

Power Systems

Isolation procedures

IBM

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Isolation procedures

IBM

Note

Before using this information and the product it supports, read the information in "Safety notices" on page vii, "Notices" on page 213, the *IBM Systems Safety Notices* manual, G229-9054, and the *IBM Environmental Notices and User Guide*, Z125-5823.

This edition applies to IBM Power Systems™ servers that contain the POWER7 processor and to all associated models.

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Contents

Safety notices	vii
Isolation procedures	1
HSL/RIO 12X isolation procedures	1
Bus, high-speed link (HSL/RIO/12X) isolation information	1
PCI bus isolation using Linux or the management console	2
Isolating a PCI bus problem while running Linux	2
Isolating a PCI bus problem from the management console	3
Verifying a high-speed link, system PCI bus, or a multi-adapter bridge repair	3
Analyzing a 12X or PCI bus reference code	5
DSA translation	6
Card positions	6
Converting the loop number to 12X port location labels	7
HSL loop configuration and status form	7
Installed features in a PCI bridge set form	8
RIO/HSL/12X link status diagnosis form	9
RIOIP01	9
Main task	9
The ports on both ends of the failed link are in different system units on the loop	10
The port on one end of the failed link is in a system unit and the port on the other end is in an I/O unit	12
The ports on both ends of the failed link are in an I/O unit	12
Cannot power on unit	14
Manually detecting the failed link	14
Refresh the port status	14
RIOIP06	15
RIOIP08	15
RIOIP09	16
RIOIP10	17
RIOIP11	18
RIOIP12	19
RIOIP56	20
Multi-adapter bridge isolation procedures	21
MABIP02	21
MABIP03	21
MABIP50	22
MABIP51	22
MABIP52	22
MABIP53	23
MABIP54	23
MABIP55	23
MABIP56	23
MABIP57	25
Intermittent isolation procedures	27
INTIP03	28
INTIP05	29
INTIP07	29
INTIP08	30
INTIP09	31
INTIP14	33
INTIP16	33
INTIP18	33
INTIP20	33
INTIP24	34
Power isolation procedures	35
Power problems	36

Cannot power on system unit	36
Cannot power off system or SPCN-controlled I/O expansion unit	39
Cannot power on SPCN-controlled I/O expansion unit.	42
PWR1900	45
PWR1905	46
Procedure for 8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	46
PWR1907	48
PWR1909	49
Procedure for 5802, 5877	49
PWR1911	52
PWR1912	54
PWR1917	56
PWR1918	58
PWR1920	59
PWR2402	60
Router isolation procedures	61
RTRIP04	61
RTRIP05	62
RTRIP06	63
Service processor isolation procedures	65
FSPSP01	65
FSPSP02	68
FSPSP03	68
FSPSP04	69
FSPSP05	69
FSPSP06	69
FSPSP07	69
FSPSP09	69
FSPSP10	70
FSPSP11	70
FSPSP12	71
FSPSP14	71
FSPSP16	72
FSPSP17	72
FSPSP18	72
FSPSP20	72
FSPSP22	72
FSPSP23	73
FSPSP24	73
FSPSP25	73
FSPSP27	74
FSPSP28	74
FSPSP29	75
FSPSP30	75
FSPSP31	75
FSPSP32	75
FSPSP33	77
FSPSP34	77
FSPSP35	78
FSPSP36	78
FSPSP38	79
FSPSP45	80
FSPSP46	80
FSPSP47	80
FSPSP48	81
FSPSP49	81
FSPSP50	82
FSPSP51	82
FSPSP52	82
FSPSP54	83
FSPSP55	83

FSPSP56	83
FSPSP58	83
FSPSP60	83
FSPSP63	84
FSPSP64	84
FSPSP65	84
FSPSP66	84
FSPSP67	84
FSPSP68	84
FSPSP70	85
FSPSP79	85
FSPSP83	85
FSPSPC1	85
FSPSPD1	87
Isolating problems on servers that run Linux	87
MAP 0210: General problem resolution	87
Problems with loading and starting the operating system (Linux)	87
SCSI service hints	90
General SCSI configuration checks.	91
High availability or multiple SCSI system checks.	91
SCSI-2 single-ended adapter PTC failure isolation procedure	91
Determining where to start	91
External SCSI-2 single-ended bus PTC isolation procedure.	92
External SCSI-2 single-ended bus probable tripped PTC causes	92
Internal SCSI-2 single-ended bus PTC isolation procedure	93
Internal SCSI-2 single-ended bus probable tripped PTC resistor causes	94
SCSI-2 differential adapter PTC failure isolation procedure	94
External SCSI-2 differential adapter bus PTC isolation procedure	95
SCSI-2 differential adapter probable tripped PTC causes	97
Dual-channel ultra SCSI adapter PTC failure isolation procedure	97
64-bit PCI-X dual channel SCSI adapter PTC failure isolation procedure	97
MAP 0020	98
MAP 0030	105
MAP 0040	106
MAP 0050	108
Preparing for hot-plug SCSI device or cable deconfiguration.	113
After hot-plug SCSI device or cable deconfiguration	114
MAP 0054	114
MAP 0070	116
MAP 0220	117
MAP 0230	122
MAP 0235	127
MAP 0260	128
MAP 0270	130
MAP 0280	134
MAP 0285	135
MAP 0291	138
MAP 4040	140
MAP 4041	140
MAP 4044	141
MAP 4047	144
MAP 4049	145
MAP 4050	145
MAP 4052	149
MAP 4053	151
MAP 4140	153
MAP 4141	154
MAP 4144	155
MAP 4147	158
MAP 4150	158
MAP 4152	162

MAP 4153	164
MAP 5000	167
MAP 5001	167
PFW1540: Problem isolation procedures	167
PFW1542: I/O problem isolation procedure	168
PFW1548: Memory and processor subsystem problem isolation procedure	182
PFW1548: Memory and processor subsystem problem isolation procedure when a management console is attached	193
PFW1548: Memory and processor subsystem problem isolation procedure without a management console attached	200
SAS fabric identification	208
SAS RAID configurations	208
Notices	213
Trademarks	214
Electronic emission notices	214
Class A Notices.	214
Class B Notices.	218
Terms and conditions.	221

Safety notices

Safety notices may be printed throughout this guide:

- **DANGER** notices call attention to a situation that is potentially lethal or extremely hazardous to people.
- **CAUTION** notices call attention to a situation that is potentially hazardous to people because of some existing condition.
- **Attention** notices call attention to the possibility of damage to a program, device, system, or data.

World Trade safety information

Several countries require the safety information contained in product publications to be presented in their national languages. If this requirement applies to your country, safety information documentation is included in the publications package (such as in printed documentation, on DVD, or as part of the product) shipped with the product. The documentation contains the safety information in your national language with references to the U.S. English source. Before using a U.S. English publication to install, operate, or service this product, you must first become familiar with the related safety information documentation. You should also refer to the safety information documentation any time you do not clearly understand any safety information in the U.S. English publications.

Replacement or additional copies of safety information documentation can be obtained by calling the IBM Hotline at 1-800-300-8751.

German safety information

Das Produkt ist nicht für den Einsatz an Bildschirmarbeitsplätzen im Sinne § 2 der Bildschirmarbeitsverordnung geeignet.

Laser safety information

IBM® servers can use I/O cards or features that are fiber-optic based and that utilize lasers or LEDs.

Laser compliance

IBM servers may be installed inside or outside of an IT equipment rack.

DANGER

When working on or around the system, observe the following precautions:

Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices.

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

DANGER

Observe the following precautions when working on or around your IT rack system:

- Heavy equipment—personal injury or equipment damage might result if mishandled.
- Always lower the leveling pads on the rack cabinet.
- Always install stabilizer brackets on the rack cabinet.
- To avoid hazardous conditions due to uneven mechanical loading, always install the heaviest devices in the bottom of the rack cabinet. Always install servers and optional devices starting from the bottom of the rack cabinet.
- Rack-mounted devices are not to be used as shelves or work spaces. Do not place objects on top of rack-mounted devices.



- Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet when directed to disconnect power during servicing.
- Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.
- An electrical outlet that is not correctly wired could place hazardous voltage on the 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.

CAUTION

- Do not install a unit in a rack where the internal rack ambient temperatures will exceed the manufacturer's recommended ambient temperature for all your rack-mounted devices.
- Do not install a unit in a rack where the air flow is compromised. Ensure that air flow is not blocked or reduced on any side, front, or back of a unit used for air flow through the unit.
- Consideration should be given to the connection of the equipment to the supply circuit so that overloading of the circuits does not compromise the supply wiring or overcurrent protection. To provide the correct power connection to a rack, refer to the rating labels located on the equipment in the rack to determine the total power requirement of the supply circuit.
- *(For sliding drawers.)* Do not pull out or install any drawer or feature if the rack stabilizer brackets are not attached to the rack. Do not pull out more than one drawer at a time. The rack might become unstable if you pull out more than one drawer at a time.
- *(For fixed drawers.)* This drawer is a fixed drawer and must not be moved for servicing unless specified by the manufacturer. Attempting to move the drawer partially or completely out of the rack might cause the rack to become unstable or cause the drawer to fall out of the rack.

(R001)

CAUTION:

Removing components from the upper positions in the rack cabinet improves rack stability during relocation. Follow these general guidelines whenever you relocate a populated rack cabinet within a room or building:

- Reduce the weight of the rack cabinet by removing equipment starting at the top of the rack cabinet. When possible, restore the rack cabinet to the configuration of the rack cabinet as you received it. If this configuration is not known, you must observe the following precautions:
 - Remove all devices in the 32U position and above.
 - Ensure that the heaviest devices are installed in the bottom of the rack cabinet.
 - Ensure that there are no empty U-levels between devices installed in the rack cabinet below the 32U level.
- If the rack cabinet you are relocating is part of a suite of rack cabinets, detach the rack cabinet from the suite.
- Inspect the route that you plan to take to eliminate potential hazards.
- Verify that the route that you choose can support the weight of the loaded rack cabinet. Refer to the documentation that comes with your rack cabinet for the weight of a loaded rack cabinet.
- Verify that all door openings are at least 760 x 230 mm (30 x 80 in.).
- Ensure that all devices, shelves, drawers, doors, and cables are secure.
- Ensure that the four leveling pads are raised to their highest position.
- Ensure that there is no stabilizer bracket installed on the rack cabinet during movement.
- Do not use a ramp inclined at more than 10 degrees.
- When the rack cabinet is in the new location, complete the following steps:
 - Lower the four leveling pads.
 - Install stabilizer brackets on the rack cabinet.
 - If you removed any devices from the rack cabinet, repopulate the rack cabinet from the lowest position to the highest position.
- If a long-distance relocation is required, restore the rack cabinet to the configuration of the rack cabinet as you received it. Pack the rack cabinet in the original packaging material, or equivalent. Also lower the leveling pads to raise the casters off of the pallet and bolt the rack cabinet to the pallet.

(R002)

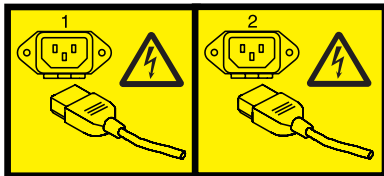
(L001)



(L002)



(L003)



or



All lasers are certified in the U.S. to conform to the requirements of DHHS 21 CFR Subchapter J for class 1 laser products. Outside the U.S., they are certified to be in compliance with IEC 60825 as a class 1 laser product. Consult the label on each part for laser certification numbers and approval information.

CAUTION:

This product might contain one or more of the following devices: CD-ROM drive, DVD-ROM drive, DVD-RAM drive, or laser module, which are Class 1 laser products. Note the following information:

- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of the controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.

(C026)

CAUTION:

Data processing environments can contain equipment transmitting on system links with laser modules that operate at greater than Class 1 power levels. For this reason, never look into the end of an optical fiber cable or open receptacle. (C027)

CAUTION:

This product contains a Class 1M laser. Do not view directly with optical instruments. (C028)

CAUTION:

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following information: laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam. (C030)

CAUTION:

The battery contains lithium. To avoid possible explosion, do not burn or charge the battery.

Do Not:

- ___ Throw or immerse into water
- ___ Heat to more than 100°C (212°F)
- ___ Repair or disassemble

Exchange only with the IBM-approved part. Recycle or discard the battery as instructed by local regulations. In the United States, IBM has a process for the collection of this battery. For information, call 1-800-426-4333. Have the IBM part number for the battery unit available when you call. (C003)

Power and cabling information for NEBS (Network Equipment-Building System) GR-1089-CORE

The following comments apply to the IBM servers that have been designated as conforming to NEBS (Network Equipment-Building System) GR-1089-CORE:

The equipment is suitable for installation in the following:

- Network telecommunications facilities
- Locations where the NEC (National Electrical Code) applies

The intrabuilding ports of this equipment are suitable for connection to intrabuilding or unexposed wiring or cabling only. The intrabuilding ports of this equipment *must not* be metallically connected to the interfaces that connect to the OSP (outside plant) or its wiring. These interfaces are designed for use as intrabuilding interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE) and require isolation from the exposed OSP cabling. The addition of primary protectors is not sufficient protection to connect these interfaces metallically to OSP wiring.

Note: All Ethernet cables must be shielded and grounded at both ends.

The ac-powered system does not require the use of an external surge protection device (SPD).

The dc-powered system employs an isolated DC return (DC-I) design. The DC battery return terminal *shall not* be connected to the chassis or frame ground.

Isolation procedures

Isolation procedures are used together with diagnostic programs, which are part of server firmware.

If a server is connected to a management console, these procedures are available on the management console. Use the management console procedures to continue isolating the problem. If the server does not have a management console and you are directed to perform an isolation procedure, the procedures documented here are needed to continue isolating a problem.

HSL/RIO 12X isolation procedures

Use RIO/HSL/12X isolation procedures if there is no a management console attached to the server. If the server is connected to a management console, use the procedures that are available on the management console to continue FRU isolation.

Bus, high-speed link (HSL/RIO/12X) isolation information

Symbolic FRUs, failing items, and bus isolation procedures use the terms partition and logical partition to indicate any single partition in a system that has multiple partitions. If the system you are working on does not have multiple partitions, then the terms refer to the primary partition.

Read all safety notices below before servicing the system and while performing a procedure.

Note: Unless instructed otherwise, always power off the system before removing, exchanging, or installing a field-replaceable unit (FRU).

DANGER

When working on or around the system, observe the following precautions:

Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices.

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

PCI bus isolation using Linux or the management console

Isolate a PCI bus problem from the management console or while running in the Linux environment.

If you have a management console, then this procedure should be performed from the management console as part of the management console directed service.

If you do not have a management console, then you should perform this procedure when directed by the maintenance package.

Isolating a PCI bus problem while running Linux

Can an IPL be run on the operating system?

- **No:** Perform "MABIP52" on page 22. **This ends the procedure.**
- **Yes:**

If you are running Linux, go to Running the online and standalone diagnostics log to isolate the PCI bus failure with stand-alone diagnostics. **This ends the procedure.**

Isolating a PCI bus problem from the management console

To isolate a PCI bus problem from the management console, check the serviceable event view for the server for FRU part locations associated with the serviceable event, then continue with this procedure:

1. Did the serviceable event view provide the locations for the failing FRUs?

Yes: Use those locations to exchange the given FRUs one at a time until the problem is resolved.
This ends the procedure.

No: Continue with the next step.

2. Go to "DSA translation" on page 6 to determine the Direct Select Address (DSA).

3. Perform the following steps:

- a. Record the bus number value (BBBB) from the DSA and convert it to decimal format.
- b. Search for the decimal system bus number in the partition resources screens on the management console.
- c. Record the frame or unit type and continue with the next step.

4. Record the Cc value from the DSA. Is the Cc value greater than 00?

Yes: Continue with the next step.

No: The multi-adapter bridge number and the multi-adapter function number have not been identified, and so the card slot cannot be identified using the DSA. Look in the management console partition resources for non-reporting or non-operational hardware. That will indicate which cards in which positions need to be replaced. See System FRU locations for the model you are working on for information about the multi-adapter bridge that controls those card slots. That multi-adapter bridge is also a FRU. **This ends the procedure.**

5. Is the right-most character (c) F?

No: Continue with the next step.

Yes: Only the multi-adapter bridge number has been identified. Record the multi-adapter bridge number (left-most character of Cc) for later use. Because the card slot cannot be identified with the DSA, see System FRU locations for the model you are working on for information about the multi-adapter bridge that controls the card slots. Consider all card slots controlled by the multi-adapter bridge to be FRUs. **This ends the procedure.**

6. See "Card positions" on page 6 and use the BBBB and Cc values that you recorded to identify the card position. Then return to the procedure that sent you here. **This ends the procedure.**

Verifying a high-speed link, system PCI bus, or a multi-adapter bridge repair

Use this procedure to verify a repair for the high-speed link, a system PCI bus, or for a multi-adapter bridge.

Within this procedure, the terms "system" and "logical partition" are interchangeable when used individually.

1. Perform this procedure from the logical partition you were in when you were sent to this procedure, or from the management console if this error was worked from the management console.
2. If you previously powered off a system or logical partition, or an expansion unit during this service action, then you need to power it off again.
3. Install all cards, cables, and hardware, ensuring that all connections are tight. You can use the system configuration list to verify that the cards are installed correctly.
4. Power on any expansion unit, logical partition or system unit that was powered off during the service action. Is one of the following true?
 - If the system or a logical partition was powered off during the service action, does the IPL complete successfully to the IPL or does Install the System display?
 - If an expansion unit was powered off during the service action, does the expansion unit power on complete successfully?

- If any IOP or IOA card locations were powered off using concurrent maintenance during the service action, do the slots power on successfully?
- If you exchanged a FRU that should appear as a resource or resources to the system, such as an IOA, or I/O bridge, does the new FRU's resource appear in HSM as operational?

Yes: Continue with the next step.

No: Verify that you have followed the power off, remove and replace, and power-on procedures correctly. When you are sure that you have followed the procedures correctly, then exchange the next FRU in the list. If there are no more FRUs to exchange, then contact your next level of support. **This ends the procedure.**

5. Does the system or logical partition have mirrored protection? Select Yes if you are not sure.

No: Continue with the next step.

Yes: From the Dedicated Service Tools (DST) display, select **Work with disk units**, and resume mirrored protection for all units that have a suspended status.

6. Choose from the following options:

- If you are working from a partition, from the Start a Service Tool display, select **Hardware service manager** and look for the I/O processors that have a failed or missing status.
- If you are working from a management console, look at the system unit properties.

a. Choose the I/O tab.

b. Look for IOAs or IOPs that have a failed or missing status.

Are all I/O processor cards operational?

Note: Ignore any IOPs that are listed with a status of not connected.

Yes: Go to step 10.

No: Display the logical hardware resource information for the non-operational I/O processors. For all I/O processors and I/O adapters that are failing; record the bus number (BBBB), board (bb) and card information (Cc). Continue with the next step.

7. Perform the following steps:

a. Return to the Dedicated Service Tools (DST) display.

b. Display the Product Activity Log.

c. Select **All logs** and search for an entry with the same bus, board, and card address information as the non-operational I/O processor. Do not include informational or statistical entries in your search. Use only entries that occurred during the last IPL.

Did you find an entry for the SRC that sent you to this procedure?

No: Continue with the next step.

Yes: Ask your next level of support for assistance. **This ends the procedure.**

8. Did you find a B600 6944 SRC that occurred during the last IPL?

Yes: Continue with the next step.

No: A different SRC is associated with the non-operational I/O processor. Go to the Start of call procedure and look up the new SRC to correct the problem. **This ends the procedure.**

9. Is there a B600 xxxx SRC that occurred during the last IPL other than the B600 6944 and informational SRCs?

Yes: Use the other B600 xxxx SRC to determine the problem. Go to the Start of call and look up the new SRC to correct the problem. **This ends the procedure.**

No: You connected an I/O processor in the wrong card position. Use the system configuration list to compare the cards. When you have corrected the configuration, go to the start of this procedure to verify the bus repair. **This ends the procedure.**

10. If in a partition, use the hardware service manager function to print the system configuration list. Are there any configuration mismatches?

No: Continue with the next step.

Yes: Ask your next level of support for assistance. **This ends the procedure.**

11. You have verified the repair of the system bus.
 - a. If for this service action only an expansion unit was powered off or only the concurrent maintenance function was used for an IOP or IOA, then continue with the next step.
 - b. Otherwise, perform the following steps to return the system to the customer:
 - 1) Power off the system or logical partition. See Powering on and powering off the system for procedures on powering on or off your system.
 - 2) Select the operating mode with which the customer was originally running.
 - 3) Power on the system or logical partition.
12. If the system has logical partitions and the entry point SRC was B600 xxxx, then check for related problems in other logical partitions that could have been caused by the failing part. **This ends the procedure.**

Analyzing a 12X or PCI bus reference code

Use Word 7 of the reference code to determine the bus number, bus type, multi-adapter bridge number, multi-adapter bridge function number, and logical card number from the direct select address (DSA).

Physical card slot labels and card positions for PCI buses are determined by using the DSA and the appropriate system unit or I/O unit card positions. See “Card positions” on page 6 for details.

Table 1. 12X and PCI reference code analysis

Word of the reference code	Control panel function	Panel function characters	Format	Description
1	11	1–8	B600 uuuu or B700 uuuu	uuuu = unit reference code (69xx)
1 – extended reference code information	11	9–16	iiii	Frame ID of the failing resource
1 – extended reference code information	11	17–24	ffff	Frame location
1 – extended reference code information	11	25–32	bbbb	Board position
2	12	1–8	MIGVEP62 or MIGVEP63	See System Reference Code (SRC) Format Description.
3	12	9–16	cccc cccc	Component reference code
4	12	17–24	pppp pppp	Programming reference code
5	12	25–32	qqqq qqqq	Program reference code high order qualifier
6	13	1–8	qqqq qqqq	Program reference code low order qualifier
7	13	9–16	BBBB Ccbb	See “DSA translation” on page 6
8	13	17–24	TTTT MMMM	Type (TTTT) and model (MMMM) of the failing item (if not zero)

Table 1. 12X and PCI reference code analysis (continued)

Word of the reference code	Control panel function	Panel function characters	Format	Description
9	13	25–32	uuuu uuuu	Unit address (if not zero)

DSA translation

The Direct Select Address (DSA) may be coded in word 7 of the reference code.

This DSA is either a PCI system bus number or a RIO/HSL/12X loop number, depending on the type of error. With the following information, and the information in either the card position table (for PCI bus numbers) or the information in the loop-number-to-NIC-port table (for RIO/HSL/12X loop numbers), you can isolate a failing PCI bus or RIO/HSL/12X loop. Use the following instructions to translate the DSA:

- Separate the DSA into the bus number, multi-adapter bridge number, and multi-adapter bridge function number. The DSA is of the form BBBB Ccxx, and separates into the following parts:
 - BBBB = bus number
 - C = multi-adapter bridge number
 - c = multi-adapter bridge function number
 - xx = not used
- Is the bus number less than 0684?

Yes: The bus number is a PCI bus number in hexadecimal. Convert the number to decimal, and then continue with the next step.

No: The bus number is a RIO/HSL/12X loop number in hexadecimal. Convert the number to decimal, and then go to step 4.
- Use one of the following guides to determine the type of system unit or expansion unit in which the bus is located:
 - If you are using a management console interface, view the managed system's properties on the management console.
 - If you are using Linux, use the command line interface to determine the enclosure type. On the command line, type the following:

```
lshwres -r io --rsubtype bus
```

The result will be in the form:

```
unit_phys_loc=Uxxxx.yyy.zzzzzz,bus_id=a,  
.....
```

Find the bus ID "a" entry that matches the decimal bus number you determined in step 2. Using the corresponding Uxxxx value, look up the unit model or enclosure type using the Unit Type and Locations table in System FRU locations.
- Perform one of the following:
 - If you are working with a PCI bus number, see "Card positions" to search for the bus number, the multi-adapter bridge number, and the multi-adapter bridge function number that matches the system unit or expansion unit type where the bus is located. **This ends the procedure.**
 - If you are working with a RIO/HSL/12X loop number, see "Converting the loop number to 12X port location labels" on page 7 to determine the starting ports for the RIO/HSL/12X loop with the failed link. **This ends the procedure.**

Card positions

The following information correlates PCI bus numbers to PCI card location codes for the listed machine types and models.

PCI bus numbers in system units are assigned as indicated in the tables below. PCI bus numbers in expansion units are assigned by Licensed Internal Code or firmware as the busses are discovered.

Table 2. Card positions for the 8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T

Bus number in DSA (hexadecimal/decimal)	Item designated by the DSA	Location
A/10	<ul style="list-style-type: none"> PCIe embedded storage I/O adapter Cache battery card Battery on cache battery card 	<ul style="list-style-type: none"> Un-P1 Un-P1-C13 Un-P1-C13-E1
B/11	PCIe embedded USB controller	Un-P1
C/12	<ul style="list-style-type: none"> RAID and cache storage controller Battery on RAID and cache storage controller 	<ul style="list-style-type: none"> Un-P1-C18 Un-P1-C18-E1
D/13	PCIe IOA card	Un-P1-C7
201/513	PCIe IOA card	Un-P1-C2
202/514	PCIe IOA card	Un-P1-C3
203/515	PCIe IOA card	Un-P1-C4
204/516	PCIe IOA card	Un-P1-C5
205/517	PCIe IOA card	Un-P1-C6

Converting the loop number to 12X port location labels

Use this table to convert the 12X loop number to port location labels.

8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T

Table 3. Converting the loop number to port location labels

Loop number (hex/dec)	FRU position	12X port labels on system unit
0780/1920	Un-P1	Internal
0782/1922	Un-P1-C8	Un-P1-C8-T1 Un-P1-C8-T2

HSL loop configuration and status form

Use this HSL loop configuration and status form to record the status of the HSL ports in the loop.

Note: You may copy this form as necessary.

HSL loop configuration and status worksheet for system _____, Loop number _____

Table 4. HSL loop configuration and status form

HSL resource information			Leading port information		Trailing port information	
Resource type	Resource name	Frame ID	Port number (or internal)	Link status (operational or failed)	Port number (or internal)	Link status (operational or failed)

RIO/HSL/12X link status diagnosis form

Use this form to record the status of the RIO/HSL/12X links.

	Column A (starting status)		Column B	Column C (column A is failed and column B is failed)	Column D	Column E (column B is failed and column D is failed)
Resource with failing link	Port info	Port status	Port status		Port status	
First	Frame ID _____	Port _0 (or internal)	Port _0 (or internal)		Port _0 (or internal)	
	Card Position _____					
	Port # _____	Port _1 (or internal)	Port _1 (or internal)		Port _1 (or internal)	
Second	Frame ID _____	Port _0 (or internal)	Port _0 (or internal)		Port _0 (or internal)	
	Card Position _____					
	Port # _____	Port _1 (or internal)	Port _1 (or internal)		Port _1 (or internal)	

RIOIP01

Use this procedure to isolate a failure in a RIO/HSL/12X loop using service tools.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

Follow the steps in the “Main task” and you will be directed to the proper subtasks.

Note: During this procedure, you will be disconnecting and reconnecting cables. If errors concerning missing resources (such as disk units and RIO/HSL/12X failures) occur, ignore them. Missing resources will report in again when the loop reinitializes.

Main task

1. Were you sent here from a B600 xxxx reference code?

No: Continue with the next step.

Yes: Use the serviceable event view and the system service documentation to search for a B700 xxxx reference code with the same last four characters reported at approximately the same time. If you find one, perform service on that reference code first, and when you close that problem, close this one as well. If you do not find one, continue with the next step.

2. Before powering down any system unit or expansion unit, work with the customer to end all subsystems in all of the partitions using each partition's console.
3. From the partition control panel, IPL the system or partition to Dedicated Service Tools (DST).
Attention: Do not use function 21.
4. Are all system and expansion units on the loop powered on?
Yes: Go to step 6.
No: Continue with the next step.
5. Perform the following steps:
 - a. Power on all system and expansion units on the loop. If a frame cannot be powered on, perform the "Cannot power on unit" on page 14 subtask below, and then continue with step 6.
 - b. Was the RIO/HSL/12X link error cleared up when the frames were powered back on?
 - **No:** Continue with the next step.
 - **Yes:** Go to Verify a repair.
This ends the procedure.
6. Perform the following steps:
 - a. Access the Service Action Log (SAL) entry for this error; the field replaceable units (FRUs) should be listed there. Look for part numbers and descriptions for the FRUs containing the RIO/HSL/12X port for two frames. There should also be a FRU for the cable between them. The locations information for the FRUs is the location of the failed ports on the failed link.
 - b. Record the loop number from the SAL (if it is displayed there in one of the FRU descriptions) or from the first four characters of word 7 of the reference code. Go to "Converting the loop number to 12X port location labels" on page 7 to determine which RIO/HSL/12X cables on the system you are working with.
Is this information in the SAL?
Yes: Continue with the next step.
No: Perform "Manually detecting the failed link" on page 14 below, and then continue with the next step of the main task.
7. Is the cable connecting the failed ports an optical cable?
No: Go to step 9.
Yes: Continue with the next step.
8. Perform the following steps:
 - a. Clean the RIO/HSL/12X cable connectors and ports using the fiber optic cleaning kit and the fiber-optic cleaning procedures in "SY27-2604 Fiber Optic Cleaning Procedures".
 - b. To determine if cleaning the connectors and ports solved the problem, perform "Manually detecting the failed link" on page 14 below and return to this point. Did the ports you were working on have a status of "failed"?
No: Then the problem is fixed, go to Verify a repair. **This ends the procedure.**
Yes: Continue with the next step.
9. There are now three cases to consider. Continue with the appropriate subtask of this procedure:
 - "The ports on both ends of the failed link are in different system units on the loop."
 - "The port on one end of the failed link is in a system unit and the port on the other end is in an I/O unit" on page 12.
 - "The ports on both ends of the failed link are in an I/O unit" on page 12.

The ports on both ends of the failed link are in different system units on the loop

1. There may be failed hardware that will report a different error on the other system units. Perform the following steps:

- a. Resolve any other RIO/HSL/12X problems in the serviceable event view on the other system units.
 - b. Perform “Manually detecting the failed link” on page 14 below and return to this point. Did the ports you were working on have a status of *“failed”*?
 - No:** Then the problem is fixed, go to Verify a repair. **This ends the procedure.**
 - Yes:** Continue with the next step.
2. Is the cable an optical RIO/HSL/12X cable?
 - Yes:** Go to step 4.
 - No:** Continue with the next step.
 3. Perform the following steps:
 - a. Verify that the cables are connected securely. For any cable that was loose, disconnect the cable at that end, wait 30 seconds, and reconnect the cable securely. If there are thumbscrews, you must tighten both thumb screws within 30 seconds of when the cable makes contact with the port.
 - b. If you disconnected and reconnected the cable at either end, perform “Manually detecting the failed link” on page 14 below and return to this point. Did the ports you were working on have a status of *“failed”*?
 - No:** Then the problem is fixed, go to Verify a repair. **This ends the procedure.**
 - Yes:** Continue with the next step.
 4. Replace the cable between the two system unit ports on the failed link. To determine if replacing the cable resolved the problem, perform “Manually detecting the failed link” on page 14 below and return to this point. Did the ports you were working on have a status of *“failed”*?
 - No:** Then the problem is fixed, go to Verify a repair. **This ends the procedure.**
 - Yes:** Continue with the next step.
 5. Exchange the FRU with the RIO/HSL/12X port in one of the system units. If you are working with a serviceable event view and the RIO/HSL/12X FRUs are listed, exchange the FRU corresponding to the first RIO/HSL/12X cable port listed. Otherwise, exchange the FRU that is quickest and easiest to replace). To determine if replacing the FRU resolved the problem, perform “Manually detecting the failed link” on page 14 below and return to this point. Did the ports you were working on have a status of *“failed”*?
 - No:** Then the problem is fixed, go to Verify a repair. **This ends the procedure.**
 - Yes:** Continue with the next step.
 6. Exchange the remaining FRU with the RIO/HSL/12X port on the other system unit. To determine if replacing the FRU resolved the problem, perform “Manually detecting the failed link” on page 14 below and return to this point. Did the ports you were working on have a status of *“failed”*?
 - No:** Then the problem is fixed, go to Verify a repair. **This ends the procedure.**
 - Yes:** Continue with the next step.
 7. Use the procedure HSL_LNK to determine if there are any additional RIO/HSL/12X cable-related FRUs, such as interposer cards and internal ribbon cables, that may be on either unit. Did you exchange any additional RIO/HSL/12X FRUs?
 - No:** Call your next level of support for further instruction. **This ends the procedure.**
 - Yes:** Continue with the next step.
 8. To determine if replacing the FRU resolved the problem, perform “Manually detecting the failed link” on page 14 below and return to this point. Did the ports you were working on have a status of *“failed”*?
 - No:** Then the problem is fixed, go to Verify a repair. **This ends the procedure.**
 - Yes:** Call your next level of support for further instruction. **This ends the procedure.**

The port on one end of the failed link is in a system unit and the port on the other end is in an I/O unit

1. Switch the two RIO/HSL/12X cables on the I/O unit with the failed port, so that each cable is connected to the port where the other cable was previously connected. Disconnect both cables at the same time, wait 30 seconds, and then reconnect the cables one at a time.
Attention: For copper cables with thumbscrews, you must fully connect the cable and tighten the connector's screws within 30 seconds of when the cable makes contact with the port. Otherwise, the link will fail and you must disconnect and reconnect again. Also, if the connector screws are not tightened, errors will occur on the link and it will fail.
2. Refresh the port status for the first failing resource by performing "Refresh the port status" on page 14 below. Then continue with the next step.
3. Is the port on the system unit that was failed now working?
No: Continue with the next step.
Yes: Exchange the RIO/HSL/12X bridge FRU in the I/O unit. Go to Verify a repair. **This ends the procedure.**
4. Switch the cables back to their original positions by disconnecting both cables at the same time, waiting 30 seconds, and then reconnecting the cables one at a time.
Attention: For copper cables with thumbscrews, you must fully connect the cable and tighten the connector's screws within 30 seconds of when the cable makes contact with the port. Otherwise, the link will fail and you must disconnect and reconnect again. Also, if the connector screws are not tightened, errors will occur on the link and it will fail.
5. Exchange the cable between the two ports on the failed link. To determine if replacing the cable resolved the problem, perform "Manually detecting the failed link" on page 14 below and return to this point. Did the ports you were working on have a status of "failed"?
No: Then the problem is fixed, go to Verify a repair. **This ends the procedure.**
Yes: Continue with the next step.
6. Use the procedure HSL_LNK to determine if there are any additional RIO/HSL/12X cable-related FRUs, such as interposer cards and internal ribbon cables, that may be on either unit. Did you exchange any additional RIO/HSL/12X FRUs?
No: Call your next level of support for further instruction. **This ends the procedure.**
Yes: Continue with the next step.
7. Exchange the RIO/HSL/12X FRU that contains the failing port in the system unit. To determine if replacing the FRU resolved the problem, perform "Manually detecting the failed link" on page 14 below and return to this point. Did the ports you were working on have a status of "failed"?
No: Then the problem is fixed, go to Verify a repair. **This ends the procedure.**
Yes: Continue with the next step.
8. To determine if replacing the FRU resolved the problem, perform "Manually detecting the failed link" on page 14 below and return to this point. Did the ports you were working on have a status of "failed"?
No: Then the problem is fixed, go to Verify a repair. **This ends the procedure.**
Yes: Call your next level of support for further instruction. **This ends the procedure.**

The ports on both ends of the failed link are in an I/O unit

1. Switch the two RIO/HSL/12X cables on the first (or "From") cable's I/O unit with the failed port so that each cable is connected to the port where the other cable was previously connected.
Attention: For copper cables with thumbscrews, you must fully connect the cable and tighten the connector's screws within 30 seconds of when the cable makes contact with the port. Otherwise, the link will fail and you must disconnect and reconnect again. Also, if the connector screws are not tightened, errors will occur on the link and it will fail.

2. Refresh the port status for the first failing resource by performing “Refresh the port status” on page 14 below. Then continue with the next step.
3. Is the port on the I/O unit on which you did not switch the cables now working?
 - No:** Go to step 5
 - Yes:** Exchange the RIO/HSL/12X I/O bridge card in the I/O unit where you just switched the cables. The continue with the next step.
4. To determine if replacing the FRU resolved the problem, perform “Manually detecting the failed link” on page 14 and return to this point. Did the ports you were working on have a status of “failed”?
 - No:** Then the problem is fixed, go to Verify a repair. **This ends the procedure.**
 - Yes:** Continue with the next step.
5. Switch the cables back to their original positions.
 - Attention:** For copper cables with thumbscrews, you must fully connect the cable and tighten the connector's screws within 30 seconds of when the cable makes contact with the port. Otherwise, the link will fail and you must disconnect and reconnect again. Also, if the connector screws are not tightened, errors will occur on the link and it will fail.
6. Switch the two RIO/HSL/12X cables on the second (or "To") I/O unit with the failed port so that each cable is connected to the port where the other cable was previously connected.
 - Attention:** For copper cables with thumbscrews, you must fully connect the cable and tighten the connector's screws within 30 seconds of when the cable makes contact with the port. Otherwise, the link will fail and you must disconnect and reconnect again. Also, if the connector screws are not tightened, errors will occur on the link and it will fail.
7. Refresh the port status for the first failing resource by performing “Refresh the port status” on page 14. Then continue with the next step.
8. Is the port on the I/O unit on which you did not switch cables now working?
 - No:** Go to step 10.
 - Yes:** Exchange the RIO/HSL/12X I/O bridge card in the I/O unit where you just switched the cables. Then continue with the next step.
9. To determine if replacing the FRU resolved the problem, perform “Manually detecting the failed link” on page 14 below and return to this point. Did the ports you were working on have a status of “failed”?
 - No:** Then the problem is fixed, go to Verify a repair. **This ends the procedure.**
 - Yes:** Continue with the next step.
10. Switch the cables back to their original positions.
 - Attention:** For copper cables with thumbscrews, you must fully connect the cable and tighten the connector's screws within 30 seconds of when the cable makes contact with the port. Otherwise, the link will fail and you must disconnect and reconnect again. Also, if the connector screws are not tightened, errors will occur on the link and it will fail.
11. Exchange the RIO/HSL/12X cable between the two ports on the failed link. To determine if replacing the cable resolved the problem, perform “Manually detecting the failed link” on page 14, then return to this point.
 - Did the ports you were working on have a status of “failed”?
 - No:** Then the problem is fixed, go to Verify a repair. **This ends the procedure.**
 - Yes:** Continue with the next step.
12. Use the procedure HSL_LNK to determine if there are any additional RIO/HSL/12X cable-related FRUs, such as interposer cards and internal ribbon cables, that may be on either unit. Did you exchange any additional RIO/HSL/12X FRUs?
 - No:** Call your next level of support for further instruction. **This ends the procedure.**
 - Yes:** Continue with the next step.

13. To determine if replacing the FRU resolved the problem, perform “Manually detecting the failed link” below and return to this point. Did the ports you were working on have a status of “failed”?
No: Then the problem is fixed, go to Verify a repair. **This ends the procedure.**
Yes: Call your next level of support for further instruction. **This ends the procedure.**

Cannot power on unit

1. Work the errors related to powering on the units, and then continue with the next step. If a unit still cannot be powered on, re-cable the RIO/HSL/12X loop without the I/O units and system units that cannot be powered on, allowing the loop to be complete (no disconnected cables).
2. To determine if re-cabling the loop resolved the problem, perform “Manually detecting the failed link” below and return to this point.

Manually detecting the failed link

1. Get the loop number from the reference code if you do not already have it. The loop number is a hexadecimal number in word 7 of the reference code.
 - If you are working from the Product Activity Log (PAL), then the loop number is the 4 leftmost characters of the DSA in word 7 (BBBB). The loop number is in hexadecimal. Convert the hexadecimal loop number to decimal format before continuing with this procedure.
 - If you are working from the Service Action Log (SAL), the loop number should be displayed in the FRU description area in decimal format.
2. Sign on to SST or DST (if you have not already done so). Select **Start a service tool > Hardware service manager > Logical hardware resources > High-speed link (HSL) resources.**
3. Select **Resources associated with loop** for the RIO/HSL/12X loop with the failed link. The RIO/HSL/12X bridges will be displayed under the loop.
4. Select **Display detail** for the loop with the failed link.
5. Record the name of the NIC/RIO controller resource you are starting from on the display. You will need to know this name to determine if you have followed the loop around and back to this resource.
6. If the leading port does not have a status of “failed”, select **Follow leading port** until a leading port with a “failed” status is found, or the display is showing information for the starting NIC/RIO resource you recorded. Did you find a leading port with a status of “failed”?
No: The loop is functioning properly. Return to the subtask that sent you here.
Yes: Record the resource name at the leading port with a “failed” status, and the type, model, and serial number for the resource with the failed status. Continue with the next step.
7. Select **Follow leading port** one more time and note all the information for the resource name with a failed trailing port.
8. Select **Display system information** and note the power controlling system's type, model, and serial number (and name, if available). This info may be needed for FRU replacement at a later time.
9. Select **Cancel** twice to return to the previous screen.
10. Go to each resource name (found above) and select **Associated packaging resources.** This gives the description of the failing item and the unit ID.
11. Select **Display detail** to find the part number and location associated with the possible failing item. Then return to the step that sent you here.

Refresh the port status

1. Wait one minute, and then sign on to SST or DST (if you have not already done so).
2. Select **Start a service tool > Hardware service manager > Logical hardware resources > High-speed link (HSL) resources.**
3. Move the cursor to the RIO/HSL/12X loop that you want to examine and select **Display detail > Include non-reporting resources.**

4. If the display is not already showing the ports for one of the units you are working on, then select **Follow leading port**. Continue to select **Follow leading port** until the display is showing the ports for one of the units you are working on. Note the status of the port you were working on. Select **Follow leading port** until the display is showing the ports for the other unit you are working on, and note the status of the port you were working on.
5. Select **Cancel > Refresh > Display detail** for the failing resource you are checking. Note any change in the status for the resource. Then return to the step that sent you here.

RIOIP06

Use HSM to examine the RIO/HSL/12X Loop to determine if other systems are connected to the loop.

1. Sign on to SST or DST (if you have not already done so).
2. Select **Start a service tool > Hardware service manager > Logical hardware resources > High-speed link (HSL) resources**.
3. Move the cursor to the RIO/HSL/12X loop that you want to examine, and select **Resources associated with loop**.
4. Search for Remote RIO/HSL/12X NICs on the loop.

Are there any Remote RIO/HSL/12X NICs on the loop?

Yes: You have determined that there **are** other systems connected to this loop. **This ends the procedure.**

No: You have determined that there are **not** any other systems connected to this loop. **This ends the procedure.**

RIOIP08

Starting with the unit ID and RIO/HSL/12X port for one end of an RIO/HSL/12X cable, determine the unit ID and port location for the other end.

1. Sign on to SST or to DST if you have not already done so.
2. Select **Start a Service Tool > Hardware Service Manager > Logical Hardware Resources > High Speed Link (HSL) Resources**.
3. Move the cursor to the RIO/HSL/12X loop that you want to examine, and select **Resources associated with loop > Include non-reporting resources**. The display that appears shows the loop resource and all the "HSL I/O Bridge" and all the "Remote HSL NIC" resources connected to the loop.
4. Perform the following for each of the HSL I/O Bridge resources listed until you are directed to do otherwise.
 - a. Move the cursor to the HSL I/O Bridge resource and select **Associated packaging resources**.
 - b. Compare the unit ID on the display with the unit ID (in hexadecimal format) that you started with.

Are the unit IDs the same?

Yes: Continue with the next step.

No: Select **Cancel** to return to the Logical Hardware Associated with HSL Loops display. Repeat this for each HSL I/O Bridge under the loop, until you are directed to do otherwise.
5. Perform the following steps:
 - a. Select **Associated logical resources**.
 - b. Move the cursor to the HSL I/O Bridge resource and select **Display detail**.
 - c. Examine the *Leading port* and *Trailing port* information. Search the display for the RIO/HSL/12X port location label that you recorded prior to starting this procedure. If the label is part of the information for the *Leading port*, then select **Follow leading port**. If the label is part of the information for the *Trailing port*, then select **Follow trailing port**.
 - d. Perform the step below that matches the function you selected in the previous step:

- If you selected **Follow leading port**, then examine the display for the *Trailing port* information. Record, on the worksheet that you are using, the RIO/HSL/12X port location label shown on the "*Trailing port from previous resource*" line. Record this information as the "*To HSL Port Label*".
 - If you selected **Follow trailing port**, then examine the display for the *Leading port* information. Record, on the worksheet that you are using, the RIO/HSL/12X port location label on the "*Leading port to next resource*" line. Record this information as the "*To HSL Port Label*".
- e. Record the "*Link type*" (Copper or Optical) on the worksheet that you are using in the field describing the cable type.
 - f. Select **Cancel > Cancel > Cancel** to return to the *Logical Hardware Associated With HSL Loops*" display.
 - g. Record the resource name on the display.
 - h. Move the cursor to the resource with the resource name you recorded in step 5g.
 - i. Select **Associated packaging resources**.
 - j. Record the unit ID.
 - k. Return to the procedure that sent you here. **This ends the procedure.**

RIOIP09

This procedure offers a description and service action for RIO/HSL/12X reference code B600 6982.

Note: A fiber-optic cleaning kit may be required for optical RIO/HSL/12X connections.

Note: This reference code can occur on an RIO/HSL/12X loop when an I/O expansion unit on the loop is powered off for a concurrent maintenance action.

1. Is the reference code in the Service Action Log (SAL) or serviceable event view you are using?
 - Yes:** There is a connection failure on an RIO/HSL/12X link. A B600 6984 reference code may also appear in the Product Activity Log (PAL) or error log view you are using. Both reference codes are reporting the same problem. Continue with the next step.
 - No:** The reference code is only informational, and requires no service action. **This ends the procedure.**
2. Multiple B600 6982 errors may occur due to retry and recovery activity. Is there a B600 6985 with "xxxx 3206" in word 4 logged after all B600 6982 errors for the same RIO/HSL/12X loop in the PAL?
 - Yes:** The recovery efforts were successful. Close all of the B600 6982 entries for the same loop in the SAL. No service is required. **This ends the procedure.**
 - No:** Continue with the next step.
3. Is there a B600 6987 reference code in the SAL, or serviceable event view you are using, logged at about the same time?
 - Yes:** Close this problem and work the B600 6987. **This ends the procedure.**
 - No:** Continue with the next step.
4. Is there a B600 6981 reference code in the SAL, or serviceable event view you are using, logged at approximately the same time?
 - Yes:** Go to step 9 on page 17.
 - No:** Continue with the next step.
5. Perform "RIOIP06" on page 15 to determine if this loop connects to any other systems and then return here.

Note: The loop number can be found in the SAL in the description for the HSL_LNK FRU.

Is this loop connected to other systems?

Yes: Continue with the next step.

No: Go to step 9 on page 17.

6. Check for RIO/HSL/12X failures in the serviceable event views on the other systems. RIO/HSL/12X failures are indicated by entries with RIO/HSL/12X I/O bridge and Network Interface Controller (NIC) resources. Ignore B600 6982 and B600 6984 entries.
Are there RIO/HSL/12X failures on other systems?
Yes: Continue with the next step.
No: Go to step 9.
7. Repair the problems on the other systems and return to this step. After making repairs on the other systems check the PAL of this system. Is there a B600 6985 reference code, with this loop's resource name, that was logged after the repairs you made on the other systems?
Yes: Continue with the next step.
No: Go to step 9.
8. For the B600 6985 reference code you found, use SIRSTAT to determine if the loop is now complete. Is the loop complete?
Yes: The problem has been resolved. Use "RIOIP01" on page 9 to verify that the loop is now working properly. **This ends the procedure.**
No: Continue with the next step.
9. The FRU list displayed in the SAL, or serviceable event view you are using, may be different from the failing item list given here. Use the FRU list in the serviceable event view if it is available.
Does the reference code appear in the serviceable event view with HSL_LNK or HSLxxxx listed as a symbolic FRU?
Yes: Perform "RIOIP01" on page 9. **This ends the procedure.**
No: Exchange the FRUs in the serviceable event view according to their part action codes. **This ends the procedure.**

RIOIP10

Use this procedure to determine if the 12X loop is complete (with both primary and redundant paths functioning for each unit on the loop).

1. Is the system managed by a management console ?
Yes: Continue with the next step
No: Go to step 3.
2. The 12X loop number found in the first 4 characters of word 7 of the SRC that sent you here is in hexadecimal. Convert this number to decimal.
Hardware Management Console (HMC): From the HMC, expand **Systems Management > Servers**. Select the server on which you are working, expand **Hardware Information**, and click **View RIO-12X Topology**. Locate the decimal loop number's information.
Systems Director Management Console (SDMC): From the SDMC, select the server on the **Resources** page. Click **Actions > Hardware Information > View Hardware Topology**. Click **Actions**, and select **Hardware Information** to view the RIO-12X topology. Locate the decimal loop number's information.
Are all links in this loop operational?
Yes: The 12X loop recovered. Return to the procedure that sent you here. **This ends the procedure.**
No: The 12X loop did not recover. Return to the procedure that sent you here. **This ends the procedure.**
3. Search in Advanced System Management Interface (ASMI) for a B700 6985 informational SRC logged after the 12X SRC you are working on. Compare the first half of word 7 in the B700 6985 informational log to the value that caused you to be sent to this procedure. Are the two values the same?
Yes: Use the informational log and SIRSTAT to determine if the loop has recovered. **This ends the procedure.**

No: The loop did not recover. Return to the procedure that sent you here. **This ends the procedure.**

RIOIP11

Use this procedure to recover from a B7xx 6982 12X failure.

1. Record the 12X loop number in the first four characters of word 7 of this SRC and perform "RIOIP10" on page 17.
2. Did the 12X loop recover?
 - No:** Continue with the next step
 - Yes:** Close the problem. **This ends the procedure.**
3. Work with the customer to determine if an I/O enclosure on the 12X loop has powered down normally.
4. Was an I/O enclosure on the loop powered down normally?
 - No:** Go to 6.
 - Yes:** The loop remains in a failed state until all I/O enclosures on the loop are powered on and functioning. Work with the customer to determine if all the powered down enclosures on the loop can be powered on. After all enclosures on the loop are powered on, continue with the next step.
5. Did the 12X loop recover?
 - No:** Continue with the next step.
 - Yes:** Close the problem. **This ends the procedure.**
6. Search for a serviceable event with a 1xxx xxxx SRC logged at approximately the same time and with one or more FRUs in the same unit as those in the FRU list for the SRC you are currently working.
7. Did you find a serviceable event with a 1xxx xxxx SRC?
 - No:** Go to 9
 - Yes:** Work to resolve the problem. After you have repaired that error, the 12X loop may be recovered. After you finish working on the problem, return to this procedure and check to determine if correcting that problem also corrected the 12X error. To determine if the 12X loop has recovered, record the 12X loop number in the first four characters of word 7 of this SRC and perform "RIOIP10" on page 17.
8. Did the 12X loop recover?
 - No:** Continue with the next step.
 - Yes:** Close the problem. **This ends the procedure.**
9. In the serviceable event view, search for a B700 6981 error logged at approximately the same time and on the same 12X loop (the first four characters of word 7 are the same).
10. Did you find a serviceable event with a B700 6981 SRC at approximately the same time and on the same 12X loop?
 - No:** Go to 14 on page 19.
 - Yes:** Work to resolve the problem. After you have repaired that error, the 12X loop may be recovered. After you finish working on the problem, return to this procedure and check to determine if correcting that problem also corrected the 12X error. To determine if the 12X loop has recovered, record the 12X loop number in the first four characters of word 7 of this SRC and perform "RIOIP10" on page 17.
11. Did the 12X loop recover?
 - No:** Continue with the next step.
 - Yes:** Close the problem. **This ends the procedure.**
12. Verify that all 12X cables in the loop are connected securely. Attach any cables which are not connected to complete the 12X loop. Did you find any 12X cables to connect?
 - No:** Go to 14 on page 19.

- Yes:** Perform “RIOIP10” on page 17.
13. Did the 12X loop recover?
No: Continue with the next step.
Yes: Close the problem. **This ends the procedure.**
14. Using the FRU list that you are working with for this SRC, exchange one FRU at a time. After you exchange each FRU, determine if the loop has recovered. To determine if the 12X loop has recovered, record the 12X loop number in the first four characters of word 7 of this SRC and perform “RIOIP10” on page 17. After the loop recovers or after you have exchanged all the FRUs, continue with the next step. To replace a FRU, see System FRU locations.
15. Did the 12X loop recover?
No: Contact your next level of support. **This ends the procedure.**
Yes: Close the problem. **This ends the procedure.**

RIOIP12

Use this procedure to recover from a B7xx 6985 12X failure.

1. Work with the customer to determine if a processor enclosure or I/O enclosure on the RIO loop has powered down normally.
2. Was a processor enclosure or I/O enclosure on the loop powered down normally?
No: Go to step 6.
Yes: The loop remains in a failed state until all processor enclosures and I/O enclosures on the loop are powered on and functioning. Work with the customer to determine if all the powered down enclosures on the loop can be powered on. After all processor enclosures and I/O enclosures on the loop are powered on, check to determine if the 12X loop is complete. To determine if the 12X loop has recovered, record the 12X loop number in the first four characters of word 7 of this SRC and perform “RIOIP10” on page 17.
3. Did the 12X loop recover?
No: Continue with the next step.
Yes: Close the problem. **This ends the procedure.**
4. Was an I/O enclosure concurrently added, and did the enclosure power on with one or both 12X links connected at approximately the same time that the permanent B7xx 6985 error was logged?
No: Go to step 6
Yes: The permanent B7xx 6985 error is expected under some circumstances when the first I/O enclosure is added to the loop concurrently. For example, if the enclosure powers on with only one link connected the error will be generated. After ensuring that both links have been connected, record the 12X loop number in the first four characters of word 7 of this SRC and then perform “RIOIP10” on page 17 to determine if the 12X loop has recovered.
5. Did the 12X loop recover?
No: Continue with the next step.
Yes: Close the problem. **This ends the procedure.**
6. In the serviceable event view, search for a serviceable event with a 1xxx xxxx SRC logged at approximately the same time and with one or more FRUs in the same enclosure as those in the FRU list for the SRC you were currently working with.
7. Did you find a serviceable event with a 1xxx xxxx SRC?
No: Go to step 9 on page 20
Yes: Work to resolve the problem. After you have repaired that error, the 12X loop may be recovered. After you finish working on the problem, return to this procedure and check to determine if correcting that problem also corrected the 12X error. To determine if the 12X loop has recovered, record the 12X loop number in the first four characters of word 7 of this SRC and perform “RIOIP10” on page 17.

8. Did the 12X loop recover?
 - No:** Continue with the next step.
 - Yes:** Close the problem. **This ends the procedure.**
9. In the serviceable event view, search for a B700 6981 or B700 6986 error logged at approximately the same time and on the same 12X loop (the first four characters of word 7 are the same).
10. Did you find a B700 6981 or a B700 6986 error logged at approximately the same time and on the same 12X loop?.
 - No:** Go to step 12.
 - Yes:** Work to resolve the problem. After you have repaired that error, the 12X loop may be recovered. After you finish working on the problem, return to this procedure and check to determine if correcting that problem also corrected the 12X error. To determine if the 12X loop has recovered, record the 12X loop number in the first four characters of word 7 of this SRC and perform "RIOIP10" on page 17.
11. Did the 12X loop recover?
 - No:** Continue with the next step.
 - Yes:** Close the problem. **This ends the procedure.**
12. Search for a processor enclosure or I/O enclosure on the 12X loop that has not powered up as expected.
13. Did you find a processor enclosure or I/O enclosure on the 12X loop that has not powered up as expected?
 - No:** Go to step 15.
 - Yes:** Go to "Cannot power on SPCN-controlled I/O expansion unit" on page 42 and work that power symptom. Use the first half of word 7 to determine the loop number for later use. After you have repaired that error, the 12X loop may be recovered. After you finish working that power symptom, return to this procedure and check to determine if correcting that problem also corrected the 12X error. To determine if the 12X loop has recovered, record the 12X loop number in the first four characters of word 7 of this SRC and perform "RIOIP10" on page 17.
14. Did the 12X loop recover?
 - No:** Continue with the next step.
 - Yes:** Close the problem. **This ends the procedure.**
15. Using the FRU list that you are working with for this SRC, exchange one FRU at a time. After you exchange each FRU, determine if the loop has recovered. To determine if the 12X loop has recovered, record the 12X loop number in the first four characters of word 7 of this SRC and perform "RIOIP10" on page 17. After the loop recovers or after you have exchanged all the FRUs, continue with the next step. To replace a FRU, see System FRU locations.
16. Did the 12X loop recover?
 - No:** Contact your next level of support. **This ends the procedure.**
 - Yes:** Close the problem. **This ends the procedure.**

RIOIP56

Use this procedure to restore the 12X link to optimal bandwidth.

