

AIX Diagnostics and Service Aids

ESCALA Power7



REFERENCE
86 A1 61FF 03

ESCALA Power7

AIX Diagnostics and Service Aids

This publication concerns the following models:

- Bull Escala E5-700 (Power 750 / 8233-E8B)
- Bull Escala M6-700 (Power 770 / 9117-MMB)
- Bull Escala M7-700 (Power 780 / 9179-MHB)
- Bull Escala E1-700 (Power 710 / 8231-E2B)
- Bull Escala E2-700 / E2-700T (Power 720 / 8202-E4B)
- Bull Escala E3-700 (Power 730 / 8231-E2B)
- Bull Escala E4-700 / E4-700T (Power 740 / 8205-E6B)

References to Power 755 / 8236-E8C models are irrelevant.

Hardware

May 2011

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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.

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Several countries require the safety information contained in product publications to be presented in their national languages. If this requirement applies to your country, a safety information booklet is included in the publications package shipped with the product. The booklet 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 in the booklet. You should also refer to the booklet any time you do not clearly understand any safety information in the U.S. English publications.

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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)

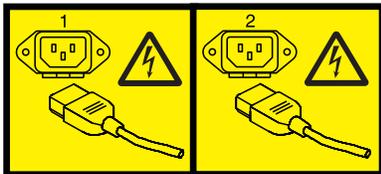
(L001)



(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)

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.

AIX diagnostics and service aids

AIX[®] diagnostic programs run on logical partitions that are running the AIX operating system. These diagnostic programs are also known as *AIX online diagnostics*. Tasks and service aids perform specific AIX diagnostic functions on the different resources contained within a system.

Because the AIX online diagnostics are always available in an AIX partition, they have the advantage of keeping error log files as long as the operating system is running. This enables the online diagnostics to analyze the error logs to help pinpoint any hardware problems without shutting down the partition. With concurrent maintenance capabilities of the hardware, many repairs can be made concurrently and system users can continue their work without interruption.

For partitions that run an operating system other than the AIX operating system, the hardware stand-alone diagnostics are available on a CD that is included with system unit hardware. The stand-alone diagnostics can be booted from a CD or if there is no CD drive available to a partition, the diagnostics also can be loaded from a Network Installation Management (NIM) server.

AIX fast-path problem isolation

Contains an AIX diagnostic troubleshooting table that quickly links you to diagnostic procedures such as maintenance analysis procedures (MAPs) and service aids.

In most cases, AIX diagnostics are performed through automatic error log analysis. In some cases, these procedures direct you to run online diagnostics. Stand-alone diagnostics should only be used if you are unable to boot AIX or are otherwise specifically directed to do so.

Notes:

1. If the server or partition has an external SCSI disk drive enclosure attached and you have not been able to find a reference code or other symptom, go to Start of Call.
If you already know the reference code or have another symptom other than a reference code, go directly to the "AIX fast path table" on page 2.

Use the following procedure to display or confirm a previously reported reference code including an SRN.

1. Log into the AIX operating system as the root user, or use the CE login. If you need assistance, contact the system operator.
2. Enter the **diag** command. The diag command allows you to load the diagnostic controller and display the online diagnostic menus.
3. Press **Enter**. This opens the **FUNCTION SELECTION** menu.
4. Select **Task Selection**.
5. Select **Display Previous Diagnostic Results**.
6. Select **DISPLAY DIAGNOSTIC LOG SUMMARY**. A display diagnostic log summary table is shown with a time ordered table of events from the error log.
7. Look for the most recent **S** entry in the **T** column. The most recent **S** entry is the one closest to the beginning of the **DISPLAY DIAGNOSTIC LOG SUMMARY** table.
8. Move your cursor over the row containing the **S** entry and press **Enter**.
9. Press **F7** to **Commit**.
A screen containing details from the table is displayed; look for the reference code (SRN or SRC) entry. The SRN or SRC entry is shown near the bottom of the screen.
10. Record the reference code.

The following example, which shows the details of an SRN, is similar to what you should see on your terminal when you perform the above procedure.

```

DISPLAY DIAGNOSTIC LOG                               802004
[TOP]
-----
IDENTIFIER:          DAFE

Date/Time:           Fri Aug 27 17:57:54
Sequence Number:     952
Event type:          SRN Callout

Resource Name:       ent1
Resource Description: Gigabit Ethernet-SX Adapter (e414a816)
Location:            U8842.P1Z.23A0781-P1-T7

Diag Session:        21546
Test Mode:           No Console,Non-Advanced,Normal IPL,ELA,Option Checkout

Error Log Sequence Number: 2189
Error Log Identifier:     6363CE4F

SRN:                  25C4-601

Description:          Download Firmware Error.

Probable FRUs:
  ent1                FRU: BCM95704A41          U8842.P1Z.23A0781-P1-T7
                    Gigabit Ethernet-SX Adapter (e414a816)
-----
[BOTTOM]
Use Enter to continue.

Esc+3=Cancel      Esc+0=Exit      Enter
  
```

11. If any reference codes are displayed, record all information provided from the diagnostic results and go to Reference code finder.
OR
If a *no trouble found* is displayed continue to the next step.
12. When your results are complete, press **F3** to return to the Diagnostic Operating Instructions display.
13. Press **Ctrl + D** to log off from being either the root user or CE login user.

AIX fast path table

Locate the problem in the following table and perform the action indicated.

Symptoms	Action
Eight-Digit Error Codes	
You have an eight-digit error code.	Go to Reference code finder, and do the listed action for the eight-digit error code. Note: If the repair for this code does not involve replacing a FRU (for instance, if you run an AIX command that fixes the problem or if you change a hot-pluggable FRU), then run the Log Repair Action option on resource sysplanar0 from the Task Selection menu under online diagnostics after the problem is resolved to update the AIX error log.
If you need information on the use of SRNs, go to Service Request Numbers	

Symptoms	Action
You have an SRN.	Look up the SRN in the Reference code finder and do the listed action. Note: Customer-provided SRNs should be verified. To verify the SRN use the Display Previous Diagnostic Results Service Aid. Choose the Display Diagnostic Log Summary when running this service aid.
An SRN is displayed when running diagnostics.	<ol style="list-style-type: none"> 1. Record the SRN and location code. 2. Look up the SRN in the Reference code finder and do the listed action.
888 Sequence in Operator Panel Display	
An 888 sequence in the operator panel display.	Go to MAP 0070: 888 Sequence in operator panel display.
The System Stops or Hangs With a Value Displayed in the Operator Panel Display	
The system stopped with a 4-digit code that begins with a 2 (two) displayed in the operator panel display.	Record SRN 101-xxxx (where xxxx is the four digits of code displayed). The physical location code or device name displays on system units with a multiple-line operator panel display. If a physical location code or an AIX location code is displayed, record it, then look up the SRN in the Reference code finder and do the listed action.
The system stopped with a 3-digit code operator panel display.	Record SRN 101-xxx (where xxx is the three digits of the code displayed). Look up the SRN in the Reference code finder and do the listed action.
System Automatically Reboots	
System automatically reboots.	<ol style="list-style-type: none"> 1. Turn off the system unit power. 2. Turn on the system unit power and boot from a removable media device, disk, or LAN in service mode. 3. Run the diagnostics in problem determination mode. 4. Select the All Resources option from the Resource Selection menu to test all resources. 5. If an SRN displays, look up the SRN in the Reference code finder and do the listed action. 6. If an SRN is not displayed, suspect a power supply or power source problem.
System does not Reboot When Reset Button is Pushed	
System does not reboot (reset) when the reset button is pushed.	Record SRN 111-999. Look up the SRN in the Reference code finder and do the listed action.
ASYNC Communication Problems	
You suspect an async communication problem.	<ol style="list-style-type: none"> 1. Run the advanced async diagnostics on the ports on which you are having problems. If an SRN is displayed, look up the SRN in the Reference code finder and do the listed action.
SCSI Adapter Problems	

Symptoms	Action
<p>You suspect a SCSI adapter problem.</p> <p>SCSI adapter diagnostics can only be run on a SCSI adapter that was not used for booting. The POST tests any SCSI adapter before attempting to use it for booting. If the system was able to boot using a SCSI adapter, then the adapter is most likely good.</p> <p>SCSI adapters problems are also logged into the error log and are analyzed when the online SCSI diagnostics are run in problem determination mode. Problems are reported if the number of errors is above defined thresholds.</p>	<ol style="list-style-type: none"> 1. Run the online SCSI adapter diagnostic in problem determination mode. If an SRN is displayed, look up the SRN in the Reference code finder and do the listed action. 2. Use MAP 0050: SCSI bus problems. Note: If you cannot load diagnostics (stand-alone or online) go to MAP1540: Problem isolation procedures.
SCSI Bus Problems	
<p>You suspect a SCSI bus problem.</p>	<ol style="list-style-type: none"> 1. Use MAP 0050: SCSI bus problems. 2. Use the SCSI Bus Service Aid to exercise and test the SCSI Bus.
Tape Drive Problems	
<p>You suspect a tape drive problem.</p>	<ol style="list-style-type: none"> 1. Refer to the tape drive documentation and clean the tape drive. 2. Refer to the tape drive documentation and do any listed problem determination procedures. 3. Run the online advanced tape diagnostics in problem determination mode. If an SRN is displayed, look up the SRN in the Reference code finder and do the listed action. 4. Use the Backup and restore service aid to exercise and test the drive and media. 5. Use MAP 0050: SCSI bus problems. 6. Use the SCSI bus service aid to exercise and test the SCSI bus. 7. Refer to MAP 0020: Problem determination procedure for problem determination procedures. <p>Note: Information on tape cleaning and tape-problem determination can be found in Tape unit isolation procedures.</p>
Optical Drive Problems	

Symptoms	Action
<p>You suspect a optical drive problem.</p>	<ol style="list-style-type: none"> 1. Perform the problem determination procedures in the optical drive documentation. 2. Before servicing a optical drive ensure that it is not in use and that the power connector is correctly attached to the drive. If the load or unload operation does not function, replace the optical drive. 3. Run the online advanced optical diagnostics in problem determination mode. If an SRN is displayed, look up the SRN in the Reference code finder and do the listed action. 4. If the problem is with a SCSI optical drive, use MAP 0050: SCSI bus problems. 5. If the problem is with a SCSI optical drive, use the SCSI bus service aid to exercise and test the SCSI bus. 6. Refer to MAP 0020: Problem determination procedure for problem determination procedures.
SCSI Disk Drive Problems	
<p>You suspect a disk drive problem.</p> <p>Disk problems are logged in the error log and are analyzed when the online disk diagnostics are run in problem determination mode. Problems are reported if the number of errors is above defined thresholds.</p> <p>If the diagnostics are booted from a disk, then the diagnostics can only be run on those drives that are not part of the root volume group. However, error log analysis is run if these drives are selected. To run the disk diagnostic tests on disks that are part of the root volume group, the stand-alone diagnostics must be used.</p>	<ol style="list-style-type: none"> 1. Run the online advanced disk diagnostics in problem determination mode. If an SRN is displayed, look up the SRN in the Reference code finder and do the listed action. 2. Run stand-alone diagnostics. If an SRN is displayed, look up the SRN in the Reference code finder and do the listed action. 3. Use the certify disk service aid to verify that the disk can be read. 4. Use MAP 0050: SCSI bus problems. 5. Use the SCSI bus service aid to exercise and test the SCSI Bus. 6. Refer to MAP 0210: General problem resolution for problem determination procedures.
<p>Identify LED does not function on the drive plugged into the SES or SAF-TE backplane.</p>	<p>Use the "identify a device attached to a SES device" service aid listed under SCSI and SCSI RAID Hot-Plug Manager on the suspect drive LED. If the drive LED does not blink when put into the identify state, use FFC 2D00 and SRN source code "B" and go to read the notes on the first page,.</p>
<p>Activity LED does not function on the drive plugged into the SES or SAF-TE backplane.</p>	<p>Use the certify media service aid (see certify media) on the drive in the slot containing the suspect activity LED. If the activity LED does not intermittently blink when running certify, use FFC 2D00 and SRN source code "B" and go to MAP 0210: General problem resolution.</p>
Diskette Drive Problems	
<p>You suspect a diskette drive problem.</p>	<ol style="list-style-type: none"> 1. Run the diskette drive diagnostics. If an SRN is displayed, look up the SRN in the Reference code finder and do the listed action. 2. Use the diskette media service aid to test the diskette media. 3. Use the backup/restore media service aid to exercise and test the drive and media.
Token-Ring Problems	

Symptoms	Action
You suspect a token-ring adapter or network problem.	<ol style="list-style-type: none"> 1. Run the online advanced token-ring diagnostics in problem determination mode. If an SRN is displayed, look up the SRN in the Reference code finder and do the listed action. 2. Use the ping command to exercise and test the network. 3. Refer to MAP 0020: Problem determination procedure for additional information and problem determination procedures.
Ethernet Problems	
You suspect an Ethernet adapter or network problem.	<ol style="list-style-type: none"> 1. Run the online advanced Ethernet diagnostics in problem determination mode. If an SRN is displayed, look up the SRN in the Reference code finder and do the listed action. 2. Use the ping command to exercise and test the network. 3. Refer to MAP 0020: Problem determination procedure. for additional information and problem determination procedures.
Display Problems	
You suspect a display problem.	<ol style="list-style-type: none"> 1. If you are using the Hardware Management Console, go to the Managing the HMC section. 2. If you are using a graphics display: <ol style="list-style-type: none"> a. Go to the problem determination procedures for the display. b. If you do not find a problem: <ul style="list-style-type: none"> • Replace the graphics display adapter. • Replace the backplane into which the graphics display adapter is plugged.
Keyboard or Mouse	
You suspect a keyboard or mouse problem.	<p>Run the device diagnostics. If an SRN is displayed, look up the SRN in the Reference code finder and do the listed action.</p> <p>If you are unable to run diagnostics because the system does not respond to the keyboard, replace the keyboard or system planar.</p> <p>Note: If the problem is with the keyboard it could be caused by the mouse device. To check, unplug the mouse and then recheck the keyboard. If the keyboard works, replace the mouse.</p>
Printer and TTY Problems	