1. Record the 12X loop number in the first four characters of word 7 of this SRC. The loop number is in hexadecimal format and must be converted to decimal.
2. Is the system managed by a management console?
 - Yes:** Continue with the next step.
 - No:** Go to step 6 on page 21.
3. Perform the following from the management console:

Hardware Management Console (HMC): From the HMC, expand **Systems Management > Servers**. Select the server on which you are working, expand **Hardware Information**, and click **View RIO-12X Topology**. In the Current Topology area, scroll down until you find the data for the decimal 12X loop number you identified in step 1 on page 20.

Systems Director Management Console (SDMC): From the SDMC, select the server on the **Resources** page. Click **Actions > Hardware Information > View Hardware Topology**. Click **Actions**, and select **Hardware Information** to view the RIO-12X topology. Scroll down until you find the data for the decimal 12X loop number you identified in step 1 on page 20.

Is the link width 12X?

Yes: The 12X cable connection is now operating at the optimal bandwidth. No further action is required. **This ends the procedure.**

No: Continue with the next step.

4. Unplug both ends of the cable indicated in the FRU list for at least 30 seconds and then reconnect it. Refresh the view on the management console and verify that the width is now 12X for the decimal loop number you identified in step 1 on page 20.

Is the link width 12X?

Yes: The 12X cable connection is now operating at the optimal bandwidth. No further action is required. **This ends the procedure.**

No: Continue with the next step.

5. Replace the cable. Refresh the view on the management console and verify that the width is now 12X for the decimal loop number you identified in step 1.

Is the link width 12X?

Yes: The 12X cable connection is now operating at the optimal bandwidth. No further action is required. **This ends the procedure.**

No: Continue replacing the items in the FRU list until the problem is resolved. **This ends the procedure.**

6. Unplug both ends of the cable indicated in the FRU list for at least 30 seconds and then reconnect the cable. It is not possible to concurrently verify that the 12X link has been restored to optimal bandwidth. If the same SRC occurs for this 12X link after the next IPL, the problem has not been resolved. Replace the cable and check for the error condition after the next IPL. Continue replacing the items in the FRU list, and perform an IPL the system each time until the problem has been resolved. **This ends the procedure.**

Multi-adapter bridge isolation procedures

Use multi-adapter bridge (MAB) isolation procedures if there is not a management console attached to the server. If the server is connected to a management console, use the procedures that are available on the management console to continue FRU isolation.

MABIP02

Use this procedure to resolve a problem with a multi-adapter bridge.

Perform "MABIP51" on page 22.

MABIP03

Use this procedure to isolate a failing PCI adapter under a multi-adapter bridge.

Perform "MABIP50" on page 22.

MABIP50

This isolation procedure is not supported on these models. Continue with the next failing item in the failing item list.

MABIP51

This isolation procedure is not supported on these models. Continue with the next failing item in the failing item list.

MABIP52

This procedure will isolate a failing PCI adapter from a reference code when an IPL is not successful on the system or logical partition.

Attention: Power off the partition to remove and replace any failing items referenced in this procedure. If you do not perform dedicated maintenance, the problem will persist.

1. Determine the PCI bridge set (multi-adapter bridge domain) by performing the following:
 - a. Record the bus number (BBBB), the multi-adapter bridge number (C) and the multi-adapter bridge function number (c) from the Direct Select Address (DSA) in word 7 of the reference code. See “DSA translation” on page 6 for help in determining these values.
 - b. Use the bus number that you recorded and the System Configuration Listing (or ask the customer) to determine which frame the bus is in.
 - c. Record the frame type where the bus is located.
 - d. Use the System Configuration Listing, the card position table for the frame type that you recorded, the bus number, and the multi-adapter bridge number to determine the PCI bridge set where the failure occurred. The PCI bridge set is the group of card positions controlled by the same multi-adapter bridge on the bus that you recorded.
 - e. Use the card position table to record the PCI bridge set card positions.
 - f. Examine the PCI bridge set in the frame, and record all the positions with IOA cards installed in them.
2. Perform the following steps:
 - a. Power off the partition.
 - b. Remove all the IOA cards in the PCI bridge set identified in step 1. Be sure to record the card position of each IOA so that you can reinstall it in the same position later. To determine the location of all the IOA cards in the PCI bridge set, go to System FRU locations.
 - c. Power on the partition.

Does the reference code or failure that sent you to this procedure occur?

No: Continue with the next step.

Yes: The problem is the multi-adapter bridge. Continue with step “MABIP52.”
3. Reinstall one of the IOAs and power on the partition. Does the reference code or failure that sent you to this procedure occur?

Yes: The IOA that you just installed is the failing FRU. Replace the IOA. **This ends the procedure.**

No:

 - If a different SRC occurs, return to Start of call and follow the service procedures for the new reference code. **This ends the procedure.**
 - If no SRC occurs and there are more IOAs to install, power off the partition and repeat this step.
 - If no SRC occurs and there are no more IOAs to install, the problem is intermittent; contact your next level of support. **This ends the procedure.**

4. Power off the partition. Determine which FRU contains the multi-adapter bridge. Locate the card position table for the frame type that you recorded. Perform the following steps:
 - a. Using the multi-adapter bridge number that you recorded, search for the multi-adapter bridge function number "F" in the card position table to determine the card position of the multi-adapter bridge's FRU.
 - b. Exchange the multi-adapter bridge's FRU at the card position that you determined for it. See System FRU locations to determine the correct card location for removal.
 - c. Install all IOAs in their original positions.
 - d. Power on the partition.

Does the reference code or failure that sent you to this procedure occur?

No: Go to Verify a repair. **This ends the procedure.**

Yes: Call your next level of support. **This ends the procedure.**

MABIP53

Use this procedure to determine a card position when no location is given for a PCI adapter FRU.

Go to "PCI bus isolation using Linux or the management console" on page 2 to isolate a PCI bus problem from a Linux partition or a management console.

MABIP54

Use this procedure to isolate the failing PCI I/O adapter card from a reference code with a Direct Select Address when the serviceable event view does not indicate a location for the PCI card.

Go to "PCI bus isolation using Linux or the management console" on page 2 to isolate a PCI bus problem from a Linux partition or a management console.

MABIP55

Use this procedure to isolate a failing I/O adapter.

Go to "PCI bus isolation using Linux or the management console" on page 2 to isolate a PCI bus problem from a Linux partition or a management console.

MABIP56

Use this procedure to isolate a problem with a PCI Express (PCIe) storage enclosure, a PCIe cable, or an enclosure RAID module (ERM).

The following procedure can be used to locate and isolate problems with PCIe storage enclosures, PCIe cables, and enclosure RAID modules only if there is a location code of the form $Un-Px-Cy-Tz-L1$ in the serviceable event view for this problem. If a location code of the form $Un-Px-Cy-Tz-L1$ is not in the serviceable event view, contact your next level of support. If you already performed this procedure, return to the procedure that sent you here.

1. Is a location code of the form $Un-Px-Cy-Tz-L1$ available in the serviceable event view for a field-replacement unit (FRU) associated with the reference code you are working on?

Yes: Continue with the next step.

No: Contact your next level of support. **This ends the procedure.**

2. Determine the location of the PCIe connector on the system unit by removing the -L1 from the location code. The resulting location code has the form $Un-Px-Cy-Tz$. The PCIe connector location is listed in the part location topic for the machine type and model number of the system unit. See Part locations and location codes. Activate the identify indicator using the PCIe connector location code. See Identifying a part.

Were you able to determine the location of the PCIe connector?

Yes: Continue with the next step.

No: Contact your next level of support. **This ends the procedure.**

3. Is a PCIe cable securely connected to the PCIe connector identified in the previous step?

Yes: Continue with the next step.

No: Reconnect the PCIe cable to the connector. If you are not sure which PCIe cable to connect to the connector, work with the customer to determine which PCIe storage enclosure and PCIe cable to connect to the connector. Record that you reconnected the system unit end of the PCIe cable. Continue with the next step.

4. Use one of the following methods to locate the ERM at the other end of the PCIe cable:

- Using the serviceable event view, find ADJ_PHY symbolic FRU in the failing item list for this problem. The location associated with this FRU is the physical location of the ERM.
- If your system firmware level is Ax760 or later, use the ASMI to find the location of the ERM. On the ASMI, use the **System Configuration** menu to access the PCIe Hardware Topology. Locate the entry for the PCIe connector you identified in step 2 in the **Host Port** column. The location code of the ERM can be found using the I/O enclosure port location in the corresponding row and removing the Tx label.
- With the system powered on, activate the identify indicator of the FRU with location code *Un-Px-Cy-Tz-L1*. Locate the ERM. Using Part locations and location codes for this PCIe storage enclosure, determine the location code of the ERM you have identified.
- Using functions in the operating system of the logical partition that owns the ERM, determine the location code of the ERM connected to the PCIe cable.
- Trace the PCIe cable to find the location of the enclosure RAID module. If it is not possible to trace the PCIe cable, record the PCIe cable serial number where the cable is attached to the system unit. Examine the PCIe cables at all other PCIe storage enclosures that are connected to the system unit. Match the serial number of the PCIe cable where it is attached to the ERM of the PCIe storage enclosure to the serial number you recorded. Using Part locations and location codes for this PCIe storage enclosure, determine the location code of the ERM you have identified.

5. Were you able to determine the location of the enclosure RAID module?

Yes: Continue with the next step.

No: Contact your next level of support. **This ends the procedure.**

6. Is the PCIe cable securely connected to the enclosure RAID module identified in the previous step?

Yes: Continue with the next step.

No: Reconnect the PCIe cable to the enclosure RAID module. Record that you reconnected the enclosure RAID module end of the PCIe cable. Continue with the next step.

7. Ensure that the PCIe storage enclosure does not have any power problems by performing the following steps:

- a. Verify that the power cables are securely connected to the PCIe storage enclosure.
- b. Resolve any power errors reported by the logical partition that owns the enclosure RAID module.
- c. Ensure that the LEDs are set as follows:
 - The ac and dc power supply LEDs (green) are on solid.
 - The enclosure RAID module powered on LED (green) is on solid.

Was there a power problem with the PCIe storage enclosure?

Yes: Resolve the power problem. If additional assistance is needed, contact your next level of support. After resolving the problem, record that you restored power to the PCIe storage enclosure and continue with the next step.

No: Continue with the next step.

8. Is the enclosure RAID module securely installed and latched into place?

Yes: Continue with the next step.

No: Remove and reinstall the enclosure RAID module, ensuring that it is securely latched into place. See Removing and installing an ERM assembly. Record that you reinstalled the enclosure RAID module and continue with the next step.

9. Did you reconnect a PCIe cable or restore power to the PCIe storage enclosure during this procedure?

Yes: Continue with the next step.

No: Remove and install the ERM assembly and continue with the next step.

For an EDR1 PCIe storage enclosure, complete the steps mentioned in Removing and installing an ERM assembly for an EDR1 PCIe storage enclosure.

10. Is the PCIe storage enclosure feature code EDR1?

Yes: If the system is already powered off, power it on. If the system is not already powered off, you can either power off the system and then power on the system or use concurrent maintenance procedures. Perform Removing and installing a PCIe cable for an EDR1 PCIe storage enclosure with the power on, but do not physically replace the cable. Then continue with the next step.

No: If the system is not already powered off, power off the system and then power on the system. Continue to the next step.

11. Record whether the problem was resolved or not and return to the procedure that sent you here. **This ends the procedure.**

MABIP57

Use this procedure to determine which I/O slot location codes are associated with a known I/O controller location code.

1. Use the following table to determine the I/O controller type used by your system.

Table 6. I/O controller to I/O slot location code mapping

Type and model	I/O controller type	I/O controller location codes	I/O slot location codes
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Embedded I/O hub on system backplane	Un-P1	Un-P1-T9
8246-L2S, 8246-L2T	GX++ 12X adapter	Un-P1-C8	Expansion unit I/O slots
8246-L2S, 8246-L2T	GX++ PCIe adapter	<ul style="list-style-type: none">Un-P1-C1Un-P1-C8	<ul style="list-style-type: none">Un-P1-C1-T1-L1Un-P1-C8-T1-L1

2. Is the I/O controller type an embedded I/O hub, a PCIe expansion riser, or a GX++ PCIe adapter?

Yes: The I/O slot location codes associated with this I/O controller are listed in Table 6. **This ends the procedure.**

No: Continue with the next step.

3. Is the I/O controller type a GX++ 12X adapter?

Yes: The I/O controller might have expansion units attached. Continue with the next step.

No: The I/O slot location codes associated with the I/O controller cannot be determined. **This ends the procedure.**

4. Is the system managed by a management console?

Yes: Continue with the next step.

No: The I/O slot location codes associated with the I/O controller cannot be determined. **This ends the procedure.**

5. Determine whether any expansion units are associated with the I/O controller by using the management console.

Hardware Management Console (HMC): From the HMC, expand **Systems Management > Servers**. Select the server on which you are working, expand **Hardware Information**, and click **View Hardware Topology**.

Systems Director Management Console (SDMC): From the SDMC, select the server on the **Resources** page. Click **Actions > Hardware Information > View Hardware Topology**.

Find the location code of the I/O controller in the Leading Port Location Code column. Are any expansion units listed under the I/O controller?

Yes: The occupied slots of each expansion unit listed are under the I/O controller. **This ends the procedure.**

No: No additional I/O slot location codes are associated with the I/O controller. **This ends the procedure.**

Intermittent isolation procedures

These procedures help you to correct an intermittent problem.

DANGER

When working on or around the system, observe the following precautions:

Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices.

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

Use these procedures to correct an intermittent problem, if other problem analysis steps or tables sent you here. Only perform the procedures that apply to your system.

Read all safety procedures before servicing the system. Observe all safety procedures when performing a procedure. Unless instructed otherwise, always power off the system or expansion unit where the FRU is located. See Powering on and powering off the system before removing, exchanging, or installing a field-replaceable unit (FRU).

Use the procedure below to identify intermittent problems and the associated corrective actions.

INTIP03

Use this procedure to isolate problems with external noise on AC voltage lines.

DANGER

When working on or around the system, observe the following precautions:

Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices.

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

Electrical noise on incoming ac voltage lines can cause various system failures. The most common source of electrical noise is lightning.

1. Ask the customer if an electrical storm was occurring at the time of the failure to determine if lightning could have caused the failure.

Could lightning have caused the failure?

No: Go to step 3 on page 29.

Yes: Continue with the next step.

2. Determine if lightning protection devices are installed on the incoming ac voltage lines where they enter the building. There must be a dedicated ground wire from the lightning protection devices to earth ground.

Are lightning protection devices installed?

Yes: Continue with the next step.

No: Lightning may have caused the intermittent problem. Recommend that the customer install lightning protection devices to prevent this problem from recurring. **This ends the procedure.**

3. Have an installation planning representative perform the following steps:
 - a. Connect a recording ac voltage monitor to the incoming ac voltage lines of the units that contain the failing devices with reference to ground.
 - b. Set the voltage monitor to start recording at a voltage slightly higher than the normal incoming ac voltage.

Does the system fail again with the same symptoms?

No: This ends the procedure.

Yes: Continue with the next step.

4. Look at the recording and see if the voltage monitor recorded any noise when the failure occurred. Did the monitor record any noise when the failure occurred?

Yes: Review with the customer what was happening external to the system when the failure occurred. This may help you to determine the source of the noise. Discuss with the customer what to do to remove the noise or to prevent it from affecting the server. **This ends the procedure.**

No: Perform the next intermittent isolation procedure listed in the *Isolation procedure* column. **This ends the procedure.**

INTIP05

Use this procedure to isolate problems with external noise on twinaxial cables.

Electrical noise on twinaxial cables that are not installed correctly may affect the twinaxial workstation I/O processor card.

Examples of this include open shields on twinaxial cables, and station protectors that are not being installed where necessary.

Check for the following on the system:

- There must be no more than 11 connector breaks in a twinaxial cable run.
- Station protectors must be installed (in pairs) where a cable enters or leaves a building.
- There can only be two station protectors for each twinaxial run.
- There is a maximum of seven devices (with addresses 0-6) for each cable run.
- There is a maximum cable length of 1524 meters (5000 feet) for each port.
- All cable runs must be ended (terminated).
- Disconnect all twinaxial cables that are not used.
- Remove any cause of electrical noise in the twinaxial cables.
- All workstations must be grounded.

This ends the procedure.

INTIP07

Use this procedure to lessen the effects of electrical noise (electromagnetic interference, or EMI) on the system.

1. Ensure that air flow cards are installed in all adapter card slots that are not used.
2. Keep all cables away from sources of electrical interference, such as ac voltage lines, fluorescent lights, arc welding equipment, and radio frequency (RF) induction heaters. These sources of electrical noise can cause the system to become powered off.
3. If you have an expansion unit, ensure that the cables that attach the system unit to the expansion unit are seated correctly.

Note: If the failures occur when people are close to the system or machines that are attached to the system, the problem may be electrostatic discharge (ESD).

4. Have an **installation planning representative** use a radio frequency (RF) field intensity meter to determine if there is an unusual amount of RF noise near the server. You also can use it to help determine the source of the noise. **This ends the procedure.**

INTIP08

Use this procedure to ensure that the system is electrically grounded correctly.

1. Have an **installation planning representative** or an electrician (when necessary), perform the following steps.
2. Power off the server and the power network branch circuits before performing this procedure.
3. Ensure the safety of personnel by making sure that all electrical wiring in the United States meets National Electrical Code requirements.
4. Check *all* system receptacles to ensure that each one is wired correctly. This includes receptacles for the server and all equipment that attaches to the server, including workstations. Do this to determine if a wire with primary voltage on it is swapped with the ground wire, causing an electrical shock hazard.
5. For each unit, check continuity from a conductive area on the frame to the ground pin on the plug. Do this at the end of the mainline ac power cable. The resistance must be 0.1 ohm or less.
6. Ground continuity must be present from each unit receptacle to an effective ground. Therefore, check the following:
 - The ac voltage receptacle for each unit must have a ground wire connected from the ground terminal on the receptacle to the ground bar in the power panel.
 - The ground bars in all branch circuit panels must be connected with an insulated ground wire to a **ground point**, that is defined as follows:
 - The nearest available metal cold water pipe, only if the pipe is effectively grounded to the earth (see *National Electric Code* Section 250-81, in the United States).
 - The nearest available steel beams in the building structure, only if the beam is effectively grounded to the earth.
 - Steel bars in the base of the building or a metal ground ring that is around the building under the surface of the earth.
 - A ground rod in the earth (see *National Electric Code* Section 250-83, in the United States).

Note: For installations in the United States only, by National Electrical Code standard, if more than one of the preceding grounding methods are used, they must be connected together electrically. See *National Electric Code* Section 250, for more information about grounding.

- The grounds of all separately derived sources (uninterruptable power supply, service entrance transformer, system power module, motor generator) must be connected to a **ground point** as defined above.
- The service entrance ground bar must connect to a **ground point** as defined above.
- All ground connections **must be tight**.
- Check continuity of the ground path for each unit that is using an ECOS tester, Model 1023-100. Check continuity at each unit receptacle, and measure to the **ground point** as defined above. The total resistance of each ground path must be 1.0 ohm or less. If you cannot meet this requirement, check for faults in the ground path.
- Conduit is sometimes used to meet wiring code requirements. If conduit is used, the branch circuits must still have a green (or green and yellow) wire for grounding as stated above.

Note: The ground bar and the neutral bar must never be connected together in branch circuit power panels.

The ground bar and the neutral bar in the power panels that make up the electrical power network for the server must be connected together. This applies to the first electrically isolating unit that is found in the path of electrical wiring from the server to the service entrance power panel. This isolating unit is sometimes referred to as a **separately derived source**. It can be an uninterruptable power supply, the system power module for the system, or the service entrance transformer. If the building has none of the above isolating units, the ground bar and the neutral bar must be connected together in the service entrance power panel.

7. Look inside all power panels to ensure the following:
 - There is a separate ground wire for each unit.
 - The green (or green and yellow) ground wires are connected only to the ground bar.
 - The ground bar inside each power panel is connected to the frame of the panel.
 - The neutral wires are connected only to the neutral bar.
 - The ground bar and the neutral bar are not connected together, except as stated in step 6 on page 30.
8. For systems with more than one unit, ensure that the ground wire for each unit is not connected from one receptacle to the next in a string. Each unit must have its own ground wire, which goes to the power source.
9. Ensure that the grounding wires are insulated with green (or green and yellow) wire at least equal in size to the phase wires. The grounding wires also should be as short as possible.
10. If extension-mainline power cables or multiple-outlet power strips are used, make sure that they must have a three-wire cable. One of the wires must be a ground conductor. The ground connector on the plug must not be removed. This applies to any extension mainline power cables or multiple-outlet power strips that are used on the server. It also applies for attaching devices such as personal computers, workstations, and modems.

Note: Check all extension-mainline power cables and multiple-outlet power strips with an ECOS tester and with power that is applied. Ensure that no wires are crossed (for example, a ground wire crossed with a wire that has voltage on it).

This ends the procedure.

INTIP09

Use this procedure to check the AC electrical power for the system.

1. Have an **installation planning representative** or an electrician (when necessary), perform the following steps.
2. Power off the server and the power network branch circuits before performing this procedure.
3. To ensure the safety of personnel, all electrical wiring in the United States must meet National Electrical Code requirements.
4. Check all system receptacles to ensure that each is wired correctly. This includes receptacles for the server and all equipment that attaches to the server, including workstations. Do this to determine if a wire with primary voltage on it has been swapped with the ground wire, causing an electrical shock hazard.
5. When three-phase voltage is used to provide power to the server, correct balancing of the load on each phase is important. The units should be connected so that all three phases are used equally.
6. The power distribution neutral must return to the "separately derived source" (uninterruptable power supply, service entrance transformer, system power module, motor generator) through an insulated wire that is the same size as the phase wire or larger.
7. The server and its attached equipment should be the only units that are connected to the power distribution network that the server gets its power.
8. The equipment that is attached to the server, such as workstations and printers, must be attached to the power distribution network for the server when possible.
9. Check all circuit breakers in the network that supply ac power to the server as follows:

- Ensure that the circuit breakers are installed tightly in the power panel and are not loose.
 - Feel the front surface of each circuit breaker to detect if it is warm. A warm circuit breaker may be caused by:
 - The circuit breaker that is not installed tightly in the power panel.
 - The contacts on the circuit breaker that is not making a good electrical connection with the contacts in the power panel.
 - A defective circuit breaker.
 - A circuit breaker of a smaller current rating than the current load which is going through it.
 - Devices on the branch circuit which are using more current than their rating.
10. Equipment that uses a large amount of current, such as: Air conditioners, copiers, and FAX machines, should not receive power from the same branch circuits as the system or its workstations. Also, the wiring that provides ac voltage for this equipment should not be placed in the same conduit as the ac voltage wiring for the server. The reason for this is that this equipment generates ac noise pulses. These pulses can get into the ac voltage for the server and cause intermittent problems.
11. Measure the ac voltage to each unit to ensure that it is in the normal range.
- Is the voltage outside the normal range?
- No:** Continue with the next step.
- Yes:** Contact the customer to have the voltage source returned to within the normal voltage range.
12. *The remainder of this procedure is only for a server that is attached to a separately derived source.* Some examples of separately derived sources are an uninterruptable power supply, a motor generator, a service entrance transformer, and a system power module. The ac voltage system must meet all the requirements that are stated in this procedure and also all of the following:

Notes:

- a. The following applies to an uninterruptable power supply, but it can be used for any separately derived source.
- b. System upgrades **must not** exceed the power requirements of your derived source.

The uninterruptable power supply must be able to supply the peak repetitive current that is used by the system and the devices that attach to it. The uninterruptable power supply can be used over its maximum capacity if it has a low peak repetitive current specification, and the uninterruptable power supply is already fully loaded. Therefore, a de-rating factor for the uninterruptable power supply must be calculated to allow for the peak-repetitive current of the complete system. To help you determine the de-rating factor for an uninterruptable power supply, use the following:

Note: The peak-repetitive current is different from the "surge" current that occurs when the server is powered on.

The de-rating factor equals the crest factor multiplied by the RMS load current divided by the peak load current where the:

- Crest factor is the peak-repetitive current rating of the uninterruptable power supply that is divided by the RMS current rating of the uninterruptable power supply. If you do not know the crest factor of the uninterruptable power supply, assume that it is 1.414.
- RMS load current is the steady state RMS current of the server as determined by the power profile.
- Peak load current is the steady state peak current of the server as determined by the power profile.

For example, if the de-rating factor of the uninterruptable power supply is calculated to be 0.707, then the uninterruptable power supply must not be used more than 70.7% of its kVA-rated

capacity. If the kVA rating of the uninterruptable power supply is 50 kVA, then the maximum allowable load on it is 35.35 kVA (50 kVA multiplied by 0.707).

When a three-phase separately derived source is used, correct balancing of the load as specified in step 5 on page 31 is *critical*. If the load on any one phase of an uninterruptable power supply is more than the load on the other phases, the voltage on all phases may be reduced.

13. If the system is attached to an uninterruptable power supply or motor generator, then check for the following:
 - The system and the attached equipment should be the only items that are attached to the uninterruptable power supply or motor generator. Equipment such as air conditioners, copiers, and FAX machines should not be attached to the same uninterruptable power supply, or motor generator that the system is attached.
 - The system unit console and the Electronic Customer Support modem must get ac voltage from the same uninterruptable power supply or motor generator to which the system is attached. **This ends the procedure.**

INTIP14

Use this procedure to isolate problems with station protectors.

Station protectors must be installed on all twinaxial cables that leave the building in which the server is located. This applies even if the cables go underground, through a tunnel, through a covered outside hallway, or through a skyway. Station protectors help prevent electrical noise on these cables from affecting the server.

1. Look at the Product Activity Log to determine what workstations are associated with the failure.
2. Determine if station protectors are installed on the twinaxial cables to the failing workstations.

Are station protectors installed on the twinaxial cables to the failing workstations?

Yes: Perform the next intermittent isolation procedure listed in the *Isolation procedure* column. **This ends the procedure.**

No: You may need to install station protectors on the twinaxial cables to the failing workstations. **This ends the procedure.**

INTIP16

Use this procedure when you need to copy a main storage dump to give to your next level of support.

For some problems, performing a dump of main storage helps to analyze the problem. The data on the dump is analyzed by support personnel to determine the cause of the problem and how to correct it.

1. Copy the main storage dump to tape. See Copying a dump.
2. Ask your next level of support to determine for assistance. **This ends the procedure.**

INTIP18

Use this procedure to determine if one or more PTFs are available to correct this specific problem.

1. Ensure that all PTFs that relate to the problem have been installed.

Note: Ensure that the latest platform LIC fix has been installed before you exchange a service processor.

2. Contact your next level of support for more information. **This ends the procedure.**

INTIP20

Use this procedure to analyze system performance problems.

1. Look in the Product Activity Log, ASM log, or management console to determine if any hardware errors occurred at the same time that the performance problem occurred. Did any hardware problems occur at the same time that the performance problem occurred?

Yes: Perform problem analysis and correct the hardware errors. **This ends the procedure.**

No: The performance problems are not related to hardware. Continue with the next step.

2. Perform the following steps:
 - a. Ask the customer if they have asked software support for any software PTFs that relate to this problem.
 - b. Recommend that the customer install a cumulative PTF package if they have not done so in the past three months.
 - c. Inform the customer that performance could possibly be improved by having Software Support analyze the conditions.
 - d. Inform the customer that your service provider has performance tools. Contact Software Support for more information. **This ends the procedure.**

INTIP24

Use this procedure to collect data when the service processor reports a suspected intermittent problem.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

It is important that you collect data for this problem so that the problem can be corrected. Use this procedure to collect the data.

There are several ways the system can display the SRC. Follow the instructions for the correct display method, defined as follows:

- If this SRC is displayed in the Product Activity Log or ASM log, then record all of the SRC data words, save all of the error log data, and contact your next level of support to submit an APAR.
- If the control panel is displaying SRC data words scrolling automatically through control panel functions 11, 12 and 13, and the control panel user interface buttons are not responding, then perform "FSPSP02" on page 68 instead of using this procedure.
- If the SRC is displayed at the control panel, and the control panel user interface buttons respond normally, then record all of the SRC words.

Do not perform an IPL until you perform a storage dump of the service processor. To get a storage dump of the service processor, perform the following steps:

1. Record the complete system reference code (SRC) (functions 11 through 20).
2. Perform a service processor dump. See Performing dumps.
3. Is a display shown on the console?
 - **Yes:** Continue with the next step.
 - **No:** The problem is not intermittent. Choose from the following options:
 - If you were sent here from another procedure, return there and follow the procedure for a problem that is not intermittent.
 - If the problem continues, replace the service processor hardware. **This ends the procedure.**
4. The problem is intermittent. Copy the IOP dump to tape. See Performing dumps.
5. Complete the IPL.
6. Determine if there are available program temporary fixes (PTFs) for this problem.
7. If a PTF is found, apply the PTF. Then, return here and answer the following question.
Did you find and apply a PTF for this problem?

- **Yes: This ends the procedure.**
 - **No:** Record the following information, and contact your next level of support.
 - The complete SRC you recorded in this procedure
 - The service processor dump to tape you obtained in step 4 on page 34.
 - All known system symptoms:
 - How often the intermittent problem occurs
 - System environment (IPL, certain applications)
 - If necessary, other SRCs that you suspect relate to the problem
 - Information needed to write an LICTR. **This ends the procedure.**
-

Power isolation procedures

Use power isolation procedures for isolating a problem in the power system. Use isolation procedures if there is not a management console attached to the server. If the server is connected to a management console, use the procedures that are available on the management console to continue FRU isolation.

Some field replaceable units (FRUs) can be replaced with the unit powered on. Follow the instructions in System FRU locations when directed to remove, exchange, or install a FRU.

The following safety notices apply throughout the power isolation procedures. Read all safety procedures before servicing the system and observe all safety procedures when performing a procedure.

DANGER

When working on or around the system, observe the following precautions:

Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices.

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

Power problems

Use the following table to learn how to begin analyzing a power problem.

Table 7. Analyzing power problems

Symptom	What you should do
System unit does not power on.	See "Cannot power on system unit."
The processor or I/O expansion unit does not power off.	See "Cannot power off system or SPCN-controlled I/O expansion unit" on page 39.
The system does not remain powered on during a loss of incoming ac voltage and has an uninterruptible power supply (UPS) installed.	See the UPS user's guide that was provided with your unit.
An I/O expansion unit does not power on.	See "Cannot power on SPCN-controlled I/O expansion unit" on page 42.

Cannot power on system unit

Perform this procedure until you correct the problem and you can power on the system.

For important safety information before continuing with this procedure, see “Power isolation procedures” on page 35.

1. Attempt to power on the system. See Powering on and powering off the system for information about powering on or off your system. Does the system power on, and is the system power status indicator light on continuously?

Note: The system power status indicator flashes at the slower rate (one flash per two seconds) while powered off, and at the faster rate (one flash per second) during a normal power-on sequence.

No: Continue with the next step.

Yes: Go to step 13 on page 39.

2. Are there any characters displayed on the control panel (a scrolling dot may be visible as a character)?

No: Continue with the next step.

Yes: Go to step 5.

3. Are the mainline ac power cables from the power supply, power distribution unit, or external uninterruptible power supply (UPS) to the customer's ac power outlet connected and seated correctly at both ends?

Yes: Continue with the next step.

No: Connect the mainline ac power cables correctly at both ends and go to step 1.

4. Perform the following steps:

- a. Verify that the UPS is powered on (if it is installed). If the UPS will not power on, follow the service procedures for the UPS to ensure proper line voltage and UPS operation.
- b. Disconnect the mainline ac power cable or ac power jumper cable from the system's ac power connector at the system.
- c. Use a multimeter to measure the ac voltage at the system end of the mainline ac power cable or ac power jumper cable.

Note: Some system models have more than one mainline ac power cable or ac power jumper cable. For these models, disconnect all the mainline ac power cables or ac power jumper cables and measure the ac voltage at each cable before continuing with the next step.

Is the ac voltage from 200 V ac to 240 V ac, or from 100 V ac to 127 V ac?

No: Go to step 8 on page 38.

Yes: Continue with the next step.

5. Perform the following steps:

- a. Disconnect the mainline ac power cables from the power outlet.
- b. Exchange the system unit control panel (Un-D1). See System FRU locations.
- c. Reconnect the mainline ac power cables to the power outlet.
- d. Attempt to power on the system.

Does the system power on?

No: Continue with the next step.

Yes: The system unit control panel was the failing item. **This ends the procedure.**

6. Perform the following steps:

- a. Disconnect the mainline ac power cables from the power outlet.
- b. Exchange the power supply or supplies (Un-E1, Un-E2). See System FRU locations.
- c. Reconnect the mainline ac power cables to the power outlet.
- d. Attempt to power on the system. See Powering on and powering off the system.

Does the system power on?

No: Continue with the next step.

Yes: The power supply was the failing item. **This ends the procedure.**

7. Perform the following steps:

- a. Disconnect the mainline ac power cables.
- b. Replace the system backplane (Un-P1). See System FRU locations.
- c. Reconnect the mainline ac power cables to the power outlet.
- d. Attempt to power on the system.

Does the system power on?

No: Continue with the next step.

Yes: The system backplane was the failing item. **This ends the procedure.**

8. Are you working with a system unit with a power distribution unit with tripped breakers?

- **No:** Continue with the next step.
- **Yes:** Perform the following steps:
 - a. Reset the tripped power distribution breaker.
 - b. Verify that the removable ac power cable is not the problem. Replace the cord if it is defective.
 - c. If the breaker continues to trip, install a new power supply in each location until the defective one is found. **This ends the procedure.**

9. Does the system have an external UPS installed?

Yes: Continue with the next step.

No: Go to step 11.

10. Use a multimeter to measure the ac voltage at the external UPS outlets. Is the ac voltage from 200 V ac to 240 V or from 100 V ac to 127 V ac?

No: The UPS needs service. For 9910 type UPS, call IBM Service Support. For all other UPS types, have the customer call the UPS provider. In the meantime, go to step 12 to bypass the UPS.

Yes: Replace the ac power cable. See System parts for FRU part number. **This ends the procedure.**

11. Perform the following steps:

- a. Disconnect the mainline ac power cable from the customer's ac power outlet.
- b. Use a multimeter to measure the ac voltage at the customer's ac power outlet.

Note: Some system models have more than one mainline ac power cable. For these models, disconnect all the mainline ac power cables and measure the ac voltage at all ac power outlets before continuing with this step.

Is the ac voltage from 200 V ac to 240 V ac or from 100 V ac to 127 V ac?

Yes: Exchange the mainline ac power cable. See System parts for the FRU part number. Then go to step 1 on page 37.

No: Inform the customer that the ac voltage at the power outlet is not correct. When the ac voltage at the power outlet is correct, reconnect the mainline ac power cables to the power outlet. **This ends the procedure.**

12. Perform the following steps to bypass the UPS unit:

- a. Power off your system and the UPS unit.
- b. Remove the signal cable used between the UPS and the system.
- c. Remove any power jumper cords used between the UPS and the attached devices.
- d. Remove the country or region-specific power cord used from the UPS to the wall outlet.
- e. Use the correct power cord (the original country or region-specific power cord that was provided with your system) and connect it to the power inlet on the system. Plug the other end of this cord into a compatible wall outlet.
- f. Attempt to power on the system.

Does the power-on standby sequence complete successfully?

Yes: Go to Verify a repair. **This ends the procedure.**

No: Go to step 5 on page 37.

13. Display the selected IPL mode on the system unit control panel. Is the selected mode the same mode that the customer was using when the power-on failure occurred?

No: Go to step 15.

Yes: Continue with the next step.

14. Is a function 11 reference code displayed on the system unit control panel?

No: Go to step 16.

Yes: Return to Start of call. **This ends the procedure.**

15. Perform the following steps:

- a. Power off the system. See Powering on and powering off the system for information about powering on and off your system.
- b. Select the mode on the system unit control panel that the customer was using when the power-on failure occurred.
- c. Attempt to power on the system.

Does the system power on?

Yes: Continue with the next step.

No: Exchange the system unit control panel (Un-D1). See System FRU locations. **This ends the procedure.**

16. Continue the IPL. Does the IPL complete successfully?

Yes: **This ends the procedure.**

No: Return to Start of call. **This ends the procedure.**

Cannot power off system or SPCN-controlled I/O expansion unit

Use this procedure to analyze a failure of the normal command and control panel procedures to power off the system unit or an SPCN-controlled I/O expansion unit.

Attention: To prevent loss of data, ask the customer to verify that no interactive jobs are running before you perform this procedure.

For important safety information before continuing with this procedure, see “Power isolation procedures” on page 35.

1. Is the power off problem on the system unit?

No: Continue with the next step.

Yes: Go to step 3.

2. Ensure that the SPCN cables that connect the units are connected and seated correctly at both ends. Does the I/O unit power off, and is the power indicator light flashing slowly?

Yes: **This ends the procedure.**

No: Go to step 7 on page 40.

3. Attempt to power off the system. Does the system unit power off, and is the power indicator light flashing slowly?

No: Continue with the next step.

Yes: The system is not responding to normal power off procedures which could indicate a Licensed Internal Code problem. Contact your next level of support. **This ends the procedure.**

4. Attempt to power off the system using ASMI. Does the system power off?

Yes: The system is not responding to normal power off procedures which could indicate a Licensed Internal Code problem. Contact your next level of support. **This ends the procedure.**

No: Continue with the next step.

5. Attempt to power off the system using the control panel power button. Does the system power off?
Yes: Continue with the next step.
No: Go to step 10.
6. Is there a reference code logged in the ASMI, the control panel, or the management console that indicates a power problem?
Yes: Perform problem analysis for the reference code in the log. **This ends the procedure.**
No: Contact your next level of support. **This ends the procedure.**
7. Is the I/O expansion unit that will not power off part of a shared expansion unit loop?
Yes: Go to step 9.
No: Continue with the next step.
8. Attempt to power off the I/O expansion unit. Were you able to power off the expansion unit?
Yes: This ends the procedure.
No: Go to step 10.
9. The unit will only power off under certain conditions:
 - If the unit is in private mode, it should power off with the system unit that is connected by the SPCN frame-to-frame cable.
 - If the unit is in switchable mode, it should power off if the "owning" system is powered off or is powering off, and the system unit that is connected by the SPCN frame-to-frame cable is powered off or is powering off.
 Does the I/O expansion unit power off?
No: Continue with the next step.
Yes: This ends the procedure.
10. Ensure there are no jobs running on the system or partition, and verify that an uninterruptible power supply (UPS) is not powering the system or I/O expansion unit. Then continue with the next step.
11. Perform the following steps:
 - a. Remove the system or I/O expansion unit ac power cord from the external UPS or, if an external UPS is not installed, from the customer's ac power outlet. If the system or I/O expansion unit has more than one ac line cord, disconnect all the ac line cords.
 - b. Exchange the following FRUs one at a time. See System FRU locations and System parts for information about FRU locations and parts for the system that you are servicing.
 - If the system unit is failing:
 - 1) Power supply (Un-E1 or Un-E2). Go to step 12.
 - 2) Exchange the service processor (Un-P1).
 - 3) System control panel (Un-D1)
 - If an I/O expansion unit is failing:
 - 1) Each power supply. Go to step 12.
 - 2) I/O backplane
 - 3) I/O backplane for the expansion unit that is sequentially configured before the expansion unit that will not power off
 - 4) SPCN frame-to-frame cable**This ends the procedure.**
12. A power supply might be the failing item.

Attention: When replacing a redundant power supply, a 1xxx1504, 1xxx1514, 1xxx1524, or 1xxx1534 reference code may be logged in the error log. If you just removed and replaced the power supply in the location associated with this reference code, and the power supply came ready after the install, disregard this reference code. If you had not previously removed and replaced a power supply, the power supply did not come ready after installation, or there are repeated fan fault errors after the power supply replacement, continue to follow these steps.

Is the reference code 1xxx15xx?

No: Continue with the next step.

Yes: Perform the following steps:

- a. Find the unit reference code in one of the following tables to determine the failing power supply.
- b. Ensure that the power cables are properly connected and seated.
- c. Is the reference code 1xxx1500, 1xxx1510, 1xxx1520, or 1xxx1530 and is the failing unit configured with a redundant power supply option (or dual line cord feature)?
 - **Yes:** Perform “PWR1911” on page 52 before replacing parts.
 - **No:** Continue with step 12d.
- d. See System FRU locations for information about FRU locations for the system that you are servicing.
- e. Replace the failing power supply (see the following tables to determine which power supply to replace).
- f. If the new power supply does not fix the problem, perform the following :
 - 1) Reinstall the original power supply.
 - 2) Try the new power supply in each of the other positions listed in the table.
 - 3) If the problem still is not fixed, reinstall the original power supply and go to the next FRU in the list.
 - 4) For reference codes 1xxx1500, 1xxx1510, 1xxx1520, and 1xxx1530, exchange the power distribution backplane if a problem persists after replacing the power supply.

Table 8. System unit

Unit reference code	Power supply
1510, 1511, 1512, 1513, 1514, 7110	E1
1520, 1521, 1522, 1523, 1524, 7120	E2

Attention: For reference codes 1500, 1510, 1520, and 1530, perform “PWR1911” on page 52 before replacing parts.

This ends the procedure.

13. Is the reference code 1xxx2600, 1xxx2603, 1xxx2605, or 1xxx2606?
 - **No:** Continue with the next step.
 - **Yes:** Perform the following steps:
 - a. See System FRU locations for information about FRU locations for the system you are servicing.
 - b. Replace the failing power supply.
 - c. Perform the following if the new power supply does not fix the problem:
 - 1) Reinstall the original power supply.
 - 2) Try the new power supply in each of the other positions listed in the table.
 - 3) If the problem still is not fixed, reinstall the original power supply and go to the next FRU in the list.

Attention: Do not install power supplies P00 and P01 ac jumper cables on the same ac input module.

Table 9. Failing power supplies

System or feature code	Failing power supply
7314-G30	E1, E2

This ends the procedure.

14. Is the reference code 1xxx8455 or 1xxx8456?

- **No:** Return to Start of call. **This ends the procedure.**
- **Yes:** One of the power supplies is missing, and must be installed. Use the following table to determine which power supply is missing, and install the power supply. See System FRU locations for information about FRU locations for the system you are servicing.

Table 10. Missing power supplies

Reference code	Missing power supply
1xxx8455	Un-E1
1xxx8456	Un-E2

This ends the procedure.

Cannot power on SPCN-controlled I/O expansion unit

You are here because an SPCN-controlled I/O expansion unit cannot be powered on, and might be displaying a 1xxxC62E reference code.

For important safety information before continuing with this procedure, see “Power isolation procedures” on page 35.

1. Power on the system.
2. Start from SPCN 0 or SPCN 1 on the system unit. See System FRU locations, then go to the first unit in the SPCN frame-to-frame cable sequence that does not power on. Is the Data display background light on, or is the power-on LED flashing, or are there any characters displayed on the I/O expansion unit display panel?

Note: The background light is a dim yellow light in the Data area of the display panel.

Yes: Go to step 12 on page 44.

No: Continue with the next step.

3. Use a multimeter to measure the ac voltage at the customer's ac power outlet.

Is the ac voltage from 200 V ac to 240 V ac, or from 100 V ac to 127 V ac?

- **Yes:** Continue with the next step.
- **No:** Inform the customer that the ac voltage at the power outlet is not correct.

This ends the procedure.

4. Is the mainline ac power cable from the ac module, power supply, or power distribution unit to the customer's ac power outlet connected and seated correctly at both ends?

- **Yes:** Continue with the next step.
- **No:** Connect the mainline ac power cable correctly at both ends.

This ends the procedure.

5. Perform the following steps:

- a. Disconnect the mainline ac power cable from the ac module, power supply, or power distribution unit.
- b. Use a multimeter to measure the ac voltage at the ac module, power supply, or power distribution unit end of the mainline ac power cable.

Is the ac voltage from 200 V ac to 240 V ac, or from 100 V ac to 127 V ac?

No: Continue with the next step.

Yes: Go to step 7.

6. Are you working on a power distribution unit with tripped breakers?

- **No:** Replace the mainline ac power cable or power distribution unit.

This ends the procedure.

- **Yes:** Perform the following steps:

- a. Reset the tripped power distribution breaker.
- b. Verify that the removable ac line cord is not the problem. Replace the cord if it is defective.
- c. Install a new power supply (one with the same part number as the one that is currently installed) in all power locations until the defective one is found.

This ends the procedure.

7. Does the unit you are working on have ac power jumper cables installed?

Note: The ac power jumper cables connect from the ac module, or the power distribution unit, to the power supplies.

Yes: Continue with the next step.

No: Go to step 11 on page 44.

8. Are the ac power jumper cables connected and seated correctly at both ends?

- **Yes:** Continue with the next step.
- **No:** Connect the ac power jumper cables correctly at both ends.

This ends the procedure.

9. Perform the following steps:

- a. Disconnect the ac power jumper cables from the ac module or power distribution unit.
- b. Use a multimeter to measure the ac voltage at the ac module or power distribution unit (that goes to the power supplies).

Is the ac voltage at the ac module or power distribution unit from 200 V ac to 240 V ac, or from 100 V ac to 127 V ac?

- **Yes:** Continue with the next step.
- **No:** Replace the following items (see System parts for location and part number information):
 - ac module
 - Power distribution unit

This ends the procedure.

10. Perform the following steps:

- a. Connect the ac power jumper cables to the ac module, or power distribution unit.
- b. Disconnect the ac power jumper cable at the power supplies.
- c. Use a multimeter to measure the voltage input that the power jumper cables provide to the power supplies.

Is the voltage 200 V ac to 240 V ac or 100 V ac to 127 V ac for each power jumper cable?

- **No:** Exchange the power jumper cable.
- **Yes:** Replace the following parts one at a time:

- a. I/O backplane
- b. Display unit
- c. Power supply 1
- d. Power supply 2
- e. Power supply 3

This ends the procedure.

11. Perform the following steps:
 - a. Disconnect the mainline ac power cable (to the expansion unit) from the customer's ac power outlet.
 - b. Exchange the following FRUs, one at a time:
 - Power supply
 - I/O backplane
 - c. Reconnect the mainline ac power cables (from the expansion unit) into the power outlet.
 - d. Attempt to power on the system.

Does the expansion unit power on?

- **Yes:** The unit you exchanged was the failing item.

This ends the procedure.

- **No:** Repeat this step and exchange the next FRU in the list. If you have exchanged all of the FRUs in the list, ask your next level of support for assistance.

This ends the procedure.

12. Is there a reference code displayed on the display panel for the I/O unit that does not power on?

- **Yes:** Continue with the next step.
- **No:** Replace the I/O backplane.

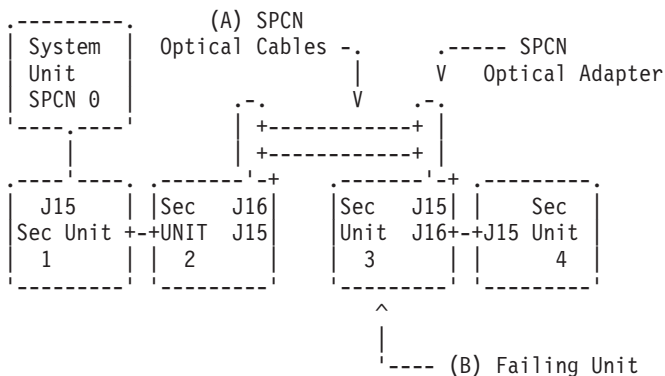
This ends the procedure.

13. Is the reference code 1xxxxx2E?

- **Yes:** Continue with the next step.
- **No:** Use the new reference code and return to Start of call.

This ends the procedure.

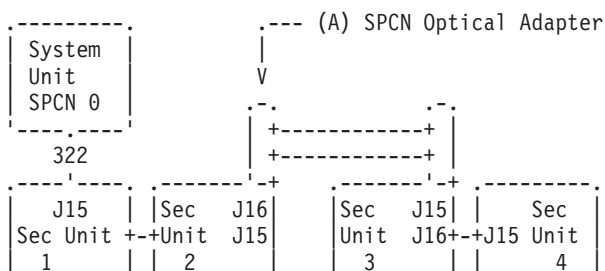
14. Do the SPCN optical cables (A) connect the failing unit (B) to the preceding unit in the chain or loop?

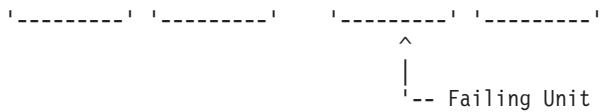


Yes: Continue with the next step.

No: Go to step 17 on page 45.

15. Remove the SPCN optical adapter (A) from the frame that precedes the frame that cannot become powered on.





16. Perform the following steps:

Notes:

- a. The cable may be connected to either J15 or J16.
- b. Use an insulated probe or jumper when performing the voltage readings.
 - a. Connect the negative lead of a multimeter to the system frame ground.
 - b. Connect the positive lead of a multimeter to pin 2 of the connector from which you removed the SPCN optical adapter in the previous step of this procedure.
 - c. Note the voltage reading on pin 2.
 - d. Move the positive lead of the multimeter to pin 3 of the connector or SPCN card.
 - e. Note the voltage reading on pin 3.

Is the voltage on both pin 2 and pin 3 from 1.5 V dc to 5.5 V dc?

- **Yes:** Continue with the next step.
- **No:** Exchange the I/O backplane.

This ends the procedure.

17. Perform the following steps:

- a. Power off the system.
- b. Disconnect the SPCN frame-to-frame cable from the connector of the first unit that cannot be powered on.
- c. Connect the negative lead of a multimeter to the system frame ground.
- d. Connect the positive lead of the multimeter to pin 2 of the SPCN cable.

Note: Use an insulated probe or jumper when performing the voltage readings.

- e. Note the voltage reading on pin 2.
- f. Move the positive lead of the multimeter to pin 3 of the SPCN cable.
- g. Note the voltage reading on pin 3.

18. Perform the following steps:

- a. Follow the SPCN frame-to-frame cable back to the preceding unit in the string.
- b. Disconnect the SPCN cable from the connector.
- c. Connect the negative lead of a multimeter to the system frame ground.
- d. Connect the positive lead of a multimeter to pin 2 of the connector.

Note: Use an insulated probe or jumper when performing the voltage readings.

- e. Note the voltage reading on pin 2.
- f. Move the positive lead of the multimeter to pin 3 of the connector.
- g. Note the voltage reading on pin 3.

This ends the procedure.

PWR1900

Determine which procedure to use based on the model number.

Follow the instructions for the model or expansion unit you are servicing.

Perform isolation procedure "PWR1905" on page 46 when servicing an 8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T system unit.

Perform isolation procedure “PWR1909” on page 49 when servicing a 5802, 5877 expansion unit.

This ends the procedure.

PWR1905

A system unit power supply load fault is occurring.

See “Power isolation procedures” on page 35 for important safety information before servicing the system.

Procedure for 8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T

1. Is the reference code 1xxx 1B01?

Yes: Continue with the next step.

No: This procedure only isolates problems that cause 1xxx 1B01 to be logged. Return to the procedure that sent you here. **This ends the procedure.**

2. Perform the following steps:

- a. Power off the system and disconnect the ac power cable from the unit you are working on. See Powering on and powering off the system.
- b. Disconnect all the I/O devices (tape, diskette, optical, and disk units) by sliding them partially out of the system unit. See System FRU locations for information about system FRU parts, locations and addresses.
- c. Remove and label all cards (for example, PCI adapters, GX adapters, RIO/HSL, and RAID cards if installed).
- d. Reconnect the ac power cable or cables to the unit you are working on.
- e. Power on the system. See Powering on and powering off the system for information about powering on or off your system.

Does a power reference code occur?

Yes: Continue with the next step.

No: Go to step 5.

3. Perform the following steps:

- a. Power off the system. See Powering on and powering off the system.
- b. Replace one of the system fans. See System FRU locations Finding parts, locations, and addresses for information about system fan locations for the system you are servicing.
- c. Power on the system. See Powering on and powering off the system for information about powering on or off your system.

Does a power reference code occur?

Yes: Continue with the next step.

No: The fan you just replaced was the failing item. **This ends the procedure.**

4. Have you tried replacing all the fans?

- **Yes:** Reinstall the fan you just replaced in step 3 and continue with the next step.
- **No:** Perform the following steps:
 - a. Power off the system.
 - b. Reinstall the fan that you just removed in step 3 to its original location.
 - c. Repeat step 3.

5. Perform the following steps:

- a. Power off the system.
- b. Reinstall all the cards (PCI adapters, memory DIMMs, GX adapters, RIO/HSL and RAID cards) you removed in step 2 into their original locations.

- c. Power on the system. See Powering on and powering off the system.
Does a power reference code occur?
Yes: Continue with the next step.
No: Go to step 8.
6. Perform the following steps:
 - a. Power off the system. See Powering on and powering off the system.
 - b. Disconnect one of the cards you reinstalled in step 5 on page 46.
 - c. Power on the system. See Powering on and powering off the system.Does a power reference code occur?
Yes: Continue with the next step.
No: Exchange the last card you disconnected in this step. See System FRU locations for information about FRU locations for the system you are servicing. **This ends the procedure.**
7. Have you disconnected all the cards?
No: Repeat step 6.
Yes: Reinstall all of the parts removed or exchanged in this procedure and return to Start of call.
This ends the procedure.
8. Perform the following steps:
 - a. Power off the system. See Powering on and powering off the system.
 - b. Reconnect all of the I/O devices (tape, diskette, optical, and disk units) that you disconnected in step 2 on page 46.
 - c. Power on the system. See Powering on and powering off the system.Does a power reference code occur?
Yes: Continue with the next step.
No: The problem has been resolved. **This ends the procedure.**
9. Perform the following steps:
 - a. Power off the system. See Powering on and powering off the system.
 - b. Disconnect one of the I/O devices (tape, diskette, optical, and disk units) that you reconnected in step 8.
 - c. Power on the system. See Powering on and powering off the system.Does a power reference code occur?
Yes: Continue with the next step.
No: Exchange the last I/O device you disconnected in this step. See System FRU locations for information about the I/O device location for the system you are servicing. **This ends the procedure.**
10. Have you tried disconnecting all of the I/O devices?
No: Repeat step 9.
Yes: Continue with the next step.
11. Replace the system backplane (Un-P1). Reinstall all of the parts you have removed or exchanged in this procedure.
Does a power reference code occur?
Yes: Continue with the next step.
No: The system is fixed. **This ends the procedure.**
12. Does the system contain only one power supply?
Yes: Continue with the next step.
No: Go to step 14 on page 48.
13. Replace the power supply.

Does a power reference code occur?

Yes: Contact your service support. **This ends the procedure.**

No: The system is fixed. **This ends the procedure.**

14. Power off the system. Remove one of the power supplies, and then power on the system. See Powering on and powering off the system.

Does a power reference code occur?

Yes: Continue with the next step.

No: The power supply you just removed is defective. Replace it. **This ends the procedure.**

15. Power off the system. Reinstall the power supply that was removed in step 14, and remove the other power supply. Power on the system. See Powering on and powering off the system.

Does a power reference code occur?

Yes: Continue with the next step.

No: The power supply you just removed is defective. Replace it. **This ends the procedure.**

16. Power off the system. Replace both power supplies. Power on the system.

Does a power reference code occur?

Yes: Contact your service support. **This ends the procedure.**

No: The system is fixed. **This ends the procedure.**

PWR1907

A unit was dropped from the SPCN configuration.

1. Is the reference code you are working with 1xxx 913B?

- **No:** Continue with the next step.

- **Yes:** A system power control network (SPCN) firmware update is needed, but not started due to the SPCN firmware update policy setting. A manual update needs to be started.