Symptoms	Action
You suspect a TTY terminal or printer problem.	<ol style="list-style-type: none"> 1. Go to problem determination procedures for the printer or terminal. 2. Check the port that the device is attached to by running diagnostics on the port. If an SRN is displayed, look up the SRN in the Reference code finder and do the listed action. 3. If a problem exists, replace the following in the order listed: <ol style="list-style-type: none"> a. Device cable b. Port to which the printer or terminal is connected.
Other Adapter Problems	
You suspect a problem on another adapter that is not listed above.	<ol style="list-style-type: none"> 1. Run the online advanced diagnostics in problem determination on the adapter you suspect. If an SRN is displayed, look up the SRN in the Reference code finder and do the listed action. 2. Refer to MAP 0020: Problem determination procedure. for additional information and problem determination procedures.
System Messages	
A system message is displayed.	<ol style="list-style-type: none"> 1. If the message describes the cause of the problem, attempt to correct it. 2. Look for another symptom to use.
Processor and Memory Problems	
<p>You suspect a memory problem.</p> <p>Memory tests are only done during POST. Only problems that prevent the system from booting are reported during POST. All other problems are logged and analyzed when the sysplanar0 option under the advanced diagnostics selection menu is run.</p> <p>System crashes are logged in the AIX error log. The sysplanar0 option under the advanced diagnostic selection menu is run in problem determination mode to analyze the error.</p>	<ol style="list-style-type: none"> 1. Power off the system. 2. Turn on the system unit power and load the online diagnostics in service mode. 3. Run either the sysplanar0 or the Memory option under the advanced diagnostics in problem determination mode. 4. If an SRN is displayed, record the SRN and location code. 5. Look up the SRN in the Reference code finder and do the listed action.
Degraded Performance or Installed Memory Mismatch	
Degraded performance or installed memory mismatch	<p>Degraded performance can be caused by memory problems that cause a reduction in the size of available memory. To verify that the system detected the full complement of installed memory do the following:</p> <ol style="list-style-type: none"> 1. From the task selection menu select the Display Resource Attribute. 2. From the resource selection menu select one of the listed memory resources. 3. Verify the amount of memory listed matches the amount actually installed. 4. Use the service processor (ASMI) menus to see if the memory has been removed (garded out of) the system's configuration by the system or an administrator.
Missing Resources	

Symptoms	Action
Missing resources	Use the Display Configuration and Resource List or Vital Product Data (VPD) Service Aid to verify that the resource was configured. If an installed resource does not appear, check that it is installed correctly. If you do not find a problem, go to MAP 0020: Problem determination procedure.
Missing Path on MPIO Resource	
Missing path on MPIO resource	If a path is missing on an MPIO resource, shown as the letter P in front of the resource in the resource listing, go to MAP 0020: Problem determination procedure.
System Hangs or Loops When Running the OS or Diagnostics	
The system hangs in the same application.	Suspect the application. To check the system: <ol style="list-style-type: none"> 1. Power off the system. 2. Turn on the system unit power and load the online diagnostics in service mode. 3. Select the All Resources option from the resource selection menu to test all resources. 4. If an SRN is displayed at anytime, record the SRN and location code. 5. Look up the SRN in the Reference code finder and do the listed action.
The system hangs in various applications.	<ol style="list-style-type: none"> 1. Power off the system. 2. Turn on system unit power and load the online diagnostics in service mode. 3. Select the All Resources option from the resource selection menu to test all resources. 4. If an SRN is displayed at anytime, record the SRN and location code. 5. Look up the SRN in the Reference code finder and do the listed action.
The system hangs when running diagnostics.	Replace the resource that is being tested.
You Cannot Find the Symptom in This Table	
All other problems.	Go to MAP 0020: Problem determination procedure.
Exchanged FRUs Did Not Fix the Problem	
A FRU or FRUs you exchanged did not fix the problem.	Go to MAP 0020: Problem determination procedure.
RAID Problems	
You suspect a problem with a RAID.	A potential problem with a RAID adapter exists. Run diagnostics on the RAID adapter. Refer to the Overview of the SAS RAID controller for AIX.
System Date and Time Problems	

Symptoms	Action
<ul style="list-style-type: none"> The system does not retain the calendar date after the system has been booted. The system does not retain the time of day after the system has been booted. 	<ol style="list-style-type: none"> Run the sysplanar0 option under the advanced diagnostics in problem determination mode. If an SRN is reported, record the SRN and location code information. Look up the SRN in the Reference code finder and do the listed action. Replace the TOD (NVRAM) battery. If this does not fix the problem, replace the service processor; its location is model-dependent.
SSA Problems	
You suspect an SSA problem.	A potential problem with an SSA adapter exists. Run the SSA service aid. To perform a service aid see AIX service aids and follow the instructions.
Power Indicator Light is Not On	
A drawer power indicator is not on.	Return to Start of Call.
System Power Problem	
The system does not power on.	Return to Start of Call.
The system powers on when it should not.	Return to Start of Call.

Working with AIX diagnostics

Working with AIX diagnostics includes diagnostic information specific to the AIX operating system and diagnostic utilities that are included with the operating system.

Use “General AIX diagnostic information” on page 10 when you need information about the following subtopics:

- AIX operating system message files
- Firmware and microcode
- CERADME file
- CE login
- Automatic diagnostic tests
- CPU and memory testing and error log analysis
- Diagnostic programs
- Periodic diagnostics
- Automatic error log analysis (diagela)
- Log repair action
- System fault indicator and system identify indicator
- Array bit steering
- Enhanced I/O error handling

Use “AIX tasks and service aids” on page 29 when you need information about the following tasks or service aids:

- Add resource to resource list
- AIX Shell Prompt
- Analyze Adapter Internal Log
- Backup and Restore Media
- Certify Media
- Change Hardware Vital Product Data
- Configure Dials and LPF Keys

- Configure ISA Adapters
- Configure Reboot Policy
- Configure Service Processor (RSPC)
- Configure Scan Dump Policy
- Delete Resource from Resource List
- Disk Maintenance
- Display Configuration and Resource List
- Display Firmware Device Node Information
- Display Hardware Error Report
- Display Hardware Vital Product Data
- Display Machine Check Error Log
- Display Microcode Level
- Display Multipath I/O (MPIO) Device Configuration
- Display or Change Bootlist
- Display or Change Diagnostic Run Time Options
- Display Previous Diagnostic Results
- Display Resource Attributes
- Display Service Hints
- Display Software Product Data
- Display System Environmental Sensors
- Display Test Patterns
- Display USB Devices
- Download Microcode
- Fibre Channel RAID Service Aids
- Flash SK-NET FDDI Firmware
- Format Media
- Gather System Information
- Generic Microcode Download
- Hot Plug Task
- Identify Indicators
- Identify and Remove Resource Task
- Identify and System Attention Indicators
- Local Area Network Analyzer
- Log Repair Action
- PCI SCSI Disk Identify Array Manager
- PCI RAID Physical Disk Identify
- Process Supplemental Media
- Run Diagnostics
- Run Error Log Analysis
- Save or Restore Service Processor Configuration (RSPC)
- SCSI Bus Analyzer
- SCSI RAID Physical Disk Status and Vital Product Data
- SCSD Tape Drive Service Aid
- Spare Sector Availability
- SSA Service Aid
- System Fault Indicator
- System Identify Indicator
- Update Disk-Based Diagnostics
- Update System or Service Processor Flash
- Update System Flash (RSPC)
- 7318 Serial Communication Network Server

General AIX diagnostic information

Contains AIX diagnostic information such as tests, logs and diagnostic service utilities designed to help the service provider service a system using AIX as its operating system.

Information in this section is common to all system units. Diagnostic procedures that are specific to a certain system unit or device are in the service information for that system unit or device.

AIX operating system message files

English is the default language displayed by the diagnostic programs when run from disk. If you want to run the diagnostic programs in a language other than English, you must install on the system the AIX operating system message locale files for the desired language that you want displayed.

Firmware and microcode

There are several types of firmware used by the system:

- Power subsystem firmware (if applicable)
- Service power control network (SPCN) firmware (if applicable)
- Service processor firmware (if applicable)
- System firmware

The following types of microcode are used by the system:

- Adapter microcode
- Device microcode

If an HMC is attached to the server, the HMC should be used to manage the server's firmware and microcode levels.

If an HMC is not attached to the server, AIX diagnostic tasks can be used to display device and adapter microcode levels as well as update device and adapter microcode. AIX diagnostic tasks also provide the capability to update firmware.

To determine the level of server firmware, and device and adapter microcode, use the Display Microcode Level task in AIX diagnostic service aids. This task presents a list of resources that are currently installed and supported by this task; you then select the resource whose microcode level you wish to check. The **lsmcode** command and the **diag** command can also be used to display the firmware and microcode levels of individual entities in the system from the AIX command line; for additional information, refer to Display Microcode Level. For adapters and devices not supported by this task, refer to the manufacturer's instructions to determine the microcode levels.

Use the Update and manage system flash task to update a server's firmware. When the flash update is complete, the server automatically reboots. Refer to "Updates" on page 18 for detailed scenarios that explain how to use the update and manage system flash task.

Use the Download microcode service aid on systems running AIX 5.2.0.30 or later to update the microcode on adapters and devices. For details on updating adapter and device microcode, refer to "Updates" on page 18.

For systems that are running only the Linux operating system, the stand-alone diagnostics booted from CD-ROM or a NIM server contain service aids that can be used to update most system flash, adapter and device microcode.

CEREADME file

A CEREADME (CE readme) file is available on all diagnostic media. This file may contain information such as:

- Errata information for the service information
- Service hints for problems
- Diagnostic information that may not be included in service information

- Other pertinent (usually release-specific) information

The CEReadME file is helpful in describing differences in diagnostics between the current version and the preceding version.

You can view the CEReadME file by using the Service Hints service aid after the diagnostics are loaded. Also, you can read the file directly from the disk using the AIX **pg** command to display **/usr/lpp/diagnostics/CEReadME**. The CEReadME file can be copied or printed using the normal commands. For information about using the service hints, refer to Display Service Hints.

Printing the CEReadME file from disk

You can print the CEReadME file from disk using the **cat** command. The path to this file is as follows: **/usr/lpp/diagnostics/CEReadME**

A copy of this file should be printed and stored with the Service Information. **lp0** is normally the printer attached to the parallel port. If a printer is attached to the parallel port and is considered as **lp0**, the command for printing the file is as follows:

```
cat /usr/lpp/diagnostics/CEReadME > /dev/lp0
```

Printing the CEReadME file from a source other than disk

The CEReadME file cannot be printed while diagnostics are being executed from a source other than from the disk. The file can be printed on a system when the AIX operating system is running in a normal user environment. The procedure involves copying the file from the diagnostic media to a temporary file on disk, printing the file, and then deleting the file from disk. Check for directory **/tmp/diag**. To determine if this directory already exists, enter:

```
cd /tmp/diag
```

If the directory does not exist, the message **/tmp/diag: not found** displays. *Do not* attempt to print the CEReadME file if this message is not displayed. To print the CEReadME file, choose the appropriate section below and follow the steps listed.

Printing the CEReadME file from CD-ROM

Insert the diagnostic CD-ROM disc into the CD-ROM drive, and then enter the following commands:

```
mkdir /tmp/diag
mount -o ro -v cdrfs /dev/cd0 /tmp/diag
cd /tmp/diag/usr/lpp/diagnostics
cat CEReadME > /dev/lp0
cd /tmp
unmount /dev/cd0
```

The CEReadME file prints on **lp0**, which is the printer normally attached to the parallel port. If this file is not the same as the CEReadME file on the disk, a copy of this file should be printed and stored with the Service Information.

CE login

CE login enables a user to perform operating system commands that are required to service the system without being logged in as a root user. CE login must have a role of **RunDiagnostics** and a primary group of **system**. This enables the user to:

- Run the diagnostics including the service aids, such as hot plug tasks, certify, format, and so forth.
- Run all the operating system commands run by **system** group users.
- Configure and unconfigure devices that are not busy.

In addition, CE login can have **shutdown** group enabled to allow:

- Use of the Update System Microcode service aid.
- Use of shutdown and reboot operations.

To use CE login, ask the customer to create a unique user name and configure these characteristics for that name.) After this is set up, you will need to obtain the user name and password from the customer to log in with these capabilities. The recommended CE login user name is **qserv**.

Automatic diagnostic tests

All automatic diagnostic tests run after the system unit is turned on and before the AIX operating system is loaded.

The automatic diagnostic tests display progress indicators (or checkpoints) to track test progress. If a test stops or hangs, the checkpoint for that test remains in the display to identify the unsuccessful test. The descriptions of these tests are contained in Reference code finder.