Notes:

- Do not perform maintenance on an expansion unit or modify the SPCN network while the SPCN firmware update is being performed.
 - Performing firmware updates or powering off the system will interrupt SPCN firmware updates and the firmware update will need to be started again after these actions.
- a. Access the Advanced System Management Interface (ASMI) and select **System Configuration** and then **Configure I/O Enclosures**.
 - b. Record the current SPCN firmware update policy setting so it can be restored later.
 - c. Change the SPCN firmware update policy setting to expanded and click **Save Policy Setting** to allow for SPCN firmware updates to be done over the RIO/HSL and serial SPCN interfaces.
 - d. Select **Start SPCN Firmware Update**. The SPCN firmware will now be downloaded to the expansion units that require an update.
 - e. Change the SPCN firmware update policy setting back to what it was originally set to in step 1b and click on **Save Policy Setting**.

Note: The SPCN firmware update can be stopped using the Stop SPCN Firmware Update button. However, the firmware update must be allowed to complete in order for the expansion units to be updated to the latest SPCN firmware level.

The progress of the SPCN firmware update can be monitored by clicking on **Configure I/O Enclosures** to update the screen. Do not use the browser **Back** or **Refresh** button to monitor the update progress. The Power Control Network Firmware Update Status column shows the percentage complete and In Progress is displayed while the download is progresses. Not Required is displayed when the download process completes.

This ends the procedure.

2. Is the reference code you are working with 1xxx 90F0?
 - **No:** Contact your next level of support.
 - **Yes:** A unit was dropped from the SPCN configuration.
This can be caused by any of the following:
 - The rack or unit has lost all ac or dc power.
 - The SPCN function in the unit has an error.
 - The SPCN frame-to-frame cable cable has failed.
3. Using the HMC or ASMI, find the 1xxx 90F0 SRC in the error log (see Displaying error and event logs). Use the option **Show details** to display the location information for the failing unit.
4. After locating the failing unit, ensure that the SPCN cable is seated correctly. Reseat the SPCN cable, if necessary.
Is the cable connected correctly?
 - **No:** Correctly reconnect the SPCN cable, or replace them if necessary. **This ends the procedure.**
 - **Yes:** Continue with the next step.
5. Are the ac line cords on the failing unit connected properly at both ends?
 - **No:** Reconnect the ac line cords, or replace them if necessary. **This ends the procedure.**
 - **Yes:** Continue with the next step.
6. Check the voltage at the customer's ac outlet. Is the voltage correct?
 - **No:** Inform the customer that the voltage at the ac power outlet is incorrect. **This ends the procedure.**
 - **Yes:** Continue with the next step.
7. Are the power supplies functional?
 - **No:** Perform the following steps:
 - a. See System FRU locations to determine the location and part number for each power supply, and to find the appropriate procedure for exchanging the power supplies.
 - b. Replace each power supply one at a time, until the problem has been resolved.
 - c. If the problem persists after replacing all of the power supplies, continue with the next step.
 - **Yes:** Continue with the next step.
8. Use the following table to determine the FRUs to replace. See System FRU locations for instructions on replacing FRUs. **This ends the procedure.**

Table 11. Expansion enclosures FRUs

Enclosure	FRU
5802, 5877	EMC card, Un-P2

PWR1909

A power supply load fault is occurring in a system expansion unit or expansion unit.

For important safety information before servicing the system, see “Power isolation procedures” on page 35.

Procedure for 5802, 5877

See System FRU locations for information about FRU locations.

1. Perform the following steps:
 - a. Power off the system.

- b. Disconnect all the I/O devices (tape, diskette, optical, and disk units) from the expansion unit or expansion unit you are working on by sliding them partially out of the unit. See System FRU locations for information about FRU location and removal.
- c. Remove and label all cards installed in the PCI adapters area.
- d. Power on the system. See Powering on and powering off the system.

Does a power reference code occur?

Yes: Continue with the next step.

No: Go to step 8 on page 51.

2. Perform the following steps:

- a. Power off the system. See Powering on and powering off the system.
- b. Remove one of the fans from the expansion unit or I/O expansion unit that you have not previously removed during this procedure.

Note: If a fan reference code occurs during this step, ignore it.

c. Power on the system. See Powering on and powering off the system.

Does a power reference code occur?

- **Yes:** Continue with the next step.
- **No:** The fan you removed in this step is the failing item.

This ends the procedure.

3. Have you removed all of the fans one at a time?

- **No:** Perform the following steps:
 - a. Power off the system. See Powering on and powering off the system.
 - b. Reinstall the fan that you removed in step 2 into its original location.
 - c. Repeat step 2.
- **Yes:** Reinstall all of the fans and continue with the next step.

4. Perform the following steps:

Note: If there are no DASD installed in this enclosure, go to step 6.

- a. Power off the system. See Powering on and powering off the system.
- b. Remove the expansion unit power supply cable, at the DASD backplane, that you have not previously removed.
- c. Power on the system. See Powering on and powering off the system.

Does a power reference code occur?

- **No:** The DASD backplane that was disconnected in this step is the failing item.

This ends the procedure.

- **Yes:** Continue with the next step.

5. Have you disconnected the power cables from each of the DASD backplanes one at a time?

Yes: Continue with the next step.

No: Repeat step 4.

6. Perform the following steps:

- a. Power off the system. See Powering on and powering off the system.
- b. Remove a power supply that you have not previously removed, and replace it with a new one.
- c. Power on the system. See Powering on and powering off the system.

Does a power reference code occur?

- **Yes:** Continue with the next step.
- **No:** The power supply that was removed in this step is the failing item.

This ends the procedure.

7. Have you removed all of the power supplies one at a time?
 - **Yes:** Perform the following steps:
 - a. Remove the new power supply that you installed in step 6 on page 50 and reinstall the original power supply.
 - b. Replace the I/O backplane if you are working on a 5802, 5877.

This ends the procedure.

- **No:** Remove the new power supply that you installed in step 6 on page 50 and reinstall the original power supply. Then, repeat step 6 on page 50.
8. Perform the following steps:
 - a. Power off the system. See Powering on and powering off the system.
 - b. Reinstall all of the cards you removed in step 1 on page 49.
 - c. Power on the system. See Powering on and powering off the system.

Does a power reference code occur?

Yes: Continue with the next step.

No: Go to step 11.

9. Perform the following steps:
 - a. Power off the system. See Powering on and powering off the system.
 - b. Disconnect one of the cards you reconnected in step 8.
 - c. Power on the system. See Powering on and powering off the system.

Does a power reference code occur?

• **Yes:** Continue with the next step.

• **No:** Exchange the last card you disconnected in this step. See System FRU locations for information about the FRU location for the system that you are servicing. Reinstall all the parts.

This ends the procedure.

10. Have you disconnected all the cards?
 - **No:** Repeat step 9.
 - **Yes:** Reinstall all the parts and return to Start of call.

This ends the procedure.

11. Perform the following steps:
 - a. Power off the system.
 - b. Reconnect all of the I/O devices (tape, diskette, optical, or disk units) that you disconnected in step 1 on page 49.
 - c. Power on the system.

Does a power reference code occur?

Yes: Continue with the next step.

No: **This ends the procedure.**

12. Perform the following steps:
 - a. Power off the system.
 - b. Disconnect one of the I/O devices you reconnected in step 11.
 - c. Power on the system.

Does a power reference code occur?

• **Yes:** Continue with the next step.

• **No:** Exchange the last I/O device you disconnected in this step.

This ends the procedure.

13. Have you disconnected all of the I/O devices?

- **No:** Repeat step 12 on page 51.
- **Yes:** Reinstall all the parts and return to Start of call.

This ends the procedure.

PWR1911

You are here because of a power problem on a dual line cord system. If the failing unit does not have a dual line cord, return to the procedure that sent you here or go to the next item in the FRU list.

The following steps are for the system unit, unless other instructions are given. For important safety information before servicing the system, see "Power isolation procedures" on page 35.

1. If an uninterruptible power supply is installed, verify that it is powered on before proceeding.
2. Are all the units powered on?
 - **Yes:** Go to step 7 on page 53.
 - **No:** On the unit that does not power on, perform the following steps:
 - a. Disconnect the ac line cords from the unit that does not power on.
 - b. Use a multimeter to measure the ac voltage at the system end of both ac line cords.

Table 12. Correct ac voltage

Model or expansion unit	Correct ac voltage
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	100 - 127 V or 200 - 240 V
5802 expansion unit	90 - 259 V

- c. Is the voltage correct (see Table 12)?

Yes: Continue with the next step.

No: Go to step 6 on page 53.

3. Are you working on an 8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T system, or a 5802 or 5877 expansion unit?
 - **No:** Continue with the next step.
 - **Yes:** Perform the following steps:
 - a. Reconnect the ac line cords.
 - b. Verify that the failing unit fails to power on.
 - c. Replace the failing power supply. Use the table below to determine which power supply needs replacing, and then see System FRU locations for its location, part number, and exchange procedure.

Table 13. Failing power supply for systems models and expansion units

Reference code	System or expansion unit	Failing item name
1510	System unit	Power supply 1
	Expansion unit	Power supply 1
1520	System unit	Power supply 2
	Expansion unit	Power supply 2

This ends the procedure.

4. Perform the following steps:
 - a. Reconnect the ac line cord to the ac modules.
 - b. Remove the ac jumper cables at the power supplies.
 - c. Use a multimeter to measure the ac voltage at the power-supply end of the jumper cable.

Is the ac voltage from 200 V to 240 V?

- **No:** Continue with the next step.
- **Yes:** Replace the failing power supply. See System FRU locations for its location, part number, and exchange procedure.

Attention: Do not install power supplies P00 and P01 ac jumper cables on the same ac module.

This ends the procedure.

5. Perform the following steps:

- Disconnect the ac jumper cable at the ac module output.
- Use a multimeter to measure the ac voltage at the ac module output.

Is the ac voltage from 200 V to 240 V?

- **Yes:** Exchange the ac jumper cable.

This ends the procedure.

- **No:** Exchange the ac module. See System FRU locations for FRU location information for the system that you are servicing.

This ends the procedure.

6. Perform the following steps:

- Disconnect the ac line cords from the customer's ac power outlet.
- Use a multimeter to measure the ac voltage at the customer's ac power outlet.

Is the ac voltage correct (see Table 12 on page 52)?

- **Yes:** Exchange the failing ac line cord.

This ends the procedure.

- **No:** Perform the following steps:

- Inform the customer that the ac voltage at the power outlet is not correct.
- Reconnect the ac line cords to the power outlet after the ac voltage at the power outlet is correct.

This ends the procedure.

7. Is the reference code 1xxx00AC?

- **No:** Continue with the next step.
- **Yes:** This reference code may have been caused by an ac outage. If the system will power on without an error, no parts need to be replaced.

This ends the procedure.

8. Is the reference code 1xxx1510 or 1520?

- **No:** Continue with the next step.
- **Yes:** Perform the following steps:
 - Use the following table, figures and location codes to locate the failing parts. See System FRU locations for information about FRU location for the system that you are servicing.

Table 14. Power reference code table

System or expansion unit	Reference code	Locate these parts
System unit	1xxx 1510	Power supply E1 and ac line cord 1
	1xxx 1520	Power supply E2 and ac line cord 2
Expansion unit	1xxx 1510	Power supply 1 and ac line cord 1
	1xxx 1520	Power supply 2 and ac line cord 2

- Locate the ac line cord or the ac jumper cable for the reference code you are working on.
- Go to step 10 on page 54.

9. Is the reference code 1xxx 1500 or 1xxx 1530?

- **No:** Perform Problem Analysis using the reference code.
This ends the procedure.
- **Yes:** Locate the ac jumper cables for the reference code you are working on (see Table 14 on page 53), and then continue with the next step:
 - If the reference code is 1xxx 1500, determine the locations of ac jumper cables that connect to power supply P00 (see the preceding figures).
 - If the reference code is 1xxx 1530, determine the locations of ac jumper cables that connect to power supply P03 (see the preceding figures).

10. Perform the following steps:

Attention: Do not disconnect the other system line cord or the other ac jumper cable when powered on.

- For the reference code you are working on, disconnect either the ac jumper cable or the ac line cord from the power supply.
- Use a multimeter to measure the ac voltage at the power supply end of the ac jumper cable **or** the ac line cord.

Is the ac voltage correct (see Table 12 on page 52)?

No: Continue with the next step.

Yes: Exchange the failing power supply. See Table 13 on page 52 for its position, and then see System FRU locations for part numbers and directions to the correct exchange procedures. **This ends the procedure.**

11. Perform the following steps:

- Disconnect the ac line cords from the power outlet.
- Use a multimeter to measure the ac voltage at the customer's ac power outlet.

Is the ac voltage correct (see Table 12 on page 52)?

- **Yes:** Exchange the following, one at a time:
 - Failing ac line cord
 - Failing ac jumper cable (if installed)
 - Failing ac module (if installed) (see System FRU locations for part numbers and directions to the correct exchange procedures)

This ends the procedure.

- **No:** Perform the following steps:

- Inform the customer that the ac voltage at the power outlet is not correct.
- Reconnect the ac line cords to the power outlet after the ac voltage at the power outlet is correct.

This ends the procedure.

PWR1912

The server detected an error in the power system.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

DANGER

When working on or around the system, observe the following precautions:

Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices.

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

1. Perform the following steps:
 - a. Ensure that both power line cords are properly connected.
 - b. Make sure that the unit EPO switch is in the *on* position.
 - c. Make sure that the unit EPO bypass switches on both bulk power controllers (BPCs) are in the *normal* position.
 - d. Ensure that the cable from unit EPO connector J00 to BPC-A connector J05 and the cable from unit EPO connector J01 to BPC-B connector J05 are secure and undamaged.
 - e. Ensure that the room temperature is not in excess of the maximum allowed (40° Celsius or 104° Fahrenheit).

Note: If the room temperature has exceeded the maximum allowed, the system may continually cycle on and off.

Were any problems discovered while performing the above checks?

No: Continue with the next step.

Yes: Correct any problems you found. **This ends the procedure.**

2. Make sure that the on/off switches on all the bulk power regulators (BPRs) are in the *on* (left) position.

Note: A switch set to the *off* position is not the cause of your problem, but they all need to be on before proceeding.

3. Check the state of the LEDs on both sides of the bulk power assembly (BPA) and then choose from the following conditions:
 - If all of the LEDs on both sides of the BPA are in the *off* position, go to step 4.
 - If the unit EPO power LED is turned on, the BPC **GOOD** LED is turned on, and all other LEDs are in the *off* position, go to step 5.
 - If neither of the above two conditions is true, independent faults are indicated on both sides of the BPA. Each side must be isolated separately. Call your next level of support. **This ends the procedure.**
4. Prepare a voltage meter to measure up to 600 V ac. Using the labelled test points on the frame, measure the voltage between phase A and phase B. Is the voltage greater than 180 V ac?
 - Yes:** Independent faults are indicated on both sides of the BPA. Each side must be isolated separately. Call your next level of support. **This ends the procedure.**
 - No:** Inform the customer that power line voltage at the input to the BPR is missing or too low and needs to be corrected. **This ends the procedure.**
5. Is a cable connected to connector J02 on the unit EPO card?
 - No:** Continue with the next step.
 - Yes:** Go to step 7 to determine if the room EPO circuit is the problem.
6. Is the internal toggle switch on the unit EPO card set to the *RM EPO BYPASS* position?
 - No:** Set the internal toggle switch on the unit EPO card to the *RM EPO BYPASS* position. **This ends the procedure.**
 - Yes:** The unit EPO card is the failing item and needs to be replaced. **This ends the procedure.**
7. Unplug the cable from connector J02 on the EPO card and set the toggle switch to the *RM EPO BYPASS* position. Does the EPO **CMPLT** LED on at least one BPC become lit?
 - Yes:** Inform the customer that the room EPO circuit is defective at this connection and requires service. **This ends the procedure.**
 - No:** The unit EPO card is the failing item and needs to be replaced. **This ends the procedure.**

PWR1917

This procedure is used to display or change the configuration ID.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

1. Use either the Advanced System Management Interface (ASMI) or the control panel to display and change the configuration ID.
 - If you are using the ASMI, see the operations guide for your system and use the instructions for *Changing system configuration*.
 - If you are using the control panel, continue with the next step.
2. Perform the following steps to display the configuration ID:
 - Attention:** The system or unit that will display the ID must be powered off with ac power applied.

Notes:

- If you have just restored power to the system, the service processor must return to standby before control panel functions will work correctly. Returning the service processor to standby takes a few minutes *after* the panel appears to be operational.
- You must have the panel in manual mode to access function 7 options.
 - a. Select function 07 on the system control panel. Press Enter (07** will be displayed).

- b. Use the arrow keys to increment or decrement to subfunction A8. 07A8 will be displayed. Press Enter (07A8 00 will be displayed).
- c. Use the arrow keys to increment or decrement to the first byte of the unit address (usually 3C) for the box you want to check. 07nn will be displayed, where nn is the first byte of the unit address.
- d. Press Enter (073C 00, for example, will be displayed).
- e. Use the arrow keys to increment or decrement to the second byte of the unit address (usually 01, 02, etc for I/O expansion units) for the box you want to check. 07nn will be displayed, where nn is the second byte of the unit address (0701, for example, for a unit). Press Enter (0701 00, for example, will be displayed).

Note: The display on the addressed I/O expansion unit being addressed should be flashing on and off while displaying the configuration ID as the last two characters of the bottom line.

- f. Use the following table to check the unit configuration ID.

Table 15. Unit configuration IDs

Model or expansion unit	Configuration ID
5802 or 5877	8E

- g. Is the correct configuration ID displayed for the expansion unit selected?
 - **No:** Continue with the next step.
 - **Yes:** Go to step 6 on page 58.
3. You need to set the unit configuration ID. Are you starting this step from the function 01 view on the control panel?
- **No:** To ensure that the control panel operates properly, return to function 01. Do the following:
 - a. The operator panel should still show the incorrect configuration ID (for example, 07C0).
 - b. Press Enter. The control panel will now show 07xx 00 (for example, 07C0 00).
 - c. Use the arrow keys to display 07**, then press Enter. The control panel will now show 07.
 - d. Use the arrow keys to get the display to function 01, then press Enter. You should now be at the regular function 01 control panel view.
 - e. Continue with the next step.
 - **Yes:** Continue with step 4.
4. Set the unit configuration ID. Do the following:
- a. Select function 07 on the system control panel. Press Enter (07** will be displayed).
 - b. Use the arrow keys to increment/decrement to subfunction A9 (07A9 will be displayed). Press Enter (07A9 00 will be displayed).
 - c. Use the arrow keys to increment/decrement to the first byte of the unit address (usually 3C) for the box that you want to change. 07nn (073C, for example) will be displayed, where nn is the first byte of the unit address. Press Enter (073C 00, for example, will be displayed).
 - d. Use the arrow keys to increment/decrement to the second byte of the unit address (usually 01, 02, etc for I/O Expansion units) for the box you want to check. 07nn will be displayed, where nn is the second byte of the unit address (01, for example, for a unit). Press Enter (0701 00, for example, will be displayed).

Note: The display on the addressed I/O expansion unit will be flashing on and off.

- e. Use the arrow keys to increment/decrement to the correct configuration ID. 07xx will be displayed where xx is the configuration ID.
- f. Press Enter (07xx 00 will be displayed). After 20 to 30 seconds, the display on the addressed I/O expansion unit will stop flashing and return to the normal display format.

Note: To return the panel to normal display, scroll to 07** and press Enter.

- g. Continue with the next step.
- 5. Power on the system. Do you still get SRC 1xxxx84D0 or 1xxxx840E?
 - **No: This ends the procedure.**
 - **Yes:** Continue with the next step.
- 6. Perform the following steps:
 - a. Power off the system.
 - b. Exchange the SPCN card in the failing frame. **This ends the procedure.**

PWR1918

The server detected an error in the power system.

See System FRU locations for information about FRU locations for the system that you are servicing.

Table 16. Use the following table to determine the action to perform.

Reference code	Action
1xxx 2611	Replace the following, if present, one at a time, and in the order listed: <ol style="list-style-type: none"> 1. System backplane (Un-P1) 2. Disk drive backplane (Un-P2)
1xxx 2622	Replace the following, if present, one at a time, and in the order listed: <ol style="list-style-type: none"> 1. System backplane (Un-P1) 2. RAID card (Un-P1-C12 or Un-P1-C13 or Un-P1-C18)
1xxx 2623	Replace the following, if present, one at a time, and in the order listed: <ol style="list-style-type: none"> 1. System backplane (Un-P1) 2. RAID battery (Un-P1-C13-E1 or Un-P1-C18-E1) 3. RAID card (Un-P1-C12 or Un-P1-C13 or Un-P1-C18) 4. Disk drive backplane (Un-P2)
1xxx 2625	Replace the following, if present, one at a time, and in the order listed: <ol style="list-style-type: none"> 1. System backplane (Un-P1) 2. RAID battery (Un-P1-C13-E1 or Un-P1-C18-E1) 3. RAID card (Un-P1-C12 or Un-P1-C13 or Un-P1-C18) 4. HEA adapter (Un-P1-C3) 5. Disk drive backplane (Un-P2)
1xxx 2626	Replace the following, if present, one at a time, and in the order listed: <ol style="list-style-type: none"> 1. System backplane (Un-P1) 2. HEA adapter (Un-P1-C3)

Table 16. Use the following table to determine the action to perform. (continued)

Reference code	Action
1xxx 2691	<p>Perform the following steps:</p> <ol style="list-style-type: none"> 1. Remove one of the memory cards that has not already been removed in this procedure and replace it with a new memory card. 2. Power on the system. See Powering on and powering off the system for information on starting and stopping the system. 3. Is reference code 1xxx 2691 logged again? <ul style="list-style-type: none"> Yes: Continue with the next step. No: The memory card that was replaced was the failing item. This ends the procedure. 4. Have all of the memory cards been replaced? <ul style="list-style-type: none"> Yes: Replace the system backplane at location U_n-P1. This ends the procedure. No: Reinstall the original memory card and repeat this procedure.
1xxx 8450	At least one processor VRM is missing. Inspect all of the processor cards and install the VRMs that are missing. See System FRU locations for FRU location information for the system that you are servicing.
1xxx 8453	There is an extra processor regulator in the system. Remove the extra regulator.
1xxx 8458	Low-power processor VRMs were installed on the system. The system requires high power processor VRMs. Replace the processor VRMs with the correct part number.

PWR1920

Use this procedure to verify that the lights on the server control panel and the display panel on all attached I/O expansion units are operating correctly.

For important safety information before continuing with this procedure, see “Power isolation procedures” on page 35.

See System FRU locations for instructions for removing and replacing FRUs.

1. Activate the lamp test by performing *one* of the following:
 - Select function 04 **lamp test** on the control panel and press Enter.
 - Sign on to ASMI and click **System Configuration -> Service Indicators -> Lamp Test**.
2. Look at the server control panel and the display panels on all attached expansion units. The lamp test is active only for 25 seconds after you press Enter. Check the following lights on the server control panel and all expansion units:
 - Power-on light.
 - Attention light.
 - All dots for the 32 character display.

Are all the lights on the control panel and the I/O display panels on?

 - **No:** Go to step 4 on page 60.
 - **Yes:** These control panel lights are working correctly. Continue with the next step.
3. Are any abnormal characters or character patterns (not reference codes or normal display mode) displayed?
 - **No:** The lights are operating correctly.
This ends the procedure.

- **Yes:** Continue with the next step.
4. Verify that all cables are seated correctly. If the problem persists, replace the control panel. If the problem still persists, use the system backplane to determine the possible causes for the lamp test failure.

PWR2402

Use this procedure when the server detects an error in the power system.

For important safety information before continuing with this procedure, see “Power isolation procedures” on page 35.

See System FRU locations for instructions for removing and replacing FRUs.

1. Is the SRC 1xxx8700 or 1xxx8701?

No: Return to the Start of call procedure. **This ends the procedure.**

Yes: Continue with the next step.

2. Measure voltages on the BPRs. If the SRC is 1xxx8700, you should measure the voltage on BPR-A (front). If the SRC is 1xxx8701, you should measure the voltage on BPR-B (rear). The test points are on the left side of BPR-1 and BPR-2. Using the labeled test points on the face of the BPR, measure the voltages between the following:

- Phase A and phase B
- Phase B and phase C
- Phase C and phase A

Are all of the meter readings greater than 200 V ac or 380 V dc?

No: Inform the customer that power voltage at the input to the BPR is either missing or too low and needs to be corrected. **This ends the procedure.**

Yes: Go to step 4.

3. Does the check confirm that the customer's voltage levels missing or too low?

No: Replace the power cord (see Cables for the proper part number). **This ends the procedure.**

Yes: The customer must correct the voltage levels. **This ends the procedure.**

4. Exchange the following FRUs, one at a time, until the problem is resolved.

Note: See System FRU locations for information about FRU locations for the system that you are servicing.

- Bulk power regulator (BPR) 1
- BPR 2
- BPR 3
- BPR 4
- Bulk power controller (BPC)
- Bulk power assembly (BPA)

This ends the procedure.

Router isolation procedures

These procedures serve as a guide to the correct isolation procedures from the reference code tables.

DANGER

When working on or around the system, observe the following precautions:

Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices.

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

Perform these procedures only when directed to do so from another procedure.

RTRIP04

Use the FRU list in the service action log if it is available. If it is not available, examine word 5 of the reference code.

Is word 5 of the reference code zero (0000 0000)?

Yes: Perform SIIOADP.

No: Perform PIOCARD.

This ends the procedure.

RTRIP05

Use the attached procedure when this reference code occurs for a RIO/HSL/12X loop resource, when an I/O expansion unit on the loop is powered off for a concurrent maintenance action.

Note: This reference code can occur for the RIO/HSL/12X loop resource when an I/O expansion unit on the loop is powered off for a concurrent maintenance action.

Note: A fiber-optic cleaning kit may be required for optical RIO/HSL/12X connections.

1. Multiple B600 6982 errors may occur due to efforts to retry and recover. If the recovery efforts were successful, there will be a B600 6985 reference code with xxxx 3206 in word 4 logged after all B600 6982 reference codes in the product activity log (PAL). If this is the case, close out all the B600 6982 entries. Then continue with the next step.
2. Is there a B600 6987 reference code in the service action log (SAL) logged at about the same time?
Yes: Close this problem and work the B600 6987.
This ends the procedure.
No: Continue with the next step.
3. Is there a B600 6981 reference code in the SAL logged at approximately the same time?
Yes: Go to step 8.
No: Continue with the next step.
4. Perform "RIOIP06" on page 15 to determine if any other systems are connected to this loop and then return here.

Note: The loop number can be found in the SAL in the description for the HSL_LNK FRU.
Are there other systems connect to this loop?

Yes: Continue with the next step.

No: Go to step 8.

5. Check for HSL failures in the SALs on the other systems before replacing parts. HSL failures are indicated by SAL entries with HSL I/O bridge and Network Interface Controller (NIC) resources. Ignore B600 6982 and B600 6984 entries.
Are there HSL failures on other systems?
Yes: Continue with the next step.
No: Go to step 8.
6. Repair the problems on the other systems and return to this step. After making repairs on the other systems check the PAL of this system. Is there a B600 6985, along with this loop's resource name, that was logged after the repairs you made on the other systems?
Yes: Continue with the next step.
No: Go to step 8.
7. For the B600 6985 reference code you found, use SIRSTAT to determine if the loop is now complete.
Is the loop complete?
Yes: The problem has been resolved.
This ends the procedure.
No: Go to step 8.
8. The FRU list displayed in the SAL may be different from the failing item list given here. Use the SAL's FRU list when it is available.
Does this reference code appear in the SAL with the symbolic FRU HSL_LNK listed as a FRU?
Yes: Perform "RIOIP01" on page 9.
This ends the procedure.
No: Exchange the FRUs listed in the SAL according to their part action codes.

This ends the procedure.

RTRIP06

Use the attached procedure when this reference code occurs in a service action code (SAL).

Note: A fiber-optic cleaning kit may be required for optical HSL connections.

1. Is the reference code in the service action log (SAL)?
 - **Yes:** Continue with the next step.
 - **No:** The reference code is informational. Use SIRSTAT to determine what the reference code means.
This ends the procedure.
2. This error can appear in the SAL if an expansion unit or another system in the loop did not complete powering on before Licensed Internal Code (LIC) checked this loop for errors. Search the product activity log (PAL) for all B600 6985 reference codes logged for this loop and use SIRSTAT to determine if this error requires service.

Is further service required?

Yes: Continue with the next step.

No: This ends the procedure.

3. There may be multiple B600 6985 reference codes, with xxxx 3205 in word 4, for the same loop resource in the SAL. This is caused by attempts to retry and recover. If there is a B600 6985 reference code with xxxx 3206 or xxxx 3208 in word 4 after the above B600 6985 entries in the PAL, then the recovery efforts were successful. If this is the case, close all the B600 6985 entries for that loop resource in the SAL. Then continue with the next step.
4. Is there a B600 6981 reference code in the SAL?
 - Yes:** Close that problem and go to step 9 on page 64.
 - No:** Continue with the next step.
5. Perform "RIOIP06" on page 15 to determine if any other systems are connected to this loop and then return here.

Note: The loop number can be found in the SAL in the description for the HSL_LNK FRU.

Are there other systems connected to this loop?

Yes: Continue with the next step.

No: Go to step 9 on page 64.

6. Check for HSL failures in the SALs on the other systems before replacing parts. HSL failures are indicated by SAL entries with HSL I/O bridge and Network Interface Controller (NIC) resources. Ignore B600 6982 and B600 6984 entries.

Are there HSL failures on other systems?

Yes: Continue with the next step.

No: Go to step 9 on page 64.

7. Repair the problems on the other systems and return to this step. After making repairs on the other systems check the PAL of this system. Is there a B600 6985 reference code that was logged after the repairs you made on the other systems?

Yes: Continue with the next step.

No: Go to step 9 on page 64.

8. For the B600 6985 log you found, use SIRSTAT to determine if the loop is now complete.

Is the loop complete?

- **Yes:** The problem has been resolved.

This ends the procedure.

- **No:** Go to step 9 on page 64.

9. The FRU list displayed in the SAL may be different from the failing item list given here. Use the SAL's FRU list when it is available.

Does this reference code appear in the SAL with the symbolic FRU HSL_LNK listed as a FRU?

- **Yes:** Perform "RIOIP01" on page 9.

This ends the procedure.

- **No:** Exchange the FRUs listed in the SAL according to their part action codes.

This ends the procedure.

Service processor isolation procedures

Use service processor isolation procedures if there is not a management console attached to the server. If the server is connected to a management console, use the procedures that are available on the management console to continue FRU isolation.

DANGER

When working on or around the system, observe the following precautions:

Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:

- Connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

1. Turn off everything (unless instructed otherwise).
2. Remove the power cords from the outlets.
3. Remove the signal cables from the connectors.
4. Remove all cables from the devices.

To Connect:

1. Turn off everything (unless instructed otherwise).
2. Attach all cables to the devices.
3. Attach the signal cables to the connectors.
4. Attach the power cords to the outlets.
5. Turn on the devices.

(D005)

FSPSP01

A part vital to system function has been unconfigured. Review the system error logs for errors that include in their failing item list parts that are relevant to each reason code. If replacing those parts does not resolve the error, use this procedure.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

Perform the following steps:

1. Is the SRC B1xB10C or B1xB10D (xx indicates that the subsystem ID is irrelevant)?

- **No:** Go to step 8.
- **Yes:** The system has detected that one of the following has occurred:
 - A memory controller that is required for the system to function is unconfigured.
 - There is not enough memory.
 - The memory is plugged incorrectly.

Continue with the next step.

2. Use the Advanced System Management Interface (ASMI) to determine if the memory controller is unconfigured.

Note: To perform this operation, your authority level must be administrator or authorized service provider.

- a. On the ASMI Welcome pane, specify your user ID and password, and click **Log In**.
 - b. In the navigation area, expand **System Service Aids > Deconfiguration Records**.
 - c. Is the memory controller unconfigured?
 - **Yes:** Contact your next level of support.
 - **No:** Continue with the next step.
3. Ensure the memory is plugged correctly.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Go to Memory riser placement and memory module balancing.

Is the memory plugged correctly?

Yes: Go to step 5.

No: Correct the memory plugging problem and continue with the next step.

4. Perform the action indicated in the table below for your system.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Power on the system to the hypervisor standby. Note: Slow boot is not supported.

Does the problem persist?

Yes: Continue with the next step.

No: Go to Verify a repair. **This ends the procedure.**

5. Perform the following steps:
 - a. Perform the action indicated in the table below for your system.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Reseat all of the memory DIMMs on each memory card but do not replace any memory DIMMs at this time.

- b. Perform the action indicated in the table below for your system.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Power on the system to the hypervisor standby. Note: Slow boot is not supported.

Does the problem persist?

Yes: Continue with the next step.

No: Go to Verify a repair. **This ends the procedure.**

6. Perform the action indicated in the table below for your system.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	<ol style="list-style-type: none"> 1. Replace the first memory DIMM pair (on each memory card, starting with memory card 1). 2. Power on the system to the hypervisor standby. Note: Slow boot is not supported. 3. Does the problem persist? Yes: Repeat this step and replace the next memory DIMM pair. If you have replaced all of the memory DIMM pairs, then continue with the next step. No: Go to Verify a repair. This ends the procedure.

7. Perform the action indicated in the table below for your system.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	<ol style="list-style-type: none"> 1. Replace the first processor module ($Un-P1-C11$). 2. Does the problem persist? Yes: Continue with the next step. No: Go to Verify a repair. This ends the procedure. 3. Is a second processor module present? Yes: Continue with the next step. No: Replace the system backplane at location $Un-P1$. This ends the procedure. 4. Replace the second processor module at location $Un-P1-C10$. Does the problem persist? Yes: Replace the system backplane at location $Un-P1$. This ends the procedure. No: Go to Verify a repair. This ends the procedure.

8. Is SRC B1xxB107 or B1xxB108?

Yes: Perform the action indicated in the table below for your system.

No: Continue with the next step.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	The system has detected a problem with the clock module. Replace the system backplane ($Un-P1$). This ends the procedure.

9. Is the SRC B1xxB106?

Yes: Perform the action indicated in the table below for your system.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Replace the system backplane (Un-P1). This ends the procedure.

No: Continue with the next step.

10. Is the SRC B1xxB110 or B1xxB111?

No: Contact your next level of support. This ends the procedure.

Yes: Perform the action indicated in the table below for your system.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Replace the system backplane (Un-P1). This ends the procedure.

FSPSP02

This procedure is for boot failures that terminate very early in the boot process.

This error path is indicated when the SRC data words are scrolling automatically through control panel functions 11, 12, and 13, and the control panel interface buttons are not responsive.

Perform the following:

1. Push the white power button to reset the system and start it on the other side of the platform Licensed Internal Code.

Note: The white power button will only reset the system and attempt to reach standby.

2. Did an SRC occur after starting the system on the other side?

No: Verify that the system's firmware is at the latest level. Update the system's firmware on the failing side if necessary. Perform LICCODE. **This ends the procedure.**

Yes: Continue with the next step.

3. Is the SRC the same SRC that brought you to this procedure?

- **No:** Return to Start of call to service this new SRC. **This ends the procedure.**
- **Yes:** Perform the action indicated in the table below for your system.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Replace the system backplane (Un-P1). Refer to System FRU locations to locate the correct system location of the part you are replacing. If the problem is not resolved, contact your next level of support. This ends the procedure.

FSPSP03

A system operator or user error has occurred.

See the documentation for the task that you were attempting to perform.

FSPSP04

A problem has been detected in the service processor firmware.

Perform LICCODE. **This ends the procedure.**

FSPSP05

The service processor has detected a problem in the platform firmware.

Perform LICCODE. **This ends the procedure.**

FSPSP06

The service processor reported a suspected intermittent problem.

Collect log, debug, and dump data if available and send it to your next level of support.

FSPSP07

The time of day has been reset to the default value.

1. To set the time of day, see the systems operations guide.
2. If the problem persists, perform the following steps:
 - a. Power off the system. See Powering on and powering off the system.
 - b. To determine the action to perform, use the following table.

System	Action
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Replace the time-of-day battery at location $Un-P1-E1$. See System FRU locations.

3. To determine the action to perform, use the following table.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Power on the system to the hypervisor standby. Note: Slow boot is not supported.

This ends the procedure.

FSPSP09

A problem has been detected with a memory DIMM, but it cannot be isolated to a specific memory DIMM.

1. Use the following table to determine the action to perform.

System	Action
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Replace all of the memory DIMMs that are located on the same memory card (starting with memory card 1: $Un-P1-Cx-Cy$, with $x = 14$ through 17 and $y = 1$ through 4). See System FRU locations for FRU location information.

2. To determine the action to perform, use the following table.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Power on the system to the hypervisor standby. Note: Slow boot is not supported.

This ends the procedure.

FSPSP10

The part indicated in the FRU list that follows this procedure is not valid or missing for this system's configuration.

See System FRU locations for information about FRU locations.

Perform the following steps to correct the problem:

1. Does word 8 (the 8 leftmost characters in the 2nd line of function 13) of the reference code end with 02 or 04?

No: Go to step 3.

Yes: Continue with the next step.

2. The FRU that is included in the failing item list after this procedure is either missing or not valid. Is that FRU installed and connected or plugged in correctly?

Yes: The installed FRU is not valid. Remove that FRU. Then contact your next level of support to determine the correct FRU. **This ends the procedure.**

No: The FRU is missing. If the FRU is present but not connected, reconnect it and then perform the specified action in following table. Otherwise, contact your next level of support to determine the missing FRU.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Power on the system to the hypervisor standby. Note: Slow boot is not supported.

This ends the procedure.

3. Does word 8 end with 01 or 05?

No: Return to the Start of call. **This ends the procedure.**

Yes: The FRU that is listed after this procedure has the same serial number as another FRU in the system. Remove all but one of the FRUs that are listed after this procedure and then perform the specified action in following table.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Power on the system to the hypervisor standby. Note: Slow boot is not supported.

This ends the procedure.

FSPSP11

The service processor has detected an error in the system unit.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

1. Verify that the system's firmware is at the latest level. Update the system's firmware if necessary.
2. If the problem persists, use the following table to determine the action to perform.

System	Action
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	<ul style="list-style-type: none"> • Replace the host Ethernet adapter (HEA) card. • Replace the system backplane at location <i>Un-P1</i>. • Power on the system to the hypervisor standby. Note: Slow boot is not supported. <p>This ends the procedure.</p>

FSPSP12

The DIMM FRU that was previously replaced did not correct the memory error.

Perform the following steps:

1. Power off the system. See Powering on and powering off the system.
2. To determine the action to perform, use the following table.

System	Action
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Replace the memory card that the DIMM is plugged into (<i>Un-P1-C14</i> through <i>Un-P1-C17</i>). See System FRU locations for information about system FRU locations.

3. To determine the action to perform, use the following table.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Power on the system to the hypervisor standby. Note: Slow boot is not supported.

This ends the procedure.

FSPSP14

The service processor cannot communicate with the system firmware. The server firmware will continue to run the system and partitions while it attempts to recover communications. Server firmware recovery actions will continue for approximately 30 to 40 minutes.

Perform the following steps:

1. Record the time the log was created or when the SRC was first noticed. Continue with the next step.
2. Are progress codes being displayed on the panel?
 - **Yes:** Server firmware was able to reset the service processor. **This ends the procedure.**
 - **No:** Continue with the next step.
3. Has an A7006995 SRC been displayed on the panel?
 - **Yes:** Partitions are being powered off and a server dump will be attempted. Follow the A7006995 SRC description if the partitions do not terminate as requested. **This ends the procedure.**
 - **No:** Continue with the next step.
4. Has the A1xx SRC remained on the panel for more than 40 minutes?

- **Yes:** Server firmware could not begin termination of the partitions. Contact your next level of support to assist in attempting to terminate any remaining partitions and forcing a server dump. Collect the dump for support, power off and power on the system. **This ends the procedure.**
- **No:** Contact your next level of support. **This ends the procedure.**

FSPSP16

Save any error log and dump data and contact your next level of support for assistance.

FSPSP17

A system uncorrectable error has occurred.

1. Look for other serviceable events and use the failing items listed with them to correct the problem.
2. If you need to run the system in a degraded mode until you can perform the service actions, do the following:
 - a. Power off the system (see Powering on and powering off the system).
 - b. Power on the system (see Powering on and powering off the system) to allow the memory diagnostics to clean up the memory and deconfigure any defective parts.

This ends the procedure.

FSPSP18

A problem has been detected in the platform Licensed Internal Code.

Perform LICCODE. **This ends the procedure.**

FSPSP20

A failing item has been detected by a hardware procedure.

To run full hardware diagnostics, use the following table.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Power on the system to the hypervisor standby. Note: Slow boot is not supported.

If a new SRC occurs, repair the system using that reference code.

If an incomplete occurs, go to Managing the advanced system management interface (ASMI) menus to power off, check for deconfigured components and perform the action mentioned in the previous table.

This ends the procedure.

FSPSP22

The system has detected that a processor chip is missing from the system configuration because JTAG lines are not working.

See System FRU locations for instructions for removing and replacing FRUs.

Complete the following steps:

1. Power off the system. See Powering on and powering off the system.
2. Replace the system backplane at location Un-P1.

3. Replace the first processor module at location $Un-P1-C11$.
4. Replace the second processor module if present at location $Un-P1-C10$.
5. Power on the system to the hypervisor standby.

Note: Slow boot is not supported.

FSPSP23

The system needs to perform a service processor dump.

1. Perform a service processor dump (see Performing a platform system dump or service processor dump).
2. Attempt to perform an IPL on the system.
3. Save the service processor dump to storage. See Managing dumps.
4. Contact your next level of support. **This ends the procedure.**

FSPSP24

The system is running degraded. Array bit steering may be able to correct this problem without replacing hardware.

1. Power off the system (see Powering on and powering off the system).
2. To determine the action to perform, use the following table.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Power on the system to the hypervisor standby. Note: Slow boot is not supported.

This ends the procedure.

3. If the problem persists, replace the FRU that is listed after this procedure in the failing item list. See System FRU locations for instructions. **This ends the procedure.**

FSPSP25

The server has detected an over-temperature thermal fault.

1. Before replacing any server hardware FRUs, look in the error log for thermal problems related to fans, power supplies, etc. Perform all service actions for the thermal problem SRCs first before continuing with any other failing items in the current SRC. Thermal problems are associated with 1100 xxxx SRCs, where xxxx may be any of the following:
 - 1514
 - 1524
 - 7201
 - 7203
 - 7205
 - 7610
 - 7611
 - 7620
 - 7621
 - 7630
 - 7631
 - 7640
 - 7641

2. If no thermal-related SRCs or problems can be found, replace the server hardware FRU associated with the current SRC. See System FRU locations for instructions. **This ends the procedure.**

FSPSP27

A problem has been detected on an attention line. If the FRU replaced before this procedure did not correct the problem, perform the following:

See System FRU locations to locate the correct system location of the part you are replacing.

1. Was the FRU listed before this procedure a memory DIMM (*Un-P1-C14-Cx* or *Un-P1-C15-Cx* or *Un-P1-C16-Cx* or *Un-P1-C17-Cx*)?

No: Go to step 4.

Yes: Continue with the next step.

2. Perform the following steps:

- a. Replace the memory card (*Un-P1-C14* or *Un-P1-C15* or *Un-P1-C16* or *Un-P1-C17*) that the DIMM was plugged into.
- b. Power on the system to the hypervisor standby.

Note: Slow boot is not supported.

Does the problem persist?

No: **This ends the procedure.**

Yes: Continue with the next step.

3. Perform the following steps:

- a. Replace the system backplane (*Un-P1*).
- b. Power on the system to the hypervisor standby.

Note: Slow boot is not supported.

Does the problem persist?

No: **This ends the procedure.**

Yes: Continue with the next step.

4. Was the FRU listed before this procedure a processor module?

No: **This ends the procedure.**

Yes: Continue with the next step.

5. Perform the following steps:

- a. Replace the system backplane (*Un-P1*).
- b. Power on the system to the hypervisor standby.

Note: Slow boot is not supported.

This ends the procedure.

FSPSP28

The resource ID (RID) of one or more FRUs could not be found in the vital product data (VPD) table.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

1. Go to your serviceable event view and find other failing items that read "FSPxxxx" where xxxx is a 4 digit hex number that represents the RID. Do not perform any actions on these failing items.

- Record all failing items, RID numbers, and the model of the system and contact your next level of support. **This ends the procedure.**

FSPSP29

The system has detected that all I/O bridges are missing from the system configuration.

- Power off the system. To review the "Powering on and powering off" procedure, go to Powering on and powering off the system.
- Replace the system backplane (Un-P1). See System FRU locations for the location of the failing item.
- Power on the system to the hypervisor standby.

Note: Slow boot is not supported.
This ends the procedure.

FSPSP30

A problem has been encountered accessing the VPD card or the data found on the VPD card has been corrupted.

This error occurred before VPD collection was completed. No location codes have been created.

- Power off the system. To review the "Powering on and powering off" procedure go to Powering on and powering off.
- Clear any deconfiguration errors for the VPD card.
- Perform the action indicated in the table below for your system.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Replace the following one at a time in the order listed: <ol style="list-style-type: none"> VPD card at location Un-P1-C19. See System FRU locations to locate the correct system location of the part you are replacing. System backplane at location Un-P1. <p>This ends the procedure.</p>

FSPSP31

The service processor has detected that one or more of the required fields in the system VPD has not been initialized.

- Log into ASMI with authorized service provider authority (see Accessing the Advanced System Management Interface).
- Set the system VPD values (see Setting the system enclosure type and Setting the system identifiers).

Note: The service processor will automatically reset when leaving the ASMI after updating the system VPD.

- Power on the system. See Powering on and powering off the system. **This ends the procedure.**

FSPSP32

A problem with the enclosure has been found.

The problem might be caused by one of the following items:

- The enclosure VPD cannot be found.
- The enclosure serial number is not programmed or has the same value as the system serial number.
- The enclosure feature code is not programmed.

See System FRU locations for instructions for removing and replacing FRUs.

Perform the following steps:

1. Record the reason code (the last 4 characters of word 11) from the SRC by looking at the operator panel or accessing the error log with the ASMI.
2. Is the reason code A46F?
 - No:** Go to step 5.
 - Yes:** Continue with the next step.
3. Check for and apply any server firmware updates. Does the problem persist?
 - No: This ends the procedure.**
 - Yes:** Continue with the next step.
4. Use the following table to determine the action to perform.

System	Action
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Perform the following steps: <ol style="list-style-type: none"> 1. Power off the system. See Powering on and powering off the system. 2. Replace the system backplane (Un-P1). 3. Power on the system to the hypervisor standby. Note: Slow boot is not supported. Does the problem persist? <ul style="list-style-type: none"> No: This ends the procedure. Yes: Contact your next level of support. This ends the procedure.

5. Is the reason code A41C or A460?
 - No:** Go to step 7.
 - Yes:** Continue with the next step.
6. Perform the following steps:
 - a. Set the enclosure serial number using the ASMI. See Setting the system enclosure type.
 - Note:** The enclosure serial number can be found on the label located on the system chassis.
 - b. The service processor will automatically reset when leaving the ASMI after updating the serial number.
 - c. To determine the action to perform, use the following table.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Power on the system to the hypervisor standby. Note: Slow boot is not supported.

Does the problem persist?

No: This ends the procedure.

Yes: Contact your next level of support. **This ends the procedure.**

7. Is the reason code A45F?
 - No:** Contact your next level of support. **This ends the procedure.**
 - Yes:** Continue with the next step.
8. Perform the following steps:

- a. Set the enclosure feature code using the ASMI. See Setting the system enclosure type. The service processor will automatically reset when leaving the ASMI after updating the serial number.
- b. To determine the action to perform, use the following table.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Power on the system to the hypervisor standby. Note: Slow boot is not supported.

Does the problem persist?

No: This ends the procedure.

Yes: Contact your next level of support. **This ends the procedure.**

FSPSP33

A problem has been detected in the connection with the management console.

1. Ensure that the cable connectors to the network from the management console, managed system, managed system partitions, and other management consoles are securely connected. If the connections are not secure, plug the cables back into the proper locations and make sure that the connections are good.
2. Check to see if the management console is working correctly or if the management console was disconnected incorrectly from the managed system, managed system partitions, and other management consoles. If either has happened, reboot the management console.
3. Verify that the network connection between the HMC, managed system, managed system partitions, and other HMCs is working properly.
4. If applicable, service the next FRU. See System FRU locations for instructions.
5. If the problem continues to persist, contact your next level of support. **This ends the procedure.**

FSPSP34

The memory cards are plugged in an invalid configuration and cannot be used by the system.

See System FRU locations for information about locating FRUs.

1. Is the SRC B1xx B17B?

Yes: There are one or more memory cards that are incompatible with the other memory cards plugged into the same board in the system. To correct the error, remove the medium severity failing items identified in the failing item list and replace them with compatible ones. If you are unable to determine which memory cards are compatible, contact your next level of support. **This ends the procedure.**

No: Continue with the next step.

2. Is the SRC B1xx B180?

Yes: There are one or more memory cards in the system which are not supported. Remove the failing items identified in the failing item list and replace them with compatible ones. If you are unable to determine which memory cards are compatible, contact your next level of support. **This ends the procedure.**

No: Continue with the next step.

3. Is the SRC B1xx C029?

Yes: A memory module is a different type than the other memory modules in the same group. The additional parts in the FRU list will include all memory modules in the group that contain the error. To correct the error, exchange the memory modules of the incorrect type with those of the required type. **This ends the procedure.**

No: Continue with the next step.

4. Is the SRC B1xx C02A?

Yes: A memory module is missing from the system. The additional parts in the FRU list will include all memory modules in the group with the missing card. To correct the error, visually check the system to determine which of these missing is missing, and add the module. **This ends the procedure.**

No: Continue with the next step.

5. Is the SRC B1xx C02B?

Yes: A group of memory modules are missing and are required so that other memory modules on the board can be configured. The additional parts in the FRU list will include all missing memory modules in the group. To correct the error, add or remove these modules to the required locations. **This ends the procedure.**

No: Continue with the next step.

6. Is the SRC B1xx C036, B1xx C04E, or B1xx C067?

Yes: A memory module is not supported by this system. The additional parts in the FRU list will include all memory modules in the group that contains the unsupported modules. To correct the error, remove these modules from the system or replace them with the correct type. **This ends the procedure.**

No: Continue with the next step.

7. Is the SRC B1xx C071?

Yes: Fewer than eight DIMMs are installed for the processor listed in the FRU list. This system requires a minimum of eight DIMMs per processor. To correct the error, add as many DIMMs as are required to meet the minimum of eight. **This ends the procedure.**

No: Return to Start of call. **This ends the procedure.**

FSPSP35

The system has detected a problem with a memory controller.

Perform the following steps to enable redundant utilization:

1. Power off the system. See Powering on and powering off the system.
2. To determine the action to perform, use the following table.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Power on the system to the hypervisor standby. Note: Slow boot is not supported.

This ends the procedure.

FSPSP36

One or both of the SMP cables connecting the system processor cards on this system are incorrectly plugged, broken, or not the correct type of cable for this system configuration.

See System FRU locations for instructions for removing and replacing FRUs.

Perform the following:

1. Re-plug the SMP cables (P2-Cx-T1 or P2-Cx-T2) that connect to the system processor cards.
2. To determine the action to perform, use the following table.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Power on the system to the hypervisor standby. Note: Slow boot is not supported.

3. Does the problem persist?

Yes: Continue with the next step.

No: This ends the procedure.

4. Replace the SMP cables.

5. To determine the action to perform, use the following table.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Power on the system to the hypervisor standby. Note: Slow boot is not supported.

6. Does the problem persist?

No: This ends the procedure.

Yes: Continue with the next step.

7. Perform the following for each system processor card:

a. Power off the system (see Powering on and powering off the system).

b. Remove processor card one in the primary unit.

c. To determine the action to perform, use the following table.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Power on the system to the hypervisor standby. Note: Slow boot is not supported.

d. Does the problem persist?

Yes: Reinstall the processor card you removed and then repeat this step removing each of the processor cards, one at a time, until all of the processor cards have been removed. After removing each card, perform the specified action in the following table. If you have removed the last processor card and the problem persists, contact your next level of support.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Power on the system to the hypervisor standby. Note: Slow boot is not supported.

No: Replace the processor you just removed, it is the failing FRU. **This ends the procedure.**

FSPSP38

The system has detected an error within the JTAG path.

Replace all failing items, if any, in the failing item list of the service processor error log entry. If the replacement of all failing items in the failing item list does not fix the problem, contact your next level of support.

See System FRU locations for information about locating FRUs.

This ends the procedure.

FSPSP45

The system has detected an error with the FSI path.

1. Replace the processor modules one at a time ($U_{n-P1-C11}$, then $U_{n-P1-C10}$ if present). See System FRU locations for information about locating the FRU.
2. Power on the system to the hypervisor standby.

Note: Slow boot is not supported.
Does the problem persist?

No: **This ends the procedure.**

Yes: Continue with the next step.

3. Have all processor modules been replaced?

No: Go back to step 1 and replace another processor module.

Yes: Continue with the next step.

4. Replace the system backplane (U_{n-P1}).
5. Power on the system to the hypervisor standby.

Note: Slow boot is not supported.
This ends the procedure.

FSPSP46

Some corrupt areas of flash or RAM have been detected on the service processor.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

1. Use the following table to determine the action to perform.

System	Action
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Replace the system backplane at location U_{n-P1} . See System FRU locations for information about system FRU locations.

2. To determine the action to perform, use the following table.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Power on the system to the hypervisor standby. Note: Slow boot is not supported.

This ends the procedure.

FSPSP47

The system has detected an error within the PSI link. To resolve the problem, perform the following steps:

See System FRU locations for instructions for removing and replacing FRUs.

1. Replace the system backplane at location $Un-P1$.
2. Power on the system to the hypervisor standby.

Note: Slow boot is not supported.

3. Does the problem persist?

No: This ends the procedure.

Yes: Continue with the next step.

4. Replace the processor modules one at a time ($Un-P1-C11$, then $Un-P1-C10$ if present). See System FRU locations for instructions for removing and replacing any FRUs.
5. Power on the system to the hypervisor standby.

Note: Slow boot is not supported.

6. Does the problem persist?

No: This ends the procedure.

Yes: Continue with the next step.

7. Have all processor modules been replaced?

No: Go back to step 4 and replace another processor module.

Yes: Contact your next level of support. This ends the procedure.

FSPSP48

A diagnostic function detected an external processor interface problem. Perform the following steps:

1. Power off the system. See Powering on and powering off the system.
2. Replace the system backplane at location $Un-P1$. See System FRU locations for information about FRU locations for the system you are servicing.
3. Power on the system to the hypervisor standby.

Note: Slow boot is not supported.

4. If the problem is not resolved, replace the FRUs listed in the FRU list. This ends the procedure.

FSPSP49

A diagnostic function detected an internal processor interface problem. Perform the following steps:

1. Replace the FRUs listed in the FRU list. Does the problem still exist?

No: This ends the procedure.

Yes: Continue with the next step.

2. Power off the system. See Powering on and powering off the system.
3. Use the following table to determine the action to perform.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	<ol style="list-style-type: none">1. Replace the processor modules at locations $Un-P1-C11$ and $Un-P1-C10$ if present, one at a time.2. Replace the system backplane at location $Un-P1$. See System FRU locations for information about locating the system backplane.

4. To determine the action to perform, use the following table.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Power on the system to the hypervisor standby. Note: Slow boot is not supported.

This ends the procedure.

FSPSP50

A diagnostic function detects a connection problem between a processor chip and a GX chip. If replacing the FRUs previously listed in the FRU list does not fix the problem, perform the following steps:

1. Power off the system. See Powering on and powering off the system.
2. Use the following table to determine the action to perform.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Replace the system backplane at location <i>Un-P1</i> . See System FRU locations for information about locating the system backplane.

3. To determine the action to perform, use the following table.

8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Power on the system to the hypervisor standby. Note: Slow boot is not supported.
--	--

This ends the procedure.

FSPSP51

A runtime diagnostic function detected a chip interconnection bus correctable error that exceeded the threshold. The correctable error did not cause a disruption of system operations. However, the system is operating in a degraded mode because the error is being corrected by hardware.

To resolve the problem, replace the FRU listed after this procedure in the failing item list.

FSPSP52

A problem has been detected on a memory bus. If replacing the FRUs previously listed in the FRU list does not fix the problem, perform the following steps:

1. Power off the system. See Powering on and powering off the system).
2. Use the following table to determine the action to perform.

System	Action
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Replace the memory card the DIMMs were located on (<i>Un-P1-C14</i> or <i>Un-P1-C15</i> or <i>Un-P1-C16</i> or <i>Un-P1-C17</i>). See System FRU locations for information about system FRU locations.