Power-on self-test

Power-On Self-Test (POST) programs check the devices needed to accomplish an initial program load. The POST also checks the memory, and portions of the central electronics complex, common interrupt handler, and the direct memory access (DMA) handler.

Configuration program

The configuration program determines which features, adapters, and devices are present on the system. The configuration program, which is part of the AIX operating system, builds a configuration list that is used by the diagnostic programs to control which tests are run during system checkout.

On systems running AIX, the configuration program displays numbers between 2E6 through 9FF and 2300 through 27FF in the operator panel display (if present). Refer to Reference code finder for a listing of program actions associated with displayed numbers. On systems running logical partitions, LPAR displays in the operator panel (if present) after the hypervisor (the system firmware that controls the allocation of resources) is loaded. When a partition running AIX is subsequently booted, the configuration codes display on the Reference code column in the HMC Contents area.

Devices attached to serial and parallel ports are not configured. The Dials and Lighted Program Function Keys (LPFKs) can be tested from online diagnostics after they are manually configured. No other device attached to the serial and parallel ports is supported by the diagnostics.

CPU and memory testing and error log analysis

Except for the floating-point tests, all CPU and memory testing on the system units are done by POST and BIST. Memory is tested entirely by the POST. The POST provides an error-free memory MAP. If POST cannot find enough good memory to boot, it halts and displays an error message. If POST finds enough good memory, the memory problems are logged and the system continues to boot.

If any memory errors were logged, they are reported by the base system or memory diagnostics, which must be run to analyze the POST results.

The CPU and memory cannot be tested after the AIX diagnostics are loaded; however, they are monitored for correct operation by various checkers such as processor runtime diagnostics.

Single-bit memory errors are corrected by ECC (Error Checking and Correction) on systems equipped with ECC memory.

Diagnostic programs

This section provides overview of the various diagnostic programs.

Diagnostic controller

The diagnostic controller runs as an application program on the AIX operating system. The diagnostic controller carries out the following functions:

- Displays diagnostic menus
- Checks availability of needed resources
- Checks error log entries under certain conditions
- Loads diagnostic application programs
- Loads task and service aid programs
- Displays test results

To test an adapter or device, select the device or adapter from the diagnostic selection menu. The diagnostic controller then loads the diagnostic application program for the selected device or adapter.

The diagnostic application program loads and runs test units to check the functions of the device or adapter.

The diagnostic controller checks the results of the tests done by the diagnostic application and determines the action needed to continue the testing.

The amount of testing that the diagnostic application does depends on the mode (service, maintenance, or concurrent) under which the diagnostic programs are running.

Error log analysis

When you select **diagnostics** or **advanced diagnostics**, the diagnostic selection menu displays (other menus may display before this menu). This menu allows you to select the purpose for running diagnostics.

When you select the **problem determination** option, the diagnostic programs read and analyze the contents of the error log.

Note: Most hardware errors in the operating system error log contain *sysplanar0* as the resource name. The resource name identifies the resource that detected the error; it does not indicate that the resource is faulty or should be replaced. Use the resource name to determine the appropriate diagnostic to analyze the error.

If the error log contains recent errors (approximately the last 7 days), the diagnostic programs automatically select the diagnostic application program to test the adapter or device that the error was logged against.

If there are no recent errors logged or the diagnostic application program runs without detecting an error, the diagnostic selection menu is displayed. This menu allows you to select a resource for testing.

If an error is detected while the diagnostic application program is running, the A PROBLEM WAS DETECTED screen displays a Service Request Number (SRN).

Note: After a FRU is replaced based on an error log analysis program, the error log entries for the problem device must be removed or the program may continue to indicate a problem with the device. To

accomplish this task, run the **errclear** command from the command line, or use System Management Interface Tool (SMIT) to select **Problem Determination/Error Log/Clear the Error Log**. Fill out the appropriate menu items.

Enhanced FRU isolation

The diagnostics provide enhanced Field Replaceable Unit (FRU) isolation by automatically selecting associated resources. The typical way in which diagnostics select a resource is to present a list of system resources, and you are then asked to select one. Diagnostics begin with that same type of selection.

If the diagnostic application for the selected resource detects a problem with that resource, the diagnostic controller checks for an associated resource. For example, if the test of a disk drive detects a problem, the diagnostic controller tests a sibling device on the same controller to determine if the drive or the controller is failing. This extra FRU isolation is apparent when you test a resource and notice that the diagnostic controller continues to test another resource that you did not select.

Advanced diagnostics function

The advanced diagnostics function are normally used by a service representative. These diagnostics may ask you to disconnect a cable and install a wrap plug.

The advanced diagnostics run in the same modes as the diagnostics used for normal hardware problem determination. The advanced diagnostics provide additional testing by allowing the service representative to do the following:

- Use wrap plugs for testing.
- Loop on a test (not available in concurrent mode) and display the results of the testing.

Task and service aid functions

If a device does not show in the test list or you think a device's diagnostic package is not loaded, check by using the display configuration and resource list task. If the device you want to test has a plus (+) sign or a minus (-) sign preceding its name, the diagnostic package is loaded. If the device has an asterisk (*) preceding its name, the diagnostic package for the device is not loaded or is not available.

Tasks and service aids provide a means to display data, check media, and check functions without being directed by the hardware problem determination procedure. Refer to AIX tasks and service aids for information and procedures about tasks and service aids.

System checkout

The system checkout program uses the configuration list generated by the configuration procedure to determine which devices and features to test. These tests run without interaction. To use system checkout, select **All Resources** on the resource selection menu.

Missing resource description

In diagnostics version earlier than 5.2.0, missing devices are presented on a missing resource screen. This happens as a result of running **diag -a** or by booting online diagnostics in service mode.

In diagnostics version 5.2.0 and later, missing devices are identified on the diagnostic selection screen by an uppercase M preceding the name of the device that is missing. The diagnostic selection menu is displayed anytime you run the diagnostic routines or the advanced diagnostics routines. The diagnostic selection menu can also be entered by running **diag -a** when there are missing devices or missing paths to a device.

When a missing device is selected for processing, the missing resource menu will ask whether the device has been turned off, removed from the system, moved to a different physical location, or if it is still present.

When a single device is missing, the fault is probably with that device. When multiple devices with a common parent are missing, the fault is most likely related to a problem with the parent device.

The diagnostic procedure may include testing the device's parent, analyzing which devices are missing, and any manual procedures that are required to isolate the problem.

Missing path resolution for MPIO resources

Diagnostics also identifies a multipath I/O device that has multiple configured paths, all of which are missing as a missing device. If some, but not all, paths to a multipath I/O device are missing, then diagnostics identifies those paths as missing. In such an instance, an uppercase P displays in front of the multipath I/O device.