3. To determine the action to perform, use the following table.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Power on the system to the hypervisor standby. Note: Slow boot is not supported.

This ends the procedure.

FSPSP54

A processor over-temperature has been detected. Check for any environmental issues before replacing any parts.

- Is the ambient room temperature in the normal operating range (less than 35 degrees C/95 degrees F)?
 - No:** Notify the customer. The customer must lower the room temperature so that it is within the normal range. Do not replace any parts. **This ends the procedure.**
 - Yes:** Continue to the next step.
- Are the front and rear of the system unit drawer, and the front and rear rack doors, free of obstructions that would impede the airflow through the drawer?
 - No:** Notify the customer. The system must be free of obstructions for proper airflow. Clean the air inlets and exits in the drawer as required. Do not replace any parts. **This ends the procedure.**
 - Yes:** Continue to the next step.
- Are all of the fans, especially those at the back of the power supply, functioning normally?
 - No:** Replace any fans that are not turning or are turning slowly. Refer to System FRU locations for instructions. **This ends the procedure.**
 - Yes:** There are no environmental issues with the cooling of the processors. **This ends the procedure.**

FSPSP55

An error occurred on a bus between two FRUs in the failing item list. All FRUs in the failing path are included in the failing item list. Any of the FRUs in the failing item list might be the cause of the error. Replace the items in the failing item list one at a time until the problem is resolved.

See System FRU locations for information about failing items.

FSPSP56

A concurrent maintenance repair action could not complete.

Reinstall the VPD card from the same drawer it was originally removed from prior to the beginning of the concurrent maintenance repair action.

FSPSP58

A network cable is misplugged.

The FRU immediately following this procedure shows the current bulk power hub port that has the wrong cable plugged into it. The FRU after that shows the bulk power hub port that the cable should be plugged into. Move the cable to the correct port. **This ends the procedure.**

FSPSP60

A MAC address has been duplicated in the system.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

1. Perform LICCODE to update the system firmware.

Note: Do not update the BPC firmware.

FSPSP63

The system has experienced a power error. Please review previous error logs for power-related issues.

FSPSP64

All the processor support interface (PSI) links of the system are either nonfunctional or deconfigured, so the system cannot perform an IPL appropriately. Look for previous error logs that deconfigure hardware.

FSPSP65

Both service processor ports are on the same IP subnet. This configuration is not valid.

The network is either wired or set up incorrectly. For the Hardware Management Console (HMC), see Configuring the HMC to correct the problem. For the IBM Systems Director Management Console (SDMC), see Configuring network to correct the problem. **This ends the procedure.**

FSPSP66

Use this procedure when a system with redundant service processors was booted with service processor fail-over disabled.

If you are servicing a system that contains redundant service processors and you booted the system with the fail-over disabled, perform the following steps.

1. Shut down the system.
2. Use the management console to enable fail-over.
3. Reboot the system. Verify that the SRC that sent you here was not logged during this boot.

FSPSP67

No standby power to the primary service processor.

The primary service processor is not receiving standby power.

Perform the following steps:

1. Verify that the AC power cords are properly plugged into the back of drawers 1 and 2.
2. Verify that the service processor and SPCN cables are properly plugged into the back of the system.
3. Verify that "01" is in the upper left-hand corner of the control (operator) panel in the first drawer.
4. Correct any problems that are found in the preceding steps.
5. If the system does not reach standby after correcting the AC input and cabling, continue to the next FRU in the list. If the system reaches standby, **this ends the procedure.**

FSPSP68

A problem occurred during a service action.

Perform a service processor dump. See Performing a service processor dump. Report the dump to your next level of support. See Reporting a dump. **This ends the procedure.**

FSPSP70

Look for 1100xxxx errors in the serviceable event view that were logged at about the same time as this error and resolve them. If there are no 1100xxxx errors logged, contact your next level of support.

FSPSP79

Look for uncorrectable memory errors in the serviceable event view that were logged at about the same time as this error and resolve them. If there are no uncorrectable memory errors logged, replace the processor module.

FSPSP83

The service processor detected hardware that was removed from the system configuration. Use the Advanced System Management Interface (ASMI) to determine the hardware to be replaced and schedule maintenance at your earliest convenience.

To determine the hardware to replace, complete the following steps:

Note: To perform this operation, your authority level must be administrator or authorized service provider.

1. On the ASMI Welcome pane, specify your user ID and password, and click **Log In**.
2. In the navigation area, expand **System Service Aids > Deconfiguration Records**.
3. Use the system reference code (SRC) associated with the unconfigured hardware to resolve the problem. **This ends the procedure.**

FSPSPC1

If the system hangs after the code that sent you to this procedure appears in the control panel, perform these steps to reset the service processor.

Attention: You should periodically check the system firmware level on all your servers and update the firmware to the latest level, if appropriate. If you were directed to this procedure because the server displayed B1817201, C1001014, or C1001020, or a combination of these codes, the latest firmware can help avoid a recurrence of this problem.

Even if the customer cannot update the firmware on this system at this time, all of their systems should be updated to the latest firmware level as soon as possible to help prevent this problem from occurring on other systems.

Resetting the service processor on systems with a physical control panel

1. If the Advanced System Management Interface (ASMI) is available, reset the service processor using the ASMI menus.

Were you able to use the ASMI menus to reset the service processor?

Yes: This ends the procedure.

No: Continue with the next step.

2. Activate the service processor pinhole reset switch on the system's control (operator) panel by carefully performing these steps:
 - a. Using an insulated paper clip, unbend the paper clip so that it has a straight section about 2 inches long.
 - b. Insert the clip straight into the hole, keeping the clip perpendicular to the plastic bezel.
 - c. When you engage the reset switch, you should feel the detent of the switch. Pressing the reset switch resets the service processor and causes the system to shut down.
3. Reboot the system in slow mode from the permanent side, using control panel function 02 or the ASMI menus, if available.

4. If the hang repeats, verify whether there is a firmware update that is available that fixes the problem; apply if available. For more information, see:
 - If the system is managed by a Hardware Management Console (HMC), see Upgrading the machine code on an HMC from Version 6 to Version 7.
 - If the system is managed by an IBM Systems Director Management Console (SDMC), see Updating the SDMC.
 - If the system is not managed by a management console, see the Managing the Advanced System Management Interface.
5. Choose from the following options:
 - If no firmware update is available, continue with the next step.
 - If a firmware update is available, use the management console to apply, if attached.

Did the update resolve the problem so that the system now boots?

Yes: This ends the procedure.

No: You are here because there is no management console attached to the system, the flash update failed, or the updated firmware did not fix the hang. Continue with the next step.

6. Choose from the following options:
 - If you are a customer, contact your authorized hardware service provider. **This ends the procedure.**
 - If you are the authorized hardware service provider, continue with the next step.
7. Replace the service processor (see System FRU locations).
8. If replacing the service processor does not fix the problem, contact your next level of support. **This ends the procedure.**

Resetting the service processor on systems with a logical control panel

1. Reset the service processor. Use the Advanced System Management Interface (ASMI) menus, if available, or the management console first to remove then to reapply power to the service processor.
2. Using the setting in the ASMI menu, reboot the system in slow mode from the permanent side.
3. If the hang repeats, check with service support to see if a firmware update is available that fixes the problem. For the Hardware Management Console (HMC), see Upgrading the machine code on an HMC from Version 6 to Version 7. If the system is managed by an IBM Systems Director Management Console (SDMC), see Updating the SDMC.
4. Choose from the following options:
 - If no firmware update is available, continue with the next step.
 - If a firmware update is available, apply it using the management console. Did the update resolve the problem so that the system now boots?

No: You are here because there is no management console attached to the system, the flash update failed, or the updated firmware did not fix the hang. Continue with the next step.

Yes: This ends the procedure.
5. Choose from the following options:
 - If you are a customer, contact your authorized hardware service provider. **This ends the procedure.**
 - If you are a customer and your system has a secondary service processor, use the management console to initiate a service processor failover and continue to power on the system. Contact your authorized service provider to schedule deferred maintenance on the service processor that is not working. **This ends the procedure.**
 - If you are the authorized hardware service provider, continue with the next step.
6. Replace the service processor. See System FRU locations for information about the FRU location for the system that you are servicing.
7. If replacing the service processor does not fix the problem, contact your next level of support. **This ends the procedure.**

FSPSPD1

If the system hangs after the code that sent you to this procedure appears in the control panel, perform these steps to reset the service processor.

Perform "FSPSPC1" on page 85.

Isolating problems on servers that run Linux

Use the procedures for Linux servers if there is not a management console attached to the server. If the server is connected to a management console, use the procedures that are available on the management console to continue FRU isolation.

MAP 0210: General problem resolution

Replace the FRUs in the failing item list one at a time in the order that they are listed.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

Problems with loading and starting the operating system (Linux)

If the system is running partitions from partition standby (LPAR), the following procedure addresses the problem in which one partition will not boot Linux while other partitions boot successfully and run the operating system successfully.

It is the customer's responsibility to move devices between partitions. If a device must be moved to another partition to run standalone diagnostics, contact the customer or system administrator. If the optical drive must be moved to another partition, all SCSI devices connected to that SCSI adapter must be moved because moves are done at the slot level, not at the device level.

Depending on the boot device, a checkpoint may be displayed on the operator panel for an extended period of time while the boot image is retrieved from the device. This is particularly true for tape and network boot attempts. If booting from an optical drive or tape drive, watch for activity on the drive's LED indicator. A flashing LED indicates that the loading of either the boot image or additional information required by the operating system being booted is still in progress. If the checkpoint is displayed for an extended period of time and the drive LED is not indicating any activity, there might be a problem loading the boot image from the device.

Notes:

1. For network boot attempts, if the system is not connected to an active network or if the target server is inaccessible (which can also result from incorrect IP parameters being supplied), the system will still attempt to boot. Because time-out durations are necessarily long to accommodate retries, the system may appear to be hung. Refer to checkpoint CA00 E174.
2. If the partition hangs with a 4-character checkpoint in the display, the partition must be deactivated, then reactivated before attempting to reboot.
3. If a BA06 000x error code is reported, the partition is already deactivated and in the error state. Reboot by activating the partition. If the reboot is still not successful, go to step 3 on page 88.

This procedure assumes that a diagnostic CD-ROM and an optical drive from which it can be booted are available, or that diagnostics can be run from a NIM (Network Installation Management) server. Booting the diagnostic image from an optical drive or a NIM server is referred to as running standalone diagnostics.

1. Is a management console attached to the managed system?

Yes: Continue with the next step.

No: Go to step 3.

2. Look at the service action event error log on the management console. Perform the actions necessary to resolve any open entries that affect devices in the boot path of the partition or that indicate problems with I/O cabling. Then try to reboot the partition. Does the partition reboot successfully?

Yes: This ends the procedure.

No: Continue with the next step.

3. Boot to the SMS main menu:

- If you are rebooting a partition from partition standby (LPAR), go to the properties of the partition and select **Boot to SMS**, then activate the partition.
- If you are rebooting from platform standby, access the ASMI. See Accessing the Advanced system Management Interface using a Web browser. Select **Power/Restart Control**, then **Power On/Off System**. In the Linux partition mode boot box, select **Boot to SMS menu > Save Settings and Power On**.

At the SMS main menu, select **Select Boot Options** and verify whether the intended boot device is correctly specified in the boot list. Is the intended load device correctly specified in the boot list?

- **Yes:** Perform the following steps:
 - a. Remove all removable media from devices in the boot list from which you do not want to load the operating system.
 - b. If you are attempting to load the operating system from a network, go to step 4.
 - c. If you are attempting to load the operating system from a disk drive or an optical drive, go to step 7.
 - d. **No:** Go to step 5.
4. If you are attempting to load the operating system from the network, perform the following steps:
 - Verify that the IP parameters are correct.
 - Use the SMS ping utility to attempt to ping the target server. If the ping is not successful, have the network administrator verify the server configuration for this client.
 - Check with the network administrator to ensure that the network is up. Also ask the network administrator to verify the settings on the server from which you are trying to load the operating system.
 - Check the network cabling to the adapter.Restart the partition and try loading the operating system. Does the operating system load successfully?

Yes: This ends the procedure.

No: Go to step 7.

5. Use the SMS menus to add the intended boot device to the boot sequence. Can you add the device to the boot sequence?

Yes: Restart the partition. **This ends the procedure.**

No: Continue with the next step.

6. Ask the customer or system administrator to verify that the device you are trying to load from is assigned to the correct partition. Then select **List All Devices** and record the list of bootable devices that displays. Is the device from which you want to load the operating system in the list?

Yes: Go to step 7.

No: Go to step 10 on page 89.

7. Try to load and run standalone diagnostics against the devices in the partition, particularly against the boot device from which you want to load the operating system. You can run standalone diagnostics from an optical drive or a NIM server. To boot standalone diagnostics, follow the detailed procedures in Running the online and stand-alone diagnostics.

Note: When attempting to load diagnostics on a partition from partition standby, the device from which you are loading standalone diagnostics must be made available to the partition that is not able to load the operating system, if it is not already in that partition. Contact the customer or system administrator if a device must be moved between partitions in order to load standalone diagnostics.

Did standalone diagnostics load and start successfully?

Yes: Go to step 8.

No: Go to step 14 on page 90.

8. Was the intended boot device present in the output of the option **Display Configuration and Resource List**, that is run from the Task Selection menu?
 - **Yes:** Continue with the next step.
 - **No:** Go to step 10.
 9. Did running diagnostics against the intended boot device result in a **No Trouble Found** message?

Yes: Go to step 12 on page 90.

No: Go to the list of service request numbers and perform the repair actions for the SRN reported by the diagnostics. When you have completed the repair actions, go to step 13 on page 90.
 10. Perform the following actions:
 - a. Perform the first item in the action list below. In the list of actions below, choose SCSI or IDE based on the type of device from which you are trying to boot the operating system.
 - b. Restart the system or partition.
 - c. Stop at the SMS menus and select **Select Boot Options**.
 - d. Is the device that was not appearing previously in the boot list now present?

Yes: Go to Verify a repair. **This ends the procedure.**

No: Perform the next item in the action list and then return to step 10b. If there are no more items in the action list, go to step 11.
- Action list:**
- Note:** See System FRU locations for part numbers and links to exchange procedures.
- a. Verify that the SCSI or IDE cables are properly connected. Also verify that the device configuration and address jumpers are set correctly.
 - b. Do one of the following:
 - **SCSI boot device:** If you are attempting to boot from a SCSI device, remove all hot-swap disk drives (except the intended boot device, if the boot device is a hot-swap drive). If the boot device is present in the boot list after you boot the system to the SMS menus, add the hot-swap disk drives back in one at a time, until you isolate the failing device.
 - **IDE boot device:** If you are attempting to boot from an IDE device, disconnect all other internal SCSI or IDE devices. If the boot device is present in the boot list after you boot the system to the SMS menus, reconnect the internal SCSI or IDE devices one at a time, until you isolate the failing device or cable.
 - c. Replace the SCSI or IDE cables.
 - d. Replace the SCSI backplane (or IDE backplane, if present) to which the boot device is connected.
 - e. Replace the intended boot device.
 - f. Replace the system backplane.
11. Choose from the following:
 - If the intended boot device is not listed, go to “PFW1548: Memory and processor subsystem problem isolation procedure” on page 182. **This ends the procedure.**
 - If an SRN is reported by the diagnostics, go to the list of service request numbers and follow the action listed. **This ends the procedure.**

12. Have you disconnected any other devices?
Yes: Reinstall each device that you disconnected, one at a time. After you reinstall each device, reboot the system. Continue this procedure until you isolate the failing device. Replace the failing device, then go to step 13.
No: Perform an operating system-specific recovery process or reinstall the operating system. **This ends the procedure.**
13. Is the problem corrected?
Yes: Go to Verify a repair. **This ends the procedure.**
No: If replacing the indicated FRUs did not correct the problem, or if the previous steps did not address your situation, go to “PFW1548: Memory and processor subsystem problem isolation procedure” on page 182. **This ends the procedure.**
14. Is a SCSI boot failure (where you cannot boot from a SCSI-attached device) also occurring?
 • **Yes:** Go to “PFW1548: Memory and processor subsystem problem isolation procedure” on page 182. **This ends the procedure.**
 • **No:** Continue to the next step.
15. Perform the following actions to determine if another adapter is causing the problem:
 a. Remove all adapters except the one to which the optical drive is attached and the one used for the console.
 b. Reload the standalone diagnostics. Can you successfully reload the standalone diagnostics?
 • **Yes:** Perform the following steps:
 1) Reinstall the adapters that you removed (and attach devices as applicable) one at a time. After you reinstall each adapter, retry the boot operation until the problem reoccurs.
 2) Replace the adapter or device that caused the problem.
 3) Go to Verify a repair. **This ends the procedure.**
 • **No:** Continue with the next step.
16. The graphics adapter (if installed), optical drive, IDE or SCSI cable, or system board is most likely defective. Does your system have a PCI graphics adapter installed?
Yes: Continue with the next step.
No: Go to step 18
17. Perform the following steps to determine if the graphics adapter is causing the problem:
 a. Remove the graphics adapter.
 b. Attach a TTY terminal to the system port.
 c. Try to reload standalone diagnostics. Do the standalone diagnostics load successfully?
Yes: Replace the graphics adapter. **This ends the procedure.**
No: Continue with the next step.
18. Replace the following (if not already replaced), one at a time, until the problem is resolved:
 a. Optical drive
 b. IDE or SCSI cable that goes to the optical drive
 c. System board that contains the integrated SCSI or IDE adapters.
 If this resolves the problem, go to Verify a repair. If the problem still persists or if the previous descriptions did not address your particular situation, go to “PFW1548: Memory and processor subsystem problem isolation procedure” on page 182.
This ends the procedure.

SCSI service hints

Use one or more of the following procedures when servicing SCSI adapter or devices.

General SCSI configuration checks

With any type of SCSI problem, begin with the following steps:

1. Verify that all SCSI devices on the SCSI bus have a unique address.
2. Verify that all cables are connected securely and that there is proper termination at both ends of the SCSI bus.
3. Verify that the cabling configuration does not exceed the maximum cable length for the adapter in use.
4. Verify that the adapters and devices that you are working with are at the appropriate microcode levels for the customer situation. If you need assistance with microcode issues, contact your service support structure.
5. If there are multiple SCSI adapters on the SCSI bus, verify that the customer is using the appropriate software to support such an arrangement. If the correct software is not in use, some SCSI errors should be expected when multiple adapters attempt to access the same SCSI device. Also, each adapter should have a unique address.

High availability or multiple SCSI system checks

If you have a high-availability configuration, or if more than one system is attached to the same SCSI bus, do the following:

1. Verify that the adapters and devices have unique SCSI addresses. The default SCSI adapter address is always 7. If you have more than one adapter on the bus, change the address of at least one by using SMIT (**SMIT Devices > SCSI Adapter > Change/Show characteristics of an adapter**). You must make the changes to the database only, then reboot the system in order for the change to take effect.

Note: Diagnostics defaults to using ID 7 (do not use this ID in high availability configurations).

2. If RAID devices such as the 7135 or 7137 are attached, run the appropriate diagnostics for the device. If problems occur, contact your service support structure for assistance. If the diagnostics are run incorrectly on these devices, misleading SRNs can result.
3. Diagnostics cannot be run against OEM devices; doing so results in misleading SRNs.
4. Verify that all cables are connected securely and that both ends of the SCSI bus is terminated correctly.
5. Verify that the cabling configuration does not exceed the maximum cable length for the adapter in use. See the SCSI Cabling section in the *RS/6000® eServer™ pSeries Adapters, Devices, and Cable Information for Multiple Bus Systems* for more details on SCSI cabling issues.
6. Verify that the adapter and devices are at the appropriate microcode levels for the customer situation. If you need assistance with microcode issues, contact your service support structure.

SCSI-2 single-ended adapter PTC failure isolation procedure

Before replacing a SCSI-2 single-ended adapter, use these procedures to determine if a short-circuit condition exists on the SCSI bus. The same positive temperature coefficient (PTC) resistor is used for both the internal and external buses. The PTC protects the SCSI bus from high currents due to short-circuiting on the cable, terminator, or device. It is unlikely that the PTC can be tripped by a defective adapter. Unless instructed to do so by these procedures, do not replace the adapter because of a tripped PTC resistor.

A fault (short-circuit) causes an increase in PTC resistance and temperature. The increase in resistance causes the PTC to halt current flow. The PTC returns to a low resistive and low temperature state when the fault is removed from the SCSI bus or when the system is turned off. Wait 5 minutes for the PTC resistor to fully cool, then retest.

These procedures determine if the PTC resistor is still tripped and then determine if there is a short-circuit somewhere on the SCSI bus.

Determining where to start

Use the following steps to determine the adapter configuration and select the appropriate procedure:

- If there are external cables attached to the adapter, start with the External Bus PTC Isolation Procedure for your type of adapter.
- If there are no external cables attached, start with the “Internal SCSI-2 single-ended bus PTC isolation procedure” on page 93.
- If there is a combination of external and internal cables start with the External Bus PTC Isolation Procedure for your type of adapter. If this procedure does not resolve the problem, continue with the Internal Bus PTC Isolation Procedure for your type of adapter.

External SCSI-2 single-ended bus PTC isolation procedure

Isolate the external SCSI bus PTC fault with the following procedure:

Note: The external bus is of single-ended design.

1. Ensure the system power and all externally attached device power is turned off. All testing is accomplished with the power off.
2. Disconnect any internal and external cables from the adapter and remove the adapter from the system.
3. Verify with a digital ohmmeter that the internal PTC resistor, labeled Z1, (see the illustration after Internal SCSI-2 Single-Ended Bus PTC Isolation Procedure, step 3 on page 93) is cool and in a low resistance state, typically less than 1/2 Ohm. Measuring across, be sure to probe both sides of the PTC where the solder joints and board come together. The polarity of the test leads is not important. If necessary, allow the PTC resistor to cool and measure again.
4. Locate Capacitor C1 and measure the resistance across it by using the following procedure:
 - a. Connect the positive lead to the side of the capacitor where the + is indicated on the board near C1. Be sure to probe at the solder joint where the capacitor and board come together.
 - b. Connect the negative lead to the opposite side of the capacitor marked *GND*. Be sure to probe at the solder joint where the capacitor and board come together.
 - c. If there is no short-circuit present, then the resistance reading is high, typically hundreds of Ohms.

Note: Because this is a measurement across unpowered silicon devices, the reading is a function of the ohmmeter used.

- If there is a fault, the resistance reading is low, typically below 10 Ohms. Because there are no cables attached, the fault is on the adapter. Replace the adapter.

Note: Some multi-function meters label the leads specifically for voltage measurements. When using this type of meter to measure resistance, the plus lead and negative lead may not be labeled correctly. If you are not sure that your meter leads accurately reflect the polarity for measuring resistance, repeat this step with the leads reversed. If the short-circuit is not indicated with the leads reversed, the SCSI bus is not faulted (short-circuited).

- If the resistance measured was high, proceed to the next step.
5. Reattach the external cable to the adapter, then do the following:
 - a. Measure across C1 as previously described.
 - b. If the resistance is still high, in this case above 10 Ohms, then there is no apparent cause for a PTC failure from this bus. If there are internal cables attached, continue to the “Internal SCSI-2 single-ended bus PTC isolation procedure” on page 93.
 - c. If the resistance is less than 10 Ohms, there is a possibility of a fault on the external SCSI bus. Troubleshoot the external SCSI bus by disconnecting devices and terminators. Measure across C1 to determine whether the fault has been removed. Replace the failing component. Go to Verify a repair.

External SCSI-2 single-ended bus probable tripped PTC causes

The following list provides some suggestions of things to check when the PTC is tripped:

- A short-circuited terminator or cable. Check for bent pins on each connector and removable terminator.

- Intermittent PTC failures can be caused by improperly seated cable connectors. Reseat the connector and flex the cable in an attempt to duplicate the fault condition across C1.
- Plugging or unplugging a cable or terminator while the system is turned on (hot plugging).
- A short-circuited device.
- Differential devices or terminators are attached to the single-ended SCSI bus.

Note: The SCSI-2 Fast/Wide and Ultra PCI Adapters use an onboard electronic terminator on the external SCSI bus. When power is removed from the adapter, as in the case of this procedure, the terminator goes to a high impedance state and the resistance measured cannot be verified, other than it is high. Some external terminators use an electronic terminator, which also goes to a high impedance state when power is removed. Therefore, this procedure is designed to find a short-circuited or low resistance fault as opposed to the presence of a terminator or a missing terminator.

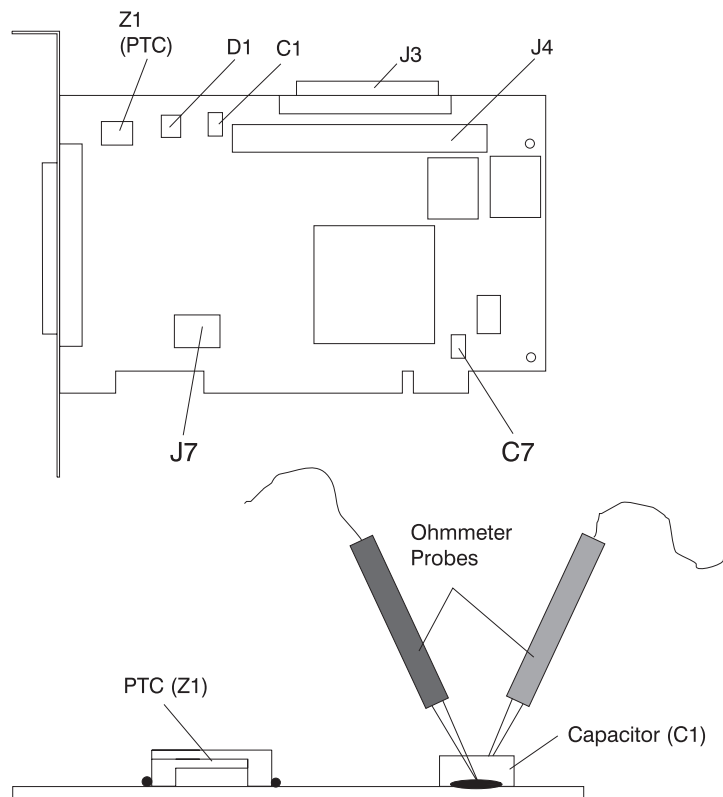
Internal SCSI-2 single-ended bus PTC isolation procedure

Isolate the internal SCSI bus PTC resistor fault with the following procedure:

Note: The internal bus is single-ended.

1. Ensure that system power and all externally attached device power is turned off.
2. Disconnect any internal and external cables from the adapter, then remove the adapter from the system.
3. Verify with a digital ohmmeter, that the internal PTC resistor, labeled Z1, is cool and in a low resistance state, typically less than 1/2 Ohm. Measuring across, be sure to probe both sides of the PTC where the solder joints and board come together. The polarity of the test leads is not important. If necessary, allow the PTC to cool and measure again. See the following illustration.

SCSI-2 Fast/Wide PCI Single-Ended Adapter



Note: Ensure that only the probe tips are touching the solder joints. Do not allow the probes to touch any other part of the component.

4. Locate capacitor C1 and measure the resistance across it using the following procedure:
 - a. Connect the positive lead to the side of the capacitor where the + is indicated. Be sure to probe at the solder joint where the capacitor and board come together.
 - b. Connect the negative lead to the opposite side of the capacitor. Be sure to probe at the solder joint where the capacitor and board come together.
 - c. If there is no short-circuit present, the resistance reading is high, typically hundreds of Ohms.

Note: Because this is a measurement across unpowered silicon devices, the reading is a function of the ohmmeter used.

- If there is a fault, the resistance reading is low, typically below 10 Ohms. Because there are no cables attached, the fault is on the adapter. Replace the adapter.

Note: Some multi-function meters label the leads specifically for voltage measurements. When using this type of meter to measure resistance, the plus lead and negative lead may not be labeled correctly. If you are not sure that your meter leads accurately reflect the polarity for measuring resistance, repeat this step with the leads reversed. Polarity is important in this measurement to prevent forward-biasing diodes, which lead to a false low resistance reading. If the short circuit is not indicated with the leads reversed, the SCSI bus is not faulted (short-circuited).

- If the resistance is high and there is no internal cable to reattach, there is no apparent cause for the PTC resistor diagnostic failure.
 - If the resistance is high and there is an internal cable to reattach, proceed to the next step.
5. Reattach the internal cable to the adapter, then do the following:
 - a. Measure across C1 as described previously.
 - b. If the resistance is still high, above 25 Ohms, there is no apparent cause for a PTC failure.
 - c. If the resistance is less than 10 Ohms, a fault on the internal SCSI bus is possible. Troubleshoot the internal SCSI bus by disconnecting devices and terminators. Measure across C1 to determine if the fault has been removed.

Note: Some internal cables have nonremovable terminators.

Internal SCSI-2 single-ended bus probable tripped PTC resistor causes

The following list provides some suggestions of things to check when the PTC is tripped:

- A short-circuited terminator or cable. Check for bent pins on each connector and removable terminator.
- Intermittent PTC failures can be caused by incorrectly seated cable connectors. Reseat the connector and flex the cable in an attempt to duplicate the fault condition across C1.
- A short-circuited device.
- On some systems, the terminator is fixed to the internal cable and cannot be removed. If all devices are removed from the cable and the resistance is still low, then the cable should be replaced.

Note: The SCSI-2 Fast/Wide and Ultra PCI adapters use an onboard electronic terminator on the internal SCSI bus. When power is removed from the adapter, as in the case of this procedure, the terminator goes to a high impedance state and the resistance measured cannot be verified, other than it is high. Some internal terminators use an electronic terminator, which also goes to a high impedance state when power is removed. Therefore, this procedure is designed to find a short-circuit or low resistance fault as opposed to the presence of a terminator or a missing terminator.

SCSI-2 differential adapter PTC failure isolation procedure

Use this procedure when SRN xxx-240 or xxx-800 has been indicated.

The differential adapter can be identified by the 4-B or 4-L on the external bracket plate.

Before replacing a SCSI-2 differential adapter, use these procedures to determine if a short-circuit condition exists on the SCSI Bus. The PTC protects the SCSI bus from high currents due to short-circuits

on the cable, terminator, or device. It is unlikely that the PTC can be tripped by a defective adapter. Unless instructed to do so by these procedures, do not replace the adapter because of a tripped PTC resistor.

A fault (short-circuit) causes an increase in PTC resistance and temperature. The increase in resistance causes the PTC to halt current flow. The PTC returns to a low resistive and low temperature state when the fault is removed from the SCSI bus or when the system is turned off. Wait 5 minutes for the PTC resistor to fully cool, then retest.

These procedures determine if the PTC resistor is still tripped and then determine if there is a short-circuit somewhere on the SCSI bus.

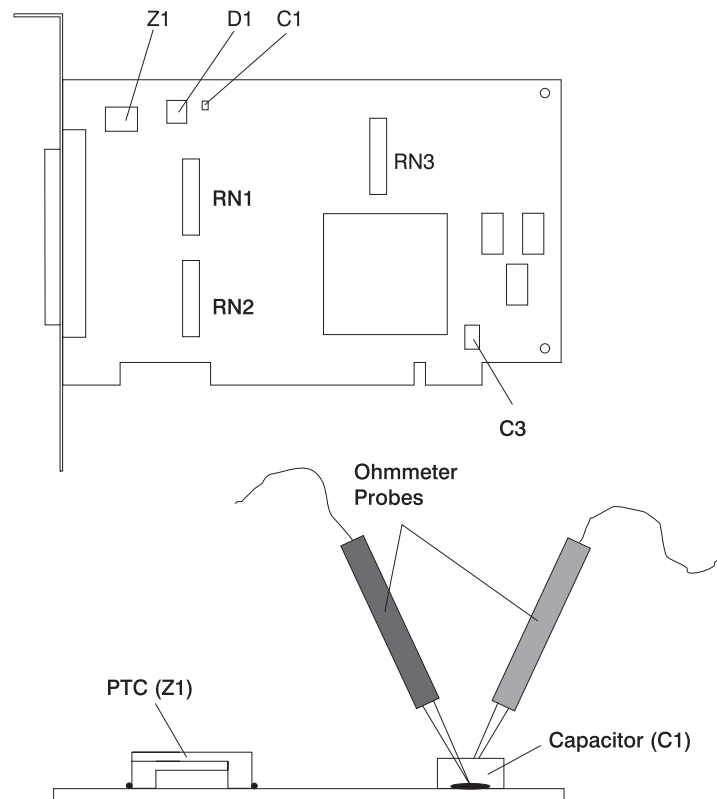
External SCSI-2 differential adapter bus PTC isolation procedure

Isolate the external SCSI bus PTC fault with the following procedure:

Notes:

1. Ensure that only the probe tips are touching the solder joints. Do not allow the probes to touch any other part of the component.
2. The external bus is differential.
 1. Ensure that system power and all externally attached device power is turned off.
 2. Check to ensure all devices are marked SCSI Differential and that the terminator on the end of the SCSI bus is also marked differential. If not, you may have a single-ended SCSI device or terminator on the differential SCSI bus. Single-ended devices do not work on a differential SCSI bus and may cause a PTC type error to be reported. The entire SCSI bus may appear to be intermittent. After ensuring the system is completely differential, continue.
3. Disconnect the external cables from the adapter and remove the adapter from the system.
4. Verify with a digital ohmmeter that the internal PTC resistor, labeled Z1, is cool and in a low resistance state, typically less than 1/2 Ohm. See the following illustration. Measuring across, be sure to probe both sides of the PTC resistor where the solder joints and board come together. The polarity of the test leads is not important. If necessary, allow the PTC resistor to cool and measure again.

SCSI-2 Differential Fast/Wide PCI Adapter



5. Locate capacitor C1 and measure the resistance across it using the following procedure:
 - a. Connect the negative lead to the side of the capacitor marked *GND*. Be sure to probe at the solder joint where the capacitor and board come together.
 - b. Connect the positive lead to the side of the capacitor marked *Cathode D1* on the board near C1. Be sure to probe at the solder joint where the capacitor and board come together.
 - If there is no fault present, then the resistance reading is 25 to 35 Ohms. The adapter is not faulty. Continue to the next step.
 - If the resistance measured is higher than 35 Ohms, check to see if RN1, RN2, and RN3 are plugged into their sockets. If these sockets are empty, you are working with a Multi-Initiators or High-Availability system. With these sockets empty, a resistive reading across C1 cannot be verified other than it measures a high resistance (not a short-circuit). If the resistance measurement is not low enough to be suspected as a fault (lower than 10 Ohms), continue to the next step.
 - If the resistance is high and there is no external cable to reattach, there is no apparent cause for the PTC diagnostic failure.
 - If the resistance reading is low, typically below 10 Ohms, there is a fault. Because there are no cables attached, the fault is on the adapter. Replace the adapter.
 - If the resistance measured was high and there is an external cable to reattach, proceed to the next step.
6. Reattach the external cable to the adapter.
 - a. Measure across C1 as previously described.
 - b. If the resistance is between 10 to 20 Ohms, there is no apparent cause for a PTC resistor failure.
 - c. If the resistance is less than 10 Ohms, there is a possibility of a fault on the external SCSI bus. Troubleshoot the external SCSI bus by disconnecting devices and terminators. Measure across C1 to determine if the fault has been removed.

SCSI-2 differential adapter probable tripped PTC causes

The following list provides some suggestions of things to check when the PTC is tripped:

- A short-circuited terminator or cable. Check for bent pins on each connector and removable terminator.
- Intermittent PTC failures can be caused by incorrectly seated cable connectors. Reseat the connector and flex the cable in an attempt to duplicate the fault condition across C1.
- Plugging or unplugging a cable or terminator while the system is turned on (hot-plugging).
- A short-circuited device.
- Single-ended devices are attached to the differential SCSI bus.

Dual-channel ultra SCSI adapter PTC failure isolation procedure

Use the following procedures if diagnostics testing indicates a potential positive temperature coefficient (PTC) resistor fault or the TERMPWR short-circuited LED is lit.

This procedure is used for SRNs 637-240 and 637-800 on the Dual-Channel Ultra SCSI Adapter. If the TERMPWR short-circuited LED is lit, use this procedure to help isolate the source of the problem on the failing channel.

1. Identify the adapter by its label of 4-R on the external bracket. Then, determine if the failure is on channel A or channel B.
2. The same PTC is used for both the internal and external buses. The PTC protects the SCSI bus from high currents due to short-circuits on the cable, terminator, or device. It is unlikely that the PTC can be tripped by a defective adapter. A fault (short-circuit) causes an increase in PTC resistance and temperature. The increase in resistance causes the PTC to halt current flow. The PTC returns to a low resistive and low temperature state when the fault is removed from the SCSI bus or when the system is turned off.

Wait 5 minutes for the PTC resistor to fully cool, then retest.

3. If this same error persists, or the TERMPWR short-circuited LED is lit, replace the components of the failing channel in the following order (wait five minutes between steps):
 - a. If the failure is on the external cable, replace the following:
 - 1) Cable
 - 2) Device
 - 3) Attached subsystem
 - 4) Adapter
 - b. If the failure is on the internal cable, replace the following:
 - 1) Cable
 - 2) Device
 - 3) Backplane
 - 4) Adapter
 - c. If the failure persists, verify that the parts exchanged are in the correct channel (internal or external, A or B).

If the errors are still occurring, continue isolating the problem by going to "MAP 0050" on page 108.

64-bit PCI-X dual channel SCSI adapter PTC failure isolation procedure

Use the following procedures if diagnostics testing indicates a potential self-resetting thermal fuse problem. This procedure is used for SRN 2524-702 on the integrated dual-channel SCSI adapter in a 7039/651 system.

1. Identify the adapter as the one embedded in the system board. Then, determine if the failure is on channel 0 or channel 1.
2. The thermal fuse protects the SCSI bus from high currents due to short-circuits on the terminator, cable, or device. It is unlikely that the thermal fuse can be tripped by a defective adapter. A fault

(short-circuit) causes an increase in resistance and temperature of the thermal fuse. The increase in temperature causes the thermal fuse to halt current flow. The thermal fuse returns to a low resistive and low temperature state when the fault is removed from the SCSI bus or when the system is turned off.

Wait 10 seconds for the thermal fuse to reset itself and recover, then retest.

3. If the same error persists, replace the components of the failing channel in the following order. Wait 10 seconds for the thermal fuse to reset itself between steps.
 - a. Cable
 - b. Device
 - c. DASD backplane (if present)
 - d. System board (adapter)
4. If the failure persists, verify that the parts exchanged are in the correct channel (0 or 1). If the errors are still occurring, continue isolating the problem by going to “MAP 0050” on page 108.

MAP 0020

Use this MAP to get a service request number (SRN) if the customer or a previous MAP provided none.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

Note: If you are unable to power the system on, see the “Power isolation procedures” on page 35.

- **Step 0020-1**

Visually check the server for obvious problems such as unplugged power cables or external devices that are powered off.

Did you find an obvious problem?

No Go to Step 0020-2.

Yes Fix the problem, then go to Verify a repair.

- **Step 0020-2**

Are the online diagnostics installed?

Note: If online diagnostics is not installed on the server or partition, answer no to the above question.

No If the operating system is running, perform its shutdown procedure. Get help if needed. Go to Step 0020-4.

Yes Go to Step 0020-3.

- **Step 0020-3**

Note: When possible, run online diagnostics in service mode. Online diagnostics perform additional functions compared to standalone diagnostics.

Run online diagnostics in concurrent mode when the customer does not let you power-off the system unit. To run online diagnostics in service mode, go to substep 5. If the system unit is already running in the service mode and you want to run online diagnostics, proceed to the question at the bottom of this MAP step. Otherwise, continue with 1 through 4 on page 99 in the following procedure.

1. Log in with root authority or use CE login. If necessary, ask the customer for the password.
2. Enter the **diag -a** command to check for missing resources.
 - a. If you see a command line prompt, proceed to substep 3 on page 99 below.
 - b. If the DIAGNOSTIC SELECTION menu is displayed, with the letter M shown next to any resource, select that resource, then press Commit (F7 key). Follow any instructions displayed. If

you are prompted with a message Do you want to review the previously displayed error select **Yes** and press Enter. If an SRN displays, record it, and go to Step 0020-15. If there is no SRN, go to substep 3 below.

- c. If the MISSING RESOURCE menu is displayed, follow any instructions displayed. If you are prompted with a message Do you want to review the previously displayed error select **Yes** and press Enter. If an SRN displays, record it, and go to Step 0020-15. If there is no SRN, go to substep 3 below.

3. Enter the **diag** command.
4. Go to Step 0020-5.
5. If the operating system is running, perform its shutdown procedure (get help if needed).
6. Turn off the system unit power and wait 45 seconds before proceeding.
7. Turn on the system unit power.
8. Load the online diagnostics in service mode.
9. Wait until the Diagnostic Operating Instructions display or the system appears to have stopped.

Are the Diagnostic Operating Instructions displayed?

No Go to Step 0020-16.

Yes Go to Step 0020-5.

• **Step 0020-4**

Note: If you are working on a partition, do not remove the power as directed in the following procedure. Remove the power only if you are working on a server that does not have multiple partitions.

1. If the server does not have multiple partitions, disconnect the power from the server, wait 45 seconds, then reconnect the power.
2. Perform the action specified in the following table.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Power on the system to the hypervisor standby. Note: Slow boot is not supported.

Set the server to perform a slow boot for the next boot that is performed. If the system does not support slow boot, do a normal boot in the next step.

3. See Running the standalone diagnostics from CD-ROM to load the standalone diagnostics. Before continuing to the next step, ensure that the server power is turned on, or if you are working on a partition, the partition is started. The server or partition should be booting the standalone diagnostics from a CD-ROM or a network server.
 4. Wait until the Diagnostic Operating Instructions display or the server boot appears to have stopped.
- Are the Diagnostic Operating Instructions displayed?

No Go to Step 0020-16.

Yes Go to Step 0020-5.

• **Step 0020-5**

Are the Diagnostic Operating Instructions displayed (screen number 801001) with no obvious problem (for example, blurred or distorted)?

No For display problems, go to Step 0020-12.

Yes To continue with diagnostics, go to Step 0020-6.

• **Step 0020-6**

Press the Enter key.

Is the FUNCTION SELECTION menu displayed (screen number 801002)?

No Go to Step 0020-13.

Yes Go to Step 0020-7.

• **Step 0020-7**

1. Select the option **ADVANCED DIAGNOSTICS ROUTINES**.

Notes:

- a. If the terminal type is not defined, do so now. You cannot proceed until this is complete.
 - b. If you have SRNs from a Previous Diagnostics Results screen, process these Previous Diagnostics Results SRNs prior to processing any SRNs you may have received from an SRN reporting screen.
2. If the DIAGNOSTIC MODE SELECTION menu (screen number 801003) displays, select the option **PROBLEM DETERMINATION**.
3. Find your system response in the following table. Follow the instructions in the Action column.

System Response	Action
Previous Diagnostic Results. Do you want to review the previously displayed error?	<p>You have a pending item in the error log for which there is no corresponding Log Repair Action. To see this error, select YES at the prompt.</p> <p>Information from the error log is displayed in order of last event first. Record the error code, the FRU names and the location code of the FRUs.</p> <p>Go to Step 0020-15.</p>
The RESOURCE SELECTION menu or the ADVANCED DIAGNOSTIC SELECTION menu is displayed (screen number 801006).	Go to Step 0020-8.
The system halted while testing a resource.	Record SRN 110-xxxx, where xxxx is the first four digits of the menu number displayed in the upper-right corner of the diagnostic menu. Go to Step 0020-15.
The MISSING RESOURCE menu is displayed or the letter M is displayed alongside a resource in the resource list.	<p>If the MISSING RESOURCE menu is displayed, follow the displayed instructions until either the ADVANCED DIAGNOSTIC SELECTION menu or an SRN is displayed. If an M is displayed in front of a resource (indicating that it is missing) select that resource then choose the Commit (F7 key).</p> <p>Note:</p> <ol style="list-style-type: none"> 1. Run any supplemental media that may have been supplied with the adapter or device, and then return to substep 1 of Step 0020-7. 2. If the SCSI enclosure services device appears on the missing resource list along with the other resources, select it first. 3. ISA adapters cannot be detected by the system. The ISA adapter configuration service aid in standalone diagnostics allows the identification and configuration of ISA adapters. <p>If the ADVANCED DIAGNOSTIC SELECTION menu is displayed, go to Step 0020-11.</p> <p>If an 8-digit error code is displayed, record it and go to Start of call.</p> <p>If an SRN is displayed, record it, and go to Step 0020-15.</p>

System Response	Action
The message The system will now continue the boot process is displayed continuously on the system unit's console.	Go to Step 0020-4.
The message Processing supplemental diagnostic diskette media is displayed continuously on the system unit's console.	Call your service support.
The diagnostics begin testing a resource. Note: If the option Problem Determination was selected from the DIAGNOSTIC MODE SELECTION menu, and if a recent error has been logged in the error log, the diagnostics automatically begin testing the resource.	Follow the displayed instructions. If the No Trouble Found screen is displayed, press Enter. If another resource is tested, repeat this step. If the ADVANCED DIAGNOSTIC SELECTION menu is displayed, go to Step 0020-11. If an SRN is displayed, record it, and go to Step 0020-15. If an 8-digit error code is displayed, go to Start of call.
The system did not respond to selecting the advanced diagnostics option.	Go to Step 0020-13.
A system unit with a beeper did not beep while booting.	Record SRN 111-947 and then go to Step 0020-15
The system unit emits a continuous sound from the beeper.	Record SRN 111-947 and then go to Step 0020-15.
An SRN or an eight-digit error code is displayed.	Record the error code, the FRU names, and the location code for the FRUs. If a SRN is displayed, go to Step 0020-15. If an 8-digit error code is displayed, go to Start of call.
The system stopped with a 3-digit or 4-digit code displayed in the operator panel display.	Record SRN 101-xxx (where xxx is the rightmost three digits of the displayed code). Go to Step 0020-15.
An 888 message is displayed in the operator panel display. Note: The 888 may or may not be flashing.	Go to "MAP 0070" on page 116.

- **Step 0020-8**

On the DIAGNOSTIC SELECTION or ADVANCED DIAGNOSTIC SELECTION menu, look through the list of resources to make sure that all adapters and SCSI devices are listed including any new resources.

Notes:

1. Resources attached to serial and parallel ports may not appear in the resource list.
2. If running diagnostics in a partition within a partitioned system, resources assigned to other partitions will not be displayed on the resource list.

Did you find all the adapters or devices on the list?

No Go to Step 0020-9.

Yes Go to Step 0020-11.

- **Step 0020-9**

Is the new device or adapter an exact replacement for a previous one installed at same location?

No Go to Step 0020-10.

Yes The replacement device or adapter may be defective. If possible, try installing it in an alternate location if one is available; if it works in that location, then suspect that the location where it failed to appear has a defective slot. Schedule time to replace the hardware that supports that slot. If it does not work in alternate location, suspect a bad replacement adapter or device. If you are still unable to detect the device or adapter, contact your service support structure.

• **Step 0020-10**

Is the operating system software to support this new adapter or device installed?

No Load the operating system software.

Yes The replacement device or adapter may be defective. If possible, try installing it in an alternate location if one is available; if it works in that location, then suspect that the location where it failed to appear has a defective slot. Schedule time to replace the hardware that supports that slot. If it does not work in alternate location, suspect a bad replacement adapter or device. If you are still unable to detect the device or adapter, contact your service support structure.

• **Step 0020-11**

Select and run the diagnostic test problem determination or system verification on one of the following:

- The resources with which the customer is having problems. If the resource is not shown on the DIAGNOSTIC SELECTION menu, then run diagnostics on its parent (the adapter or controller to which the resource is attached).
- The resources you suspect are causing a problem.
- All resources.

Note: When choosing **All Resources**, interactive tests are not done. If no problem is found running **All Resources**, select each of the individual resources on the selection menu to run diagnostics tests on to do the interactive tests

Find the response in the following table, or follow the directions on the test results screen.

Diagnostic Response	Action
An SRN or an eight-digit error code is displayed on the screen.	Record the error code, the FRU names, and the location code for the FRUs. If an SRN is displayed, go to Step 0020-15. If an 8-digit error code is displayed, go to the information center, and perform a search on the error code to obtain the name and location of the failing FRU. Perform the listed action.
The TESTING COMPLETE menu and the No trouble was found message are displayed, and you have not tested all of the resources.	Press Enter and continue testing other resources.
The TESTING COMPLETE menu and the No trouble was found message are displayed, and you have tested all of the resources.	Go to Step 0020-14. Note: If you have not run the sysplanar test, do so before going to Step 0020-14.
The system halted while testing a resource.	Record SRN 110-xxxx, where xxxx is the first three or four digits of the menu number displayed in the upper-right corner of the diagnostic menu screen. Go to Step 0020-15.

Diagnostic Response	Action
When running the Online Diagnostics, an installed device does not appear in the test list.	Ensure that the diagnostic support for the device was installed. The display configuration service aid can be used to determine whether diagnostic support is installed for the device. Record SRN 110-101. Go to Step 0020-15. Note: Supplemental diskettes may be required if service aids are run from standalone diagnostics.
The IBM ARTIC960 Quad T1/E1 adapter diagnostics display a message indicating that the interface board (PMC) is either not installed or is malfunctioning.	Install a PMC board if not already installed. When running online diagnostics on any of the IBM ARTIC960 family of adapters and the message indicates that the PMC is not installed, but it is installed, do the following: <ul style="list-style-type: none"> • Reseat the PMC board, then run diagnostics. • If the response is the same, replace the PMC and then go to Verify a repair.
The symptom was not found in the table.	Return to the Start of call.

- **Step 0020-12**

The following step analyzes a console display problem.

Find your type of console display in the following table. Follow the instructions given in the Action column.

Type of Console Display	Action
TTY-type terminal	Be sure the TTY terminal attributes are set correctly. If you did not find a problem with the attributes, go to the documentation for this type of TTY terminal, and continue problem determination. If you do not find the problem, record SRN 111-259, then go the Step 0020-15.
Graphics display	Go to the documentation for this type of graphics display, and continue problem determination. If you do not find the problem, record SRN 111-82c, then go to Step 0020-15.
Management console	For a Hardware Management Console (HMC), go to the service procedures in Troubleshooting the HMC. For an IBM Systems Director Management Console (SDMC), go to the service procedure in Troubleshooting the SDMC. If management console tests find no problem, there may be a problem with the communication between the management console and the managed system. If the management console communicates with the managed system through a network interface, verify whether the network interface is functional. If the management console communicates with the managed system through the management console interface, check the cable between the management console and the managed system. If it is not causing the problem, suspect a configuration problem of the management console communications setup.

- **Step 0020-13**

There is a problem with the keyboard.

Find the type of keyboard you are using in the following table. Follow the instructions given in the Action column.

Keyboard Type	Action
Type 101 keyboard (U.S.). Identify by the size of the Enter key. The Enter key is in only one horizontal row of keys.	Record SRN 111-736, then go to Step 0020-15.
Type 102 keyboard (W.T.). Identify by the size of the Enter key. The Enter key extends into two horizontal rows.	Record SRN 111-922; then go to Step 0020-15.
Kanji-type keyboard. (Identify by the Japanese characters.)	Record SRN 111-923; then go to Step 0020-15.
TTY terminal keyboard	Go to the documentation for this type of TTY terminal and continue problem determination.
Hardware Management Console (HMC)	Go to the HMC service procedures in Troubleshooting the HMC. If HMC tests find no problem, there may be a problem with the communication between the HMC and the managed system. If the HMC communicates with the managed system through a network interface, verify whether the network interface is functional. If the HMC communicates with the managed system through the HMC interface, check the cable between the HMC and the managed system. If it is not causing the problem, suspect a configuration problem of the HMC communications setup.

- **Step 0020-14**

The diagnostics did not detect a problem.

If the problem is related to either the system unit or the I/O expansion box, see the service documentation for that unit.

If the problem is related to an external resource, use the problem determination procedures, if available, for that resource.

If a problem occurs when running online diagnostics but not when running the stand-alone diagnostics, suspect a software problem.

Check for the presence of supplemental diagnostic material, such as diskettes or documentation.

This is possibly a problem with software or intermittent hardware. If you think that you have an intermittent hardware problem, go to "MAP 0040" on page 106.

- **Step 0020-15**

Take the following actions:

1. Handle multiple SRNs and error codes in the following order:
 - a. 8-digit error codes.
 - b. SRNs with a source code other than F or G.
 - c. SRNs with a source code of F. Run online diagnostics in advanced and problem determination mode to obtain maximum isolation.
 - d. SRNs with a source code of G.

Note: The priority for multiple SRNs with a source of G is determined by the time stamp of the failure. Follow the action for the SRN with the earliest time stamp first.

- e. Device SRNs and error codes (5-digit SRNs).

If a group has multiple SRNs, it does not matter which SRN is handled first.

2. Find the SRN.

If the SRN is not listed, look for it in the following:

- Any supplemental service information for the device
- The diagnostic problem report screen for additional information
- The "Service Hints" service aid in Linux tasks and service aids

3. Perform the action listed.
 4. If you replace a part, go to Verify a repair.
- **Step 0020-16**
Look up the IPL progress codes for definitions of configuration program indicators. They are normally 0xxx or 2xxx.
Is a configuration program indicator displayed?
No Go to the “Problems with loading and starting the operating system (Linux)” on page 87.
Yes Record SRN 101-xxxx (where xxxx is the rightmost three or four digits or characters of the configuration program indicator). Go to Step 0020-17.
 - **Step 0020-17**
Is a location information displayed on the operator panel display?
No Go to Step 0020-15.
Yes Record the location code, then go to Step 0020-15.

MAP 0030

This MAP is used for problems that still occur after all FRUs indicated by the SRN or error code have been exchanged.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

Note: Check the action text of the SRN before proceeding with this MAP. If there is an action listed, perform that action before proceeding with this MAP.

- **Step 0030-1**
Some external devices (including rack drawers that contain devices) have their own problem determination procedures. If the problem is related to an external device that has its own problem determination procedure, run those procedures if not already run. If they do not correct the problem, continue with this MAP.
- **Step 0030-2**
The problem may have been caused by a resource that has not been tested. System Checkout tests all resources. If the online Diagnostics are installed and you are able to load them, then **All Resources** under the Diagnostic Selection menu should be run. If you get a different SRN, look up the SRN in the SRN topic collections and perform the listed action. If you are unable to run **All Resources** under the Diagnostic Selection menu or you do not get another SRN when running it, continue with this MAP.
- **Step 0030-3**
If the problem is related to a SCSI device, SCSI bus, or SCSI controller, go to “MAP 0050” on page 108. If you are unable to isolate the problem with MAP 0050, continue with Step 0030-4.
- **Step 0030-4**
 1. Find the resources that are identified by the SRN or error code in the following table.
 2. Perform the first action listed for the resource.
 3. If you exchange a FRU or change a switch setting, test the resource again.
 4. If the action does not correct the problem, perform the next action until all actions have been tried. If an action says to exchange a FRU that you have already exchanged, go to the next action. If an action corrects the problem, go to Verify a repair.
 5. If you perform all of the actions and do not correct the problem, check the Service Hints service aid for information. If the service aid does not help, call your service support structure.

Failing Resource	Repair Action
SCSI Device	Exchange the SCSI controller. Replace the power supply.
Pluggable SCSI or IDE controller	Exchange the backplane into which the adapter is plugged.
Keyboard, tablet, mouse, dials, LFP keys, diskette drive	Check the cable attaching the device to its adapter. If you do not find a problem, exchange the device's adapter.
Pluggable adapters, CPU cards, and controllers	Determine whether the adapter contains any attached FRUs such as fuses, DRAMs, and crossover cables. <ol style="list-style-type: none"> 1. Check or exchange any attached FRU on the resource. 2. If the adapter is plugged into a riser card, check or exchange the riser card. 3. Exchange the backplane into which the adapter is plugged.
System and I/O backplanes	Contact your service support structure.
Built-In system ports	Replace the service processor if present.
A device attached to the system by a cable and an adapter.	<ol style="list-style-type: none"> 1. Replace the adapter for the device. 2. Replace the cable to the device.
IDE Device	Replace the cable between the IDE controller and the device. If the IDE controller is packaged on a backplane, replace that backplane, otherwise replace the adapter containing the IDE controller.

MAP 0040

This MAP provides a structured way of analyzing intermittent problems.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

This MAP consists of two tables: Hardware Symptoms and Software Symptoms.

Because software or hardware can cause intermittent problems, consider all symptoms relevant to your problem.

How to use this MAP

This MAP contains information about causes of intermittent symptoms. In the following tables, find your symptoms, and read the list of things to check.

When you exchange a FRU, go to Verify a repair to check out the system.

Hardware symptoms

Note: This table spans several pages.

Symptom of hardware problem	Things to check for
Any hardware log entry in the error log.	<p>Use the Hardware Error Report service aid to view the error log and check for:</p> <ul style="list-style-type: none"> • Multiple errors on devices attached to the same SCSI bus. • Multiple errors on devices attached to the same async adapter. • Multiple errors on internally installed devices only. <p>Contact your service support structure for assistance with error report interpretation.</p>

Symptom of hardware problem	Things to check for
Hardware-caused system crashes	<ul style="list-style-type: none"> • The connections on the CPU backplane or CPU card • Memory modules for correct connections • Connections to the system backplane. • Cooling fans operational • The environment for a too-high or too-low operating temperature. • Vibration: proximity to heavy equipment.
System unit powers off a few seconds after powering.	<ul style="list-style-type: none"> • Fan speed. Some fans contain a speed-sensing circuit. If one of these fans is slow, the power supply powers the system unit off. • Correct voltage at the outlet into which the system unit is plugged. • Loose power cables and fan connectors, both internal and external.
System unit powers off after running for more than a few seconds.	<ul style="list-style-type: none"> • Excessive temperature in the power supply area. • Loose cable connectors on the power distribution cables. • Fans turning at full speed after the system power has been on for more than a few seconds.
Only internally installed devices are failing.	<p>Check the following items that are common to more than one device:</p> <ul style="list-style-type: none"> • Ground connections on all of the disk drives and other types of drives installed. • Loose connections on the power cables to the backplanes, drives, fans, and battery. • System unit cooling. Is the input air temperature within limits? Are all the fans running at full speed? Are any of the vent areas blocked? • Signal cables to the diskette drives, and the power supply. • SCSI device signal cables for loose connectors and terminators. • Loose SCSI device address jumpers. • Possible contamination of any device that has a cleaning procedure. See the operator guide for cleaning instructions. • Excessive static electricity. • Correct voltage at the system unit power outlet
Only externally attached devices are failing.	<p>Check the following items that are common to more than one device.</p> <ul style="list-style-type: none"> • Check the SCSI signal cables to the devices for loose connectors and terminators. • Check devices that use jumpers to set the SCSI address for loose jumpers. • Check any device that has a cleaning procedure for contamination. See the operator guide for cleaning instructions. • Check for excessive static electricity. • Check the outlet that the device is plugged into for correct voltage. • Check the error log for entries for the adapter driving the failing devices. • Check the temperature of the devices. Are the cooling vents blocked? Are the fans running? • Check for other devices near the failing device that may be radiating noise (displays, printers, and so on).

Software symptoms

Symptom of software problem	Things to check for
Any symptom you suspect is related to software.	Use the software documentation to analyze software problems.

Symptom of software problem	Things to check for
Software-caused system crashes	Check the following software items: <ul style="list-style-type: none"> • Is the problem only with one application program? • Is the problem only with one device? • Does the problem occur on a recently installed program? • Was the program recently patched or modified in any way? • Is the problem associated with any communication lines? • Check for static discharge occurring at the time of the failure.

MAP 0050

Use this MAP to analyze problems with a SCSI bus.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

Considerations

- To prevent hardware damage or erroneous diagnostic results from a system with its power turned on, use "PCI hot-plug manager" subtask "replace/remove PCI hot plug adapter" before connecting or disconnecting cables or devices.
- Also, use this MAP for SCSI adapters that are built into system backplanes or I/O backplanes. If this procedure calls for replacing a SCSI adapter and the SCSI adapter is built into the system backplane or I/O backplane, replace the system backplane or I/O backplane as appropriate.
- If the failure is a terminator power failure (SRNs xxx-226, xxx-240, xxx-800), always allow five minutes for the PTC to cool.
- The differential version of the adapter has socket-type terminators to support high-availability. If this is the adapter's configuration, the terminators would have been removed from the adapter. MAP steps requiring the removal of the cable from the adapter do not apply, because an adapter that is not terminated always fails diagnostics. Proper SCSI diagnostics require proper termination. If the configuration involves a Y-cable, leave it, with the appropriate terminator, attached to the adapter. Or, place an external differential terminator on the external port.
- If the system uses shared disk-drive hardware or a high-availability configuration, ensure that the other system that is sharing the devices is not using the devices. For additional information concerning high-availability configurations, see "SCSI service hints" on page 90.
- For intermittent problems that cannot be resolved with this MAP, see "SCSI service hints" on page 90.
- If the SCSI bus is attached to a RAID subsystem, see the RAID subsystem documentation for any problem determination. If the RAID adapter is a PCI-X RAID adapter, see the *PCI-X SCSI RAID Controller Reference Guide for Linux*.

Follow the steps in this MAP to isolate a SCSI bus problem.

Note: This procedure removes devices and components from a SCSI bus until a problem or a symptom or problem is eliminated. If you follow the entire procedure, you will remove all components of a SCSI bus in the following order:

1. Hot-swap devices
2. Devices that are not hot-swap
3. SCSI Enclosure Services (SES) device or enclosures
4. SCSI cables
5. SCSI adapter

Do the following:

- **Step 0050-1**

Have changes been made recently to the SCSI configuration?

No Go to Step 0050-2.

Yes Go to Step 0050-5.
- **Step 0050-2**

Are there any hot-swap devices (SCSI disk drives or media devices) controlled by the adapter?

No Go to Step 0050-3.

Yes Go to Step 0050-11.
- **Step 0050-3**

Are there any devices other than hot-swappable devices controlled by the adapter?

No Go to Step 0050-4.

Yes Go to Step 0050-13.
- **Step 0050-4**

Is an enclosure or drawer that supports hot-swap devices controlled by the adapter?

No Go to Step 0050-22.

Yes Go to Step 0050-15.
- **Step 0050-5**

This step handles cases where recent changes have been made to the SCSI configuration.

Using the first three digits of the SRN, see the FFC listing and determine if the adapter is single-ended or differential.

Is the adapter a single-ended adapter?

No Go to Step 0050-6.

Yes Go to Step 0050-7.
- **Step 0050-6**

The adapter's termination jumper settings may be incorrect. Power off the system, and inspect jumper J7.

Are the jumpers correct?

No Go to Step 0050-8.

Yes Go to Step 0050-9.
- **Step 0050-7**

If the adapter *is not* being used in a high-availability configuration, be sure sockets RN1, RN2, and RN3 are populated.

If the adapter *is* being used in a high-availability configuration, be sure sockets RN1, RN2, and RN3 *are not* populated.

Go to Step 0050-9.
- **Step 0050-8**
 1. Correct the jumper settings and reinstall the adapter and all cables.
 2. Power on the system, and run diagnostics in system verification mode on the adapter.

Did the diagnostic pass?

No Go to Step 0050-9.

Yes Go to Step 0050-10.
- **Step 0050-9**

Check for the following problems:

- Address conflicts between devices.
- Cabling problems such as configurations that exceed the maximum cable lengths, missing termination, or excessive termination.

Did you find a problem?

No Go to Step 0050-2.

Yes Go to Step 0050-10.

• **Step 0050-10**

1. Correct the problem.
2. Power on the system, and run diagnostics in system verification mode on the adapter.

Did a failure occur?

No Go to Verify a repair.

Yes Go to Step 0050-2.

• **Step 0050-11**

This step determines if a hot-swap device is causing the failure.

1. Go to Preparing for hot-plug SCSI device or cable deconfiguration.
2. Disconnect all hot-swap devices attached to the adapter.
3. Go to After hot-plug SCSI device or cable deconfiguration.
4. If the Missing Options menu displays, select the option **The resource has been turned off, but should remain in the system configuration** for all the devices that were disconnected.
5. Run the diagnostics in system verification mode on the adapter.

Did a failure occur?

No Go to Step 0050-12.

Yes Go to Step 0050-3.

• **Step 0050-12**

Go to Preparing for hot-plug SCSI device or cable deconfiguration. Reconnect the hot-plug devices one at a time. After reconnecting each device, do the follow:

1. Go to After hot-plug SCSI device or cable deconfiguration.
2. Rerun the diagnostics on the adapter.
3. If the adapter fails, the problem may be with the last device reconnected. Perform these substeps:
 - a. Follow repair procedures for that last device.
 - b. Rerun diagnostics on the adapter.
 - c. If diagnostics fail, replace the SES backplane corresponding to the slot for the device.
 - d. Rerun diagnostics.
 - e. If diagnostics fail, replace the last device.
 - f. Rerun diagnostics on the adapter.
 - g. If diagnostics pass, go to Verify a repair. Otherwise, contact your support center.

Note: A device problem can cause other devices attached to the same SCSI adapter to go into the defined state. Ask the system administrator to make sure that all devices attached to the same SCSI adapter as the device that you replaced are in the available state.

4. If no errors occur, the problem could be intermittent. Make a record of the problem. Running the diagnostics for each device on the bus may provide additional information.

• **Step 0050-13**

This step determines if a device other than a hot-swappable device is causing the failure. Follow these steps:

1. Go to Preparing for hot-plug SCSI device or cable deconfiguration.
2. Disconnect all devices attached to the adapter (except for the device from which you boot to run diagnostics; you may want to temporarily move this device to another SCSI port while you are trying to find the problem).
3. Go to After hot-plug SCSI device or cable deconfiguration.
4. If the Missing Options menu displays, select the option **The resource has been turned off, but should remain in the system configuration** for all the devices that were disconnected.
5. Run the diagnostics in system verification mode on the adapter.

Did a failure occur?

No Go to Step 0050-14.

Yes Go to Step 0050-4.

- **Step 0050-14**

Reconnect the devices one at time. After reconnecting each device, follow this procedure:

1. Rerun the diagnostics in system verification mode on the adapter.
2. If there is a failure, the problem should be with the last device reconnected. Follow the repair procedures for that device, then go to Verify a repair.
3. If no errors occur, the problem could be intermittent. Make a record of the problem. Running the diagnostics for each device on the bus may provide additional information.

- **Step 0050-15**

This step determines whether the SCSI Enclosure Services (SES) controller, which provides hot-plug capability for SCSI drives in the server, is causing the problem.

Note: In most cases the SES controller is integrated on the backplane that is used to connect SCSI devices, for example a disk drive backplane. If your system has hot-plug capability and the SES controller is separate from the SCSI drive backplane, there will be an intermediate card on the SCSI bus between the SCSI adapter and the device or SCSI backplane. You will have to make a visual check to see if there are any intermediate cards on the SCSI bus that is displaying a problem.

Does a separate SES controller plug into the SCSI device backplane?

No Go to Step 0050-18.

Yes Go to Step 0050-16.

- **Step 0050-16**

Follow these steps:

1. Power off the system.
2. Remove the intermediate SES controller card. Locate the SES controller part number under System parts.
3. Power on the system.
4. If the Missing Options menu displays, select the option **The resource has been turned off, but should remain in the system configuration** for all the devices that were disconnected.
5. Run the diagnostics in system verification mode on the adapter.

Did a failure occur?

No Go to Step 0050-17.

Yes Go to Step 0050-18.

- **Step 0050-17**

Follow these steps:

1. Power off the system.

2. Replace the intermediate SES controller card.
 3. Go to Verify a repair.
- **Step 0050-18**
Follow these steps:
 1. Go to Preparing for hot-plug SCSI device or cable deconfiguration.
 2. Disconnect all cables attached to the SCSI adapter. For SCSI differential adapters in a high-availability configuration, see Considerations.
 3. Go to After hot-plug SCSI device or cable deconfiguration.
 4. If the Missing Options menu displays, select the option **The resource has been turned off, but should remain in the system configuration** for all the devices that were disconnected.
 5. Run the diagnostics in system verification mode on the adapter.

Did a failure occur?

No Go to Step 0050-19.

Yes Replace the adapter, then go to Verify a repair.
 - **Step 0050-19**
Follow these steps:
 1. Go to Preparing for hot-plug SCSI device or cable deconfiguration.
 2. Reconnect the cables to the adapter.

Does the SES controller (an intermediated SES controller) plug into the backplane?

No Go to Step 0050-20.

Yes Go to Step 0050-21.
 - **Step 0050-20**
Follow these steps:
 1. Replace the SES controller. Locate the intermediate SES controller part number under System parts.
 2. Power on the system.
 3. If the Missing Options menu displays, select the option **The resource has been turned off, but should remain in the system configuration** for all the devices that were disconnected.
 4. Run the diagnostics in system verification mode on the adapter.

Did a failure occur?

No Go to Verify a repair.

Yes Go to Step 0050-21.
 - **Step 0050-21**
One of the cables remaining in the system is defective. See System parts for the cable part numbers. Replace the parts one at a time in the order listed. Follow these steps for each FRU replaced:
 1. Rerun the diagnostics for the adapter.
 2. If there is any failure, continue with the next FRU.
 3. If there is no failure, go to Verify a repair.
 - **Step 0050-22**
Follow these steps:
 1. Go to Preparing for hot-plug SCSI device or cable deconfiguration.
 2. Disconnect all cables attached to the adapter (except for the cable to the device from which you boot to run diagnostics; you may want to temporarily move this device to another SCSI port while you are trying to find the problem).
 3. Go to After hot-plug SCSI device or cable deconfiguration.

4. If the Missing Options menu displays, select the option **The resource has been turned off, but should remain in the system configuration** for all the devices that were disconnected.

5. Run the diagnostics on the adapter.

Did a failure occur?

No Go to Step 0050-23.

Yes Replace the adapter, then go to Verify a repair.

• **Step 0050-23**

One of the cables remaining in the system is defective. See System parts for the cable part numbers. Replace the parts one at time in the order listed. Follow these steps for each FRU replaced:

1. Rerun the diagnostics for the adapter.

2. If there is any failure, continue with the next FRU.

3. If there is no failure, go to Verify a repair.

Preparing for hot-plug SCSI device or cable deconfiguration

Use this procedure when you are preparing to unconfigure a hot-plug Small Computer System Interface (SCSI) device or cable. This procedure will help determine if a SCSI device or SCSI device cable is causing your system problem.

Disconnect all cables attached to the adapter, (except for the cable to the device from which you boot to run diagnostics; temporarily move these device cables to another SCSI port while you are trying to find the problem).

1. Go to Running the online and stand-alone diagnostics and perform the prerequisite tasks described in the Before you begin topic.
2. Determine which SCSI adapter you plan to remove the cables or devices from.
3. Adapter slots are numbered on the rear of the system unit, record the slot number and location of each adapter being removed.
4. Ensure that any processes or applications that might use the adapter are stopped.
5. Enter the system diagnostics by logging in as root user or as the CE login user. Type the diag command on the command line.
6. When the DIAGNOSTIC OPERATING INSTRUCTIONS menu displays, and press Enter. The FUNCTION SELECTION menu appears.
7. From the FUNCTION SELECTION menu, select Task Selection, and then press Enter.
8. From the Task Selection list, select Hot Plug Manager, and select PCI Hot Plug Manager.
9. From the PCI Hot Plug Manager menu, select Unconfigure a Device, and then press Enter.
10. Press F4 or ESC+4 to display the Device Names menu.
11. Select the adapter from which you are removing the cables or devices in the Device Names menu.
12. In the Keep Definition field, use the tab key to answer Yes.
13. In the Unconfigure Child Devices field, use the Tab key to answer Yes, then press Enter. The ARE YOU SURE screen is displayed.
14. Press Enter to verify the information. A successful deconfiguration is indicated by the OK message displayed next to the **Command** field at the top of the screen.
15. Press F4 or ESC+4 twice to return to the Hot Plug Manager menu.
16. Select replace/remove PCI Hot Plug adapter.
17. Select the slot that has the adapter you want to remove the cables or devices from in the system.
18. Select **Remove**.

Note: A fast flashing amber LED located at the back of the machine indicates the slot that you selected.

19. Press Enter. This places the adapter in the action state, meaning it is ready to be removed from the system. (You do not need to remove the adapter, unless it makes removing the cables attached to it easier).

After hot-plug SCSI device or cable deconfiguration

Use this procedure after you deconfigure or hot-plug a SCSI device to ensure that the replaced component was successfully installed.

1. Press Enter, then continue to follow the screen instructions until you receive a message that the replacement is successful. A successful replacement is indicated by the OK message displayed next to the command field at the top of the screen.
2. Press the F3 or ESC 3 key to return to the **PCI Hot-Plug Manager** menu.
3. Press the F3 or ESC 3 key to return to the **Hot-Plug Manager** menu.
4. Press the F3 or ESC 3 key to return to the **TASK** selection list.
5. Select **Log Repair Action**.
6. Select the adapter you just removed the cables or devices from, then press Enter.
7. Press Commit (F7 or ESC 7), then press Enter.
8. Press the F10 or the ESC 0 key to exit diagnostics.
9. Type the **diag -a** command on the command line.

MAP 0054

Use this MAP to determine which FRUs may need to be replaced in order to solve a SCSI bus-related problem on a PCI-X SCSI or PCI-X SCSI RAID adapter.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

Considerations

- Remove power from the system before connecting and disconnecting cables or devices, as appropriate, to prevent hardware damage or erroneous diagnostic results.
- Note that some systems have SCSI and PCI-X bus interface logic integrated onto the system boards and use a pluggable RAID enablement card (a non-PCI form factor card) for these SCSI and PCI-X buses. An example of such a RAID enablement card is FC 5709. For these configurations, replacement of the RAID enablement card is unlikely to solve a SCSI bus-related problem, because the SCSI bus interface logic is on the system board.
- Some adapters provide two connectors, one internal and one external, for each SCSI bus. For this type of adapter, it is not acceptable to use both connectors for the same SCSI bus at the same time. SCSI bus problems are likely to occur if this is done. However, it is acceptable to use an internal connector for one SCSI bus and an external connector for another SCSI bus. The internal and external connectors are labeled to indicate which SCSI bus they correspond to.

Attention: RAID adapters should not be replaced when SCSI bus problems exist, except with assistance from your service support structure. Because the adapter may contain non-volatile write cache data and configuration data for the attached disk arrays, additional problems can be created by replacing an adapter when SCSI bus problems exist.

Attention: Do not remove functioning disks in a disk array without assistance from your service support structure. A disk array may become degraded or failed if functioning disks are removed, and additional problems may be created.

Follow the steps in this MAP to isolate a PCI-X SCSI bus problem.

- **Step 0054-1**

Identify the SCSI bus on which the problem is occurring on by examining the hardware error log. To view the hardware error log, do the following:

1. Invoke diagnostics and select **Task Selection** on the Function Selection display.
2. Select **Display Hardware Error Report**.
3. Choose one of the following options:
 - If the type of adapter is not known, select **Display Hardware Errors for Any Resource**.
 - If the adapter is a PCI-X SCSI adapter, select **Display Hardware Errors for PCI-X SCSI Adapters**.
 - If the adapter is a PCI-X SCSI RAID adapter, select **Display Hardware Errors for PCI-X SCSI RAID Adapters**.
4. Select the resource, or select **All Resources** if the resource is not known. If you had previously selected **Display Hardware Errors for Any Resource**, then select **All Resources**.
5. On the Error Summary screen, look for an entry with a SRN corresponding to the problem which sent you here, and select it.

Note: If multiple entries exist for the SRN, some entries might be old or the problem has occurred on multiple entities (adapters, disk arrays, or devices). Older entries can be ignored; however, this MAP may need to be used multiple times if the same problem has occurred on multiple entities.

6. Select the hardware error log to view.

While viewing the hardware error log, under the Detail Data and SENSE DATA headings, identify the first four bytes of the hexadecimal data (for example, nnnn nnnn nnnn nnnn ...). The four bytes identified in the error log can be interpreted as:

00bb ssLL

where:

- bb, when not FF, identifies the adapter's SCSI bus
- ss, when not FF, identifies the SCSI ID of a device
- LL, when not FF, identifies the logical unit number (LUN) of a device

Go to Step 0540-2.

• **Step 0054-2**

Are the last two bytes of the four bytes identified in Step 0540-1, equal to FFFF (for example, 00bb FFFF, where bb identifies the adapter's SCSI bus)?

No Go to Step 0540-4.

Yes Go to Step 0540-3.

• **Step 0054-3**

While the error persists, replace the components of the failing SCSI bus in the following order:

1. Cable on bus bb (if present)
2. Adapter (if SCSI bus interface logic is on the adapter) or system board (if SCSI bus interface logic is on the system board)

To replace a component, and see if the problem was corrected, do the following:

1. Follow the removal and replacement procedure for the component as previously described in this step.
2. Run diagnostics in system verification mode on the adapter.

When the problem is resolved, go to Verify a repair.

• **Step 0054-4**

Are the last two bytes of the four bytes identified in Step 0540-1, equal to FF00 (for example, 00bb FF00, where bb identifies the adapter's SCSI bus)?

No Go to Step 0540-6.

Yes Go to Step 0540-5.

- **Step 0054-5**

While the error persists, replace the components of the failing SCSI bus in the following order:

1. Cable on bus bb (if present)
2. Adapter (if SCSI bus interface logic is on the adapter) or system board (if the SCSI bus interface logic is on the system board)
3. DASD backplane attached to bus bb (if present)

To replace a component, and see if the problem was corrected, do the following:

1. Follow the removal and replacement procedure for the component as previously described in this step.
2. Run diagnostics in system verification mode on the adapter.

When the problem is resolved, go to Verify a repair.

- **Step 0054-6**

While the error persists, replace the components of the failing SCSI bus in the following order:

1. Device on bus bb with SCSI ID ss
2. Cable on bus bb (if present)
3. Adapter (if SCSI bus interface logic is on the adapter) or system board (if SCSI bus interface logic is on the system board)

To replace a component and see if the problem was corrected, do the following:

1. Follow the removal and replacement procedure for the component as previously described in this step.
2. Run diagnostics in system verification mode on the adapter.

When the problem is resolved, go to Verify a repair.

MAP 0070

Use this MAP when you receive an 888 sequence on the operator panel display or monitor.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

An 888 sequence in operator panel display suggests that either a hardware or software problem has been detected and a diagnostic message is ready to be read.

Note: The 888 will not necessarily flash on the operator panel display.

- **Step 0070-1**

Perform the following steps to record the information contained in the 888 sequence message.

1. Wait until the 888 sequence displays.
2. Record, in sequence, every code displayed after the 888. On systems with a 3-digit or a 4-digit operator panel, you may need to press the system's "reset" button to view the additional digits after the 888. Stop recording when the 888 digits reappear.
3. Go to Step 0070-2.

- **Step 0070-2**

Using the first code that you recorded, use the following list to determine the next step to use.

Type 102

Go to Step 0070-3.

Type 103

Go to Step 0070-4.

- **Step 0070-3**

A type 102 message generates when a software or hardware error occurs during system execution of an application. Use the following information to determine the content of the type 102 message.

The message readout sequence is:

102 = Message type RRR = Crash code (the three-digit code that immediately follows the 102) SSS = Dump status code (the three-digit code that immediately follows the Crash code).

Record the crash code and the dump status code from the message you recorded in Step 0070-1.

Are there additional codes following the dump status?

No Go to Step 0070-5.

Yes The message also has a type 103 message included in it. Go to Step 0070-4 to decipher the SRN and field replaceable unit (FRU) information in the type 103 message.

Note: Type 102 messages have no associated SRNs.

- **Step 0070-4**

A type 103 message is generated by the hardware when certain types of hardware errors are detected. Use the following steps and information you recorded in Step 0070-1 to determine the content of the type 103 message.

The message readout sequence is:

103 = Message type (x)xxx (y)yyy = SRN (where (x)xxx = the three- or four-digit code following the 103 and (y)yyy is the three- or four-digit code following the (x)xxx code).

1. Record the SRN and FRU location codes from the recorded message.
2. Find the SRN in the Service Request Number List and perform the indicated action.

Note: The only way to recover from an 888 type of halt is to turn off the system unit.

- **Step 0070-5**

Perform the following steps:

1. Turn off the system unit power.
2. Turn on the system unit power, and load the online diagnostics in service mode.
3. Wait until one of the following conditions occurs:
 - You are able to load the diagnostics to the point where the Diagnostic Mode Selection menu displays.
 - The system stops with an 888 sequence.
 - The system appears to hang.

Is the Diagnostic Mode Selection menu displayed?

No Go to Start of call.

Yes Go to Step 0070-6.

- **Step 0070-6**

Run the **All Resources** options under Advanced Diagnostics in Problem Determination Mode.

Was an SRN reported by the diagnostics?

No This is possibly a software-related 888 sequence. Follow the procedure for reporting a software problem.

Yes Record the SRN and its location code information. Find the SRN in the SRN Listing and do the indicated action.

MAP 0220

Use this procedure to exchange hot-swappable field replaceable units (FRUs).

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

Note: The FRU you want to hot plug might have a defect on it that can cause the hot-plug operation to fail. If, after following the hot-plug procedure, you continue to get an error message that indicates that the hot-plug operation has failed, schedule a time for deferred maintenance when the system containing the FRU can be powered off. Then go to MAP 0210: General problem resolution, Step 0210-2 and answer NO to the question **Do you want to exchange this FRU as a hot-plug FRU?**

Attention: If the FRU is a disk drive or an adapter, ask the system administrator to perform the steps necessary to prepare the device for removal.

- **Step 0220-1**

1. If the system displayed a FRU part number on the screen, use that part number to exchange the FRU.

If there is no FRU part number displayed on the screen, see the SRN listing. Record the SRN source code and the failing function codes in the order listed.

2. Find the failing function codes in the FFC listing, and record the FRU part number and description of each FRU.
3. To determine if the part is hot-swappable, see the System FRU locations procedure for the part.

Does this system unit support hot-swapping of the first FRU listed?

No Go to "MAP 0210: General problem resolution" on page 87.

Yes Go to Step 0220-2.

- **Step 0220-2**

Is the FRU a hot-swap power supply or fan?

No Go to Step 0220-4.

Yes Go to Step 0220-3.

- **Step 0220-3**

Note: See System FRU locations for the part.

1. Remove the old FRU.
2. Install the new FRU.
3. Enter the **diag** command.

Go to Step 0220-14.

- **Step 0220-4**

Is the FRU a hot-plug PCI adapter?

No Go to Step 0220-5.

Yes Go to Step 0220-12.

- **Step 0220-5**

Is the FRU a SCSI hot-plug device?

No Go to Step 0220-11.

Yes Go to Step 0220-6.

- **Step 0220-6**

Is the hot-plug drive located within a system unit?

No Go to Step 0220-8.

Yes Go to Step 0220-7.

- **Step 0220-7**

See the removal and replacement procedures for your system in System FRU locations.

Go to Step 0220-13.

- **Step 0220-8**

Does the hot-plug drive's enclosure have procedures for removing and replacing SCSI disk drives?

No Go to Step 0220-9.

Yes If a hot-plug procedure exists, use that procedure to remove the old hot-plug SCSI disk drive and replace it with a new hot-plug SCSI disk drive. Otherwise, if no hot-plug procedure exists, use the power off procedure to remove the old SCSI disk drive and replace it with a new SCSI disk drive. Go to Step 0220-13.

- **Step 0220-9**

1. Ask the customer to back up the data on the drive that you intend to replace onto another drive.
2. Verify that the disk drive is in the defined state. The amber LED on the hot-plug disk drive should be off.

Is the hot-plug disk drive's amber LED unlit?

No Ask the customer to remove the hot-plug disk drive from the operating system configuration (refer the customer to the system management guide for more information).

Yes Go to Step 0220-10.

- **Step 0220-10**

Using the hot-plug task service aid, replace the hot-plug drive using the following procedure:

1. Use the option **List the SES Devices** to show the configuration of the hot-plug slots. Identify the slot number of the adapter for the FRU you want to replace.
2. Select the option **REPLACE/REMOVE a Device Attached to an SES Device**.
3. Select the slot which contains the SCSI hot-plug drive you want to replace. Press Enter. You will see a fast flashing green light on the front on the hot-plug drive indicating that it is ready for removal.

Note: See the "Installing hardware" section of the information; locate the server information that you are servicing and follow the tables to locate the correct removal or replacement procedure.

4. Remove the old hot-plug drive.
5. Install the new hot-plug drive. After the hot-plug drive is in place, press Enter.
6. Press Exit. Wait while configuration is done on the drive, until you see the "hot-plug task" on the service aid menu.

Go to Step 0220-15.

- **Step 0220-11**

Attention: Do not remove functioning disks in a disk array attached to a PCI-X SCSI RAID controller without assistance from your service support structure. A disk array may become degraded or failed if functioning disks are removed and additional problems may be created. If you still need to remove a RAID array disk attached to a PCI-X SCSI RAID controller, use the SCSI and SCSI RAID hot-plug manager.

Using the hot-plug task service aid, replace the hot-plug drive using the hot plug RAID service aid:

Note: The drive you want to replace must be either a SPARE or FAILED drive. Otherwise, the drive would not be listed as an "Identify and remove resources selection" within the RAID HOT-PLUG DEVICES screen. In that case you must ask the customer to put the drive into FAILED state. Refer the customer to the *Operating System and Device management* in the Linux library for more information. Ask the customer to back up the data on the drive that you intend to replace.

1. Select the option **RAID HOT-PLUG DEVICES** within the **HOT-PLUG TASK** under **DIAGNOSTIC SERVICE AIDS**.
2. Select the RAID adapter that is connected to the RAID array containing the RAID drive you want to remove, then select **COMMIT**.

3. Choose the option **IDENTIFY** in the IDENTIFY AND REMOVE RESOURCES menu.
4. Select the physical disk which you want to remove from the RAID array and press Enter.
5. The disk will go into the **IDENTIFY** state, indicated by a flashing light on the drive. Verify that it is the physical drive you want to remove, then press Enter.
6. At the IDENTIFY AND REMOVE RESOURCES menu, choose the option **REMOVE** and press Enter.
7. A list of the physical disks in the system that may be removed will be displayed. If the physical disk you want to remove is listed, select it and press Enter. The physical disk will go into the REMOVE state, as indicated by the LED on the drive. If the physical disk you want to remove is not listed, it is not a SPARE or FAILED drive. Ask the customer to put the drive in the FAILED state before you can proceed to remove it. Refer the customer to the *Operating System and Device management* in the Linux library for more information.
8. See the service information for the system unit or enclosure that contains the physical drive for removal and replacement procedures for the following substeps:
 - a. Remove the old hot-plug RAID drive.
 - b. Install the new hot-plug RAID drive. After the hot-plug drive is in place, press Enter. The drive will exit the REMOVE state, and will go to the NORMAL state after you exit diagnostics.

Note: There are no elective tests to run on a RAID drive itself under diagnostics (the drives are tested by the RAID adapter).

9. This completes the repair. Return the system to the customer. Ask the customer to add the physical disk drive to the original configuration within the RAID. Refer them to system management guide for more information.

- **Step 0220-12**

1. Remove the old adapter FRU and replace it with the new adapter FRU. See the System FRU locations procedure for the part.
2. Enter the diag command.
3. Go to the FUNCTION SELECTION menu, and select the option **Advanced Diagnostics Routines**.
4. When the DIAGNOSTIC MODE SELECTION menu displays, select the option **System Verification**.
5. Go to Step 0220-14.

- **Step 0220-13**

1. If not already running diagnostics, enter the diag command.

Note: If you are already running service mode diagnostics and have just performed the task **Configure Added/Replaced Devices** (under the SCSI Hot Swap manager of the Hot Plug Task service aid), you must use the F3 key to return to the DIAGNOSTIC OPERATING INSTRUCTIONS menu before proceeding with the next step, or else the drive might not appear on the resource list.

2. Go to the FUNCTION SELECTION menu, and select the option **Advanced Diagnostics Routines**.
3. When the DIAGNOSTIC MODE SELECTION menu displays, select the option **System Verification**.

Does the hot-plug SCSI disk drive you just replaced appear on the resource list?

No Verify that you have correctly followed the procedures for replacing hot-plug SCSI disk drives in the system service information. If the disk drive still does not appear in the resource list, go to "MAP 0210: General problem resolution" on page 87 to replace the resource that the hot-plug SCSI disk drive is plugged into.

Yes Go to Step 0220-14.

- **Step 0220-14**

Run the diagnostic test on the FRU you just replaced.

Did the diagnostics run with no trouble found?

No Go to Step 0220-15.

Yes Go to Verify a repair. Before returning the system to the customer, if a hot-plug disk has been removed, ask the customer to add the hot-plug disk drive to the operating system configuration. See *Operating System and Device Management* in the Linux library for more information.

• **Step 0220-15**

1. Use the option **Log Repair Action** in the TASK SELECTION menu to update the Linux error log. If the repair action was reseating a cable or adapter, select the resource associated with your repair action. If it is not displayed on the resource list, select **sysplanar0**.

Note: On systems with a fault indicator LED, this changes the fault indicator LED from the fault state to the normal state.

2. While in diagnostics, go to the FUNCTION SELECTION menu. Select the option **Advanced Diagnostics Routines**.
3. When the DIAGNOSTIC MODE SELECTION menu displays, select the option **System Verification**. Run the diagnostic test on the FRU you just replaced, or **sysplanar0**.

Did the diagnostics run with no trouble found?

No Go to Step 0220-16.

Yes If you changed the service processor or network settings, restore the settings to the value they had prior to servicing the system. If you performed service on a PCI RAID subsystem involving changing of the RAID adapter cache card or changing the configuration on RAID disks, ask the customer to run "PCI SCSI disk array manager" using smitty to resolve the PCI SCSI RAID adapter configuration. The following is an example of how the customer would resolve the configuration:

1. At the Linux command line, type `smitty pdam`.
2. On the PCI SCSI Disk Array Manager screen, select **RECOVERY OPTIONS**.
3. If a previous configuration exists on the replacement adapter, this must be cleared. Select **Clear PCI SCSI RAID Adapter Configuration**. Press F3.
4. On the Recovery Options screen, select **RESOLVE PCI SCSI RAID ADAPTER CONFIGURATION**.
5. On the Resolve PCI SCSI RAID Adapter Configuration screen, select **ACCEPT CONFIGURATION on DRIVES**.
6. On the PCI SCSI RAID Adapter selection menu, select the adapter that you changed.
7. On the next screen, press Enter.
8. On the "Are You Sure?" selection menu, press Enter to continue.
9. You receive an OK status message when the recovery is complete. If you get a Failed status message, verify that you are performing recovery on the correct adapter, then do this complete procedure. When you complete the recovery, exit smitty to return to the Linux command line.

Go to Verify a repair.

• **Step 0220-16**

Does the original problem persist?

No If a FRU was replaced, run the log repair action service aid under the online diagnostics for the resource that was replaced. If the resource associated with your action is not displayed on the resource list, select **sysplanar0**. If steps were taken to make the device ready for removal, inform the system administrator of the steps required to return the system to the original state. Go to Verify a repair.

Yes Go to Step 0220-17.

• **Step 0220-17**

Have you exchanged all the FRUs that correspond to the failing function codes?

No Go to Step 0220-18.

Yes The SRN did not identify the failing FRU. Schedule a time to run diagnostics in service mode. If the same SRN is reported in service mode, go to “MAP 0030” on page 105.

• **Step 0220-18**

Note: Before proceeding, remove the FRU you just replaced and install the original FRU in its place.

Does the system unit support hot-swapping of the next FRU listed?

No Go to “MAP 0210: General problem resolution” on page 87.

Yes The SRN did not identify the failing FRU. Schedule a time to run diagnostics in service mode. If the same SRN is reported in service mode, go to Step 0220-14.

MAP 0230

Use this MAP to resolve problems reported by SRNs A00-xxx to A25-xxxx.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

Step 0230-1

1. The last character of the SRN is bit-encoded as follows:

8	4	2	1	
				Replace all FRUs listed
				Hot-swap is supported
				Software or Firmware could be the cause
				Reserved

2. See the last character in the SRN. A 4, 5, 6, or 7 indicates a possible software or firmware problem.

Does the last character indicate a possible software or firmware problem?

No Go to Step 0230-4

Yes Go to Step 0230-2.

Step 0230-2

Ask the customer if any software or firmware has been installed recently.

Has any software or firmware been installed recently?

No Go to Step 0230-4.

Yes Go to Step 0230-3.

Step 0230-3

Check with your support center for any known problems with the new software or firmware.

Are there any known problems with the software or firmware?

No Go to Step 0230-4.

Yes Obtain and follow the procedure to correct the software problem. This completes the repair.

Step 0230-4

Were any FRUs or location codes reported with the SRN?

No Go to Step 0230-5.

Yes Go to Step 0230-9

Step 0230-5

Run the diagnostics in problem determination mode on **sysplanar0**.

Were there any FRUs reported with the SRN?

No Go to Step 0230-6.

Yes Go to Step 0230-9

Step 0230-6

Did the system display: "Previous Diagnostic Results - Do you want to review the previously displayed error?"

No Go to Step 0230-7.

Yes You have a pending item in the error log for which there is no corresponding log repair action. To see this error, select **YES** at the prompt. Information from the error log displays in order of last event first. Record the error code, the FRU names and the location code of the FRUs. Go to Step 0230-7

Step 0230-7

Were there any other SRNs that begin with an A00 to A1F reported?

No Go to Step 0230-8.

Yes Go to Step 0230-1 and use the new SRN.

Step 0230-8

Perform the action specified in the following table.

System:	Action:
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Power on the system to the hypervisor standby. Note: Slow boot is not supported.

If the system boots, run the diagnostics in problem determination mode on **sysplanar0**

Were any new error codes or SRNs reported?

No Call your support center.

Yes Follow the procedure for the new error code or SRN.

Step 0230-9

1. Obtain the list of physical location codes and FRU numbers that were listed on the Problem Report Screen. The list can be obtained by running the **sysplanar0** diagnostics or using the task **Display Previous Diagnostic Results**.
2. Record the physical location codes and FRU numbers.

3. See the last character in the SRN. A 2, 3, 6, or 7 indicates that hot-swap is possible.

Does the last character indicate that hot-swap is possible?

No Go to Step 0230-10.

Yes Go to Step 0230-14

Step 0230-10

Note: If necessary, see Powering on and powering off the system for information about system shutdown and powering the system on and off.

1. If the operating system is running, perform the operating system's shutdown procedure.
2. Turn off power to the system.
3. See the last character in the SRN. A 1, 3, 5, or 7 indicates that all FRUs listed on the Problem Report Screen need to be replaced. For SRNs ending with any other character, exchange one FRU at a time, in the order listed.
4. Turn on power to the system.
5. If you are running the Linux operating system, load the stand-alone diagnostics. See Running the stand-alone diagnostics.

Note: If the Diagnostics Operating Instructions do not display or you are unable to select the option **Task Selection**, check for loose cards, cables, and obvious problems. If you do not find a problem, go to "MAP 0020" on page 98 and get a new SRN.

6. Wait until the **Diagnostics Operating Instructions** are displayed or the system appears to stop.
7. Press Enter.
8. Select **Diagnostic Routines** at the function selection menu.
9. Select **System Verification**.
10. If a missing options exist, particularly if it is related to the device that was replaced, resolve the missing options before proceeding
11. Select the option **Task Selection**.
12. Select the option **Log Repair Action**.
13. Log a repair action for each replaced resource.
14. If the resource associated with your repair action is not displayed on the resource list, select **sysplanar0**.
15. Return to the Task Selection Menu.
16. If the FRU that was replaced was memory and the system is running as a full system partition, select **Run Exercisers** and run the short exerciser on all the resources, otherwise proceed to Step 0230-15.
17. If you ran the exercisers in Step 0230-10, substep 16, return to the Task Selection menu.
18. Select **Run Error Log Analysis** and run analysis on all the resources.

Was a problem reported?

No The repair is complete. Go to Verify a repair.

Yes Go to Step 0230-11.

Step 0230-11

Is the problem the same as the original problem?

No The symptom has changed. Check for loose cards, cables, and obvious problems. If you do not find a problem, go to "MAP 0020" on page 98 and get a new SRN.

Yes Go to Step 0230-12.

Step 0230-12

Look at the physical location codes and FRU part numbers you recorded.

Have you exchanged all the FRUs that were listed?

No Go to Step 0230-13.

Yes The SRN did not identify the failing FRU. Call your support person for assistance.

Step 0230-13

1. After performing a shutdown of the operating system, turn off power to the system.
2. Remove the new FRU and install the original FRU.
3. Exchange the next FRU in list.
4. Turn on power to the system.
5. If you are running the Linux operating system, load the stand-alone diagnostics. See Running the stand-alone diagnostics.

Note: If the Diagnostics Operating Instructions do not display or you are unable to select the option **Task Selection**, check for loose cards, cables, and obvious problems. If you do not find a problem, go to "MAP 0020" on page 98 and get a new SRN.

6. Wait until the Diagnostics Operating Instructions are displayed or the system appears to stop.
7. Press Enter.
8. Select **Diagnostic Routines** at the function selection menu.
9. Select **System Verification**.
10. If a missing options exist, particularly if it is related to the device that was replaced, resolve the missing options before proceeding.
11. Select the option **Task Selection**.
12. Select the option **Log Repair Action**.
13. Log a repair action for each replaced resource.
14. If the resource associated with your action does not appear on the Resource List, select **sysplanar0**.
15. Return to the Task Selection Menu.
16. If the FRU that was replaced was memory and the system is running as a full system partition, select **Run Exercisers** and run the short exerciser on all the resources, otherwise proceed to Step 0230-15.
17. If you ran the exercisers in Step 0230-13, substep 16, return to the Task Selection menu.
18. Select **Run Error Log Analysis** and run analysis on all the resources.

Was a problem reported?

No The repair is complete. Go to Verify a repair.

Yes Go to Step 0230-11.

Step 0230-14

The FRUs can be hot-swapped. If you do not want to use the hot-swap, go to Step 0230-10.

1. See the last character in the SRN. A 1, 3, 5, or 7 indicates that all FRUs listed on the Problem Report Screen must be replaced. For SRNs ending with any other character, exchange one FRU at a time, in the order listed.
2. If available, use the CE Login and enter the **diag** command.

Note: If CE Login is not available, have the system administrator enter superuser mode and then enter the **diag** command.

3. After the Diagnostics Operating Instructions display, press Enter.
4. Select the option **Task Selection**.
5. Select the option **Log Repair Action**.
6. If the resource associated with your action is not displayed on the Resource List, select **sysplanar0**.
7. Log a repair action for each replaced resource.
8. Return to the Task Selection menu.
9. For systems running as a full system partition, select **Run Exercisers** and run the short exerciser on all resources.
10. Use the option **Log Repair Action** in the Task Selection menu to update the error log. If the repair action was reseating a cable or adapter, select the resource associated with your repair action. If it is not displayed on the resource list, select **sysplanar0**.

Note: On systems with a Fault Indicator LED, this changes the Fault Indicator LED from the fault state to the normal state.

Was a problem reported?

No The repair is complete. Return the system to the customer.

Yes Go to Step 0230-15.

Step 0230-15

Is the problem the same as the original problem?

No The symptom has changed. Check for loose cards, cables, and obvious problems. If you do not find a problem, go to "MAP 0020" on page 98 and get a new SRN.

Yes Go to Step 0230-16.

Step 0230-16

Look at the physical location codes and FRU part numbers you recorded.

Have you exchanged all the FRUs that were listed?

No Go to Step 0230-17.

Yes The SRN did not identify the failing FRU. Call your support person for assistance.

Step 0230-17

1. Remove the new FRU and install the original FRU.
2. Exchange the next FRU in the list.
3. Return to the Task Selection Menu.
4. Select the option **Log Repair Action**.
5. Log a repair action for each replaced resource.
6. If the resource associated with your action is not displayed on the Resource List, select **sysplanar0**.
7. Return to the Task Selection Menu.
8. For systems running as a full system partition, select **Run Exercisers** and run the short exerciser on all resources.
9. If you ran the exercisers in substep Step 0230-17, substep 8.
10. Select **Run Error Log Analysis** and run analysis on all exchanged resources.

Was a problem reported?

No The repair is complete. Return the system to the customer.

Yes Go to Step 0230-15.

MAP 0235

Use this MAP to resolve problems reported by SRNS A11-560 to A11-580.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

Note: The following steps may require that the system be rebooted to invoke Array bit steering, so you may wish to schedule deferred maintenance with the system administrator to arrange a convenient time to reboot their system.

Step 0235-1

Was the SRN A11-560?

No Go to Step 0235-3.

Yes Go to Step 0235-2.

Step 0235-2

Logged in as root or using CE Login, at the command line type `diag` then press enter. Use the **Log Repair Action** option in the TASK SELECTION menu to update the error log. Select `sysplanar0`.

Note: On systems with fault indicator LED, this changes the fault indicator LED from the FAULT state to the NORMAL state.

Were there any other errors on the resource reporting the array bit steering problem?

No Step 0235-4.

Yes Resolve those errors before proceeding.

Step 0235-3

Logged in as root or using CE Login, at the command line type `diag` then press enter. Use the **Log Repair Action** option in the TASK SELECTION menu to update the error log. Select `procx`, where `x` is the processor number of the processor that reported the error.

Note: On systems with fault indicator LED, this changes the fault indicator LED from the FAULT state to the NORMAL state.

Were there any other errors on `procx`?

No Step 0235-4.

Yes Resolve those errors before proceeding.

Step 0235-4

Schedule deferred Maintenance with the customer. When it is possible, reboot the system to invoke Array Bit steering.

Step 0235-5

After the system has been rebooted, log in as root or use CE Login. At the command line, run diagnostics in problem determination mode to determine if the array bit steering was able to correct the problem.

If diagnostics are not run (for instance, if the system returns to **Resource Selection** menu after running diagnostics in problem determination mode) or there is no problem on the resource that originally reported the problem, then array bit steering was able to correct the problem. Go to Verify a repair.

MAP 0260

Use this MAP when the system unit hangs while configuring a resource.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

This MAP handles problems when the system unit hangs while configuring a resource.

- **Step 0260-1**

The last three or four digits of the SRN following the dash (-) match a failing function code number.

Look at the System parts and find the failing function code that matches the last three or four digits of your SRN, following the dash. Record the FRU part number and description (use the first FRU part listed when multiple FRUs are listed).

The location information or device name is displayed on the operator panel.

Do you have a location code displayed?

No Go to Step 0260-4.

Yes Go to Step 0260-2.

- **Step 0260-2**

Are there any FRUs attached to the device described by the location code?

No Go to Step 0260-6.

Yes Go to Step 0260-3.

- **Step 0260-3**

Remove this kind of FRU attached to the device described in the location code one at a time. Note whether the system still hangs after each device is removed. Repeat this step until you no longer get a hang, or all attached FRUS have been removed from the adapter or device.

Has the symptom changed?

No Go to Step 0260-4.

Yes Use the location code of the attached device that you removed when the symptom changed, and go to Step 0260-6.

- **Step 0260-4**

Does your system unit contain only one of this kind of FRU?

No Go to Step 0260-5.

Yes Go to Step 0260-6.

- **Step 0260-5**

One of the FRUs of this kind is defective.

Remove this kind of FRU one at a time. Test the system unit after each FRU is removed. Stop when the test completes successfully or when you have removed all of the FRUs of this kind.

Were you able to identify a failing FRU?

- No** Go to “PFW1540: Problem isolation procedures” on page 167.
- Yes** Go to Step 0260-6.
- **Step 0260-6**
 1. Turn off the system unit.
 2. Exchange the FRU identified by the location code or Step 0260-5.

Is this system capable of running online diagnostics in service mode?

No Go to Step 0260-7.

Yes Go to Step 0260-8.
 - **Step 0260-7**
 1. Turn on the system unit.
 2. Load the standalone diagnostics. See Running the standalone diagnostics from CD-ROM.
 3. Wait until the Diagnostic Operating Instructions display or the system appears to have stopped.

Are the DIAGNOSTIC OPERATING INSTRUCTIONS displayed?

No Go to Step 0260-9.

Yes Go to Verify a repair.
 - **Step 0260-8**
 1. Turn on the system unit.
 2. Load the standalone diagnostics. See Running the standalone diagnostics from CD-ROM.
 3. Wait until the Diagnostic Operating Instructions display or the system appears to have stopped.

Are the DIAGNOSTIC OPERATING INSTRUCTIONS displayed?

No Go to Step 0260-9.

Yes Go to Verify a repair.
 - **Step 0260-9**

Look at the operator panel display.

Is the number displayed the same as the last three or four digits after the dash (-) of your SRN?

No The symptom changed. Check for loose cards, cables, and obvious problems. If you do not find a problem, go to “MAP 0020” on page 98 and get a new SRN.

Yes Go to Step 0260-10.
 - **Step 0260-10**

Was the FRU you exchanged an adapter or a backplane?

No Go to Step 0260-11.

Yes Go to “PFW1540: Problem isolation procedures” on page 167.
 - **Step 0260-11**

Was the FRU you exchanged a device?

No Go to “PFW1540: Problem isolation procedures” on page 167.

Yes Go to Step 0260-12.
 - **Step 0260-12**

The adapter for the device may be causing the problem.

 1. Turn off the system unit.
 2. Exchange the adapter for the device.

Note: If the Linux operating system is not used on the system, start diagnostics from an alternate source.

3. Turn on the system unit. If c31 is displayed, follow the instructions to select a console display.
4. Load the standalone diagnostics. See Running the standalone diagnostics from CD-ROM.
5. Wait until the DIAGNOSTIC OPERATING INSTRUCTIONS display or the system appears to have stopped.

Are the DIAGNOSTIC OPERATING INSTRUCTIONS displayed?

No Go to “PFW1540: Problem isolation procedures” on page 167.

Yes Go to Verify a repair.

MAP 0270

Use this MAP to resolve SCSI RAID adapter, cache, or drive problems.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

Notes:

1. This MAP assumes that the RAID adapter and drive microcode is at the correct level.
2. This MAP applies only to PCI, not PCI-X, RAID adapters.

Attention: If the FRU is a disk drive or an adapter, ask the system administrator to perform the steps necessary to prepare the device for removal.

• Step 0270-1

1. If the system displayed a FRU part number on the screen, use that part number. If there is no FRU part number displayed on the screen, see the SRN listing. Record the SRN source code and the failing function codes in the order listed.
2. Find the failing function codes in the FFC listing, and record the FRU part number and description of each FRU.

Go to Step 0270-2.

• Step 0270-2

Is the FRU a RAID drive?

No Go to Step 0270-6.

Yes Go to Step 0270-3.

• Step 0270-3

If the RAID drive you want to replace is not already in the **failed** state, then ask the customer to run the PCI SCSI Disk Array Manager using smit to fail the drive that you want to replace. An example of this procedure is:

1. Log in as root user.
2. Type `smit pdam`.
3. Select **Fail a Drive in a PCI SCSI Disk Array**.
4. Select the appropriate disk array by placing the cursor over that array and press Enter.
5. Select the appropriate drive to fail based on the Channel and ID indicated in diagnostics. The **Fail a Drive** screen will appear.
6. Verify that you are failing the correct drive by looking at the Channel ID row. Press Enter when verified correct. Press Enter again.
7. Press **F10** and type `smit pdam`
8. Select **Change/Show PCI SCSI RAID Drive Status > Remove a Failed Drive**.
9. Select the drive that just failed.

Go to Step 0270-4.

- **Step 0270-4**

Replace the RAID drive using the RAID HOT PLUG DEVICES service aid:

Note: The drive you want to replace must be either a SPARE or FAILED drive. Otherwise, the drive would not be listed as an IDENTIFY AND REMOVE RESOURCES selection within the RAID HOT PLUG DEVICES screen. In that case you must ask the customer to put the drive into FAILED state. For information about putting the drive in a FAILED state, refer the customer to the SAS RAID controllers for Linux.

1. Select the option **RAID HOT PLUG DEVICES** within the HOT PLUG TASK under DIAGNOSTIC SERVICE AIDS.
2. Select the RAID adapter that is connected to the RAID array containing the RAID drive you want to remove, then select COMMIT.
3. Choose the option **IDENTIFY** in the IDENTIFY AND REMOVE RESOURCES menu.
4. Select the physical disk which you want to remove from the RAID array and press Enter. The disk will go into the IDENTIFY state, indicated by a flashing light on the drive.
5. Verify that it is the physical drive you want to remove, then press Enter.
6. At the IDENTIFY AND REMOVE RESOURCES menu, choose the option **REMOVE** and press Enter. A list of the physical disks in the system that may be removed will be displayed.
7. If the physical disk you want to remove is listed, select it and press Enter. The physical disk will go into the REMOVE state, as indicated by the LED on the drive. If the physical disk you want to remove is not listed, it is not a SPARE or FAILED drive. Ask the customer to put the drive in the FAILED state before you can proceed to remove it. For information about putting the drive in a FAILED state, refer the customer to the SAS RAID controllers for Linux.
8. See the service information for the system unit or enclosure that contains the physical drive for removal and replacement procedures for the following substeps:
 - a. Remove the old hot-swap RAID drive.
 - b. Install the new hot-swap RAID drive. After the hot-swap drive is in place, press Enter. The drive will exit the REMOVE state, and will go to the NORMAL state after you exit diagnostics.

Note: There are no elective tests to run on a RAID drive itself under diagnostics (the drives are tested by the RAID adapter).

Go to Step 0270-5.

- **Step 0270-5**

If the RAID did not begin reconstructing automatically, perform the following steps.

Adding a Disk to the RAID array and Reconstructing:

Ask the customer to run the PCI SCSI Disk Array Manager using **smit**. An example of this procedure is:

1. Log in as root user.
2. Type `smit pdam`.
3. Select **Change/Show PCI SCSI RAID Drive Status**.
4. Select **Add a Spare Drive**.
5. Select the appropriate adapter.
6. Select the channel and ID of the drive that was replaced.
7. Press Enter when verified.
8. Press F3 until you return to the **Change/Show PCI SCSI RAID Drive Status** screen.
9. Select **Add a Hot Spare**.
10. Select the drive you just added as a spare.

If there was no hot spare previously installed in the array, the array will begin reconstructing immediately. Reconstruction time will vary based on the size of the RAID array. Allow 1-2 hours for completion.

To check the progress of the reconstruction:

1. Log in as root user.
2. Type `smit pdam`.
3. Select **List PCI SCSI RAID Arrays**.
4. Choose the array containing the drive you replaced.

If the state of the RAID array is `reconstructing`, then it is in process of reconstructing. If it is `optimal`, then reconstruction has completed.

5. Press F10 to exit.

Go to Step 027017.

• **Step 0270-6**

Is the FRU a RAID adapter base card, RAID adapter cache card, or RAID adapter battery?

No Go to Step 0270-15.

Yes Go to Step 0270-7.

• **Step 0270-7**

Do you want to change the FRU using a hot-swap operation?

No Power off the system, and remove the RAID adapter. Go to Step 0270-8.

Yes Remove the RAID adapter. Go to Step 0270-8.

• **Step 0270-8**

Is the FRU you want to replace a RAID adapter cache card or RAID adapter battery?

No Go to Step 0270-10.

Yes Go to Step 0270-9.

• **Step 0270-9**

Replace the FRU onto the existing base card.

Go to Step 0270-11.

• **Step 0270-10**

After physically removing the base card from the system, remove any other good FRUs (RAID cache card or cache battery) from the RAID base card adapter. Plug these FRUs on to the replacement RAID base card adapter FRU.

Go to Step 0270-11.

• **Step 0270-11**

Did you change the FRU using a hot-swap operation?

No Install the RAID adapter assembly into the system. Power on the system and log in to Linux.
Go to Step 0270-12.

Yes Install the RAID adapter assembly into the system. Go to Step 0270-12.

• **Step 0270-12**

Was the replacement FRU a RAID base card?

No Go to Step 0270-14.

Yes Go to Step 0270-13.

• **Step 0270-13**

Attention: Prior to cabling the SCSI RAID adapter to the subsystem, check for preexisting configurations on the replacement SCSI RAID base card. The replacement base card can overwrite your system's configuration data if it already has a configuration written to it. Check it before cabling the SCSI RAID subsystem array.

Ask to customer to check for preexisting configuration on the SCSI RAID base card. Below is an example of this procedure:

1. Log in as root (if not already root).
2. Type `smit pdam`.
3. Select **List PCI SCSI RAID Arrays**.
4. If no RAID arrays are listed, then there are no preexisting configurations on the base card.
5. Press F10 key to exit.

If a preexisting configuration exists on the base card, ask the customer to run the PCI SCSI Disk Array Manager using **smitty**.