When a device with missing paths is selected from the **diagnostic selection** menu, the **missing path selection** menu displays showing the missing paths for the device. The menu requests the user to select a missing path for processing. If the device has only one missing path, then the selection menu is bypassed. In either case, a menu is displayed showing the selected missing path and other available paths to the device (which may be missing or available). The menu asks if the missing path has been removed, has not been removed, or should be ignored. The procedures are as follows:

- If the **Path Has Been Removed** option is selected, diagnostics removes the path from the data base.
- If the **Path Has Not Been Removed** option is selected, diagnostics determines why the path is missing.
- If the **Run Diagnostics on the Selected Device** option is selected, diagnostics runs on the device and does not change the system configuration.

Automatic error log analysis (diagela)

Automatic Error Log Analysis (**diagela**) provides the capability to perform error log analysis when a permanent hardware error is logged, by enabling the **diagela** program on all platforms.

The **diagela** program determines if the error should be analyzed by the diagnostics. If the error should be analyzed, a diagnostic application is invoked and the error is analyzed. No testing is done if the diagnostics determine that the error requires a service action. Instead it sends a message to your console, and either the Service Management applications for systems with an HMC, or to all system groups. The message contains the SRN.

Running diagnostics in this mode is similar to using the **diag -c -e -d Device** command.

Notification can also be customized by adding a stanza to the **PDiagAtt** object class. The following example illustrates how a customer's program can be invoked in place of the normal mail message, or in addition to sending the message to the Service Management applications when there is an HMC:

```
PDiagAtt:
  DClass = " "
  DSClass = " "
  DType = " "
  attribute = "diag_notify"
  value = "/usr/bin/customer_notify_program $1 $2 $3 $4 $5"
  rep = "s"
```

If DClass, DSClass, and DType are blank, then the `customer_notify_program` applies for *all* devices. Filling in the DClass, DSClass, and DType with specifics causes the `customer_notify_program` to be invoked only for that device type.

After the above stanza is added to the ODM data base, problems are displayed on the system console and the program specified in the value field of the `diag_notify` predefined attribute is invoked. The following keyword is expanded automatically as arguments to the notify program:

- \$1 the keyword `diag_notify`
- \$2 the resource name that reported the problem
- \$3 the Service Request Number
- \$4 the device type
- \$5 the error label from the error log entry

In the case where no diagnostic program is found to analyze the error log entry, or analysis is done but no error was reported, a separate program can be specified to be invoked. This is accomplished by adding a stanza to the **PDiagAtt** object class with an attribute = **diag_analyze**. The following example illustrates how a customer's program can be invoked for this condition:

```
PDiagAtt:
  DClass = " "
  DSClass = " "
  DType= " "
  attribute = "diag_analyze"
  value = "/usr/bin/customer_analyzer_program $1 $2 $3 $4 $5"
  rep = "s"
```

If `DClass`, `DSClass`, and `DType` are blank, then the `customer_analyzer_program` applies for all devices. Filling in the `DClass`, `DSClass`, and `DType` with specifics causes the `customer_analyzer_program` to be invoked only for that device type.

After the above stanza is added to the ODM data base, the program specified is invoked if there is no diagnostic program specified for the error, or if analysis was done, but no error found. The following keywords expand automatically as arguments to the analyzer program:

- \$1 the keyword **diag_analyze**
- \$2 the resource name that reported the problem
- \$3 the error label from the error log entry if from ELA, the keyword `PERIODIC` if from Periodic Diagnostics, or the keyword `REMINDER` if from a Diagnostic Reminder.
- \$4 the device type
- \$5 the keywords:
 - **no_trouble_found** if the analyzer was run, but no trouble was found.
 - **no_analyzer** if the analyzer is not available.

To activate the automatic error log analysis feature, log in as root user (or use the CE login) and type the following command:

```
/usr/lpp/diagnostics/bin/diagela ENABLE
```

To disable the automatic error log analysis feature, log in as root user (or use the CE login) and type the following command:

```
/usr/lpp/diagnostics/bin/diagela DISABLE
```

The **diagela** program can also be enabled and disabled using the periodic diagnostic service aid.

Log repair action

The diagnostics perform error log analysis on most resources. The default time for error log analysis is seven days; however, this time can be changed from 1 to 60 days using the **display or change diagnostic run time options** task. To prevent false problems from being reported when error log analysis is run,

repair actions need to be logged whenever a FRU is replaced. A repair action can be logged by using the **log repair action** task or by running advanced diagnostics in system verification mode.

The log repair action task lists all resources. Replaced resources can be selected from the list, and when **commit** (F7 key) is selected, a repair action is logged for each selected resource.

Updates

Learn about obtaining machine code updates for your HMC, server firmware, I/O adapter and device, as well as operating system updates.

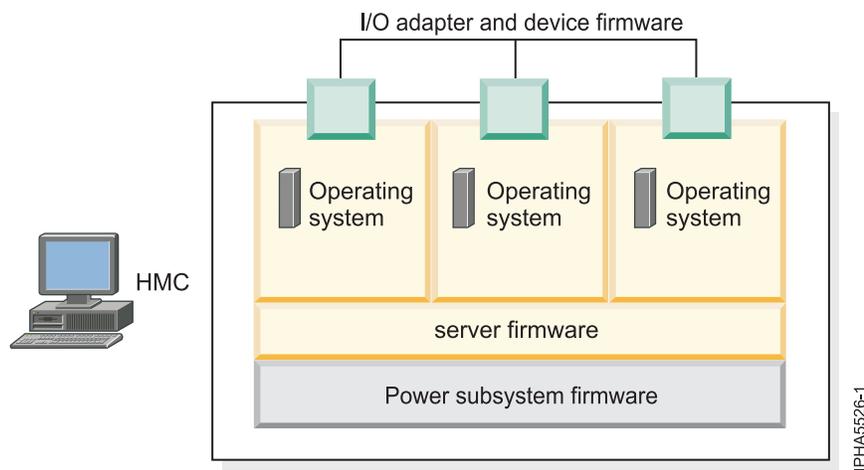
Updates provide changes to your software, Licensed Internal Code, or machine code that fix known problems, add new function, and keep your server or HMC operating efficiently. For example, you might install updates for your operating system in the form of a PTF (program temporary fix). Or, you might install a server firmware update with code changes that are needed to support new hardware or new functions of the existing hardware.

A good update strategy is an important part of maintaining and managing your server. If you have a dynamic environment that changes frequently, install updates on a regular basis. If you have a stable environment, you do not have to install updates as frequently. However, you should consider installing updates whenever you make any major software or hardware changes in your environment.

You can get updates using a variety of methods, depending on your service environment. For example, if you use an HMC to manage your server, you can use the HMC interface to download, install, and manage your HMC and firmware updates. If you do not use an HMC to manage your server, you can use the functions specific to your operating system to get your updates. In addition, you can download or order many updates through Internet Web sites.