1. Log in as root (if not already root).
2. Type `smit pdam` from the Linux command prompt (if not already in the RAID manager).
3. Select **Recovery Options**.
4. Select **Clear PCI SCSI RAID Adapter Configuration**. Select the adapter that you just installed. Press Enter to confirm.
5. Return to the **Recovery Options** menu (if not already there). Select **Resolve PCI SCSI RAID Adapter Configuration**. Select **Accept Configuration on Drives**. Select the adapter that you just installed. Press Enter to confirm. The configuration on the new adapter should now match the configuration existent on the drives.
6. Press F10 to exit.

You may now proceed to cable the RAID system array.

Go to Step 0270-16.

- **Step 0270-14**

Ask the customer to resynchronize the RAID array configuration:

1. Log in as root (if not already root).
2. Type `smit pdam`.
3. Select **Recovery Options**.
4. Select **Resolve PCI SCSI RAID Adapter Configuration**.
5. Select **Retry Current Configuration**.
6. Select the appropriate `sraid` (SCSI RAID) adapter. A message will be displayed as to the success of the operation.
7. Press F10 to exit.

Go to Step 0270-16.

- **Step 0270-15**

Other RAID FRUs require that the system be shut down prior to replacement.

1. If the operating system is running, perform the operating system shutdown procedure (get help if needed).
2. Turn off the system power.
3. Replace the FRU indicated by the FFC.

Go to Step 0270-16.

- **Step 0270-16**

Run the diagnostics in system verification mode on the RAID subsystem.

Did the diagnostics run with no trouble found?

No Go to Step 0270-18.

Yes Go to Step 0270-17.

• **Step 0270-17**

1. Use the option **Log Repair Action** in the TASK SELECTION menu to update the Linux error log. Select **scraidX** (where X is the RAID adapter number of the RAID subsystem you have been working on).

Note: On systems with fault indicator LED, this changes the fault indicator LED from the Fault state to the Normal state.

2. While in diagnostics, go to the FUNCTION SELECTION menu. Select the option **Advanced Diagnostics Routines**.
3. When the DIAGNOSTIC MODE SELECTION menu displays, select the option **System Verification**. Run the diagnostic test on **scraidX** (where X is the RAID adapter number).

Did the diagnostics run with no trouble found?

No Go to the Step 0270-18.

Yes If you changed the service processor or network settings, restore the settings to the value they had prior to servicing the system.

This completes the repair; return the system to the customer. Go to Closing a service call.

• **Step 0270-18**

Have you exchanged all the FRUs that correspond to the failing function codes?

No Go to Step 0270-19.

Yes The SRN did not identify the failing FRU. Schedule a time to run diagnostics in service mode. If the same SRN is reported in service mode, go to “MAP 0030” on page 105.

• **Step 0270-19**

Note: Note: Before proceeding, remove the FRU you just replaced and install the original FRU in its place.

Use the next FRU on the list and go to Step 0270-2.

MAP 0280

Use this MAP to resolve console and keyboard problems when the system is booting.

Use this MAP to resolve console and keyboard problems when the system is booting. For other boot problems and concerns, go to “Problems with loading and starting the operating system (Linux)” on page 87.

Entry table	
Keyboard problem	Go to Step 0280-1.
Graphic adapter problem	Go to Step 0280-2.
Terminal problem	Go to Step 0280-3.

• **Step 0280-1**

The system fails to respond to keyboard entries.

This problem is most likely caused by a faulty keyboard, keyboard adapter, or keyboard cable.

Try the FRUs in the following order. Test each FRU by retrying the failing operation.

1. Keyboard.
2. Keyboard adapter, typically located on the system board.
3. Keyboard cable, if not included with the keyboard.

Were you able to resolve the problem?

No Go to “MAP 0030” on page 105.

Yes Go to Verify a repair.

• **Step 0280-2**

1. Some systems have a graphic adapter POST. If a graphic adapter POST is supported and it indicates a failure, follow the procedures in the system guide to resolve the problem.
2. If a graphic adapter POST is supported and it does not indicate a failure, suspect the display or display cable.
3. If the system does not have a graphic adapter POST, go to the display's problem determination procedures. If you do not find a problem, replace the graphics adapter.

Were you able to resolve the problem?

No Go to “MAP 0030” on page 105.

Yes Go to Verify a repair.

• **Step 0280-3**

Go to the problem determination procedure for the terminal. If you do not find a problem, suspect the serial port adapter or terminal cable.

Were you able to resolve the problem?

No Call your support person.

Yes Go to Verify a repair.

MAP 0285

Use this MAP to handle SRN A23-001 and ssss-640 (where ssss is the 3 or 4 digit Failing Function Code (FFC) of an SCSD drive) to check the path from adapter to device.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

Note: Not all devices support MPIO. Before proceeding with this MAP, make sure that the devices on both ends of the missing path support MPIO.

• **Step 0285-1**

Look at the problem report screen for the missing path. After the resource name and FRU, the next column identifies the missing path between resources (for example, `scsi0 -> hdisk1`). This indicates the missing path between the two resources, `scsi0` (the parent resource) and `hdisk1` (the child resource).

Is the cabling present between the two resources?

No Go to Step 0285-2.

Yes Go to Step 0285-4.

Note: In the following MAP steps, if no path previously existed between a parent and child device, the child device will have to be changed from the defined to the available state, otherwise you will be unable to select the child device to which you want to establish a path.

• **Step 0285-2**

1. Power off the system.
2. Connect the correct cable between the two resources.
3. Power on the system, rebooting Linux.
4. At the Linux command line, type `smitty mpio`.
5. Choose **MPIO Path Management**.

6. Select **Enable Paths**.
7. Select **Enable Paths for a Device**.
8. In the **Device Name** selection, choose the name of the child device (the device at the end of the path).
9. In the **Paths to Enable** selection, select the missing path (between the parent and child device).
10. Press Enter.

Did the smitty menu complete with no errors?

No Go to Step 0285-4.

Yes Go to Step 0285-3.

- **Step 0285-3**

To verify that the device path is present, rerun `diag -a`.

When the resource list displays, select the child resource that had the missing path. If the letter P is shown in front of the resource, you still have a path problem. If no letter P is shown in front of the resource or if the system returns to the command prompt or you get a message without the resource list being displayed, then the problem has been resolved.

Do you still have a path problem?

No Go to Verify a repair.

Yes Go to Step 0285-4.

- **Step 0285-4**

1. Power off the system.
2. Reseat the cables between the device and the adapter that have the missing path.
3. Power on the system, and reboot Linux.
4. At the Linux command line, type `smitty mpio`.
5. Choose **MPIO Path Management**.
6. Select **Enable Paths**.
7. Select **Enable Paths for a Device**.
8. In the **Device Name** selection, choose the name of the child device (the device at the end of the path).
9. In the **Paths to Enable** selection, select the missing path (between the parent and child device).
10. Press Enter.

Did the smitty menu complete with no errors?

No Go to Step 0285-6.

Yes Go to Step 0285-5.

- **Step 0285-5**

To verify that the device path is present, rerun `diag -a`

When the resource list displays, select the child resource that had the missing path. If the letter P is shown in front of the resource, you still have a path problem. If no letter P is shown in front of the resource or if the system returns to the command prompt or you get a message without the resource list being displayed, then the problem has been resolved.

Do you still have a path problem?

No Go to Verify a repair.

Yes Go to Step 0285-6.

- **Step 0285-6**

You may have a problem with the driver interface or connector on either the parent or child device.

1. Power off the system (see the system service information if necessary).

2. Remove the cables to the parent device.
3. Replace the cables that go between the parent and child device (if present).
4. Reattach the cables to the parent device.
5. Power on the system, rebooting Linux (refer to the system service information if necessary).
6. At the Linux command line, type `smitty mpio`.
7. Choose **MPIO Path Management**.
8. Select **Enable Paths**.
9. Select **Enable Paths for a Device**.
10. In the **Device Name** selection, choose the name of the child device (the device at the end of the path).
11. In the **Paths to Enable** selection, select the missing path (between the parent and child device).
12. Press Enter.

Did the smitty menu complete with no errors?

No Go to Step 0285-7.

Yes Go to Step 0285-8.

- **Step 0285-7**

To verify that the device path is present, rerun `diag -a`.

When the resource list displays, select the child resource that had the missing path. If the letter P is shown in front of the resource, you still have a path problem. If the letter P is not shown in front of the resource, or if the system returns to the command prompt, or you get a message without the resource list being displayed, then the problem has been resolved.

Do you still have a problem?

No Go to Verify a repair.

Yes Go to Step 0285-8.

- **Step 0285-8**

You may have a problem with the driver interface or connector on either the parent or child device.

1. Power off the system.
2. Remove the cables to the parent device.
3. Replace the parent device.
4. Reattach the cables to the parent device.
5. Power on the system, rebooting Linux.
6. At the Linux command line, type `smitty mpio`.
7. Choose **MPIO Path Management**.
8. Select **Enable Paths**.
9. Select **Enable Paths for a Device**.
10. In the **Device Name** selection, choose the name of the child device (the device at the end of the path).
11. In the **Paths to Enable** selection, select the missing path (between the parent and child device).
12. Press Enter.

Did the smitty menu complete with no errors?

No Go to Step 0285-9.

Yes Go to Step 0285-10.

- **Step 0285-9**

To verify that the device path is present, rerun `diag -a`.

When the resource list displays, select the child resource that had the missing path. If the letter P is shown in front of the resource, you still have a path problem. If no letter P is shown in front of the resource or if the system returns to the command prompt or you get a message without the resource list being displayed, then the problem has been resolved.

Do you still have a path problem?

No Go to Verify a repair.

Yes Go to Step 0285-10.

- **Step 0285-10**

You may have a problem with the driver interface or connector on the child device.

1. Power off the system.
2. Remove the cables to the child device.
3. Replace the child device (in the case of a SCSI or SAF-TE backplane, replace the backplane first, followed by the child device).
4. Reattach the cables to the child device.
5. Power on the system, rebooting Linux.
6. At the Linux command line, type `smitty mpio`.
7. Choose **MPIO Path Management**.
8. Select **Enable Paths**.
9. Select **Enable Paths for a Device**.
10. In the **Device Name** selection, choose the name of the child device (the device at the end of the path).
11. In the **Paths to Enable** selection, select the missing path (between the parent and child device).
12. Press Enter.

Did the smitty menu complete with no errors?

No Neither the cabling, nor the parent, nor the child seem to be causing the problem. Contact your service support structure.

Yes Go to Step 0285-11.

- **Step 0285-11**

Rerun `diag -a` to verify that the device path is present.

When the resource list displays, select the child resource that had the missing path. If the letter P is shown in front of the resource, you still have a path problem. If no letter P is shown in front of the resource or if the system returns to the command prompt or you get a message without the resource list being displayed, then the problem has been resolved.

Do you still have a path problem?

No Go to Verify a repair.

Yes Neither the cabling, nor the parent, nor the child seem to be causing the problem. Contact your service support structure.

MAP 0291

Use this MAP when a bus or device (such as a disk drive) is reported as a missing resource by the diagnostics.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

- **Step 0291-1**

The device may be missing because of a power problem.

If the missing device is located in a drawer or enclosure, do the following:

1. Check for any environmental problem indicators such as power or cooling that may indicate a problem.
2. If a problem is indicated, follow the service documentation to resolve the problem.

Go to Step 0291-2.

- **Step 0291-2**

Inspect the cables (signal and power) of the missing device. Be sure all connections are in place and power is present. See the system or enclosure documentation containing the power wiring diagram or system cable diagram to locate specific cables, determine the cable numbering, and check for a problem-determination procedure. Look for obvious power cabling problems, such as missing or loose cable connectors.

Power problems can sometimes be identified by checking other devices that use the same power source (such as a diskette drive and a SCSI tape drive, even though they have different controllers). If other devices that share a power source are reported as missing devices, suspect the power source as the problem.

If there is a power problem, see “Power problems” on page 36.

Did you find a problem?

No Go to Step 0291-3.

Yes Correct the problem, then go to Verify a repair.

- **Step 0291-3**

Is the missing device a SCSI device installed in a SCSI Enclosure Services (Linux resource SESx) or SAF-TE (Linux resource SAFTEEx), or a SCSI device installed in either type of enclosure?

No Go to “MAP 0210: General problem resolution” on page 87.

Yes Go to Step 0291-4.

- **Step 0291-4**

Run the advanced diagnostics in problem determination mode on the SCSI Enclosure Services or SAF-TE device.

Note: A no trouble found result, or if you get another SRN with the same digits before the dash as you previously had from the diagnostics, indicates that you did *not* get a different SRN.

Did you get a different SRN than when you ran the diagnostics previously?

No Go to Step 0291-5.

Yes Take the following action:

1. Look up the SRN.

Note: If the SRN is not listed in the Reference codes look for additional information in the following:

- Any supplemental service manual for the device.
- The diagnostic Problem Report screen.
- The Service Hints service aid in Running the online and standalone diagnostics log.

2. Perform the action listed.

- **Step 0291-5**

Power[®] off the system. Disconnect all hot-swap devices attached to the adapter. Reconnect the hot-swap devices one at time. After reconnecting each device, do the following:

1. Power on the system and boot the system in the same mode that you were in when you received the symptom that led you to this MAP Powering on and powering off the system .
2. At an Linux command prompt, run the **diag -a** command to check for missing options.

3. Verify that the device you just added to the system is present in the system configuration. If other devices are now missing, the problem may be with the last device that was reconnected or reinstalled. Perform these substeps:
 - a. If the device that was just reinstalled in the system is missing, or if additional devices are now missing, replace the last device that was reinstalled.
 - b. Rerun **diag -a** to check for missing options.
 - c. If devices are no longer missing, go to Verify a repair. Otherwise, contact your support center.

Note: A device problem can cause other devices attached to the same SCSI adapter to go into the defined state. Ask the system administrator to make sure that all devices attached to the same SCSI adapter as the device that you replaced are in the available state.

4. If no devices were missing, the problem could be intermittent. Make a record of the problem. Running the diagnostics for each device on the bus may provide additional information. If you have not replaced FFCs B88, 190, and 152 go to "MAP 0210: General problem resolution" on page 87, using FFCs (in order): B88, 190, and 152.

MAP 4040

Use this MAP to resolve the following problem: Multiple controllers connected in an invalid configuration (SRN *nnnn* - 9073)

A configuration error occurred. See SAS RAID configurations to determine the allowable configurations. Then correct the configuration. If correcting the configuration does not resolve the error, contact your hardware service provider.

When the problem is resolved, see the removal and replacement procedures topic for the system unit on which you are working and do the "Verifying the repair" procedure.

MAP 4041

Use this MAP to resolve the following problem: Multiple controllers not capable of controlling the same set of devices (SRN *nnnn* - 9074)

Step 4041-1

This error relates to adapters connected in a multi-initiator and high availability configuration. To obtain the reason or description for this failure, you must find the formatted error information in the error log. The log also contains information about the attached adapter (**Remote Adapter** fields).

Display the hardware error log. View the hardware error log as follows:

1. Follow the steps in Examining the hardware error log and return here.
2. Select the hardware error log to view. In the hardware error log, the **Detail Data** section contains the **reason for failure** and the **Remote Adapter Vendor ID, Product ID, Serial Number, and World Wide ID**.
3. Go to "Step 4041-2."

Step 4041-2

Find the **reason for failure** and information for the attached adapter (remote adapter) shown in the error log, and perform the action listed for the reason in the following table.

Table 17. RAID array reason for failure

Reason for failure	Description	Action	Adapter on which to perform the action
Secondary is unable to find devices found by the primary.	Secondary adapter cannot discover all the devices that the primary has.	Verify the connections to the devices from the adapter that is logging the error. View the disk array configuration screens to determine the SAS port that has the problem. See SAS fabric identification to verify connections.	Adapter that logged the error.
Secondary found devices not found by the primary.	Secondary adapter has discovered more devices than the primary. After this error is logged, an automatic failover will occur.	Verify the connections to the devices from the remote adapter as indicated in the error log. View the disk array configuration screens to determine the SAS port that has the problem. See SAS fabric identification to verify connections.	Remote adapter indicated in the error log.
Primary lost contact with disks accessible by secondary.	Link failure from primary adapter to devices. An automatic failover will occur.	Verify the connections to the devices from the adapter that is logging the error. View the disk array configuration screens to determine the SAS port that has the problem. See SAS fabric identification to verify connections.	Adapter that logged the error.
Other	Not currently defined.	Contact your hardware service provider.	

When the problem is resolved, see the removal and replacement procedures topic for the system unit on which you are working and do the "Verifying the repair" procedure.

MAP 4044

Use this MAP to resolve an incorrect or incomplete multipath connection problem.

Use this MAP to resolve the following problems:

- Configuration error, incorrect multipath connection (SRN *nnnn* – 4030)
- Configuration error, incomplete multipath connection between controller and enclosure detected (SRN *nnnn* – 4040)

The possible causes are:

- Incorrect cabling to device enclosure.

Note: Pay special attention to the requirement that a YI-cable must be routed along the right side of the rack frame (as viewed from the rear) when connecting to a disk expansion unit. Review the device enclosure cabling and correct the cabling as required. To see example device configurations with SAS cabling, see Serial-attached SCSI cable planning.

- A failed connection caused by a failing component in the SAS fabric between, and including, the controller and device enclosure.

Considerations:

- Remove power from the system before connecting and disconnecting cables or devices, as appropriate, to prevent hardware damage or erroneous diagnostic results.
- Some systems have SAS and PCI-X or PCIe bus interface logic integrated onto the system boards and use a pluggable RAID enablement card (a non-PCI form factor card) for these integrated buses. See the feature comparison tables for PCIe and PCI-X cards. For these configurations, replacement of the RAID enablement card is unlikely to solve a SAS-related problem because the SAS interface logic is on the system board.
- Some systems have the disk enclosure or removable media enclosure integrated in the system with no cables. For these configurations the SAS connections are integrated onto the system boards, and a failed connection can be the result of a failed system board or integrated device enclosure.
- When using SAS adapters in either an HA two-system RAID or HA single-system RAID configuration, ensure that the actions taken in this MAP are against the primary adapter and not the secondary adapter.
- An adapter reset might occur during the system verification step of this procedure. To avoid potential data loss, reconstruct any degraded disk arrays if possible, before performing system verification.

Attention: Obtain assistance from your Hardware Service Support organization before you replace RAID adapters when SAS fabric problems exist. Because the adapter might contain nonvolatile write cache data and configuration data for the attached disk arrays, additional problems can be created by replacing an adapter when SAS fabric problems exist. Appropriate service procedures must be followed when replacing the cache RAID - dual IOA enablement card (for example, FC5662) because removal of this card can cause data loss if incorrectly performed and can also result in a nondual storage IOA (non-HA) mode of operation.

Step 4044-1

Was the SRN *nnnn*-4030?

No Go to "Step 4044-4" on page 143.

Yes Go to "Step 4044-2."

Step 4044-2

Review the device enclosure cabling and correct the cabling as required. To see example device configurations with SAS cabling, see "Serial-attached SCSI cable planning."

Step 4044-3

Run diagnostics in system verification mode on the adapter to rediscover the devices and connections.

1. Start Diagnostics and select **Task Selection** on the Function Selection display.
2. Select **Run Diagnostics**.
3. Select the adapter resource.

4. Select **System Verification**.

Examine the error log. See Examining the hardware error log. Did the error occur again?

No Go to "Step 4044-9" on page 144.

Yes Contact your hardware service provider.

Step 4044-4

The SRN is *nnnn-4040*.

Determine if a problem still exists for the adapter that logged this error by examining the SAS connections as follows:

1. Start the IBM SAS Disk Array Manager.
 - a. Start Diagnostics and select **Task Selection** on the Function Selection display.
 - b. Select **RAID Array Manager**.
 - c. Select **IBM SAS Disk Array Manager**.
2. Select **Diagnostics and Recovery Options**.
3. Select **Show SAS Controller Physical Resources**.
4. Select **Show Fabric Path Graphical View**.

Do all expected devices appear in the list and are all paths marked as Operational?

No Go to "Step 4044-5."

Yes Go to "Step 4044-9" on page 144.

Step 4044-5

Run diagnostics in System Verification mode on the adapter to rediscover the devices and connections.

1. Start Diagnostics and select **Task Selection** on the Function Selection display.
2. Select **Run Diagnostics**.
3. Select the adapter resource.
4. Select **System Verification**.

Note: At this point, ignore any problems found and continue with the next step.

Step 4044-6

Determine if the problem still exists for the adapter that logged this error by examining the SAS connections as follows:

1. Start the IBM SAS Disk Array Manager.
 - a. Start Diagnostics and select **Task Selection** on the Function Selection display.
 - b. Select **RAID Array Manager**.
 - c. Select **IBM SAS Disk Array Manager**.
2. Select **Diagnostics and Recovery Options**.
3. Select **Show SAS Controller Physical Resources**.
4. Select **Show Fabric Path Graphical View**.
5. Select a device with a path that is not **Operational** (if one exists) to obtain additional details about the full path from the adapter port to the device. See Viewing SAS fabric path information for an example of how this additional detail can be used to help isolate where in the path the problem exists.

Do all expected devices appear in the list and are all paths marked as **Operational**?

No Go to "Step 4044-7."

Yes Go to "Step 4044-9."

Step 4044-7

Go to SAS fabric identification. Then continue with the next step.

Step 4044-8

Determine if the problem still exists for the adapter that logged this error by examining the SAS connections as follows:

1. Start the IBM SAS Disk Array Manager.
 - a. Start Diagnostics and select **Task Selection** on the Function Selection display.
 - b. Select **RAID Array Manager**.
 - c. Select **IBM SAS Disk Array Manager**.
2. Select **Diagnostics and Recovery Options**.
3. Select **Show SAS Controller Physical Resources**.
4. Select **Show Fabric Path Graphical View**.
5. Select a device with a path that is not **Operational** (if one exists) to obtain additional details about the full path from the adapter port to the device. See Viewing SAS fabric path information for an example of how this additional detail can be used to help isolate where in the path the problem exists.

Do all expected devices appear in the list and are all paths marked as **Operational**?

No Go to "Step 4044-7."

Yes Go to "Step 4044-9."

Step 4044-9

When the problem is resolved, see the removal and replacement procedures topic for the system unit on which you are working and do the "Verifying the repair" procedure.

MAP 4047

Use this MAP to resolve the following problem: Missing remote controller (SRN *nnnn* - 9076)

An adapter attached in a multi-initiator and high availability configuration was not discovered in the allotted time. Determine which of the following items is the cause of your specific error and take the appropriate actions listed. If this action does not correct the error, contact your hardware service provider.

The possible causes are:

- An attached adapter for the configuration is not installed or is not powered on. Some adapters are required to be part of a high availability RAID configuration. Verify this requirement in the feature comparison tables for PCIe and PCI-X cards. Ensure that both adapters are properly installed and powered on.
- If the configuration is a high availability single-system RAID configuration, both adapters might not be in the same partition. Ensure that both adapters are assigned to the same partition.
- An attached adapter does not support the desired configuration. See SAS RAID configurations to determine the allowable configurations. Then correct the configuration. If correcting the configuration does not resolve the error, contact your hardware service provider.

- An attached adapter for the configuration failed. Take action on the other errors that have occurred at the same time as this error.
- Adapter microcode levels are not up to date or are not at the same level of supported function. Ensure that the microcode for both adapters is at the latest level.

Note: The adapter that is logging this error will run in a performance degraded mode, without caching, until the problem is resolved.

When the problem is resolved, see the removal and replacement procedures topic for the system unit on which you are working and do the "Verifying the repair" procedure.

MAP 4049

Use this MAP to resolve the following problem: Incomplete multipath connection between controller and remote controller (SRN *nnnn* - 9075)

The possible cause is a failure in the embedded SAS fabric. Use the following table to determine the service action to perform.

Table 18. Service actions for a failure in the embedded SAS fabric

Location of device or devices	Service action
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	<p>Replace the following FRUs, one at a time, in the order shown until the problem is resolved. See 8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T locations to determine the location, part number, and replacement procedure to use for each FRU.</p> <ol style="list-style-type: none"> 1. Device backplane (CCIN 2BD7 or 2BE7) at location Un-P3. 2. Device backplane interposer (CCIN 2D1E or 2D1F) at location Un-P2. 3. Replace the adapter that logged the error. The adapter might be any of the following possible failing items: <ul style="list-style-type: none"> • System backplane (CCIN 2B2C, 2B2D, 2B4A, or 2B4B) at location Un-P1. • RAID adapter (CCIN 2B4C) at location Un-P1-C18.
Disk expansion unit attached to an 8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Replace the cables to the disk expansion unit. If that does not resolve the problem, see the service information for the disk expansion unit for additional FRUs to replace.

MAP 4050

Use this MAP to perform SAS fabric problem isolation.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

Considerations:

- Remove power from the system before connecting and disconnecting cables or devices, as appropriate, to prevent hardware damage or erroneous diagnostic results.
- Some systems have SAS and PCI-X or PCIe bus interface logic integrated onto the system boards and use a pluggable RAID enablement card (a non-PCI form factor card) for these integrated-logic buses.

See the feature comparison tables for PCIe and PCI-X cards. For these configurations, replacement of the RAID enablement card is unlikely to solve a SAS-related problem because the SAS interface logic is on the system board.

- Some systems have the disk enclosure or removable media enclosure integrated in the system with no cables. For these configurations, the SAS connections are integrated onto the system boards. A failed connection can be the result of a failed system board or integrated device enclosure.

Attention: When SAS fabric problems exist, obtain assistance from your hardware service provider before performing any of the following actions:

- Before you replace a RAID adapter: Because the adapter might contain nonvolatile write cache data and configuration data for the attached disk arrays, additional problems can be created by replacing an adapter.
- Before you remove functioning disks in a disk array: The disk array might become degraded or failed and additional problems might be created if functioning disks are removed from a disk array.

Attention: Do not remove functioning disks in a disk array without assistance from your hardware service support organization. A disk array might become degraded or might fail if functioning disks are removed, and additional problems might be created.

Step 4050-1

Was the SRN *mmmm-3020*?

No Go to "Step 4050-3."

Yes Go to "Step 4050-2."

Step 4050-2

The possible causes are:

- More devices are connected to the adapter than the adapter supports. Change the configuration to the allowable number of devices.
- A SAS device has been improperly moved from one location to another. Either return the device to its original location or move the device while the adapter is powered off or unconfigured.
- A SAS device has been improperly replaced by a SATA device. A SAS device must be used to replace a SAS device.

When the problem is resolved, see the removal and replacement procedures topic for the system unit on which you are working and do the "Verifying the repair" procedure.

Step 4050-3

Determine if any of the disk arrays on the adapter are in a **Degraded** state as follows:

1. Start the IBM SAS Disk Array Manager.
 - a. Start Diagnostics and select **Task Selection** on the Function Selection display.
 - b. Select **RAID Array Manager**.
 - c. Select **IBM SAS Disk Array Manager**.
2. Select **List SAS Disk Array Configuration**.
3. Select the IBM SAS RAID Controller identified in the hardware error log.

Does any disk array have a state of **Degraded**?

No Go to "Step 4050-5" on page 147.

Yes Go to "Step 4050-4" on page 147.

Step 4050-4

Other errors might have occurred related to the disk array being in a **Degraded** state. Take action on these errors to replace the failed disk and restore the disk array to an **Optimal** state.

When the problem is resolved, see the removal and replacement procedures topic for the system unit on which you are working and do the "Verifying the repair" procedure.

Step 4050-5

Have other errors occurred at the same time as this error?

No Go to "Step 4050-7."

Yes Go to "Step 4050-6."

Step 4050-6

Take action on the other errors that have occurred at the same time as this error.

When the problem is resolved, see the removal and replacement procedures topic for the system unit on which you are working and do the "Verifying the repair" procedure.

Step 4050-7

Was the SRN *nnnn-FFFE*?

No Go to "Step 4050-10."

Yes Go to "Step 4050-8."

Step 4050-8

Ensure device, device enclosure, and adapter microcode levels are up to date.

Did you update to newer microcode levels?

No Go to "Step 4050-10."

Yes Go to "Step 4050-9."

Step 4050-9

When the problem is resolved, see the removal and replacement procedures topic for the system unit on which you are working and do the "Verifying the repair" procedure.

Step 4050-10

Is the problem in a disk expansion unit?

No Go to SAS fabric identification.

Yes Go to "Step 4050-11."

Step 4050-11

Identify the adapter SAS port that is associated with the problem by examining the hardware error log. The hardware error log might be viewed as follows:

1. Follow the steps in Examining the hardware error log and return here.

2. Select the hardware error log to view. In the hardware error log under the **Disk Information** heading, the **Resource** field can be used to identify which controller port the error is associated with.

Note: If you do not see the **Disk Information** heading in the error log, obtain the **Resource** field from the **Detail Data / PROBLEM DATA** section as illustrated in the following example:

```
Detail Data
PROBLEM DATA
0000 0800 0004 FFFF 0000 0000 0000 0000 0000 0000 1910 00F0 0408 0100 0101 0000
      ^
      |
Resource is 0004FFFF
```

Go to “Step 4050-12.”

Step 4050-12

Using the resource found in the previous step, see SAS resource locations to understand how to identify the port of the controller to which the device, or device enclosure, is attached.

For example, if the resource were equal to 0004FFFF, port 04 on the adapter is used to attach the device or device enclosure that is experiencing the problem.

The resource found in the previous step can also be used to identify the device. To identify the device, you can attempt to match the resource with the one found on the display, that is displayed by performing the following steps.

1. Start the IBM SAS Disk Array Manager:
 - a. Start the diagnostics program and select **Task Selection** from the Function Selection display.
 - b. Select **RAID Array Manager**.
 - c. Select **IBM SAS Disk Array Manager**.
2. Select **Diagnostics and Recovery Options**.
3. Select **Show SAS Controller Physical Resources**.
4. Select **Show Physical Resource Locations**.

Step 4050-13

Because the problem persists, some corrective action is needed to resolve the problem. Using the port or device information found in the previous step, proceed by doing the following steps.

1. Power off the system or logical partition.
2. Perform only one of the following corrective actions, which are listed in the order of preference. If one of the corrective actions has previously been attempted, proceed to the next one in the list.

Note: Before replacing parts, consider using a complete power down of the entire system, including any external device enclosures, to provide a reset of all possible failing components. This action might correct the problem without replacing parts.

- Reseat cables on adapter and device enclosure.
- Replace cable from adapter to device enclosure.
- Replace the device.

Note: If there are multiple devices with a path that is not **Operational**, the problem is not likely to be with a device.

- Replace the internal device enclosure or see the service documentation for an external expansion unit.

- Replace the adapter.
 - Contact your hardware service provider.
3. Power on the system or logical partition.

Note: In some situations, it might be acceptable to unconfigure and reconfigure the adapter instead of powering off and powering on the system or logical partition.

Step 4050-14

Does the problem still occur after performing the corrective action?

No Go to "Step 4050-15."

Yes Go to "Step 4050-13" on page 148.

Step 4050-15

When the problem is resolved, see the removal and replacement procedures topic for the system unit on which you are working and do the "Verifying the repair" procedure.

MAP 4052

Use this MAP to resolve device bus fabric problems.

Use this MAP to resolve the following problems:

- Device bus fabric error (SRN *nnnn* – 4100)
- Temporary device bus fabric error (SRN *nnnn* – 4101)

The possible causes are:

- A failed connection caused by a failing component in the SAS fabric between, and including, the adapter and device enclosure.
- A failed connection caused by a failing component within the device enclosure, including the device itself.

Considerations:

- Remove power from the system before connecting and disconnecting cables or devices, as appropriate, to prevent hardware damage or erroneous diagnostic results.
- Some systems have SAS and PCI-X or PCIe bus interface logic integrated onto the system boards and use a pluggable RAID enablement card (a non-PCI form factor card) for such integrated-logic buses. See the feature comparison tables for PCIe and PCI-X cards. For these configurations, replacement of the RAID enablement card is unlikely to solve a SAS-related problem because the SAS interface logic is on the system board.
- Some systems have the disk enclosure or removable media enclosure integrated in the system with no cables. For these configurations, the SAS connections are integrated onto the system boards. A failed connection can be the result of a failed system board or integrated device enclosure.
- When using SAS adapters in either an HA two-system RAID or HA single-system RAID configuration, ensure that the actions taken in this MAP are against the primary adapter (not the secondary adapter).
- An adapter reset might occur during the system verification step of this procedure. To avoid potential data loss, reconstruct any degraded disk arrays if possible, before performing system verification.

Attention: When SAS fabric problems exist, obtain assistance from your hardware service provider before performing any of the following actions:

- Before you replace a RAID adapter: Because the adapter might contain nonvolatile write cache data and configuration data for the attached disk arrays, additional problems can be created by replacing an adapter.
- Before you remove functioning disks in a disk array: The disk array might become degraded or failed and additional problems might be created if functioning disks are removed from a disk array.

Step 4052-1

Determine if the problem still exists for the adapter that logged this error by examining the SAS connections as follows:

1. Start the IBM SAS Disk Array Manager.
 - a. Start Diagnostics and select **Task Selection** on the Function Selection display.
 - b. Select **RAID Array Manager**.
 - c. Select **IBM SAS Disk Array Manager**.
2. Select **Diagnostics and Recovery Options**.
3. Select **Show SAS Controller Physical Resources**.
4. Select **Show Fabric Path Graphical View**.

Do all expected devices appear in the list and are all paths marked as Operational?

No Go to "Step 4052-2."

Yes Go to "Step 4052-6" on page 151.

Step 4052-2

Run diagnostics in system verification mode on the adapter to rediscover the devices and connections.

1. Start Diagnostics and select **Task Selection** on the Function Selection display.
2. Select **Run Diagnostics**.
3. Select the adapter resource.
4. Select **System Verification**.

Note: Disregard any trouble found for now, and continue with the next step.

Step 4052-3

Determine if the problem still exists for the adapter that logged this error by examining the SAS connections as follows:

1. Start the IBM SAS Disk Array Manager.
 - a. Start Diagnostics and select **Task Selection** on the Function Selection display.
 - b. Select **RAID Array Manager**.
 - c. Select **IBM SAS Disk Array Manager**.
2. Select **Diagnostics and Recovery Options**.
3. Select **Show SAS Controller Physical Resources**.
4. Select **Show Fabric Path Graphical View**.
5. Select a device with a path that is not **Operational** (if one exists) to obtain additional details about the full path from the adapter port to the device. See Viewing SAS fabric path information for an example of how this additional detail can be used to help isolate where in the path the problem exists.

Do all expected devices appear in the list and are all paths marked as **Operational**?

No Go to "Step 4052-4."

Yes Go to "Step 4052-6."

Step 4052-4

Go to SAS fabric identification. Then continue with the next step.

Step 4052-5

Determine if the problem still exists for the adapter that logged this error by examining the SAS connections as follows:

1. Start the IBM SAS Disk Array Manager.
 - a. Start Diagnostics and select **Task Selection** on the Function Selection display.
 - b. Select **RAID Array Manager**.
 - c. Select **IBM SAS Disk Array Manager**.
2. Select **Diagnostics and Recovery Options**.
3. Select **Show SAS Controller Physical Resources**.
4. Select **Show Fabric Path Graphical View**.
5. Select a device with a path that is not **Operational** (if one exists) to obtain additional details about the full path from the adapter port to the device. See Viewing SAS fabric path information for an example of how this additional detail can be used to help isolate where in the path the problem exists.

Do all expected devices appear in the list and are all paths marked as **Operational**?

No Go to "Step 4052-4."

Yes Go to "Step 4052-6."

Step 4052-6

When the problem is resolved, see the removal and replacement procedures topic for the system unit on which you are working and do the "Verifying the repair" procedure.

MAP 4053

Use this MAP to resolve the following problem: Multipath redundancy level got worse (SRN *nnnn* - 4060)

The possible causes are:

- A failed connection caused by a failing component in the SAS fabric between, and including, the adapter and device enclosure.
- A failed connection caused by a failing component within the device enclosure, including the device itself.

Note: The failed connection was previously working, and might have already recovered.

Considerations:

- Remove power from the system before connecting and disconnecting cables or devices, as appropriate, to prevent hardware damage or erroneous diagnostic results.
- Some systems have SAS and PCI-X or PCIe bus interface logic integrated onto the system boards and use a pluggable RAID enablement card (a non-PCI form factor card) for such integrated-logic buses. See the feature comparison tables for PCIe and PCI-X cards. For these configurations, replacement of the RAID enablement card is unlikely to solve a SAS-related problem because the SAS interface logic is on the system board.

- Some systems have the disk enclosure or removable media enclosure integrated in the system with no cables. For these configurations, the SAS connections are integrated onto the system boards. A failed connection can be the result of a failed system board or integrated device enclosure.
- When using SAS adapters in either an HA two-system RAID or HA single-system RAID configuration, ensure that the actions taken in this MAP are against the primary adapter and not the secondary adapter.
- An adapter reset might occur during the system verification step of this procedure. To avoid potential data loss, reconstruct any degraded disk arrays if possible, before performing system verification.

Attention: When SAS fabric problems exist, obtain assistance from your hardware service provider before performing any of the following actions:

- Before you replace a RAID adapter: Because the adapter might contain nonvolatile write cache data and configuration data for the attached disk arrays, additional problems can be created by replacing an adapter.
- Before you remove functioning disks in a disk array: The disk array might become degraded or failed and additional problems might be created if functioning disks are removed from a disk array.

Step 4053-1

Determine if the problem still exists for the adapter that logged this error by examining the SAS connections as follows:

1. Start the IBM SAS Disk Array Manager.
 - a. Start Diagnostics and select **Task Selection** on the Function Selection display.
 - b. Select **RAID Array Manager**.
 - c. Select **IBM SAS Disk Array Manager**.
2. Select **Diagnostics and Recovery Options**.
3. Select **Show SAS Controller Physical Resources**.
4. Select **Show Fabric Path Graphical View**.

Do all expected devices appear in the list and are all paths marked as **Operational**?

No Go to "Step 4053-2."

Yes Go to "Step 4053-6" on page 153.

Step 4053-2

Run diagnostics in system verification mode on the adapter to rediscover the devices and connections.

1. Start Diagnostics and select **Task Selection** on the Function Selection display.
2. Select **Run Diagnostics**.
3. Select the adapter resource.
4. Select **System Verification**.

Note: Disregard any trouble found for now, and continue with the next step.

Step 4053-3

Determine if the problem still exists for the adapter that logged this error by examining the SAS connections as follows:

1. Start the IBM SAS Disk Array Manager.
 - a. Start Diagnostics and select **Task Selection** on the Function Selection display.
 - b. Select **RAID Array Manager**.

- c. Select **IBM SAS Disk Array Manager**.
2. Select **Diagnostics and Recovery Options**.
3. Select **Show SAS Controller Physical Resources**.
4. Select **Show Fabric Path Graphical View**.
5. Select a device with a path that is not **Operational** (if one exists) to obtain additional details about the full path from the adapter port to the device. See Viewing SAS fabric path information for an example of how this additional detail can be used to help isolate where in the path the problem exists.

Do all expected devices appear in the list and are all paths marked as **Operational**?

No Go to "Step 4053-4."

Yes Go to "Step 4053-6."

Step 4053-4

Go to SAS fabric identification. Then continue with the next step.

Step 4053-5

Determine if the problem still exists for the adapter that logged this error by examining the SAS connections as follows:

1. Start the IBM SAS Disk Array Manager.
 - a. Start Diagnostics and select **Task Selection** on the Function Selection display.
 - b. Select **RAID Array Manager**.
 - c. Select **IBM SAS Disk Array Manager**.
2. Select **Diagnostics and Recovery Options**.
3. Select **Show SAS Controller Physical Resources**.
4. Select **Show Fabric Path Graphical View**.
5. Select a device with a path that is not **Operational** (if one exists) to obtain additional details about the full path from the adapter port to the device. See Viewing SAS fabric path information for an example of how this additional detail can be used to help isolate where in the path the problem exists.

Do all expected devices appear in the list and are all paths marked as **Operational**?

No Go to "Step 4053-4."

Yes Go to "Step 4053-6."

Step 4053-6

When the problem is resolved, see the removal and replacement procedures topic for the system unit on which you are working and do the "Verifying the repair" procedure.

MAP 4140

Use this MAP to resolve the following problem: Multiple controllers connected in an invalid configuration (SRN *nnnn* - 9073)

One adapter, of a connected pair of adapters, is not operating under the same operating system type as the other adapter. Connected adapters must both be controlled by the same type of operating system. Correct the configuration. If correcting the configuration does not resolve the error, contact your hardware service provider.

When the problem is resolved, see the removal and replacement procedures topic for the system unit on which you are working and do the "Verifying the repair" procedure.

MAP 4141

Use this MAP to resolve the following problem: Multiple controllers not capable of controlling the same set of devices (SRN *nnnn* - 9074)

Step 4141-1

This error relates to adapters connected in a multi-initiator and high availability configuration. To obtain the reason or description for this failure, you must find the formatted error information in the error log. The log also contains information about the attached adapter (**Remote Adapter** fields).

Display the hardware error log. View the hardware error log as follows:

1. Follow the steps in Examining the hardware error log and return here.
2. Select the hardware error log to view. In the hardware error log, the **Detail Data** section contains the **reason for failure** and the **Remote Adapter Vendor ID, Product ID, Serial Number, and World Wide ID**.
3. Go to "Step 4141-2."

Step 4141-2

Find the **reason for failure** and information for the attached adapter (remote adapter) shown in the error log, and perform the action listed for the reason in the following table.

Table 19. RAID array reason for failure

Reason for failure	Description	Action	Adapter on which to perform the action
Secondary is unable to find devices found by the primary.	Secondary adapter cannot discover all the devices that the primary has.	Verify the connections to the devices from the adapter that is logging the error. View the disk array configuration screens to determine the SAS port that has the problem. See SAS fabric identification to verify connections.	Adapter that logged the error.
Secondary found devices not found by the primary.	Secondary adapter has discovered more devices than the primary. After this error is logged, an automatic failover will occur.	Verify the connections to the devices from the remote adapter as indicated in the error log. View the disk array configuration screens to determine the SAS port that has the problem. See SAS fabric identification to verify connections.	Remote adapter indicated in the error log.

Table 19. RAID array reason for failure (continued)

Reason for failure	Description	Action	Adapter on which to perform the action
Primary lost contact with disks accessible by secondary.	Link failure from primary adapter to devices. An automatic failover will occur.	<p>Verify the connections to the devices from the adapter that is logging the error.</p> <p>View the disk array configuration screens to determine the SAS port that has the problem.</p> <p>See SAS fabric identification to verify connections.</p>	Adapter that logged the error.
Other	Not currently defined.	Contact your hardware service provider.	

When the problem is resolved, see the removal and replacement procedures topic for the system unit on which you are working and do the "Verifying the repair" procedure.

MAP 4144

Use this MAP to resolve an incorrect or incomplete multipath connection problem.

Use this MAP to resolve the following problems:

- Configuration error, incorrect multipath connection (SRN *nnnn* – 4030)
- Configuration error, incomplete multipath connection between controller and enclosure detected (SRN *nnnn* – 4040)

The possible causes are:

- Incorrect cabling to device enclosure.

Note: Pay special attention to the requirement that a YI-cable must be routed along the right side of the rack frame (as viewed from the rear) when connecting to a disk expansion unit. Review the device enclosure cabling and correct the cabling as required. To see example device configurations with SAS cabling, see Serial-attached SCSI cable planning.

- A failed connection caused by a failing component in the SAS fabric between, and including, the controller and device enclosure.

Considerations:

- Remove power from the system before connecting and disconnecting cables or devices, as appropriate, to prevent hardware damage or erroneous diagnostic results.
- Some systems have the disk enclosure or removable media enclosure integrated in the system with no cables. For these configurations, the SAS connections are integrated onto the system boards. A failed connection can be the result of a failed system board or integrated device enclosure.
- Some systems have SAS RAID adapters integrated onto the system boards and use a cache RAID - dual IOA enablement card (for example, FC5662) to enable storage adapter write cache and dual storage I/O adapter (IOA) mode (HA RAID mode). For these configurations, replacement of the Cache RAID - dual IOA enablement card is unlikely to solve a SAS-related problem because the SAS interface logic is on the system board. Additionally, appropriate service procedures must be followed when replacing the Cache RAID - dual IOA enablement card because removal of this card can cause data loss if incorrectly performed and can also result in a nondual storage IOA (non-HA) mode of operation.

- When using SAS adapters in either an HA two-system RAID or HA single-system RAID configuration, ensure that the actions taken in this MAP are against the primary adapter and not the secondary adapter.
- An adapter reset might occur during the system verification step of this procedure. To avoid potential data loss, reconstruct any degraded disk arrays if possible, before performing system verification.

Attention: Obtain assistance from your Hardware Service Support organization before you replace RAID adapters when SAS fabric problems exist. Because the adapter might contain nonvolatile write cache data and configuration data for the attached disk arrays, additional problems can be created by replacing an adapter when SAS fabric problems exist. Appropriate service procedures must be followed when replacing the cache RAID - dual IOA enablement card (for example, FC5662) because removal of this card can cause data loss if incorrectly performed and can also result in a nondual storage IOA (non-HA) mode of operation.

Step 4144-1

Was the SRN *nnnn-4030*?

No Go to "Step 4144-4."

Yes Go to "Step 4144-2."

Step 4144-2

Review the device enclosure cabling and correct the cabling as required. To see example device configurations with SAS cabling, see "Serial-attached SCSI cable planning."

Step 4144-3

Run diagnostics in system verification mode on the adapter to rediscover the devices and connections.

1. Start Diagnostics and select **Task Selection** on the Function Selection display.
2. Select **Run Diagnostics**.
3. Select the adapter resource.
4. Select **System Verification**.

Referring to the steps in Examining the hardware error log, did the error occur again?

No Go to "Step 4144-9" on page 158.

Yes Contact your hardware service provider.

Step 4144-4

The SRN is *nnnn-4040*.

Determine if a problem still exists for the adapter that logged this error by examining the SAS connections as follows:

1. Start the IBM SAS Disk Array Manager.
 - a. Start Diagnostics and select **Task Selection** on the Function Selection display.
 - b. Select **RAID Array Manager**.
 - c. Select **IBM SAS Disk Array Manager**.
2. Select **Diagnostics and Recovery Options**.
3. Select **Show SAS Controller Physical Resources**.
4. Select **Show Fabric Path Graphical View**.

Do all expected devices appear in the list and are all paths marked as Operational?

No Go to "Step 4144-5."

Yes Go to "Step 4144-9" on page 158.

Step 4144-5

Run diagnostics in System Verification mode on the adapter to rediscover the devices and connections.

1. Start Diagnostics and select **Task Selection** on the Function Selection display.
2. Select **Run Diagnostics**.
3. Select the adapter resource.
4. Select **System Verification**.

Note: At this point, ignore any problems found and continue with the next step.

Step 4144-6

Determine if the problem still exists for the adapter that logged this error by examining the SAS connections as follows:

1. Start the IBM SAS Disk Array Manager.
 - a. Start Diagnostics and select **Task Selection** on the Function Selection display.
 - b. Select **RAID Array Manager**.
 - c. Select **IBM SAS Disk Array Manager**.
2. Select **Diagnostics and Recovery Options**.
3. Select **Show SAS Controller Physical Resources**.
4. Select **Show Fabric Path Graphical View**.
5. Select a device with a path that is not **Operational** (if one exists) to obtain additional details about the full path from the adapter port to the device. See Viewing SAS fabric path information for an example of how this additional detail can be used to help isolate where in the path the problem exists.

Do all expected devices appear in the list and are all paths marked as **Operational**?

No Go to "Step 4144-7."

Yes Go to "Step 4144-9" on page 158.

Step 4144-7

Go to SAS fabric identification. Then continue with the next step.

Step 4144-8

Determine if the problem still exists for the adapter that logged this error by examining the SAS connections as follows:

1. Start the IBM SAS Disk Array Manager.
 - a. Start Diagnostics and select **Task Selection** on the Function Selection display.
 - b. Select **RAID Array Manager**.
 - c. Select **IBM SAS Disk Array Manager**.
2. Select **Diagnostics and Recovery Options**.
3. Select **Show SAS Controller Physical Resources**.
4. Select **Show Fabric Path Graphical View**.

5. Select a device with a path that is not **Operational** (if one exists) to obtain additional details about the full path from the adapter port to the device. See Viewing SAS fabric path information for an example of how this additional detail can be used to help isolate where in the path the problem exists.

Do all expected devices appear in the list and are all paths marked as **Operational**?

No Go to "Step 4144-7" on page 157.

Yes Go to "Step 4144-9."

Step 4144-9

When the problem is resolved, see the removal and replacement procedures topic for the system unit on which you are working and do the "Verifying the repair" procedure.

MAP 4147

Use this MAP to resolve the following problem: Missing remote controller (SRN *nnnn* - 9076)

An adapter attached in a multi-initiator and high availability configuration was not discovered in the allotted time. Determine which of the following items is the cause of your specific error and take the appropriate actions listed. If this action does not correct the error, contact your hardware service provider.

The possible causes are:

- An attached adapter for the configuration is not installed or is not powered on. Some adapters are required to be part of a high availability RAID configuration. Verify this requirement in the feature comparison tables for PCIe and PCI-X cards. Ensure that both adapters are properly installed and powered on.
- If the configuration is a high availability single-system RAID configuration, both adapters might not be in the same partition. Ensure that both adapters are assigned to the same partition.
- The 175 MB cache RAID and dual storage IOA enablement card is not seated properly.
Attention: Appropriate service procedures must be followed when reseating the 175 MB cache RAID and dual storage IOA enablement card because removal of this card can cause data loss if incorrectly performed.
- An attached adapter for the configuration failed. Take action on the other errors that have occurred at the same time as this error.
- Adapter microcode levels are not up to date or are not at the same level of supported function. Ensure that the microcode for both adapters is at the latest level.

Note: The adapter that is logging this error will run in a performance degraded mode, without caching, until the problem is resolved.

When the problem is resolved, see the removal and replacement procedures topic for the system unit on which you are working and do the "Verifying the repair" procedure.

MAP 4150

Use this MAP to perform SAS fabric problem isolation.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see Part locations and location codes. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

Considerations:

- Remove power from the system before connecting and disconnecting cables or devices, as appropriate, to prevent hardware damage or erroneous diagnostic results.

- Some systems have the disk enclosure or removable media enclosure integrated in the system with no cables. For these configurations, the SAS connections are integrated onto the system boards. A failed connection can be the result of a failed system board or integrated device enclosure.
- Some systems have SAS RAID adapters integrated onto the system boards and use a cache RAID - dual IOA enablement card (for example, FC5662) to enable storage adapter write cache and dual storage I/O adapter (IOA) mode (HA RAID mode). For these configurations, replacement of the Cache RAID - dual IOA enablement card is unlikely to solve a SAS-related problem because the SAS interface logic is on the system board. Additionally, appropriate service procedures must be followed when replacing the Cache RAID - dual IOA enablement card because removal of this card can cause data loss if incorrectly performed and can also result in a nondual storage IOA (non-HA) mode of operation.

Attention: When SAS fabric problems exist, obtain assistance from your hardware service provider before performing any of the following actions:

- Before you replace a RAID adapter: Because the adapter might contain nonvolatile write cache data and configuration data for the attached disk arrays, additional problems can be created by replacing an adapter.
- Before you remove functioning disks in a disk array: The disk array might become degraded or failed and additional problems might be created if functioning disks are removed from a disk array.

Attention: Do not remove functioning disks in a disk array without assistance from your hardware service support organization. A disk array might become degraded or might fail if functioning disks are removed, and additional problems might be created.

Step 4150-1

Was the SRN *nnnn-3020*?

No Go to "Step 4150-3."

Yes Go to "Step 4150-2."

Step 4150-2

The possible causes are:

- More devices are connected to the adapter than the adapter supports. Change the configuration to the allowable number of devices.
- A SAS device has been improperly moved from one location to another. Either return the device to its original location or move the device while the adapter is powered off or unconfigured.
- A SAS device has been improperly replaced by a SATA device. A SAS device must be used to replace a SAS device.

When the problem is resolved, see the removal and replacement procedures topic for the system unit on which you are working and do the "Verifying the repair" procedure.

Step 4150-3

Determine if any of the disk arrays on the adapter are in a **Degraded** state as follows:

1. Start the IBM SAS Disk Array Manager.
 - a. Start Diagnostics and select **Task Selection** on the Function Selection display.
 - b. Select **RAID Array Manager**.
 - c. Select **IBM SAS Disk Array Manager**.
2. Select **List SAS Disk Array Configuration**.
3. Select the IBM SAS RAID Controller identified in the hardware error log.

Does any disk array have a state of **Degraded**?

No Go to "Step 4150-5."

Yes Go to "Step 4150-4."

Step 4150-4

Other errors might have occurred related to the disk array being in a **Degraded** state. Take action on these errors to replace the failed disk and restore the disk array to an **Optimal** state.

When the problem is resolved, see the removal and replacement procedures topic for the system unit on which you are working and do the "Verifying the repair" procedure.

Step 4150-5

Have other errors occurred at the same time as this error?

No Go to "Step 4150-7."

Yes Go to "Step 4150-6."

Step 4150-6

Take action on the other errors that have occurred at the same time as this error.

When the problem is resolved, see the removal and replacement procedures topic for the system unit on which you are working and do the "Verifying the repair" procedure.

Step 4150-7

Was the SRN *nnnn-FFFFE*?

No Go to "Step 4150-10."

Yes Go to "Step 4150-8."

Step 4150-8

Ensure device, device enclosure, and adapter microcode levels are up to date.

Did you update to newer microcode levels?

No Go to "Step 4150-10."

Yes Go to "Step 4150-9."

Step 4150-9

When the problem is resolved, see the removal and replacement procedures topic for the system unit on which you are working and do the "Verifying the repair" procedure.

Step 4150-10

Is the problem in a disk expansion unit?

No Go to SAS fabric identification.

Yes Go to "Step 4150-11" on page 161.

Step 4150-11

Identify the adapter SAS port that is associated with the problem by examining the hardware error log. The hardware error log might be viewed as follows:

1. Follow the steps in Examining the hardware error log and return here.
2. Select the hardware error log to view. In the hardware error log under the **Disk Information** heading, the **Resource** field can be used to identify which controller port the error is associated with.

Note: If you do not see the **Disk Information** heading in the error log, obtain the **Resource** field from the **Detail Data / PROBLEM DATA** section as illustrated in the following example:

```
Detail Data
PROBLEM DATA
0000 0800 0004 FFFF 0000 0000 0000 0000 0000 0000 1910 00F0 0408 0100 0101 0000
      ^
      |
Resource is 0004FFFF
```

Go to "Step 4150-12."

Step 4150-12

Using the resource found in the previous step, see SAS resource locations to understand how to identify the port of the controller to which the device, or device enclosure, is attached.

For example, if the resource were equal to 0004FFFF, port 04 on the adapter is used to attach the device or device enclosure that is experiencing the problem.

The resource found in the previous step can also be used to identify the device. To identify the device, you can attempt to match the resource with the one found on the display, that is displayed by performing the following steps.

1. Start the IBM SAS Disk Array Manager:
 - a. Start the diagnostics program and select **Task Selection** from the Function Selection display.
 - b. Select **RAID Array Manager**.
 - c. Select **IBM SAS Disk Array Manager**.
2. Select **Diagnostics and Recovery Options**.
3. Select **Show SAS Controller Physical Resources**.
4. Select **Show Physical Resource Locations**.

Step 4150-13

Because the problem persists, some corrective action is needed to resolve the problem. Using the port or device information found in the previous step, proceed by doing the following steps.

1. Power off the system or logical partition.
2. Perform only one of the following corrective actions, which are listed in the order of preference. If one of the corrective actions has previously been attempted, proceed to the next one in the list.

Note: Before replacing parts, consider using a complete power down of the entire system, including any external device enclosures, to provide a reset of all possible failing components. This action might correct the problem without replacing parts.

- Reseat cables on adapter and device enclosure.
- Replace cable from adapter to device enclosure.
- Replace the device.

Note: If there are multiple devices with a path that is not **Operational**, the problem is not likely to be with a device.

- Replace the internal device enclosure or see the service documentation for an external expansion unit.
- Replace the adapter.
- Contact your hardware service provider.

3. Power on the system or logical partition.

Note: In some situations, it might be acceptable to unconfigure and reconfigure the adapter instead of powering off and powering on the system or logical partition.

Step 4150-14

Does the problem still occur after performing the corrective action?

No Go to "Step 4150-15."

Yes Go to "Step 4150-13" on page 161.