You must manage several types of updates to maintain your hardware. The following figure shows the different types of hardware and software that might require updates.

Figure 1. A diagram that shows the hardware and software that might require updates, including the HMC, I/O adapters and devices firmware, server firmware, power subsystem firmware, and operating systems.



HMC user interface

Learn about the HMC graphical user interface.

The HMC provides a menu (also called the *context* menu) for quick access to menu choices. The menu lists the actions found in the Selected and Object menus for the current object or objects.

The user interface provided with the Hardware Management Console (HMC) uses navigation that provides hierarchical views of system resources and tasks. This user interface is made up of several major components: the Banner, the Navigation pane, the Work pane, the Task bar, and the Status bar. The following sections describe each of these components.

System fault indicator and system identify indicator

Some systems support the system identify indicator and/or the system fault indicator.

The system identify indicator is used to help physically identify a particular system in a room. The system fault indicator is used to help physically identify a particular system that has a fault condition.

On a system that supports system fault indicator, the indicator is set to fault condition when a fault is detected. After the problem with the system is fixed, the system fault indicator should be set back to normal. This is done by using the log repair action task. For additional information, see Log repair action.

Note: This action keeps the system fault indicator from being set to the fault state due to a previous error, that has already been serviced, in the error log.

Both of these indicator functions can be managed by using the system identify indicator and system fault indicator tasks. See System Fault Indicator or System Identify Indicator for additional information.

Array bit steering

An advanced feature of many systems is array bit steering. The processors in these systems have internal cache arrays with extra memory capacity that can be configured to correct certain types of array faults.

This reconfiguration can be used to correct arrays for faults detected at IPL or run time. In the case of a fault detected during run time, the recoverable fault is reported with a "Repair Disposition Pending Reboot" indicator set. This allows diagnostics to call out a service request number that identifies the array and directs the service representative to a MAP for problem resolution that uses array bit steering. If the array bit steering cannot be used for the reported fault, then the FRU with that array is replaced.

Enhanced I/O error handling

Enhanced I/O Error Handling (EEH) is an error recovery strategy for errors that can occur during I/O operations on the PCI bus. Not all systems support EEH; if you get an SRN involving an EEH error, follow the action listed.

Running the online and stand-alone diagnostics

Use these tools to diagnose hardware problems on your AIX or Linux systems or logical partitions.

Use these diagnostics only if you are directed to do so by your next level of support or your hardware service provider.

Diagnostics are available for AIX and Linux systems or logical partitions which can help you perform hardware analysis. Additionally, there are various service aids in AIX diagnostics that can help you with service tasks on the system or logical partition. If there is a problem, you will receive a Service Request Number (SRN) that can help you pinpoint the problem and determine a corrective action.

If you have AIX installed and it is running, you can perform online diagnostics. However, if the installed AIX cannot be started, or you have Linux installed, you will need to run the diagnostics from CD or from a NIM server.

Verifying the repair can also be done using the diagnostics CD. To verify a repair in Linux, see *Verify a repair in Linux*. To verify the repair in AIX, see *Verify a repair in AIX*.

Running the online diagnostics

If you have AIX installed and it can be started, use this procedure to perform diagnostic procedures when directed from another procedure or by your next level of support.

When you run online diagnostics, keep the following in mind:

- When AIX is installed, the support for some devices might not be automatically installed. If this happens, that device will not display in the test list when online diagnostics run.
- When running diagnostics in a logically partitioned system, you must run diagnostics in the logical partition containing the resource or resources that you want to test.

Three modes are available for running the online diagnostics:

- **Service mode** provides the most complete check of the system resources, but requires that no other programs are running on the system. When possible, run the diagnostics in service mode.
- **Maintenance mode** checks most of the available resources, with the exception of SCSI adapters, memory, processor, and the disk drive used for paging.
- **Concurrent mode** runs online diagnostics on some of the system resources while the system is running normal activity.

Running the online diagnostics in concurrent mode

Use this procedure to run the online diagnostics in concurrent mode.

Use concurrent mode to run online diagnostics on some of the system resources while the system is running normal activity.

Because the system is running in normal operation, the following resources cannot be tested in concurrent mode:

- SCSI adapters connected to paging devices
- Disk drive used for paging
- Some display adapters and graphics related devices

The following levels of testing exist in concurrent mode:

Share-test level

This level tests a resource while the resource is being shared by programs running in the normal operation. This testing is mostly limited to normal commands that test for the presence of a device or adapter.

Sub-test level

This level tests a portion of a resource while the remaining part of the resource is being used in normal operation. For example, you could test one port of a multiport device while the other ports are being used in normal operation.

Full-test level

This level requires the device to not be assigned or used by any other operation. This level of testing on a disk drive might require the use of the vary off command. Use the diagnostics display menus to vary off the needed resource.

Perform the following steps to run online diagnostics in concurrent mode:

1. Log in to the AIX operating system as root user, or use CE login. If you need help, contact the system administrator.
2. Enter the `diag` command to load the diagnostic controller, and display the online diagnostic menus.
3. If requested, enter a password.
4. When the Diagnostic Operating Instructions screen displays, follow the online instructions to check the desired resources.

Note: If you do not receive the Diagnostic Operating Instructions display, try to run the standalone diagnostics. For details, see “Running the eServer™ stand-alone diagnostics from CD-ROM” on page 22.

5. When testing is complete, press F3 to return to the Diagnostic Operating Instructions display.
6. Press F3 again to return to the AIX operating system prompt.
7. Vary on any resources that you varied off.
8. Press Ctrl+D to log off from root user or CE login.
9. When finished, contact your next level of support or your hardware service provider with any information you received during the diagnostics, including service request numbers (SRNs).

Running the online diagnostics in maintenance mode

Use this procedure to run the online diagnostics in maintenance mode.

Maintenance mode requires that all activity on the logical partition running the AIX operating system be stopped so that the online diagnostics have most of the resources available. All of the system resources, except the SCSI adapters, memory, processor, and the disk drive used for paging can be checked.

Perform the following steps to run the online diagnostics in maintenance mode:

1. Stop all programs running on the logical partition except the AIX operating system.
2. Log in to the AIX operating system as root user or use CE login.
3. Type the `shutdown -m` command to stop all activity on the AIX operating system and put it into maintenance mode.
4. When a message indicates that the system is in maintenance mode, enter the `diag` command to invoke the diagnostic controller so you can run the diagnostics.

Note: It might be necessary to set TERM type again.

5. Enter any passwords, if requested.
6. When the Diagnostic Operating Instructions screen displays, follow the online instructions to check the desired resources.

Note: If you do not receive the Diagnostic Operating Instructions display, try to run the standalone diagnostics. For details, see Running the stand-alone diagnostics from CD-ROM.