Step 4150-15

When the problem is resolved, see the removal and replacement procedures topic for the system unit on which you are working and do the "Verifying the repair" procedure.

MAP 4152

Use this MAP to resolve device bus fabric problems.

Use this MAP to resolve the following problems:

- Device bus fabric error (SRN *nnnn* – 4100)
- Temporary device bus fabric error (SRN *nnnn* – 4101)

The possible causes are:

- A failed connection caused by a failing component in the SAS fabric between, and including, the adapter and device enclosure.
- A failed connection caused by a failing component within the device enclosure, including the device itself.

Considerations:

- Remove power from the system before connecting and disconnecting cables or devices, as appropriate, to prevent hardware damage or erroneous diagnostic results.
- Some systems have the disk enclosure or removable media enclosure integrated in the system with no cables. For these configurations, the SAS connections are integrated onto the system boards. A failed connection can be the result of a failed system board or integrated device enclosure.
- Some systems have SAS RAID adapters integrated onto the system boards and use a cache RAID - dual IOA enablement card (for example, FC5662) to enable storage adapter write cache and dual storage I/O adapter (IOA) mode (HA RAID mode). For these configurations, replacement of the Cache RAID - dual IOA enablement card is unlikely to solve a SAS-related problem because the SAS interface logic is on the system board. Additionally, appropriate service procedures must be followed when replacing the Cache RAID - dual IOA enablement card since removal of this card can cause data loss if incorrectly performed and can also result in a nondual storage IOA (non-HA) mode of operation.
- When using SAS adapters in either an HA two-system RAID or HA single-system RAID configuration, ensure that the actions taken in this MAP are against the primary adapter (not the secondary adapter).

- An adapter reset might occur during the system verification step of this procedure. To avoid potential data loss, reconstruct any degraded disk arrays if possible, before performing system verification.

Attention: When SAS fabric problems exist, obtain assistance from your hardware service provider before performing any of the following actions:

- Before you replace a RAID adapter: Because the adapter might contain nonvolatile write cache data and configuration data for the attached disk arrays, additional problems can be created by replacing an adapter.
- Before you remove functioning disks in a disk array: The disk array might become degraded or failed and additional problems might be created if functioning disks are removed from a disk array.

Step 4152-1

Determine if the problem still exists for the adapter that logged this error by examining the SAS connections as follows:

1. Start the IBM SAS Disk Array Manager.
 - a. Start Diagnostics and select **Task Selection** on the Function Selection display.
 - b. Select **RAID Array Manager**.
 - c. Select **IBM SAS Disk Array Manager**.
2. Select **Diagnostics and Recovery Options**.
3. Select **Show SAS Controller Physical Resources**.
4. Select **Show Fabric Path Graphical View**.

Do all expected devices appear in the list and are all paths marked as Operational?

No Go to "Step 4152-2."

Yes Go to "Step 4152-6" on page 164.

Step 4152-2

Run diagnostics in system verification mode on the adapter to rediscover the devices and connections.

1. Start Diagnostics and select **Task Selection** on the Function Selection display.
2. Select **Run Diagnostics**.
3. Select the adapter resource.
4. Select **System Verification**.

Note: Disregard any trouble found for now, and continue with the next step.

Step 4152-3

Determine if the problem still exists for the adapter that logged this error by examining the SAS connections as follows:

1. Start the IBM SAS Disk Array Manager.
 - a. Start Diagnostics and select **Task Selection** on the Function Selection display.
 - b. Select **RAID Array Manager**.
 - c. Select **IBM SAS Disk Array Manager**.
2. Select **Diagnostics and Recovery Options**.
3. Select **Show SAS Controller Physical Resources**.
4. Select **Show Fabric Path Graphical View**.

5. Select a device with a path that is not **Operational** (if one exists) to obtain additional details about the full path from the adapter port to the device. See Viewing SAS fabric path information for an example of how this additional detail can be used to help isolate where in the path the problem exists.

Do all expected devices appear in the list and are all paths marked as **Operational**?

No Go to "Step 4152-4."

Yes Go to "Step 4152-6."

Step 4152-4

Go to SAS fabric identification. Then continue with the next step.

Step 4152-5

Determine if the problem still exists for the adapter that logged this error by examining the SAS connections as follows:

1. Start the IBM SAS Disk Array Manager.
 - a. Start Diagnostics and select **Task Selection** on the Function Selection display.
 - b. Select **RAID Array Manager**.
 - c. Select **IBM SAS Disk Array Manager**.
2. Select **Diagnostics and Recovery Options**.
3. Select **Show SAS Controller Physical Resources**.
4. Select **Show Fabric Path Graphical View**.
5. Select a device with a path that is not **Operational** (if one exists) to obtain additional details about the full path from the adapter port to the device. See Viewing SAS fabric path information for an example of how this additional detail can be used to help isolate where in the path the problem exists.

Do all expected devices appear in the list and are all paths marked as **Operational**?

No Go to "Step 4152-4."

Yes Go to "Step 4152-6."

Step 4152-6

When the problem is resolved, see the removal and replacement procedures topic for the system unit on which you are working and do the "Verifying the repair" procedure.

MAP 4153

Use this MAP to resolve the following problem: Multipath redundancy level got worse (SRN *nnnn* - 4060)

The possible causes are:

- A failed connection caused by a failing component in the SAS fabric between, and including, the adapter and device enclosure.
- A failed connection caused by a failing component within the device enclosure, including the device itself.

Note: The failed connection was previously working, and might have already recovered.

Considerations:

- Remove power from the system before connecting and disconnecting cables or devices, as appropriate, to prevent hardware damage or erroneous diagnostic results.

- Some systems have the disk enclosure or removable media enclosure integrated in the system with no cables. For these configurations, the SAS connections are integrated onto the system boards. A failed connection can be the result of a failed system board or integrated device enclosure.
- Some systems have SAS RAID adapters integrated onto the system boards and use a cache RAID - dual IOA enablement card (for example, FC 5662) to enable storage adapter write cache and dual storage I/O adapter (IOA) mode (HA RAID mode). For these configurations, replacement of the Cache RAID - dual IOA enablement card is unlikely to solve a SAS-related problem because the SAS interface logic is on the system board. Additionally, appropriate service procedures must be followed when replacing the Cache RAID - dual IOA enablement card since removal of this card can cause data loss if incorrectly performed and can also result in a nondual storage IOA (non-HA) mode of operation.
- When using SAS adapters in either an HA two-system RAID or HA single-system RAID configuration, ensure that the actions taken in this MAP are against the primary adapter and not the secondary adapter.
- An adapter reset might occur during the system verification step of this procedure. To avoid potential data loss, reconstruct any degraded disk arrays if possible, before performing system verification.

Attention: When SAS fabric problems exist, obtain assistance from your hardware service provider before performing any of the following actions:

- Before you replace a RAID adapter: Because the adapter might contain nonvolatile write cache data and configuration data for the attached disk arrays, additional problems can be created by replacing an adapter.
- Before you remove functioning disks in a disk array: The disk array might become degraded or failed and additional problems might be created if functioning disks are removed from a disk array.

Step 4153-1

Determine if the problem still exists for the adapter that logged this error by examining the SAS connections as follows:

1. Start the IBM SAS Disk Array Manager.
 - a. Start Diagnostics and select **Task Selection** on the Function Selection display.
 - b. Select **RAID Array Manager**.
 - c. Select **IBM SAS Disk Array Manager**.
2. Select **Diagnostics and Recovery Options**.
3. Select **Show SAS Controller Physical Resources**.
4. Select **Show Fabric Path Graphical View**.

Do all expected devices appear in the list and are all paths marked as **Operational**?

No Go to "Step 4153-2."

Yes Go to "Step 4153-6" on page 166.

Step 4153-2

Run diagnostics in system verification mode on the adapter to rediscover the devices and connections.

1. Start Diagnostics and select **Task Selection** on the Function Selection display.
2. Select **Run Diagnostics**.
3. Select the adapter resource.
4. Select **System Verification**.

Note: Disregard any trouble found for now, and continue with the next step.

Step 4153-3

Determine if the problem still exists for the adapter that logged this error by examining the SAS connections as follows:

1. Start the IBM SAS Disk Array Manager.
 - a. Start Diagnostics and select **Task Selection** on the Function Selection display.
 - b. Select **RAID Array Manager**.
 - c. Select **IBM SAS Disk Array Manager**.
2. Select **Diagnostics and Recovery Options**.
3. Select **Show SAS Controller Physical Resources**.
4. Select **Show Fabric Path Graphical View**.
5. Select a device with a path that is not **Operational** (if one exists) to obtain additional details about the full path from the adapter port to the device. See Viewing SAS fabric path information for an example of how this additional detail can be used to help isolate where in the path the problem exists.

Do all expected devices appear in the list and are all paths marked as **Operational**?

No Go to "Step 4153-4."

Yes Go to "Step 4153-6."

Step 4153-4

Go to SAS fabric identification. Then continue with the next step.

Step 4153-5

Determine if the problem still exists for the adapter that logged this error by examining the SAS connections as follows:

1. Start the IBM SAS Disk Array Manager.
 - a. Start Diagnostics and select **Task Selection** on the Function Selection display.
 - b. Select **RAID Array Manager**.
 - c. Select **IBM SAS Disk Array Manager**.
2. Select **Diagnostics and Recovery Options**.
3. Select **Show SAS Controller Physical Resources**.
4. Select **Show Fabric Path Graphical View**.
5. Select a device with a path that is not **Operational** (if one exists) to obtain additional details about the full path from the adapter port to the device. See Viewing SAS fabric path information for an example of how this additional detail can be used to help isolate where in the path the problem exists.

Do all expected devices appear in the list and are all paths marked as **Operational**?

No Go to "Step 4153-4."

Yes Go to "Step 4153-6."

Step 4153-6

When the problem is resolved, see the removal and replacement procedures topic for the system unit on which you are working and do the "Verifying the repair" procedure.

MAP 5000

Use this MAP to resolve the following problem: The disk has failed and must be replaced.

1. Access a root shell prompt on any of the I/O nodes of the cluster.
2. Run the following command to release the carrier by using the recovery group name and location codes shown in the error log. If multiple location codes are given, they must refer to disks in the same carrier.

```
mmchcarrier RecoveryGroupName --release --location "location-code1;location-code2;... "
```

This command unlocks the disk carrier.

3. Pull out the carrier. This action switches on the indicator lights of the disks given in the previous command. These lights are powered by a supercapacitor and continue to be switched on after the carrier has been removed.
4. Replace the disks with disks of the same FRU part number.

Note: Select the force flag to override the FRU part number.

5. Replace the carrier.
6. Run the following command to complete the disk replacements:

```
mmchcarrier RecoveryGroupName --replace --location "location-code1;location-code2;..."
```

MAP 5001

This event notifies the system administrator that there might be a data loss if the previously reported REPLACE_DISK events are not handled promptly.

Repair all the disks that were indicated in previous replacement requests.

PFW1540: Problem isolation procedures

The PFW1540 procedures are used to locate problems in the processor subsystem or I/O subsystem.

If a problem is detected, these procedures help you isolate the problem to a failing unit. Find the symptom in the following table; then follow the instructions given in the Action column.

Problem Isolation Procedures	
Symptom/Reference Code/Checkpoint	Action
You have or suspect an I/O card or I/O subsystem failure. You received one of the following SRNs or reference codes: 101-000, 101-517, 101-521, 101-538, 101-551 to 101-557, 101-559 to 101-599, 101-662, 101-727, 101-c32, 101-c33, 101-c70	Go to "PFW1542: I/O problem isolation procedure" on page 168.
You have or suspect a memory or processor subsystem problem. You received the following SRN or reference code: 101-185	Go to "PFW1548: Memory and processor subsystem problem isolation procedure" on page 182.
If you were directed to the PFW1540 procedure by an SRN and that SRN is not listed in this table.	Go to "PFW1542: I/O problem isolation procedure" on page 168.

FRU identify LEDs

Your system is configured with an arrangement of LEDs that help identify various components of the system. These include but are not limited to:

- Rack identify beacon LED (optional rack status beacon)
- Processor subsystem drawer identify LED
- I/O drawer identify LED

- RIO port identify LED
- FRU identify LED
- Power subsystem FRUs
- Processor subsystem FRUs
- I/O subsystem FRUs
- I/O adapter identify LED
- DASD identify LED

The identify LEDs are arranged hierarchically with the FRU identify LED at the bottom of the hierarchy, followed by the corresponding processor subsystem or I/O drawer identify LED, and the corresponding rack identify LED to locate the failing FRU more easily. Any identify LED in the system may be flashed; see *Managing the Advanced system Management Interface (ASMI)*.

Any identify LED in the system may also be flashed by using the Linux diagnostic programs task “Identify and Attention Indicators”. The procedure to use the Linux diagnostics task “Identify and Attention Indicators” is outlined in “diagnostic and service aids” in *Running the online and stand-alone diagnostics*.

PFW1542: I/O problem isolation procedure

This I/O problem-determination procedure isolates I/O card and I/O subsystem failures. When I/O problem isolation is complete, all cables and cards that are failing will have been replaced or reseated.

If you need additional information for failing part numbers, location codes, or removal and replacement procedures, see *Part locations and location codes*. Select your machine type and model number to find additional location codes, part numbers, or replacement procedures for your system.

Notes:

1. To avoid damage to the system or subsystem components, unplug the power cords before removing or installing a part.
2. This procedure assumes either of the following items:
 - An optical drive is installed and connected to the integrated EIDE adapter, and a stand-alone diagnostic CD-ROM is available.
 - Stand-alone diagnostics can be booted from a NIM server.
3. If a power-on password or privileged-access password is set, you are prompted to enter the password before the stand-alone diagnostic CD-ROM can load.
4. The term POST indicators refers to the device mnemonics that appear during the power-on self-test (POST).
5. The service processor might have been set by the user to monitor system operations and to attempt recoveries. You might want to disable these options while you diagnose and service the system. If these settings are disabled, make notes of their current settings so that they can be restored before the system is turned back over to the customer.

The following settings may be of interest.

Monitoring

(also called surveillance) From the ASMI menu, expand the System Configuration menu, then click **Monitoring**. Disable both types of surveillance.

Auto power restart

(also called unattended start mode) From the ASMI menu, expand **Power/Restart Control**, then click **Auto Power Restart**, and set it to disabled.

Wake on LAN

From the ASMI menu, expand **Wake on LAN**, and set it to disabled.

Call Out

From the ASMI menu, expand the Service Aids menu, then click **Call-Home/Call-In Setup**. Set the call-home system port and the call-in system port to disabled.

6. Verify that the system has not been set to boot to the SMS menus or to the open firmware prompt. From the ASMI menu, expand **Power/Restart Control** to view the menu, then click **Power On/Off System**. The Linux partition mode boot indicates **Continue to Operating System**.

Use this procedure to locate defective FRUs not found by normal diagnostics. For this procedure, diagnostics are run on a minimally configured system. If a failure is detected on the minimally configured system, the remaining FRUs are exchanged one at a time until the failing FRU is identified. If a failure is not detected, FRUs are added back until the failure occurs. The failure is then isolated to the failing FRU.

Perform the following procedure:

- **PFW1542-1**

1. Ensure that the diagnostics and the operating system are shut down.
2. Turn off the power.
3. Is system firmware Ax710_xxx installed?

No: Continue to the next sub-step.

Yes: Select slow system boot speed on the power on/off system menu under the power/restart control menu on the ASMI.

4. Turn on the power.
5. Insert the stand-alone diagnostic CD-ROM into the optical drive.

Does the optical drive appear to operate correctly?

No Go to "Problems with loading and starting the operating system (Linux)" on page 87.

Yes Continue to PFW1542-2.

- **PFW1542-2**

1. When the keyboard indicator is displayed (the word "keyboard"), if the system or partition gets that far in the IPL process, press the 5 key on the firmware console.
2. If you are prompted to do so, enter the appropriate password.

Is the "Please define the System Console" screen displayed?

No Continue to PFW1542-3.

Yes Go to PFW1542-4.

- **PFW1542-3**

The system is unable to boot stand-alone diagnostics.

Was a slow boot performed?

No: Go to "PFW1548: Memory and processor subsystem problem isolation procedure" on page 182.

If you were sent here because the system is hanging on a partition firmware checkpoint, and the hang condition did not change as a result of the slow boot, go to PFW1542-5.

Yes: Check the service processor error log (using the ASMI) and the operator panel for additional error codes resulting from the slow boot that was performed in PFW1542-1.

Did the slow boot generate a different error code or partition firmware hang from the one that originally sent you to PFW1542?

No If you were sent here by an error code, and the error code did not change as the result of a slow boot, you have a processor subsystem problem. Go to "PFW1548: Memory and processor subsystem problem isolation procedure" on page 182. If you were sent here because the system is hanging on a partition firmware checkpoint, and the hang condition did not change as a result of the slow boot, go to PFW1542-5.

Yes Restore fast boot on the power on/off system menu from the ASMI. Look up the new error code in the reference code index and perform the listed actions.

• **PFW1542-4**

The system stopped with the **Please define the System Console** prompt on the system console. Stand-alone diagnostics can be booted. Perform the following steps:

1. Follow the instructions on the screen to select the system console.
2. When the DIAGNOSTIC OPERATING INSTRUCTIONS screen is displayed, press Enter.
3. If the terminal type has not been defined, you must use the option **Initialize Terminal** on the FUNCTION SELECTION menu to initialize the Linux operating system environment before you can continue with the diagnostics. This is a separate operation from selecting the firmware console.
4. Select **Advanced Diagnostic Routines**.
5. When the DIAGNOSTIC MODE SELECTION menu displays, select **System Verification** to run diagnostics on all resources.

Did running diagnostics produce a different symptom?

No Continue with the following sub-step.

Yes Return to the Problem Analysis procedures with the new symptom.

6. Record any devices missing from the list of all adapters and devices. Continue with this procedure. When you have fixed the problem, use this record to verify that all devices appear when you run system verification.

Are there any devices missing from the list of all adapters and devices?

No Reinstall all remaining adapters, if any, and reconnect all devices. Return the system to its original configuration. Be sure to select fast boot on the power on/off system menu on the ASMI. Go to Verify a repair.

Yes The boot attempts that follow will attempt to isolate any remaining I/O subsystem problems with missing devices. Ignore any codes that may display on the operator panel unless stated otherwise. Continue to PFW1542-5.

• **PFW1542-5**

Examine RIO port 0 of the first RIO bus card in the base system unit drawer.

Are there any I/O subsystems attached to this RIO card?

No Go to PFW1542-29.

Yes Continue to PFW1542-6.

• **PFW1542-6**

There may be devices missing from one of more of the I/O subsystems, or one or more devices in the I/O subsystems may be causing the system or a partition to hang during IPL.

Note:

- Various types of I/O subsystems might be connected to this system.
- The order in which the RIO or GX+ adapters are listed is the order in which the adapters are used for attaching external I/O boxes. The first adapter listed for the system units should be used in step PFW1548-2. The second adapter listed should be used in step PFW1548-7.

The RIO and 12X ports on these subsystems are shown in the following table. Use this table to determine the physical location codes of the RIO or 12X connectors that are mentioned in the remainder of this MAP.

Table 20. RIO and 12X ports location table

Port	8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T
Port 0	Un-P1-C1-T2 Un-P1-C8-T2
Port 1	Un-P1-C1-T1 Un-P1-C8-T1

Note: Before continuing, check the cabling from the base system to the I/O subsystem to ensure that the system is cabled correctly. See the cabling information for your I/O enclosure for valid configurations. Record the current cabling configuration and then continue with the following steps.

In the following steps, the term *RIO* means either RIO or 12X.

1. Turn off the power. Record the location and machine type and model number, or feature number, of each expansion unit. In the following steps, use this information to determine the physical location codes of the RIO connectors that are referred to by their logical names. For example, if I/O subsystem 1 is a 7311-D20 drawer, RIO port 0 is Un-P1-C05-T2.
2. At the base system drawer, disconnect the cable connection at RIO port 0.
3. At the other end of the RIO cable referred to in step 2 of PFW1542-6, disconnect the I/O subsystem port connector 0. The RIO cable that was connected to RIO port 0 in the base system should now be loose; remove it. Record the location of this I/O subsystem and call it "subsystem 1".
4. Examine the connection at the I/O port connector 1 of the I/O subsystem recorded in step 3 of PFW1542-6. If the RIO cable attached to I/O port connector 1 connects to the I/O port connector 0 of another I/O subsystem, record the location of the next I/O subsystem that is connected to I/O port 1 of subsystem 1, then go to step 8 of PFW1542-6.
5. At the base system, disconnect the cable connection at RIO port 1 and reconnect it to RIO port 0.
6. At the I/O subsystem recorded in step 3 of PFW1542-6, disconnect the I/O port connector 1 and reconnect to I/O port 0.
7. Verify that a single RIO cable connects the base system RIO port 0 to port 0 of the I/O subsystem recorded in step 4. Go to step 28 of PFW1542-6.
8. Record the location of the next I/O subsystem and call it "subsystem 2". This is the I/O subsystem that is connected to I/O port 1 of subsystem 1.
9. Examine the connection at the I/O port 1 of subsystem 2 recorded in step 8 of PFW1542-6. If the RIO cable attached to I/O port 1 connects to the I/O port 0 of another I/O subsystem, record the location of the next I/O subsystem that is connected to I/O port 1 of subsystem 2 and call it "subsystem 3". Go to step 13 of PFW1542-6.
10. The RIO cable attached to the I/O port 1 of subsystem 2 is attached to port 1 of the base system. At the base system, disconnect the cable connection at RIO port 1 and reconnect it to RIO port 0.
11. On subsystem 2, disconnect the cable from I/O port 1 and reconnect it to I/O port 0 of subsystem 1.
12. Verify that a single RIO cable connects base system RIO port 0 to one or two I/O subsystems. Go to step 28 of PFW1542-6.
13. Examine the connection at the I/O port 1 of subsystem 3 recorded in step 9 of PFW1542-6. If the RIO cable attached to I/O port 1 connects to the I/O port 0 of another I/O subsystem, record the location of the next I/O subsystem that is connected to I/O port 1 of the subsystem 3 and call it "subsystem 4". Go to step 17 of PFW1542-6.
14. The RIO cable attached to the I/O port 1 of subsystem 3 is attached to port 1 of the base system. At the base system, disconnect the cable connection at RIO port 1 and reconnect it to RIO port 0.

15. On subsystem 3, disconnect the cable from I/O port 1 and reconnect it to I/O port 0 of subsystem 1.
16. Verify that a single RIO cable connects base system RIO port 0 to three I/O subsystems. Go to step 28 of PFW1542-6.
17. Examine the connection at the I/O port 1 of subsystem 4 recorded in step 13 of PFW1542-6. If the RIO cable attached to I/O port 1 connects to the I/O port 0 of another I/O subsystem, record the location of the next I/O subsystem that is connected to I/O port 1 of subsystem 4 and call it "subsystem 5". Go to step 21 of PFW1542-6.
18. The RIO cable attached to the I/O port 1 of subsystem 4 is attached to port 1 of the base system. At the base system, disconnect the cable connection at RIO port 1 and reconnect it to RIO port 0.
19. On subsystem 4, disconnect the cable from I/O port 1 and reconnect it to I/O port 0 of subsystem 1.
20. Verify that a single RIO cable connects base system RIO port 0 to four I/O subsystems. Continue to step 28 of PFW1542-6.
21. Examine the connection at the I/O port 1 of subsystem 5 recorded in step 17 of PFW1542-6. If the RIO cable attached to I/O port 1 connects to the I/O port 0 of another I/O subsystem, record the location of the next I/O subsystem that is connected to I/O port 1 of subsystem 5 and call it "subsystem 6". Go to step 25 of PFW1542-6.
22. The RIO cable attached to the I/O port 1 of subsystem 5 is attached to port 1 of the base system. At the base system, disconnect the cable connection at RIO port 1 and reconnect it to RIO port 0.
23. On subsystem 5, disconnect the cable from I/O port 1 and reconnect it to I/O port 0 of subsystem 1.
24. Verify that a single RIO cable connects base system RIO port 0 to five I/O subsystems. Go to step 28 of PFW1542-6.
25. The RIO cable attached to the I/O port 1 of subsystem 6 is attached to port 1 of the base system. At the base system, disconnect the cable connection at RIO port 1 and reconnect it to RIO port 0.
26. On subsystem 6, disconnect the cable from I/O port 1 and reconnect it to I/O port 0 of subsystem 1.
27. Verify that a single RIO cable connects base system RIO port 0 to six I/O subsystems. Continue with step 28 of PFW1542-6.
28. Turn on the power to boot the stand-alone diagnostics from CD-ROM.
29. If the "Please define the system console" screen is displayed, follow the directions to select the system console.
30. Use the option **Display Configuration and Resource List** to list all of the attached devices and adapters.
31. Verify that all adapters and the attached devices are listed.

Did the "Please define the System Console" screen display and are all adapters and attached devices listed?

No Go to PFW1542-7.

Yes The RIO cable that was removed in step 3 above is defective. Replace this RIO cable.

- If six I/O subsystems are chained to RIO port 0 of the base system, connect the new RIO cable from subsystem 6 I/O port 1 to base system RIO port 1.
- If five I/O subsystems are chained to RIO port 0 of the base system, connect the new RIO cable from subsystem 5 I/O port 1 to base system RIO port 1.
- If four I/O subsystems are chained to RIO port 0 of the base system, connect the new RIO cable from subsystem 4 I/O port 1 to base system RIO port 1.
- If three I/O subsystems are chained to RIO port 0 of the base system, connect the new RIO cable from subsystem 3 I/O port 1 to base system RIO port 1.

- If two I/O subsystems are chained to RIO port 0 of the base system, connect the new RIO cable from subsystem 2 I/O port 1 to base system RIO port 1.
- If one I/O subsystem is chained to RIO port 0 of the base system, connect the new RIO cable from subsystem 1 I/O port 1 to base system RIO port 1.

Restore the system to its original configuration. Go to Verify a repair.

- **PFW1542-7**

The I/O device attached to the other RIO ports are now isolated. Power off the system. Disconnect the cable connection at RIO port 0 of the base system.

- **PFW1542-8**

1. Turn on the power to boot the stand-alone diagnostic CD-ROM.
2. If the "Please define the system console" screen is displayed, follow the directions to select the system console.
3. Use the option **Display Configuration and Resource List** to list all of the attached devices and adapters.
4. Check that all adapters and attached devices in the base system are listed.

If the "Please define the system console" screen was not displayed or all adapters and attached devices are not listed, the problem is in the base system.

Was the "Please define the system console" screen displayed and were all adapters and attached devices listed?

No Go to PFW1542-29.

Yes Go to PFW1542-21.

- **PFW1542-9**

For subsystem 1: **Are there any adapters in the I/O subsystem?**

No Go to PFW1542-10.

Yes Go to PFW1542-15.

- **PFW1542-10**

For subsystem 2: **Are there any adapters in the I/O subsystem?**

No Go to PFW1542-11.

Yes Go to PFW1542-16.

- **PFW1542-11**

For subsystem 3: **Are there any adapters in the I/O subsystem?**

No Go to PFW1542-12.

Yes Go to PFW1542-17.

- **PFW1542-12**

For subsystem 4: **Are there any adapters in the I/O subsystem?**

No Go to PFW1542-13.

Yes Go to PFW1542-18.

- **PFW1542-13**

For subsystem 5: **Are there any adapters in the I/O subsystem?**

No Go to PFW1542-14.

Yes Go to PFW1542-19.

- **PFW1542-14**

For subsystem 6: **Are there any adapters in the I/O subsystem?**

No Go to PFW1542-23.

Yes Go to PFW1542-20.

• **PFW1542-15 (Subsystem 1)**

1. If it is not already off, turn off the power.
2. Label and record the locations of any cables attached to the adapters, then disconnect the cables.
3. Record the slot numbers of the adapters.
4. Remove all adapters from the I/O subsystem.
5. Turn on the power to boot the stand-alone diagnostic CD-ROM.
6. If the ASCII terminal displays **Enter 0 to select this console**, press the 0 (zero) key on the ASCII terminal's keyboard.
7. If the "Please select the system console" screen is displayed, follow the directions to select the system console.
8. Use the option **Display Configuration and Resource List** to list all adapters and attached devices.
9. Check that all adapters and attached devices are listed.

Was the "Please define the system console" screen displayed and were all adapters and attached devices listed?

No Go to PFW1542-10.

Yes Go to PFW1542-21.

• **PFW1542-16 (Subsystem 2)**

1. If it is not already off, turn off the power.
2. Label and record the locations of any cables attached to the adapters, then disconnect the cables.
3. Record the slot numbers of the adapters.
4. Remove all adapters from the I/O subsystem.
5. Turn on the power to boot the stand-alone diagnostic CD-ROM.
6. If the ASCII terminal displays **Enter 0 to select this console**, press the 0 (zero) key on the ASCII terminal's keyboard.
7. If the "Please select the system console" screen is displayed, follow the directions to select the system console.
8. Use the option **Display Configuration and Resource List** to list all adapters and attached devices.
9. Check that all adapters and attached devices are listed.

Was the "Please define the system console" screen displayed and were all adapters and attached devices listed?

No Go to PFW1542-11.

Yes Go to PFW1542-21.

• **PFW1542-17 (Subsystem 3)**

1. If it is not already off, turn off the power.
2. Label and record the locations of any cables attached to the adapters, then disconnect the cables.
3. Record the slot numbers of the adapters.
4. Remove all adapters from the I/O subsystem.
5. Turn on the power to boot the stand-alone diagnostic CD-ROM.
6. If the ASCII terminal displays **Enter 0 to select this console**, press the 0 (zero) key on the ASCII terminal's keyboard.
7. If the "Please select the system console" screen is displayed, follow the directions to select the system console.
8. Use the option **Display Configuration and Resource List** to list all adapters and attached devices.
9. Check that all adapters and attached devices are listed.

Was the "Please define the system console" screen displayed and were all adapters and attached devices listed?

No Go to PFW1542-12.

Yes Go to PFW1542-21.

• **PFW1542-18 (Subsystem 4)**

1. If it is not already off, turn off the power.
2. Label and record the locations of any cables attached to the adapters, then disconnect the cables.
3. Record the slot numbers of the adapters.
4. Remove all adapters from the I/O subsystem.
5. Turn on the power to boot the stand-alone diagnostic CD-ROM.
6. If the ASCII terminal displays **Enter 0 to select this console**, press the 0 (zero) key on the ASCII terminal's keyboard.
7. If the "Please define the system console" screen is displayed, follow the directions to select the system console.
8. Use the option **Display Configuration and Resource List** to list all adapters and attached devices.
9. Check that all adapters and attached devices are listed.

Was the "Please define the system console" screen displayed and were all adapters and attached devices listed?

No Go to PFW1542-13.

Yes Go to PFW1542-21.

• **PFW1542-19 (Subsystem 5)**

1. If it is not already off, turn off the power.
2. Label and record the locations of any cables attached to the adapters, then disconnect the cables.
3. Record the slot numbers of the adapters.
4. Remove all adapters from the I/O subsystem.
5. Turn on the power to boot the stand-alone diagnostic CD-ROM.
6. If the ASCII terminal displays **Enter 0 to select this console**, press the 0 (zero) key on the ASCII terminal's keyboard.
7. If the "Please define the system console" screen is displayed, follow the directions to select the system console.
8. Use the option **Display Configuration and Resource List** to list all adapters and attached devices.
9. Check that all adapters and attached devices are listed.

Was the "Please define the system console" screen displayed and were all adapters and attached devices listed?

No Go to PFW1542-14.

Yes Go to PFW1542-21.

• **PFW1542-20 (Subsystem 6)**

1. If it is not already off, turn off the power.
2. Label and record the locations of any cables attached to the adapters, then disconnect the cables.
3. Record the slot numbers of the adapters.
4. Remove all adapters from the I/O subsystem.
5. Turn on the power to boot the stand-alone diagnostic CD-ROM.
6. If the ASCII terminal displays **Enter 0 to select this console**, press the 0 (zero) key on the ASCII terminal's keyboard.

7. If the "Please define the system console" screen is displayed, follow the directions to select the system console.
8. Use the option **Display Configuration and Resource List** to list all adapters and attached devices.
9. Check that all adapters and attached devices are listed.

Was the "Please define the system console" screen displayed and were all adapters and attached devices listed?

No Go to PFW1542-23.

Yes Go to PFW1542-21.

- **PFW1542-21**

If the "Please define the system console" screen was displayed and all adapters and attached devices were not listed, the problem is with one of the adapters or attached devices that was removed or disconnected from the I/O subsystem.

1. Turn off the power.
2. Reinstall one adapter or device that was removed. Use the original adapters in their original slots when reinstalling adapters.
3. Turn on the power to boot the stand-alone diagnostic CD-ROM.
4. If the "Please define the system console" screen is displayed, follow the directions to select the system console.
5. Use the option **Display Configuration and Resource List** to list all adapters and attached devices.
6. Check that all adapters and attached devices are listed.

Was the "Please define the system console" screen displayed and were all adapters and attached devices listed?

No Go to PFW1542-22.

Yes Reinstall the next adapter and device and return to the beginning of this step. Repeat this process until an adapter or device causes the "Please define the System Console" screen to not display, or all attached devices and adapters to not be listed.

After installing all of the adapters and the "Please define the System Console" screen does display and all attached devices and adapters are listed, return the system to its original configuration. Go to Verify a repair.

- **PFW1542-22**

Replace the adapter you just installed with a new adapter and retry booting stand-alone diagnostics from CD-ROM.

1. If the "Please define the system console" screen is displayed, follow the directions to select the system console.
2. Use the option **Display Configuration and Resource List** to list all adapters and attached devices.
3. Check that all adapters and attached devices are listed.

Was the "Please define the system console" screen displayed and were all adapters and attached devices listed?

No The I/O subsystem backplane is defective. Replace the I/O subsystem backplane. In all 4 subsystem types, the I/O subsystem backplane is Un-CB1. Then go to PFW1542-24.

Yes The adapter was defective. Go to PFW1542-24.

- **PFW1542-23**

1. Turn off the power.
2. Disconnect the I/O subsystem power cables.
3. Replace the following parts, one at a time, if present, in the sequence listed:
 - a. I/O subsystem 1 backplane

- b. I/O subsystem 2 backplane
 - c. I/O subsystem 3 backplane
 - d. I/O subsystem 4 backplane
 - e. I/O subsystem 5 backplane
 - f. I/O subsystem 6 backplane
 - g. The RIO interface in the base system to which the RIO cables are presently attached.
4. Reconnect the I/O subsystem power cables.
 5. Turn on the power.
 6. Boot stand-alone diagnostics from CD.
 7. If the "Please define the System Console" screen is displayed, follow directions to select the system console.
 8. Use the option **Display Configuration and Resource List** to list all adapters and attached devices.
 9. Check that all attached devices and adapters are listed.

Did the "Please define the System Console" screen display and are all attached devices and adapters listed?

No Replace the next part in the list and return to the beginning of this step. Repeat this process until a part causes the "Please define the System Console" screen to be displayed and all adapters and attached devices to be listed. If you have replaced all the items listed above and the "Please define the System Console" screen does not display or all attached devices and adapters are not listed, check all external devices and cabling. If you do not find a problem, contact your next level of support for assistance.

Yes Go to PFW1542-22.

- **PFW1542-24**

The item you just replaced fixed the problem.

1. Turn off the power.
2. If a display adapter with keyboard and mouse were installed, reinstall the display adapter, keyboard, and mouse.
3. Reconnect the tape drive (if previously installed) to the internal SCSI bus cable.
4. Plug in all adapters that were previously removed but not reinstalled.
5. Reconnect the I/O subsystem power cables that were previously disconnected.

Return the system to its original condition. Go to Verify a repair.

- **PFW1542-25**

1. Turn off the power.
2. At the base system, reconnect the cable connection at RIO port 0 recorded in PFW1542-7.
3. At the base system, reconnect the cable connection at RIO port 1 recorded in PFW1542-7.
4. Reconnect the power cables to the I/O subsystems that were found attached to the base system RIO ports mentioned in step 2 and step 3 of PFW1542-25. All I/O subsystems that were attached to the base system RIO port 0 and RIO port 1 should now be reconnected to the base system.
5. Make sure the I/O subsystem are cabled correctly. See the cabling information for your I/O subsystem.
6. Turn on the power to boot stand-alone diagnostics from CD-ROM.
7. If the "Please define the System Console" screen is displayed, follow the directions to select the system console.
8. Use the option **Display Configuration and Resource List** to list all adapters and attached devices.
9. Check that all adapters and attached devices are listed.

Did the "Please define the System Console" screen display and are all attached devices and adapters listed?

No Go to PFW1542-9 to isolate a problem in an I/O subsystem attached to the base system RIO bus on the system backplane.

Yes Go to PFW1542-26.

• **PFW1542-26**

Is there a second RIO/12X in the base system, and if so, is there at least one I/O subsystem attached to it?

No Go to PFW1542-29.

Yes Continue to PFW1542-27.

• **PFW1542-27**

1. Turn off the power.
2. At the base system, reconnect the cable connection at RIO port 0 on the second RIO/12X controller recorded in PFW1542-7.
3. At the base system, reconnect the cable connection at RIO port 1 on the second RIO/12X controller recorded in PFW1542-7.
4. Reconnect the power cables to the I/O subsystems that were attached to the second ports mentioned in substeps 2 and 3 in this step. All I/O subsystems that were attached to RIO port 0 on the second RIO/12X controller and RIO port 1 on the second RIO/12X controller in the base system should now be reconnected to the system.
5. Make sure that the I/O subsystem are cabled correctly as shown in the cabling information for your I/O expansion unit.
6. Turn on the power to boot the stand-alone diagnostic CD-ROM.
7. If the Please define the system console screen is displayed, follow the directions to select the system console.
8. Use the option **Display Configuration and Resource List** to list all adapters and attached devices.
9. Verify that all adapters and attached devices are listed.

Did the "Please define the system console" screen display and are all adapters and attached devices listed?

No Go to PFW1542-28 to isolate the problems in the I/O subsystems that are attached to the second RIO expansion card or GX adapter in the base system.

Yes Go to PFW1542-29.

• **PFW1542-28**

At the base system, reconnect the second I/O subsystem to the RIO ports on the base system's RIO expansion cards or GX adapters

The RIO ports on these subsystems are shown in the following table. Use this table to determine the physical location codes of the RIO connectors that are mentioned in the remainder of this MAP.

Note: The order in which the RIO or GX+ adapters are listed is the order in which the adapters are used for attaching external I/O boxes. The first adapter listed for the system units should be used in step PFW1548-2. The second adapter listed should be used in step PFW1548-7.

Table 21. RIO and 12X ports location table

Port	8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T
Port 0	U _n -P1-C1-T2 U _n -P1-C8-T2
Port 1	U _n -P1-C1-T1 U _n -P1-C8-T1

Note: Before continuing, check the cabling from the base system to the I/O subsystem to ensure that the system is cabled correctly. Record the current cabling configuration and then continue with the following steps.

1. Turn off the power. Record the location and machine type and model number, or feature number, of each expansion unit. In the following steps, use this information to determine the physical location codes of the RIO connectors that are referred to by their logical names. For example, if I/O subsystem 1 is a 7311/D20 drawer, RIO port 0 is *Un-P1-C05-T2*.
2. At the base system, disconnect the cable connection at RIO port 0.
3. At the other end of the RIO cable referred to in step 2 of PFW1542-28, disconnect the I/O subsystem port connector 0. The RIO cable that was connected to RIO port 0 on the expansion card should now be loose; remove it. Record the location of this I/O subsystem and call it "subsystem 1".
4. Examine the connection at the I/O port connector 1 of the I/O subsystem recorded in step 3 of PFW1542-28. If the RIO cable attached to I/O port connector 1 connects to the I/O port connector 0 of another I/O subsystem, record the location of the next I/O subsystem that is connected to I/O port 1 of subsystem 1, then go to step 8 of PFW1542-28.
5. At the base system, disconnect the cable connection at RIO port 1 and reconnect it to RIO port 0.
6. At the I/O subsystem recorded in step 3 of PFW1542-28, disconnect the I/O port connector 1 and reconnect to I/O port 0.
7. Verify that a single RIO cable connects the base system RIO port 0 to port 0 of the I/O subsystem recorded in step 4 of PFW1542-28. Go to step 28 of PFW1542-28.
8. Record the location of the next I/O subsystem and call it "subsystem 2". This is the I/O subsystem that is connected to I/O port 1 of subsystem 1.
9. Examine the connection at the I/O port 1 of subsystem 2 recorded in step 8 of PFW1542-28. If the RIO cable attached to I/O port 1 connects to the I/O port 0 of another I/O subsystem, record the location of the next I/O subsystem that is connected to I/O port 1 of subsystem 2 and call it "subsystem 3". Go to step 13 of PFW1542-28.
10. The RIO cable attached to the I/O port 1 of subsystem 2 is attached to port 1 of the base system. At the base system, disconnect the cable connection at RIO port 1 and reconnect it to RIO port 0.
11. On subsystem 2, disconnect the cable from I/O port 1 and reconnect it to I/O port 0 of subsystem 1.
12. Verify that a single RIO cable connects base system RIO port 0 to two I/O subsystems. Go to step 28 of PFW1542-28.
13. Examine the connection at the I/O port 1 of subsystem 3 recorded in step 9 of PFW1542-28. If the RIO cable attached to I/O port 1 connects to the I/O port 0 of another I/O subsystem, record the location of the next I/O subsystem that is connected to I/O port 1 of the subsystem 3 and call it "subsystem 4". Go to step 17 of PFW1542-28.
14. The RIO cable attached to the I/O port 1 of subsystem 3 is attached to port 1 of the base system. At the base system, disconnect the cable connection at RIO port 1 and reconnect it to RIO port 0.
15. On subsystem 3, disconnect the cable from I/O port 1 and reconnect it to I/O port 0 of subsystem 1.
16. Verify that a single RIO cable connects base system RIO port 0 to three I/O subsystems. Go to step 28 of PFW1542-28.
17. Examine the connection at the I/O port 1 of subsystem 4 recorded in step 13 of PFW1542-28. If the RIO cable attached to I/O port 1 connects to the I/O port 0 of another I/O subsystem, record the location of the next I/O subsystem that is connected to I/O port 1 of subsystem 4 and call it "subsystem 5". Go to step 21 of PFW1542-28.
18. The RIO cable attached to the I/O port 1 of subsystem 4 is attached to port 1 of the base system. At the base system, disconnect the cable connection at RIO port 1 and reconnect it to RIO port 0.
19. On subsystem 4, disconnect the cable from I/O port 1 and reconnect it to I/O port 0 of subsystem 1.

20. Verify that a single RIO cable connects base system RIO port 0 to four I/O subsystems. Go to step 27 of PFW1542-28.
21. Examine the connection at the I/O port 1 of subsystem 5 recorded in step 17 of PFW1542-28. If the RIO cable attached to I/O port 1 connects to the I/O port 0 of another I/O subsystem, record the location of the next I/O subsystem that is connected to I/O port 1 of the subsystem 5 and call it "subsystem 6". Go to step 25 of PFW1542-28.
22. The RIO cable attached to the I/O port 1 of subsystem 5 is attached to port 1 of the base system. At the base system, disconnect the cable connection at RIO port 1 and reconnect it to RIO port 0.
23. On subsystem 5, disconnect the cable from I/O port 1 and reconnect it to I/O port 0 of subsystem 1.
24. Verify that a single RIO cable connects base system RIO port 0 to five I/O subsystems. Go to step 28 of PFW1542-28.
25. The RIO cable attached to the I/O port 1 of subsystem 6 is attached to port 1 of the base system. At the base system, disconnect the cable connection at RIO port 1 and reconnect it to RIO port 0.
26. On subsystem 6, disconnect the cable from I/O port 1 and reconnect it to I/O port 0 of subsystem 1.
27. Verify that a single RIO cable connects base system RIO port 0 to six I/O subsystems. Go to step 28 of PFW1542-28.
28. Turn on the power to boot the stand-alone diagnostics from CD-ROM.
29. If the "Please define the system console" screen is displayed, follow the directions to select the system console.
30. Use the option **Display Configuration and Resource List** to list all of the attached devices and adapters.
31. Verify that all adapters and the attached devices are listed.

Did the "Please define the system console" screen display and are all adapters and attached devices listed?

No Go to PFW1542-9.

Yes The RIO cable that was removed in step 3 above is defective. Replace this RIO cable.

- If six I/O subsystems are chained to RIO port 0 of the base system, connect the new RIO cable from subsystem 6 I/O port 1 to base system RIO port 1.
- If five I/O subsystems are chained to RIO port 0 of the base system, connect the new RIO cable from subsystem 5 I/O port 1 to base system RIO port 1.
- If four I/O subsystems are chained to RIO port 0 of the base system, connect the new RIO cable from subsystem 4 I/O port 1 to base system RIO port 1.
- If three I/O subsystems are chained to RIO port 0 of the base system, connect the new RIO cable from subsystem 3 I/O port 1 to base system RIO port 1.
- If two I/O subsystems are chained to RIO port 0 of the base system, connect the new RIO cable from subsystem 2 I/O port 1 to base system RIO port 1.
- If one I/O subsystem is chained to RIO port 0 of the base system, connect the new RIO cable from subsystem 1 I/O port 1 to base system RIO port 1.

Restore the system back to its original configuration. Go to Verify a repair.

• **PFW1542-29**

Are there any adapters in the PCI slots in the base system?

No Go to PFW1542-30.

Yes Go to PFW1542-32.

• **PFW1542-30**

Replace the system backplane, *Un-P1*. Continue to PFW1542-31.

• **PFW1542-31**

1. Boot stand-alone diagnostics from CD.
2. If the "Please define the System Console" screen is displayed, follow directions to select the system console.
3. Use the Display Configuration and Resource List to list all adapters and attached devices.
4. Check that all adapters and attached devices are listed.

Did the "Please define the System Console" screen display and are all attached devices and adapters listed?

No Go to PFW1542-35.

Yes Go to PFW1542-24.

• **PFW1542-32**

1. If it is not already off, turn off the power.
2. Label and record the location of any cables attached to the adapters.
3. Record the slot number of the adapters.
4. Remove all adapters from slots 1, 2, 3, 4, 5, and 6 in the base system that are not attached to the boot device.
5. Turn on the power to boot stand-alone diagnostics from CD-ROM.
6. If the ASCII terminal displays **Enter 0 to select this console**, press the 0 key on the ASCII terminal's keyboard.
7. If the "Please define the System Console" screen is displayed, follow directions to select the system console.
8. Use the option **Display Configuration and Resource List** to list all adapters and attached devices.
9. Check that all adapters and attached devices are listed.

Did the "Please define the System Console" screen display and are all attached devices and adapters listed?

No Go to PFW1542-35.

Yes Continue to PFW1542-33.

• **PFW1542-33**

If the "Please define the System Console" screen does display and all adapters and attached devices are listed, the problem is with one of the adapters or devices that was removed or disconnected from the base system.

1. Turn off the power.
2. Reinstall one adapter and device that was removed. Use the original adapters in their original slots when reinstalling adapters.
3. Turn on the power to boot stand-alone diagnostics from the optical drive.
4. If the "Please define the System Console" screen is displayed, follow the directions to select the system console.
5. Use the Display Configuration and Resource List to list all adapters and attached devices.
6. Check that all adapters and attached devices are listed.

Did the "Please define the System Console" screen display and are all attached devices and adapters listed?

No Continue to PFW1542-34.

Yes Return to the beginning of this step to continue reinstalling adapters and devices.

• **PFW1542-34**

Replace the adapter you just installed with a new adapter and retry the boot to stand-alone diagnostics from CD-ROM.

1. If the "Please Define the System Console" screen is displayed, follow directions to select the system console.
2. Use the option **Display Configuration and Resource List** to list all adapters and attached devices.
3. Check that all adapters and attached devices are listed.

Did the "Please define the System Console" screen display and are all attached devices and adapters listed?

No Go to PFW1542-30.

Yes The adapter you just replaced was defective. Go to PFW1542-24.

• **PFW1542-35**

1. Turn off the power.
2. Disconnect the base system power cables.
3. Replace the following parts, one at a time, in the sequence listed:
 - a. Optical drive
 - b. Removable media backplane and cage assembly
 - c. Disk drive backplane and cage assembly
 - d. I/O backplane, location U_{n-P1}
 - e. Service processor
4. Reconnect the base system power cables.
5. Turn on the power.
6. Boot stand-alone diagnostics from CD.
7. If the "Please define the System Console" screen is displayed, follow directions to select the system console.
8. Use the option **Display Configuration and Resource List** to list all adapters and attached devices.
9. Check that all adapters and attached devices are listed.

Did the "Please define the System Console" screen display and are all adapters and attached devices listed?

No Replace the next part in the list and return to the beginning of this step. Repeat this process until a part causes the Please define the System Console screen to be displayed and all adapters and attached devices to be listed. If you have replaced all the items listed above and the Please define the System Console screen does not display or all adapters and attached devices are not listed, check all external devices and cabling. If you do not find a problem, contact your next level of support for assistance.

Yes Go to PFW1542-24.

PFW1548: Memory and processor subsystem problem isolation procedure

Use this problem isolation procedure to aid in solving memory and processor problems that are not found by normal diagnostics.

Notes:

1. To avoid damage to the system or subsystem components, unplug the power cords before removing or installing any part.
2. This procedure assumes that either:
 - An optical drive is installed and connected to the integrated EIDE adapter, and a stand-alone diagnostic CD-ROM is available.

OR

 - Stand-alone diagnostics can be booted from a NIM server.

3. If a power-on password or privileged-access password is set, you are prompted to enter the password before the stand-alone diagnostic CD-ROM can load.
4. The term POST indicators refers to the device mnemonics that appear during the power-on self-test (POST).
5. The service processor might have been set by the user to monitor system operations and to attempt recoveries. You might want to disable these options while you diagnose and service the system. If these settings are disabled, make notes of their current settings so that they can be restored before the system is turned back over to the customer. The following settings may be of interest.

Monitoring

(also called surveillance) From the ASMI menu, expand the **System Configuration** menu, then click **Monitoring**. Disable both types of surveillance.

Auto power restart

(also called unattended start mode) From the ASMI menu, expand **Power/Restart Control**, then click **Auto Power Restart**, and set it to disabled.

Wake on LAN

From the ASMI menu, expand **Wake on LAN**, and set it to disabled.

Call Out

From the ASMI menu, expand the **Service Aids** menu, then click **Call-Home/Call-In Setup**. Set the call-home system port and the call-in system port to disabled.

6. Verify that the system has not been set to boot to the System Management Services (SMS) menus or to the open firmware prompt. From the ASMI menu, expand **Power/Restart Control** to view the menu, then click **Power On/Off System**. The Linux partition mode boot should say "Continue to Operating System".
7. The service processor might have recorded one or more symptoms in its error/event log. Use the Advanced System Management Interface (ASMI) menus to view the error/event log.
 - If you arrived here after performing a slow boot, look for a possible new error that occurred during the slow boot. If there is a new error, and its actions call for a FRU replacement, perform those actions. If this does not resolve the problem, go to PFW1548-1.
 - If an additional slow boot has not been performed, or if the slow boot did not yield a new error code, look at the error that occurred just before the original error. Perform the actions associated with that error. If this does not resolve the problem, go to PFW1548-1.
 - If a slow boot results in the same error code, and there are no error codes before the original error code, go to PFW1548-1.

Perform the following procedure:

• PFW1548-1

1. Ensure that the diagnostics and the operating system are shut down.

Is the system at "service processor standby", indicated by 01 in the control panel?

No Replace the system backplane, location is *Un-P1*. Return to the beginning of this step.

Yes Continue with substep 2.

2. Turn on the power using either the white button or the ASMI menus.

If an HMC is attached, does the system reach hypervisor standby as indicated on the management console? If a management console is not attached, does the system reach an operating system login prompt, or if booting the stand-alone diagnostic CD-ROM, is the Please define the System Console screen displayed?

No Go to PFW1548-3.

Yes Go to PFW1548-2.

3. Insert the stand-alone diagnostic CD-ROM into the optical drive.

Note: If you cannot insert the diagnostic CD-ROM, go to PFW1548-2.

4. When the word *keyboard* is displayed on an ASCII terminal, a directly attached keyboard, or management console, press the number 5 key.
5. If you are prompted to do so, enter the appropriate password.
Is the "Please define the System Console" screen displayed?

No Go to PFW1548-2.

Yes Go to PFW1548-14.

- **PFW1548-2**

Insert the stand-alone diagnostic CD-ROM into the optical drive.

Note: If you cannot insert the stand-alone diagnostic CD-ROM, go to step PFW1548-3.

Turn on the power using either the white button or the ASMI menus. (If the stand-alone diagnostic CD-ROM is not in the optical drive, insert it now.) If a management console is attached, after the system has reached hypervisor standby, activate a Linux partition by clicking the **Advanced** button on the activation screen. On the Advanced activation screen, select **Boot in service mode using the default boot list** to boot the stand-alone diagnostic CD-ROM.

If you are prompted to do so, enter the appropriate password.

Is the "Please define the System Console" screen displayed?

No Go to PFW1548-3.

Yes Go to PFW1548-14.

- **PFW1548-3**

1. Turn off the power.
2. If you have not already done so, configure the service processor (using the ASMI menus) with the instructions in note 6 at the beginning of this procedure, then return here and continue.
3. Exit the service processor (ASMI) menus and remove the power cords.
4. Disconnect all external cables (parallel, system port 1, system port 2, keyboard, mouse, USB devices, SPCN, Ethernet, and so on). Also disconnect all of the external cables attached to the service processor except the Ethernet cable going to the management console, if a management console is attached.

Go to the next step.

- **PFW1548-3.1**

Disconnect the flex cables from the front and the back of all the processor drawers if not already disconnected. Does the processor drawer with the service processor card power on OK?

No: Go to the next step.

Yes Go to PFW1548-13.2.

- **PFW1548-4**

Locate the system machine type and model you are servicing and determine the action to perform.

Perform the following steps:

1. Place the drawer into the service position and remove the service access cover.
2. Record the slot numbers of the PCI adapters and I/O expansion cards if present. Label and record the locations of all cables attached to the adapters. Disconnect all cables attached to the adapters and remove all of the adapters.
3. Remove the removable media or disk drive enclosure assembly by pulling out the blue tabs on the sides of the enclosure, and then sliding the enclosure out approximately three centimeters.
4. Remove and label the disk drives from the media or disk drive enclosure assembly.
5. Remove memory cards 2, 3, and 4 (if installed). If memory cards 2, 3, and 4 are removed, ensure that memory card 1 is installed.

- Record the slot numbers of the memory DIMMs on memory card 1. Remove all memory DIMMs except for one pair from memory card 1.

Notes:

- Place the memory DIMM locking tabs in the locked (upright) position to prevent damage to the tabs.
 - Memory DIMMs must be installed in pairs and in the correct connectors. See System FRU locations for information about memory DIMMs locations.
- Plug in the power cords and wait for 01 in the upper-left corner of the control panel display.
 - Turn on the power using either the management console or the white button.

If a management console is attached, does the managed system reach power on at hypervisor standby as indicated on the management console? If a management console is not attached, does the system reach an operating system login prompt, or if booting the stand-alone diagnostic CD-ROM, is the Please define the System Console screen displayed?

No Go to PFW1548-7.

Yes Go to the next step.

• **PFW1548-5**

For 8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T, were any memory DIMMs removed from system backplane?

No Go to PFW1548-8.

Yes Go to the next step.

• **PFW1548-6**

- Turn off the power, and remove the power cords.
- Replug the memory DIMMs that were removed from memory card 1 (8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T) in PFW1548-2 in their original locations.

Notes:

- Place the memory DIMM locking tabs into the locked (upright) position to prevent damage to the tabs.
 - Memory DIMMs must be installed in quads in the correct connectors. See System FRU locations for information about memory DIMMs locations for the system that you are servicing.
- Plug in the power cords and wait for 01 in the upper-left corner of the control panel display.
 - Turn on the power using either the management console or the white button.

If a management console is attached, does the managed system reach power on at hypervisor standby as indicated on the management console? If a management console is not attached, does the system reach an operating system login prompt, or if booting the stand-alone diagnostic CD-ROM, is the Please define the System Console screen displayed?

No: Using the following table, locate the system machine type and model you are servicing and determine the action to perform.

A memory DIMM in the pair you just replaced in the system is defective. Turn off the power, remove the power cords, and exchange the memory DIMM pair with new or previously removed memory DIMM pair. Repeat this step until the defective memory DIMM pair is identified, or all memory DIMM pairs have been replaced.

If your symptom did not change and all the memory DIMM pairs have been exchanged, call your service support person for assistance. If the symptom changed, check for loose cards and obvious problems.

If you do not find a problem, go to Problem Analysis and follow the instructions for the new symptom.

Yes: Using the following information, locate the system machine type and model you are servicing and determine the action to perform.

Was one or more memory cards removed from the system?

No: Go to PFW1548-8.

Yes: Go to PFW1548-7.1.

- **PFW1548-7**

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

Note: If a memory DIMM is exchanged, ensure that the new memory DIMM is the same size and speed as the original memory DIMM.

1. Turn off the power and remove the power cords. Using the following list, locate the system machine type and model you are servicing and exchange the FRUs, one at a time, in the order shown.
 - a. Memory DIMMs. Exchange one pair at a time with new or previously removed DIMM pairs.
 - b. Memory card 1, location is *Un-P1-C17*.
 - c. System backplane, location is *Un-P1*.
 - d. Power supplies, locations: *Un-E1* and *Un-E2*.
 - e. Processor modules, locations *Un-P1-C11* or *Un-P1-C10*
2. Plug in the power cords and wait for 01 in the upper-left corner of the control panel display.
3. Turn on the power using either the management console or the white button.

If a management console is attached, does the managed system reach power on at hypervisor standby as indicated on the management console? If a management console is not attached, does the system reach an operating system login prompt, or if booting the stand-alone diagnostic CD-ROM, is the Please define the System Console screen displayed?

No Reinstall the original FRU.

Repeat the FRU replacement steps until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, go to Problem Analysis and follow the instructions for the new symptom.

Yes Go to Verify a repair.

- **PFW1548-7.1**

Using the following steps, locate the system machine type and model you are servicing and determine the action to perform.

No failure was detected with this configuration.

1. Turn off the power and remove the power cords.
2. Reinstall the next memory card.
3. Plug in the power cords and wait for 01 in the upper-left corner of the control panel display.
4. Turn on the power using either the management console or the white button.

If a management console is attached, does the managed system reach power on at hypervisor standby as indicated on the management console? If a management console is not attached, does the system reach an operating system login prompt, or if booting the stand-alone diagnostic CD-ROM, is the Please define the System Console screen displayed?

- No:** One of the FRUs remaining in the system is defective. Exchange the FRUs (that have not already been changed) in the following order:
- a. Memory DIMMs (if present) on the memory card that was just reinstalled. Exchange the DIMM quads one at a time with new or previously removed DIMM quads.
 - b. System backplane, location is *Un-P1*.
 - c. Power supplies, locations: *Un-E1* and *Un-E2*.
 - d. The processor modules locations are *Un-P1-C11* and *Un-P1-C10*.

Repeat the FRU replacement steps until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, go to Problem Analysis and follow the instructions for the new symptom.

- Yes:** If all of the processor cards have been reinstalled, go to step PFW1548-8. Otherwise, repeat this step.

• **PFW1548-8**

1. Turn off the power.
2. Reconnect the system console.

Notes:

- a. If an ASCII terminal has been defined as the firmware console, attach the ASCII terminal cable to the S1 connector on the rear of the system unit.
- b. If a display attached to a display adapter has been defined as the firmware console, install the display adapter and connect the display to the adapter. Plug the keyboard and mouse into the keyboard connector on the rear of the system unit.
3. Turn on the power using either the management console or the white button. (If the stand-alone diagnostic CD-ROM is not in the optical drive, insert it now.) If a management console is attached, after the system has reached hypervisor standby, activate a Linux partition by clicking the **Advanced** button on the activation screen. On the Advanced activation screen, select **Boot in service mode using the default boot list** to boot the stand-alone diagnostic CD-ROM.
4. If the ASCII terminal or graphics display (including display adapter) is connected differently from the way it was previously, the console selection screen appears. Select a firmware console.
5. Immediately after the word *keyboard* is displayed, press the number 1 key on the directly attached keyboard, an ASCII terminal or management console. This activates the system management services (SMS).
6. Enter the appropriate password if you are prompted to do so.

Is the SMS screen displayed?

- No** One of the FRUs remaining in the system unit is defective.

Replace the FRUs that have not been exchanged, in the following order:

1. If you are using an ASCII terminal, go to the problem determination procedures for the display. If you do not find a problem, replace the system backplane, location is *Un-P1*.
2. If you are using a graphics display, go to the problem determination procedures for the display. If you do not find a problem, do the following:
 - a. Replace the display adapter.
 - b. Replace the backplane in which the graphics adapter is plugged.

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

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

If the symptom changed, check for loose cards, cables, and obvious problems. If you do not find a problem, go to Problem Analysis and follow the instructions for the new symptom.

Yes Go to the next step.

• **PFW1548-9**

1. Make sure the stand-alone diagnostic CD-ROM is inserted into the optical drive.
2. Turn off the power and remove the power cords.
3. Use the cam levers to reconnect the disk drive enclosure assembly to the I/O backplane.
4. Reconnect the removable media or disk drive enclosure assembly by sliding the media enclosure toward the rear of the system, and then pressing the blue tabs.
5. Plug in the power cords and wait for 01 in the upper-left corner of the operator panel display.
6. Turn on the power using either the management console or the white button. (If the stand-alone diagnostic CD-ROM is not in the optical drive, insert it now.) If a management console is attached, after the system has reached hypervisor standby, activate a Linux partition by clicking the **Advanced** button on the activation screen. On the Advanced activation screen, select **Boot in service mode using the default boot list** to boot the stand-alone diagnostic CD-ROM.
7. Immediately after the word *keyboard* is displayed, press the number 5 key on either the directly attached keyboard or an ASCII terminal keyboard.
8. Enter the appropriate password if you are prompted to do so.

Is the "Please define the System Console" screen displayed?

No: One of the FRUs remaining in the system unit is defective.

Using the following steps, exchange the FRUs in the order listed that have not been exchanged.

8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T
--

- | |
|---|
| <ol style="list-style-type: none">1. Optical drive2. Removable media enclosure3. System backplane, location is <i>Un-P1</i> |
|---|

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

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, go to Problem Analysis and follow the instructions for the new symptom.

Yes: Go to the next step.

• **PFW1548-10**

The system is working correctly with this configuration. One of the disk drives that you removed from the disk drive backplanes may be defective.

1. Make sure the stand-alone diagnostic CD-ROM is inserted into the optical drive.
2. Turn off the power and remove the power cords.
3. Install a disk drive in the media or disk drive enclosure assembly.
4. Plug in the power cords and wait for the OK prompt to display on the operator panel display.
5. Turn on the power.
6. Immediately after the word *keyboard* is displayed, press the number 5 key on either the directly attached keyboard or an ASCII terminal keyboard.
7. Enter the appropriate password if you are prompted to do so.

Is the "Please define the System Console" screen displayed?

No Using the following list, exchange the FRUs in the order listed that have not been exchanged.

8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T

- | |
|--|
| <ol style="list-style-type: none">1. Last disk drive installed2. Disk drive backplane |
|--|

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

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, go to Problem Analysis and follow the instructions for the new symptom.

Yes Repeat this step with all disk drives that were installed in the disk drive backplane.

After all of the disk drives have been reinstalled, go to the next step.

- **PFW1548-11**

The system is working correctly with this configuration. One of the devices that was disconnected from the system backplane may be defective.

1. Turn off the power and remove the power cords.
2. Attach a system backplane device (for example: system port 1, system port 2, USB, keyboard, mouse, Ethernet) that had been removed.

After all of the I/O backplane device cables have been reattached, reattached the cables to the service processor one at a time.

3. Plug in the power cords and wait for 01 in the upper-left corner on the operator panel display.
4. Turn on the power using either the management console or the white button. (If the stand-alone diagnostic CD-ROM is not in the optical drive, insert it now.) If a management console is attached, after the system has reached hypervisor standby, activate a Linux partition by clicking the **Advanced** button on the activation screen. On the Advanced activation screen, select **Boot in service mode using the default boot list** to boot the stand-alone diagnostic CD-ROM.
5. If the Console Selection screen is displayed, choose the system console.
6. Immediately after the word *keyboard* is displayed, press the number 5 key on either the directly attached keyboard or on an ASCII terminal keyboard.
7. Enter the appropriate password if you are prompted to do so.

Is the "Please define the System Console" screen displayed?

No The last device or cable that you attached is defective.

To test each FRU, exchange the FRUs in the order listed.

1. Device and cable (last one attached)
2. System backplane, location is *Un-P1*

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, go to Problem Analysis and follow the instructions for the new symptom.

Yes Repeat this step until all of the devices are attached. Go to the next step.

- **PFW1548-12**

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

1. Turn off the power and remove the power cords.

2. Install a FRU (adapter) and connect any cables and devices that were attached to the FRU.
 3. Plug in the power cords and wait for the OK prompt to display on the operator panel display.
 4. Turn on the power using either the management console or the white button. (If the stand-alone diagnostic CD-ROM is not in the optical drive, insert it now.) If a management console is attached, after the system has reached hypervisor standby, activate a Linux partition by clicking the **Advanced** button on the activation screen. On the Advanced activation screen, select **Boot in service mode using the default boot list** to boot the stand-alone diagnostic CD-ROM.
 5. If the Console Selection screen is displayed, choose the system console.
 6. Immediately after the word *keyboard* is displayed, press the number 5 key on either the directly attached keyboard or on an ASCII terminal keyboard.
 7. Enter the appropriate password if you are prompted to do so.
- Is the "Please define the System Console" screen displayed?

No Go to the next step.

Yes Repeat this step until all of the FRUs (adapters) are installed. Go to Verify a repair.

- **PFW1548-13**

The last FRU installed or one of its attached devices is probably defective.

1. Make sure the stand-alone diagnostic CD-ROM is inserted into the optical drive.
2. Turn off the power and remove the power cords.
3. Starting with the last installed adapter, disconnect one attached device and cable.
4. Plug in the power cords and wait for the 01 in the upper-left corner on the operator panel display.
5. Turn on the power using either the management console or the white button. (If the stand-alone diagnostic CD-ROM is not in the optical drive, insert it now.) If a management console is attached, after the system has reached hypervisor standby, activate a Linux partition by clicking the **Advanced** button on the Advanced activation screen. On the Advanced activation screen, select **Boot in service mode using the default boot list** to boot the stand-alone diagnostic CD-ROM.
6. If the Console Selection screen is displayed, choose the system console.
7. Immediately after the word *keyboard* is displayed, press the number 5 key on either the directly attached keyboard or on an ASCII terminal keyboard.
8. Enter the appropriate password if you are prompted to do so.

Is the "Please define the System Console" screen displayed?

No Repeat this step until the defective device or cable is identified or all devices and cables have been disconnected.

If all the devices and cables have been removed, then one of the FRUs remaining in the system unit is defective.

To test each FRU, exchange the FRUs in the order listed.

1. Adapter (last one installed)
2. System backplane, location is *Un-P1*

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, go to the Problem Analysis and follow the instructions for the new symptom.

Yes The last device or cable that you disconnected is defective. Exchange the defective device or cable then go to the next step.

- **PFW1548-13.1**

Reattach the flex cables, if present, both front and back. Return the system to its original configuration. Reinstall the control panel, the VPC card, and the service processor in the original primary processor drawer. Reattach the power cords and power on the system.

Does the system come up properly?

No: Go to the next step.

Yes: Go to Verify a repair..

- **PFW1548-13.2**

Have all of the drawers been tested individually with the physical control panel (if present), service processor, and VPD card?

No:

1. Detach the flex cables from the front and back of the system if not already disconnected.
2. Remove the service processor card, the VPD card, and the control panel from the processor drawer that was just tested.
3. Install these parts in the next drawer in the rack, going top to bottom.
4. Go to PFW1548-3.

YES: Reinstall the control panel, the VPD card, and the service processor card in the original primary processor drawer. Return the system to its original configuration. Suspect a problem with the flex cables. If the error code indicates a problem with the SPCN or service processor communication between drawers, replace the flex cable in the rear. If the error code indicates a problem with inter-processor drawer communication, replace the flex cable on the front of the system. Continue with the next step.

- **PFW1548-13.3**

Did replacing the flex cables resolve the problem?

No: Go to step the next step.

Yes: The problem is resolved. Go to Verify a repair.

- **PFW1548-13.4**

Replacing the flex cables did not resolve the problem. If the problem appears to be with the service processor or SPCN signals, suspect the I/O backplanes. If the problem appears to be with processor communication, suspect the processor cards. Replace the I/O backplanes, or processor cards, one at a time until the defective part is found.

Did this resolve the problem?

No: Contact your next level of support.

Yes: The problem is resolved. Go to Verify a repair.

- **PFW1548-14**

1. Follow the instructions on the screen to select the system console.
2. When the DIAGNOSTIC OPERATING INSTRUCTIONS screen is displayed, press Enter.
3. Select **Advanced Diagnostics Routines**.
4. If the terminal type has not been defined, you must use the option **Initialize Terminal** on the FUNCTION SELECTION menu to initialize the diagnostic environment before you can continue with the diagnostics. This is a separate operation from selecting the console display.
5. If the NEW RESOURCE screen is displayed, select an option from the bottom of the screen.

Note: Adapters and devices that require supplemental media are not shown in the new resource list. If the system has adapters or devices that require supplemental media, select option 1.

6. When the DIAGNOSTIC MODE SELECTION screen is displayed, press Enter.
7. Select **All Resources**. (If you were sent here from step PFW1548-18, select the adapter or device that was loaded from the supplemental media).

Did you get an SRN?

No Go to step PFW1548-16.

Yes Go to the next step.

- **PFW1548-15**

Look at the FRU part numbers associated with the SRN.

Have you exchanged all the FRUs that correspond to the failing function codes (FFCs)?

No Exchange the FRU with the highest failure percentage that has not been changed.

Repeat this step until all the FRUs associated with the SRN have been exchanged or diagnostics run with no trouble found. Run diagnostics after each FRU is exchanged. Go to Verify a repair.

Yes If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

- **PFW1548-16**

Does the system have adapters or devices that require supplemental media?

No Go to step the next step.

Yes Go to step PFW1548-18.

- **PFW1548-17**

Consult the PCI adapter configuration documentation for your operating system to verify that all adapters are configured correctly.

Go to Verify a repair.

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

- **PFW1548-18**

1. Select **Task Selection**.

2. Select **Process Supplemental Media** and follow the on-screen instructions to process the media. Supplemental media must be loaded and processed one at a time.

Did the system return to the TASKS SELECTION SCREEN after the supplemental media was processed?

No Go to the next step.

Yes Press F3 to return to the FUNCTION SELECTION screen. Go to step PFW1548-14 substep 4.

- **PFW1548-19**

The adapter or device is probably defective.

If the supplemental media is for an adapter, replace the FRUs in the following order:

1. Adapter
2. System backplane, location is Un-P1

If the supplemental media is for a device, replace the FRUs in the following order:

1. Device and any associated cables.
2. The adapter to which the device is attached.

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

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, go to Problem Analysis and follow the instructions for the new symptom.

Go to Verify a repair.

This ends the procedure.

PFW1548: Memory and processor subsystem problem isolation procedure when a management console is attached

This procedure is used to locate defective FRUs not found by normal diagnostics. For this procedure, diagnostics are run on a minimally configured system. If a failure is detected on the minimally configured system, the remaining FRUs are exchanged one at a time until the failing FRU is identified. If a failure is not detected, FRUs are added back until the failure occurs. The failure is then isolated to the failing FRU.

Note: the system backplane has two memory DIMM quads: *Un-P1-C14* to *Un-P1-C17*, and *Un-P1-C21* to *Un-P1-C24*. See System FRU locations for information about system FRU locations.

Perform the following procedure:

• **PFW1548-1**

1. Ensure that the diagnostics and the operating system are shut down.

Is the system at "service processor standby", indicated by 01 in the control panel?

No Replace the system backplane, location: *Un-P1*. Return to step PFW1548-1.

Yes Continue with substep 2.

2. Turn on the power using either the white button or the ASMI menus.

Does the system reach hypervisor standby as indicated on the management console?

No Go to PFW1548-3.

Yes Go to PFW1548-2.

3. Insert the stand-alone diagnostic CD-ROM into the optical drive.

Note: If you cannot insert the diagnostic CD-ROM, go to PFW1548-2.

4. When the word *keyboard* is displayed on an ASCII terminal, a directly attached keyboard, or management console, press the number 5 key.

5. If you are prompted to do so, enter the appropriate password.

Is the "Please define the System Console" screen displayed?

No Go to PFW1548-2.

Yes Go to PFW1548-14.

• **PFW1548-2**

Insert the stand-alone diagnostic CD-ROM into the optical drive.

Note: If you cannot insert the diagnostic CD-ROM, go to step PFW1548-3.

Turn on the power using either the white button or the ASMI menus. (If the diagnostic CD-ROM is not in the optical drive, insert it now.) After the system has reached hypervisor standby, activate a Linux partition by clicking the **Advanced** button on the activation screen. On the Advanced activation screen, select **Boot in service mode using the default boot list** to boot the diagnostic CD-ROM.

If you are prompted to do so, enter the appropriate password.

Is the "Please define the System Console" screen displayed?

No Go to PFW1548-3.

Yes Go to PFW1548-14.

• **PFW1548-3**

1. Turn off the power.

2. If you have not already done so, configure the service processor (using the ASMI menus), follow the instructions in note 6 located in “PFW1548: Memory and processor subsystem problem isolation procedure” on page 182 and then return here and continue.
3. Exit the service processor (ASMI) menus and remove the power cords.
4. Disconnect all external cables (parallel, system port 1, system port 2, keyboard, mouse, USB devices, SPCN, Ethernet, and so on). Also disconnect all of the external cables attached to the service processor except the Ethernet cable going to the management console.

Go to the next step.

- **PFW1548-4**

1. If this is a desktide system, remove the service access cover. If this is a rack-mounted system, place the drawer into the service position and remove the service access cover. Also remove the front cover.
2. Record the slot numbers of the PCI adapters and I/O expansion cards if present. Label and record the locations of all cables attached to the adapters. Disconnect all cables attached to the adapters and remove all of the adapters.
3. Remove the removable media or disk drive enclosure assembly by pulling out the blue tabs at the bottom of the enclosure, then sliding the enclosure out approximately three centimeters.
4. Remove and label the disk drives from the media or disk drive enclosure assembly.
5. Remove one of the two memory DIMMs quads.

Notes:

- a. Place the memory DIMM locking tabs in the locked (upright) position to prevent damage to the tabs.
 - b. Memory DIMMs must be installed in quads and in the correct connectors. See System FRU locations for information about memory DIMMs locations.
6. Plug in the power cords and wait for 01 in the upper-left corner of the control panel display.
 7. Turn on the power using either the management console or the white button.

Does the managed system reach power on at hypervisor standby as indicated on the management console?

No Go to PFW1548-7.

Yes Go to the next step.

- **PFW1548-5**

Were any memory DIMMs removed from system backplane?

No Go to PFW1548-8.

Yes Go to the next step.

- **PFW1548-6**

1. Turn off the power, and remove the power cords.
2. Replug the memory DIMMs that were removed from system backplane in PFW1548-2 in their original locations.

Notes:

- a. Place the memory DIMM locking tabs into the locked (upright) position to prevent damage to the tabs.
 - b. Memory DIMMs must be installed in quads in the correct connectors. See System FRU locations for information about memory DIMM locations.
3. Plug in the power cords and wait for 01 in the upper-left corner of the control panel display.
 4. Turn on the power using either the management console or the white button.

Does the managed system reach power on at hypervisor standby as indicated on the management console?

No A memory DIMM in the quad you just replaced in the system is defective. Turn off the power, remove the power cords, and exchange the memory DIMM quad with new or previously removed memory DIMM quad. Repeat this step until the defective memory DIMM quad is identified, or both memory DIMM quads have been exchanged.

Note: the system backplane has two memory DIMM quads: $Un-P1-C1x-C1$ to $Un-P1-C1x-C4$, and $Un-P1-C1x-C6$ to $Un-P1-C1x-C9$. See System FRU locations.

If your symptom did not change and both the memory DIMM quads have been exchanged, call your service support person for assistance.

If the symptom changed, check for loose cards and obvious problems. If you do not find a problem, go to the Problem Analysis procedures and follow the instructions for the new symptom.

Yes Go to the next step.

• **PFW1548-7**

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

Note: If a memory DIMM is exchanged, ensure that the new memory DIMM is the same size and speed as the original memory DIMM.

1. Turn off the power, remove the power cords, and exchange the following FRUs, one at a time, in the order listed:
 - a. Memory DIMMs. Exchange one quad at a time with new or previously removed DIMM quads
 - b. System backplane, location: $Un-P1$
 - c. Power supplies, locations: $Un-E1$ and $Un-E2$.
2. Plug in the power cords and wait for 01 in the upper-left corner of the control panel display.
3. Turn on the power using either the management console or the white button.

Does the managed system reach power on at hypervisor standby as indicated on the management console?

No Reinstall the original FRU.

Repeat the FRU replacement steps until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, go to the Problem Analysis procedures and follow the instructions for the new symptom.

Yes Go to Verify a repair.

• **PFW1548-8**

1. Turn off the power.
2. Reconnect the system console.

Notes:

- a. If an ASCII terminal has been defined as the firmware console, attach the ASCII terminal cable to the S1 connector on the rear of the system unit.
- b. If a display attached to a display adapter has been defined as the firmware console, install the display adapter and connect the display to the adapter. Plug the keyboard and mouse into the keyboard connector on the rear of the system unit.

3. Turn on the power using either the management console or the white button. (If the diagnostic CD-ROM is not in the optical drive, insert it now.) After the system has reached hypervisor standby, activate a Linux partition by clicking the **Advanced** button on the activation screen. On the Advanced activation screen, select **Boot in service mode using the default boot list** to boot the diagnostic CD-ROM.
4. If the ASCII terminal or graphics display (including display adapter) is connected differently from the way it was previously, the console selection screen appears. Select a firmware console.
5. Immediately after the word *keyboard* is displayed, press the number 1 key on the directly attached keyboard, an ASCII terminal or management console. This activates the system management services (SMS).
6. Enter the appropriate password if you are prompted to do so.

Is the SMS screen displayed?

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

Exchange the FRUs that have not been exchanged, in the following order:

1. If you are using an ASCII terminal, go to the problem determination procedures for the display. If you do not find a problem, do the following:
 - a. Replace the system backplane, location: *Un-P1*.
2. If you are using a graphics display, go to the problem determination procedures for the display. If you do not find a problem, do the following:
 - a. Replace the display adapter.
 - b. Replace the backplane in which the graphics adapter is plugged.

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

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

If the symptom changed, check for loose cards, cables, and obvious problems. If you do not find a problem, go to the Problem Analysis procedures and follow the instructions for the new symptom.

Yes Go to the next step.

• **PFW1548-9**

1. Make sure the diagnostic CD-ROM is inserted into the optical drive.
2. Turn off the power and remove the power cords.
3. Use the cam levers to reconnect the disk drive enclosure assembly to the I/O backplane.
4. Reconnect the removable media or disk drive enclosure assembly by sliding the media enclosure toward the rear of the system, then pressing the blue tabs.
5. Plug in the power cords and wait for 01 in the upper-left corner of the operator panel display.
6. Turn on the power using either the management console or the white button. (If the diagnostic CD-ROM is not in the optical drive, insert it now.) After the system has reached hypervisor standby, activate a Linux partition by clicking the **Advanced** button on the activation screen. On the Advanced activation screen, select **Boot in service mode using the default boot list** to boot the diagnostic CD-ROM.
7. Immediately after the word *keyboard* is displayed, press the number 5 key on either the directly attached keyboard or an ASCII terminal keyboard.
8. Enter the appropriate password if you are prompted to do so.

Is the "Please define the System Console" screen displayed?

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

Exchange the FRUs that have not been exchanged, in the following order:

1. Optical drive

2. Removable media enclosure.
3. System backplane, *Un-P1*.

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

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, go to Problem Analysis procedures and follow the instructions for the new symptom.

Yes Go to the next step.

• **PFW1548-10**

The system is working correctly with this configuration. One of the disk drives that you removed from the disk drive backplanes may be defective.

1. Make sure the diagnostic CD-ROM is inserted into the optical drive.
2. Turn off the power and remove the power cords.
3. Install a disk drive in the media or disk drive enclosure assembly.
4. Plug in the power cords and wait for the OK prompt to display on the operator panel display.
5. Turn on the power.
6. Immediately after the word *keyboard* is displayed, press the number 5 key on either the directly attached keyboard or an ASCII terminal keyboard.
7. Enter the appropriate password if you are prompted to do so.

Is the "Please define the System Console" screen displayed?

No Exchange the FRUs that have not been exchanged, in the following order:

1. Last disk drive installed
2. Disk drive backplane.

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

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, go to Problem Analysis procedures and follow the instructions for the new symptom.

Yes Repeat this step with all disk drives that were installed in the disk drive backplane.

After all of the disk drives have been reinstalled, go to the next step.

• **PFW1548-11**

The system is working correctly with this configuration. One of the devices that was disconnected from the system backplane may be defective.

1. Turn off the power and remove the power cords.
2. Attach a system backplane device (for example: system port 1, system port 2, USB, keyboard, mouse, Ethernet) that had been removed.

After all of the I/O backplane device cables have been reattached, reattached the cables to the service processor one at a time.

3. Plug in the power cords and wait for 01 in the upper-left corner on the operator panel display.
4. Turn on the power using either the management console or the white button. (If the diagnostic CD-ROM is not in the optical drive, insert it now.) After the system has reached hypervisor standby, activate a Linux partition by clicking the **Advanced** button on the activation screen. On the Advanced activation screen, select **Boot in service mode using the default boot list** to boot the diagnostic CD-ROM.

5. If the Console Selection screen is displayed, choose the system console.
6. Immediately after the word *keyboard* is displayed, press the number 5 key on either the directly attached keyboard or on an ASCII terminal keyboard.
7. Enter the appropriate password if you are prompted to do so.

Is the "Please define the System Console" screen displayed?

No The last device or cable that you attached is defective.

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

1. Device and cable (last one attached)
2. System backplane, location: *Un-P1*.

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, go to Problem Analysis procedures and follow the instructions for the new symptom.

Yes Repeat this step until all of the devices are attached. Go to the next step.

• **PFW1548-12**

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

1. Turn off the power and remove the power cords.
2. Install a FRU (adapter) and connect any cables and devices that were attached to the FRU.
3. Plug in the power cords and wait for the OK prompt to display on the operator panel display.
4. Turn on the power using either the management console or the white button. (If the diagnostic CD-ROM is not in the optical drive, insert it now.) After the system has reached hypervisor standby, activate a Linux partition by clicking the **Advanced** button on the activation screen. On the Advanced activation screen, select **Boot in service mode using the default boot list** to boot the diagnostic CD-ROM.
5. If the Console Selection screen is displayed, choose the system console.
6. Immediately after the word *keyboard* is displayed, press the number 5 key on either the directly attached keyboard or on an ASCII terminal keyboard.
7. Enter the appropriate password if you are prompted to do so.

Is the "Please define the System Console" screen displayed?

No Go to the next step.

Yes Repeat this step until all of the FRUs (adapters) are installed. Go to Verify a repair.

• **PFW1548-13**

The last FRU installed or one of its attached devices is probably defective.

1. Make sure the diagnostic CD-ROM is inserted into the optical drive.
2. Turn off the power and remove the power cords.
3. Starting with the last installed adapter, disconnect one attached device and cable.
4. Plug in the power cords and wait for the 01 in the upper-left corner on the operator panel display.
5. Turn on the power using either the management console or the white button. (If the diagnostic CD-ROM is not in the optical drive, insert it now.) After the system has reached hypervisor standby, activate a Linux partition by clicking the **Advanced** button on the Advanced activation screen. On the Advanced activation screen, select **Boot in service mode using the default boot list** to boot the diagnostic CD-ROM.
6. If the Console Selection screen is displayed, choose the system console.

7. Immediately after the word *keyboard* is displayed, press the number 5 key on either the directly attached keyboard or on an ASCII terminal keyboard.
8. Enter the appropriate password if you are prompted to do so.

Is the "Please define the System Console" screen displayed?

No Repeat this step until the defective device or cable is identified or all devices and cables have been disconnected.

If all the devices and cables have been removed, then one of the FRUs remaining in the system unit is defective.

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

1. Adapter (last one installed)
2. System backplane, location: Un-P1.

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, go to the Problem Analysis procedures and follow the instructions for the new symptom.

Yes The last device or cable that you disconnected is defective. Exchange the defective device or cable then go to the next step.

• **PFW1548-14**

1. Follow the instructions on the screen to select the system console.
2. When the DIAGNOSTIC OPERATING INSTRUCTIONS screen is displayed, press Enter.
3. Select **Advanced Diagnostics Routines**.
4. If the terminal type has not been defined, you must use the option **Initialize Terminal** on the FUNCTION SELECTION menu to initialize the stand-alone diagnostic environment before you can continue with the diagnostics. This is a separate operation from selecting the console display.
5. If the NEW RESOURCE screen is displayed, select an option from the bottom of the screen.

Note: Adapters and devices that require supplemental media are not shown in the new resource list. If the system has adapters or devices that require supplemental media, select option 1.

6. When the DIAGNOSTIC MODE SELECTION screen is displayed, press Enter.
7. Select **All Resources**. (If you were sent here from step PFW1548-18, select the adapter or device that was loaded from the supplemental media).

Did you get an SRN?

No Go to step PFW1548-16.

Yes Go to the next step.

• **PFW1548-15**

Look at the FRU part numbers associated with the SRN.

Have you exchanged all the FRUs that correspond to the failing function codes (FFCs)?

No Exchange the FRU with the highest failure percentage that has not been changed.

Repeat this step until all the FRUs associated with the SRN have been exchanged or diagnostics run with no trouble found. Run diagnostics after each FRU is exchanged. Go to Verify a repair.

Yes If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

• **PFW1548-16**

Does the system have adapters or devices that require supplemental media?

No Go to step the next step.

Yes Go to step PFW1548-18.

- **PFW1548-17**

Consult the PCI adapter configuration documentation for your operating system to verify that all adapters are configured correctly.

Go to Verify a repair.

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

- **PFW1548-18**

1. Select **Task Selection**.

2. Select **Process Supplemental Media** and follow the on-screen instructions to process the media. Supplemental media must be loaded and processed one at a time.

Did the system return to the TASKS SELECTION SCREEN after the supplemental media was processed?

No Go to the next step.

Yes Press F3 to return to the FUNCTION SELECTION screen. Go to step PFW1548-14, substep 4 on page 199.

- **PFW1548-19**

The adapter or device is probably defective.

If the supplemental media is for an adapter, replace the FRUs in the following order:

1. Adapter
2. System backplane, location: *Un-P1*.

If the supplemental media is for a device, replace the FRUs in the following order:

1. Device and any associated cables
2. The adapter to which the device is attached

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

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, go to the Problem Analysis procedures and follow the instructions for the new symptom.

Go to Verify a repair.

This ends the procedure.

PFW1548: Memory and processor subsystem problem isolation procedure without a management console attached

This procedure is used to locate defective FRUs not found by normal diagnostics. For this procedure, diagnostics are run on a minimally configured system. If a failure is detected on the minimally configured system, the remaining FRUs are exchanged one at a time until the failing FRU is identified. If a failure is not detected, FRUs are added back until the failure occurs. The failure is then isolated to the failing FRU.

Note: the system backplane has two memory DIMM quads: *Un-P1-C14* to *Un-P1-C17*, and *Un-P1-C21* to *Un-P1-C24*. See System FRU locations.

Perform the following procedure:

- **PFW1548-1**

1. Ensure that the diagnostics and the operating system are shut down.

Is the system at "service processor standby", indicated by 01 in the control panel?

No Replace the system backplane, location: *Un-P1*. Return to step PFW1548-1.

Yes Continue with substep 2.

2. Turn on the power using either the white button or the ASMI menus.

Does the system reach an operating system login prompt, or if booting the stand-alone diagnostic CD-ROM, is the "Please define the System Console" screen displayed?

No Go to PFW1548-3.

Yes Go to PFW1548-2.

3. Insert the stand-alone diagnostic CD-ROM into the optical drive.

Note: If you cannot insert the diagnostic CD-ROM, go to PFW1548-2.

4. When the word *keyboard* is displayed on an ASCII terminal or a directly attached keyboard, press the number 5 key.

5. If you are prompted to do so, enter the appropriate password.

Is the "Please define the System Console" screen displayed?

No Go to PFW1548-2.

Yes Go to PFW1548-14.

- **PFW1548-2**

1. Insert the stand-alone diagnostic CD-ROM into the optical drive.

Note: If you cannot insert the diagnostic CD-ROM, go to step PFW1548-3.

2. Turn on the power using either the white button or the ASMI menus. If the diagnostic CD-ROM is not in the optical drive, insert it now. If you are prompted to do so, enter the appropriate password.

Is the "Please define the System Console" screen displayed?

No Go to PFW1548-3.

Yes Go to PFW1548-14.

- **PFW1548-3**

1. Turn off the power.
2. If you have not already done so, configure the service processor (using the ASMI menus) with the instructions in note 6 on page 183 at the beginning of this procedure, then return here and continue.
3. Exit the service processor (ASMI) menus and remove the power cords.
4. Disconnect all external cables (parallel, system port 1, system port 2, keyboard, mouse, USB devices, SPCN, Ethernet, and so on). Also disconnect all of the external cables attached to the service processor.

Go to the next step.

- **PFW1548-4**

1. If this is a deskside system, remove the service access cover. If this is a rack-mounted system, place the drawer into the service position and remove the service access cover. Also remove the front cover.
2. Record the slot numbers of the PCI adapters and I/O expansion cards if present. Label and record the locations of all cables attached to the adapters. Disconnect all cables attached to the adapters and remove all of the adapters.
3. Remove the removable media or disk drive enclosure assembly by pulling out the blue tabs at the bottom of the enclosure, then sliding the enclosure out approximately three centimeters.
4. Remove and label the disk drives from the media or disk drive enclosure assembly.
5. Remove a memory DIMM quad.

Notes:

- a. Place the memory DIMM locking tabs in the locked (upright) position to prevent damage to the tabs.
 - b. Memory DIMMs must be installed in quads and in the correct connectors. See System FRU locations for information about memory DIMM locations.
6. Plug in the power cords and wait for 01 in the upper-left corner of the control panel display.
 7. Turn on the power using the white button.

Does the system reach an operating system login prompt, or if booting the stand-alone diagnostic CD-ROM, is the "Please define the System Console" screen displayed?

No Go to PFW1548-7.

Yes Go to the next step.

• **PFW1548-5**

Were any memory DIMMs removed from system backplane?

No Go to PFW1548-8.

Yes Go to the next step.

• **PFW1548-6**

1. Turn off the power, and remove the power cords.
2. Replug the memory DIMMs that were removed from the system backplane in PFW1548-2 in their original locations.

Notes:

- a. Place the memory DIMM locking tabs into the locked (upright) position to prevent damage to the tabs.
 - b. Memory DIMMs must be installed in quads in the correct connectors. See System FRU locations for information about memory DIMM locations.
3. Plug in the power cords and wait for 01 in the upper-left corner of the control panel display.
 4. Turn on the power using the white button.

Does the system reach an operating system login prompt, or if booting the stand-alone diagnostic CD-ROM, is the "Please define the System Console" screen displayed?

No A memory DIMM in the quad you just replaced in the system is defective. Turn off the power, remove the power cords, and exchange the memory DIMMs quad with new or previously removed memory DIMM quad. Repeat this step until the defective memory DIMM quad is identified, or both memory DIMM quads have been exchanged.

Note: the system backplane has two memory DIMM quads: $Un-P1-C14$ to $Un-P1-C17$ and $Un-P1-C21$ to $Un-P1-C24$. See System FRU locations.

If your symptom did not change and both the memory DIMM quads have been exchanged, call your service support person for assistance.

If the symptom changed, check for loose cards and obvious problems. If you do not find a problem, go to the Problem Analysis procedures and follow the instructions for the new symptom.

Yes Go to the next step.

• **PFW1548-7**

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

Note: If a memory DIMM is exchanged, ensure that the new memory DIMM is the same size and speed as the original memory DIMM.

1. Turn off the power, remove the power cords, and exchange the following FRUs, one at a time, in the order listed:
 - a. Memory DIMMs. Exchange one quad at a time with new or previously removed DIMM quads
 - b. System backplane, location: *Un-P1*
 - c. Power supplies, locations: *Un-E1* and *Un-E2*.
2. Plug in the power cords and wait for 01 in the upper-left corner of the control panel display.
3. Turn on the power using the white button.

Does the system reach an operating system login prompt, or if booting the stand-alone diagnostic CD-ROM, is the "Please define the System Console" screen displayed?

No Reinstall the original FRU.

Repeat the FRU replacement steps until the defective FRU is identified or all the FRUs have been exchanged.

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, go to the Problem Analysis procedures and follow the instructions for the new symptom.

Yes Go to Verify a repair.

• **PFW1548-8**

1. Turn off the power.
2. Reconnect the system console.

Notes:

- a. If an ASCII terminal has been defined as the firmware console, attach the ASCII terminal cable to the S1 connector on the rear of the system unit.
- b. If a display attached to a display adapter has been defined as the firmware console, install the display adapter and connect the display to the adapter. Plug the keyboard and mouse into the keyboard connector on the rear of the system unit.
3. Turn on the power using the white button. (If the diagnostic CD-ROM is not in the optical drive, insert it now.)
4. If the ASCII terminal or graphics display (including display adapter) is connected differently from the way it was previously, the console selection screen appears. Select a firmware console.
5. Immediately after the word *keyboard* is displayed, press the number 1 key on the directly attached keyboard, or an ASCII terminal. This action activates the system management services (SMS).
6. Enter the appropriate password if you are prompted to do so.

Is the SMS screen displayed?

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

Exchange the FRUs that have not been exchanged, in the following order:

1. If you are using an ASCII terminal, go to the problem determination procedures for the display. If you do not find a problem, do the following:
 - a. Replace the system backplane, location: *Un-P1*.
2. If you are using a graphics display, go to the problem determination procedures for the display. If you do not find a problem, do the following:
 - a. Replace the display adapter.
 - b. Replace the backplane in which the graphics adapter is plugged.

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

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

If the symptom changed, check for loose cards, cables, and obvious problems. If you do not find a problem, go to the Problem Analysis procedures and follow the instructions for the new symptom.

Yes Go to the next step.

• **PFW1548-9**

1. Make sure the diagnostic CD-ROM is inserted into the optical drive.
2. Turn off the power and remove the power cords.
3. Use the cam levers to reconnect the disk drive enclosure assembly to the I/O backplane.
4. Reconnect the removable media or disk drive enclosure assembly by sliding the media enclosure toward the rear of the system, then pressing the blue tabs.
5. Plug in the power cords and wait for 01 in the upper-left corner of the operator panel display.
6. Turn on the power using the white button. (If the diagnostic CD-ROM is not in the optical drive, insert it now.)
7. Immediately after the word *keyboard* is displayed, press the number 5 key on either the directly attached keyboard or an ASCII terminal keyboard.
8. Enter the appropriate password if you are prompted to do so.

Is the "Please define the System Console" screen displayed?

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

Exchange the FRUs that have not been exchanged, in the following order:

1. Optical drive
2. Removable media enclosure.
3. System backplane, *Un-P1*.

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

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, go to Problem Analysis procedures and follow the instructions for the new symptom.

Yes Go to the next step.

• **PFW1548-10**

The system is working correctly with this configuration. One of the disk drives that you removed from the disk drive backplanes may be defective.

1. Make sure the diagnostic CD-ROM is inserted into the optical drive.
2. Turn off the power and remove the power cords.
3. Install a disk drive in the media or disk drive enclosure assembly.
4. Plug in the power cords and wait for the OK prompt to display on the operator panel display.
5. Turn on the power.
6. Immediately after the word *keyboard* is displayed, press the number 5 key on either the directly attached keyboard or an ASCII terminal keyboard.
7. Enter the appropriate password if you are prompted to do so.

Is the "Please define the System Console" screen displayed?

No Exchange the FRUs that have not been exchanged, in the following order:

1. Last disk drive installed

2. Disk drive backplane.

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

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, go to Problem Analysis procedures and follow the instructions for the new symptom.

Yes Repeat this step with all disk drives that were installed in the disk drive backplane.

After all of the disk drives have been reinstalled, go to the next step.

• **PFW1548-11**

The system is working correctly with this configuration. One of the devices that was disconnected from the system backplane may be defective.

1. Turn off the power and remove the power cords.
2. Attach a system backplane device (for example: system port 1, system port 2, USB, keyboard, mouse, Ethernet) that had been removed.

After all of the I/O backplane device cables have been reattached, reattached the cables to the service processor one at a time.

3. Plug in the power cords and wait for 01 in the upper-left corner on the operator panel display.
4. Turn on the power using the white button. (If the diagnostic CD-ROM is not in the optical drive, insert it now.)
5. If the Console Selection screen is displayed, choose the system console.
6. Immediately after the word *keyboard* is displayed, press the number 5 key on either the directly attached keyboard or on an ASCII terminal keyboard.
7. Enter the appropriate password if you are prompted to do so.

Is the "Please define the System Console" screen displayed?

No The last device or cable that you attached is defective.

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

1. Device and cable (last one attached)
2. System backplane, location: Un-P1.

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, go to Problem Analysis procedures and follow the instructions for the new symptom.

Yes Repeat this step until all of the devices are attached. Go to the next step.

• **PFW1548-12**

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

1. Turn off the power and remove the power cords.
2. Install a FRU (adapter) and connect any cables and devices that were attached to the FRU.
3. Plug in the power cords and wait for the OK prompt to display on the operator panel display.
4. Turn on the power using the white button. (If the diagnostic CD-ROM is not in the optical drive, insert it now.)
5. If the Console Selection screen is displayed, choose the system console.
6. Immediately after the word *keyboard* is displayed, press the number 5 key on either the directly attached keyboard or on an ASCII terminal keyboard.

7. Enter the appropriate password if you are prompted to do so.

Is the "Please define the System Console" screen displayed?

No Go to the next step.

Yes Repeat this step until all of the FRUs (adapters) are installed. Go to Verify a repair.

• **PFW1548-13**

The last FRU installed or one of its attached devices is probably defective.

1. Make sure the diagnostic CD-ROM is inserted into the optical drive.
2. Turn off the power and remove the power cords.
3. Starting with the last installed adapter, disconnect one attached device and cable.
4. Plug in the power cords and wait for the 01 in the upper-left corner on the operator panel display.
5. Turn on the power using either the white button. (If the diagnostic CD-ROM is not in the optical drive, insert it now.)
6. If the Console Selection screen is displayed, choose the system console.
7. Immediately after the word *keyboard* is displayed, press the number 5 key on either the directly attached keyboard or on an ASCII terminal keyboard.
8. Enter the appropriate password if you are prompted to do so.

Is the "Please define the System Console" screen displayed?

No Repeat this step until the defective device or cable is identified or all devices and cables have been disconnected.

If all the devices and cables have been removed, then one of the FRUs remaining in the system unit is defective.

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

1. Adapter (last one installed)
2. System backplane, location: Un-P1.

If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.

If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, go to the Problem Analysis procedures and follow the instructions for the new symptom.

Yes The last device or cable that you disconnected is defective. Exchange the defective device or cable and then go to the next step.

• **PFW1548-14**

1. Follow the instructions on the screen to select the system console.
2. When the DIAGNOSTIC OPERATING INSTRUCTIONS screen is displayed, press Enter.
3. Select **Advanced Diagnostics Routines**.
4. If the terminal type has not been defined, you must use the option **Initialize Terminal** on the FUNCTION SELECTION menu to initialize the stand-alone diagnostic environment before you can continue with the diagnostics. This is a separate operation from selecting the console display.
5. If the NEW RESOURCE screen is displayed, select an option from the bottom of the screen.

Note: Adapters and devices that require supplemental media are not shown in the new resource list. If the system has adapters or devices that require supplemental media, select option 1.

6. When the DIAGNOSTIC MODE SELECTION screen is displayed, press Enter.
7. Select **All Resources**. If you were sent here from step PFW1548-18, select the adapter or device that was loaded from the supplemental media.

Did you get an SRN?

- No** Go to step PFW1548-16.
- Yes** Go to the next step.
- **PFW1548-15**
Look at the FRU part numbers associated with the SRN.
Have you exchanged all the FRUs that correspond to the failing function codes (FFCs)?
No Exchange the FRU with the highest failure percentage that has not been changed.
Repeat this step until all the FRUs associated with the SRN have been exchanged or diagnostics run with no trouble found. Run diagnostics after each FRU is exchanged. Go to Verify a repair.
Yes If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.
 - **PFW1548-16**
Does the system have adapters or devices that require supplemental media?
No Go to step the next step.
Yes Go to step PFW1548-18.
 - **PFW1548-17**
Consult the PCI adapter configuration documentation for your operating system to verify that all adapters are configured correctly.
Go to Verify a repair.
If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.
 - **PFW1548-18**
 1. Select **Task Selection**.
 2. Select **Process Supplemental Media** and follow the on-screen instructions to process the media. Supplemental media must be loaded and processed one at a time.Did the system return to the TASKS SELECTION SCREEN after the supplemental media was processed?
No Go to the next step.
Yes Press F3 to return to the FUNCTION SELECTION screen. Go to step PFW1548-14, substep 4 on page 206.
 - **PFW1548-19**
The adapter or device is probably defective.
If the supplemental media is for an adapter, replace the FRUs in the following order:
 1. Adapter
 2. System backplane, location: Un-P1.If the supplemental media is for a device, replace the FRUs in the following order:
 1. Device and any associated cables
 2. The adapter to which the device is attachedRepeat this step until the defective FRU is identified or all the FRUs have been exchanged.
If the symptom did not change and all the FRUs have been exchanged, call service support for assistance.
If the symptom has changed, check for loose cards, cables, and obvious problems. If you do not find a problem, go to the Problem Analysis procedures and follow the instructions for the new symptom.
Go to Verify a repair.
This ends the procedure.

SAS fabric identification

Use this information to determine the FRUs to replace when there is a SAS fabric connection problem.

Determine if the connection problem is with a single device or multiple devices. For Linux operating systems, see Viewing SAS fabric path information to view the status of SAS fabric paths.

Table 22. Service actions for SAS fabric connection problems

Location of device or devices	Connection problem with a tape device	Connection problem with a single device other than a tape device	Connection problem with multiple devices
8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	<p>Replace the following FRUs, one at a time, in the order shown until the problem is resolved. See 8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T locations to determine the location, part number, and replacement procedure to use for each FRU.</p> <ol style="list-style-type: none"> 1. Tape device at location Un-P1-D1 or Un-P1-D2. 2. System backplane (CCIN 2B2C, 2B2D, 2B4A, or 2B4B) at location Un-P1. 	<p>Replace the following FRUs, one at a time, in the order shown until the problem is resolved. See 8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T locations to determine the location, part number, and replacement procedure to use for each FRU.</p> <ol style="list-style-type: none"> 1. Device at location Un-P3-Dx. 2. Device backplane (CCIN 2BD7 or 2BE7) at location Un-P3. 3. Device backplane interposer (CCIN 2D1E or 2D1F) at location Un-P2. 4. Replace the adapter that logged the error. The adapter might be any of the following possible failing items: <ul style="list-style-type: none"> • System backplane (CCIN 2B2C, 2B2D, 2B4A, or 2B4B) at location Un-P1. • RAID adapter (CCIN 2B4C) at location Un-P1-C18. 	<p>Replace the following FRUs, one at a time, in the order shown until the problem is resolved. See 8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T locations to determine the location, part number, and replacement procedure to use for each FRU.</p> <ol style="list-style-type: none"> 1. Device backplane (CCIN 2BD7 or 2BE7) at location Un-P3. 2. Device backplane interposer (CCIN 2D1E or 2D1F) at location Un-P2. 3. Replace the adapter that logged the error. The adapter might be any of the following possible failing items: <ul style="list-style-type: none"> • System backplane (CCIN 2B2C, 2B2D, 2B4A, or 2B4B) at location Un-P1. • RAID adapter (CCIN 2B4C) at location Un-P1-C18.
Disk expansion unit attached to an 8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T	Not applicable	Replace the device located in the disk expansion drawer. If that does not resolve the problem, see the service information for the disk expansion unit for additional FRUs to replace.	Replace the cables to the disk expansion unit. If that does not resolve the problem, see the service information for the disk expansion unit for additional FRUs to replace.

SAS RAID configurations

Use this information to determine which configurations are valid on the 8246-L1C, 8246-L1D, 8246-L1S, 8246-L1T, 8246-L2C, 8246-L2D, 8246-L2S, or 8246-L2T.

Select the system that you are servicing.

- System models with feature code EJ0D
- System models with feature code EJ0E
- System models with feature code EJ0F

Systems with feature code EJ0D

System models with feature code EJ0D have the following configuration. See the following figure.

- Six disk drives and one DVD drive
- System backplane CCIN 2B2C, 2B2D, 2B4A, or 2B4B contains JBOD and RAID-0, 10 storage controller CCIN 57C7
- Interposer CCIN 2D1E
- Disk drive backplane CCIN 2BD7

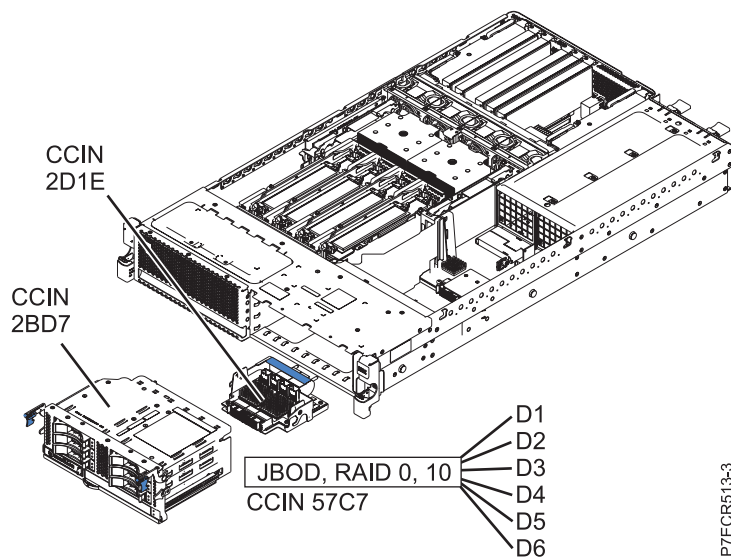


Figure 1. Systems with feature code EJ0D configuration

Systems with feature code EJ0E

System models with feature code EJ0E have the following configuration. See the following figure.

- Three disk drives and one tape or DVD drive
- System backplane CCIN 2B2C, 2B2D, 2B4A, or 2B4B contains JBOD and RAID-0, 10 storage controller CCIN 57C7
- Interposer CCIN 2D1E
- Disk drive backplane CCIN 2BE7
- No dual storage I/O adapter (no HA RAID mode)

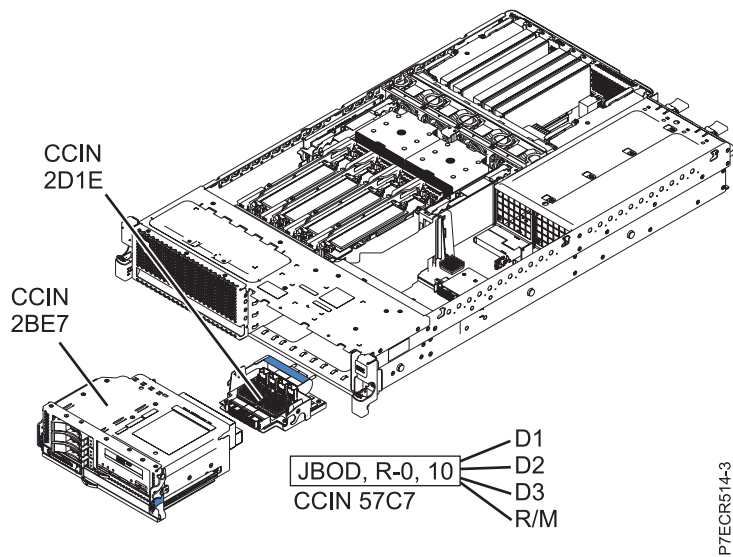


Figure 2. Systems with feature code EJ0E configuration

Systems with feature code EJ0F

System models with feature code EJ0F have the following configuration. See the following figure.

- Six disk drives and one DVD drive
- CCIN 2BCF and CCIN 57CB for RAID or cache enablement
- RAID and cache storage controller CCIN 2B4C
- Interposer CCIN 2D1F
- Disk drive backplane CCIN 2BD7

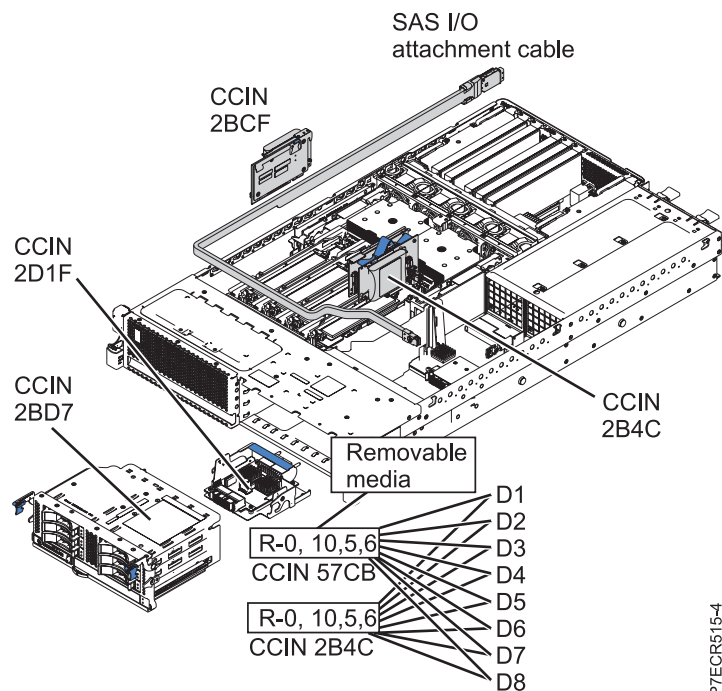


Figure 3. Systems with feature code EJ0F configuration

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European Community contact:
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Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse A

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:
International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
Tel: 914-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:
IBM Deutschland GmbH
Technical Regulations, Abteilung M372
IBM-Allee 1, 71139 Ehningen, Germany
Tel: +49 7032 15 2941
email: lugi@de.ibm.com

Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

Electromagnetic Interference (EMI) Statement - Russia

ВНИМАНИЕ! Настоящее изделие относится к классу А.
В жилых помещениях оно может создавать
радиопомехи, для снижения которых необходимы
дополнительные меры

Class B Notices

The following Class B statements apply to features designated as electromagnetic compatibility (EMC) Class B in the feature installation information.

Federal Communications Commission (FCC) statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an IBM-authorized dealer or service representative for help.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Proper cables and connectors are available from IBM-authorized dealers. IBM is not responsible for

any radio or television interference caused by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate this equipment.

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

Industry Canada Compliance Statement

This Class B digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

European Community Compliance Statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

This product has been tested and found to comply with the limits for Class B Information Technology Equipment according to European Standard EN 55022. The limits for Class B equipment were derived for typical residential environments to provide reasonable protection against interference with licensed communication equipment.

European Community contact:
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VCCI Statement - Japan

この装置は、クラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをして下さい。 VCCI-B

Japanese Electronics and Information Technology Industries Association (JEITA) Confirmed Harmonics Guideline (products less than or equal to 20 A per phase)

高調波ガイドライン適合品

**Japanese Electronics and Information Technology Industries Association (JEITA)
Confirmed Harmonics Guideline with Modifications (products greater than 20 A per
phase)**

高調波ガイドライン準用品

IBM Taiwan Contact Information

台灣IBM 產品服務聯絡方式：
台灣國際商業機器股份有限公司
台北市松仁路7號3樓
電話：0800-016-888

Electromagnetic Interference (EMI) Statement - Korea

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Germany Compliance Statement

**Deutschsprachiger EU Hinweis: Hinweis für Geräte der Klasse B EU-Richtlinie zur
Elektromagnetischen Verträglichkeit**

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse B ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der IBM empfohlene Kabel angeschlossen werden. IBM übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung von IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung von IBM gesteckt/eingebaut werden.

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**Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von
Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse B**

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Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse B.

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