7. When finished, press Ctrl+D to log off from root user or CE login.
8. Contact your next level of support or your hardware service provider with any information you received during the diagnostics, including service request numbers (SRNs). **This ends the procedure.**

Running the online diagnostics in service mode

Use this procedure to run the online diagnostics in service mode.

Using service mode will check everything except the SCSI adapter and the disk drives used for paging. However, memory and processor are only tested during POST. Running in service mode ensures that the error state of the system that has been captured in NVRAM is available for your use in analyzing the problem.

Running the online diagnostics in service mode with an HMC attached:

Use this procedure to run the online diagnostics in service mode with an HMC attached.

Perform the following steps:

1. Stop all programs including the AIX operating system. For details, see Powering on and powering off.
2. From the HMC, right-click **Partition Manager** and select **Open Terminal Window**.
3. From the Service Processor Menu on the VTERM, select option 2 (System Power Control).
4. Select option 6.
5. Verify that the state changes to currently disabled. Disabling fast system boot automatically enables slow boot.
6. Select option 98 to exit the system power control menu.
7. From the HMC, start the managed system in a full system partition by following these steps:
 - a. In the Contents area, select the managed system.
 - b. Right-click, and select **Power On**.
8. Select **Power on Diagnostic Stored Boot list**.
9. Make sure that there is no media in the devices in the media subsystem.
10. Enter any passwords, if requested.
11. When the Diagnostic Operating Instructions screen displays, follow the online instructions to check the desired resources.

Note: If you do not receive the Diagnostic Operating Instructions display, try to run the standalone diagnostics. For details, see Running the stand-alone diagnostics from CD-ROM.

12. When finished, contact your next level of support or your hardware service provider with any information you received during the diagnostics, including service request numbers (SRNs).

Running the online diagnostics in service mode without an HMC attached:

Use this procedure to run the online diagnostics in service mode *without* an HMC attached.

Perform the following steps:

1. Stop all programs including the AIX operating system. For details, see Powering on and powering off.
2. Remove all tapes, diskettes, and CDs.
3. Turn off the system unit power.
4. Turn on the system unit power.
5. After the keyboard POST indicator displays on the firmware console, and before the last POST indicator (speaker) displays, press 6 on the keyboard or ASCII terminal to indicate that a service mode boot should be initiated using the customized service mode boot list.
6. Enter any passwords, if requested.
7. When the Diagnostic Operating Instructions screen displays, follow the online instructions to check the desired resources.

Note: If you do not receive the Diagnostic Operating Instructions display, try to run the standalone diagnostics. For details, see Running the stand-alone diagnostics from CD-ROM.

8. When finished, contact your next level of support or your hardware service provider with any information you received during the diagnostics, including service request numbers (SRNs).

Running the eServer™ stand-alone diagnostics from CD-ROM

If the system or logical partition where you would like to run diagnostics has AIX installed but it cannot be started, or you have Linux installed, use this procedure to perform diagnostic procedures from CD-ROM when directed from another procedure or by your next level of support.

Diagnostics, which are available for AIX and Linux systems and logical partitions, can help you perform hardware analysis. If a problem is found, you will receive a service request number (SRN) or a service reference code (SRC) that can help pinpoint the problem and determine a corrective action.

Additionally, there are various service aids in the diagnostics that can help you with service tasks on the system or logical partition.

Running the stand-alone diagnostics from CD on a server without an HMC attached

Use this procedure to run the stand-alone diagnostics on a system without an HMC attached.

1. Choose from the following options:
 - If the system is powered on, continue with step 2.
 - If the system is powered off, continue with step 3.
2. If the system is powered on, perform these steps:
 - a. Let the system administrator and system users know that the system unit will be shut down.
 - b. Stop all programs including the operating system. For details, see Powering on and powering off a system.
 - c. Continue with step 4.
3. If the system is powered off, perform the following steps:
 - a. Start the server so you will be able to insert the diagnostic CD into the CD drive during the next step.
 - b. Continue with step 4.
4. Insert the diagnostic CD in the CD drive.
5. Re-start the server.
6. Continue with "Selecting testing options."

Selecting testing options:

1. When the keyboard POST indicator (the word *keyboard*) is shown on the firmware console, and before the last POST indicator (the word *speaker*) is shown, press the 5 key on either the attached keyboard or the ASCII keyboard to indicate that a service mode boot should be initiated using the default service mode boot list.
2. When the Welcome screen is shown, define the following items:
 - System console
 - Language to be used
 - Type of terminal

Note: Depending on the terminal emulator selected, the function keys (Fn) might not function. In this case, use the ESC and the number in the screen menus. For example, F3 = ESC key and the #3.

3. When the Diagnostics Operating Instructions appear, press Enter.

Note: If you are unable to load the diagnostics to the point where the "Diagnostic Operating Instructions" display is shown, contact your next level of support or your hardware service provider.

4. From the Function Select screen, select one of the following options:
 - If you want to run diagnostics in Problem Determination mode, continue with the next step.
 - If you want to run diagnostics in Task Selection (Service Aids) mode, go to step 11 on page 24.
5. Select **Problem determination** and press Enter.
6. Check the list of resources that is displayed. Does the list of resources match what you know to be installed in your system or partition?
 - **Yes:** Continue with the next step.

- **No:** Record any information you have about the missing resource and check to ensure that the missing resource is installed correctly. If you cannot correct the problem with a missing resource, replace the missing resource (contact your service provider if necessary). To test the available resources, continue with the next step.
7. Select **All Resources**, or the specific resource or resources to be tested, and press the P7 (commit) key.
 8. Record any error information you receive during the diagnostics, including service request numbers (SRNs) or SRCs, to report to your service provider.
 9. When testing is complete, press the F3 key to return to the Diagnostic Operating Instructions.
 10. Choose from the following options:
 - To continue testing, return to step 7.
 - To exit stand-alone diagnostics, select the exit function key from the menu and press Enter. Continue with step 18.
 11. Select **Task Selection list** and press Enter.
 12. To perform one of these tasks, select the **Task Selection** option from the Function Selection menu. After a task is selected, a resource menu might be presented showing all resources supported by the task.
 13. From the Task selection list, select the service aid task you want to perform. For example, Update and manage system Flash.
 14. Follow the instructions for the task selected on each menu or panel.
 15. Record any information you receive during the diagnostics, including service request numbers (SRNs), to report to your service provider.
 16. When testing is complete, press the F3 key to return to the Diagnostic Operating Instructions.
 17. Choose from the following options:
 - To continue testing, return to step 13.
 - To exit stand-alone diagnostics, select the exit function key from the menu and press Enter. Continue with the next step.
 18. Remove the CD from the drive.
 19. When finished, contact your next level of support or your hardware service provider with any information you received during the diagnostics, including service request numbers (SRNs) and any missing resources. **This ends the procedure.**

Running the stand-alone diagnostics from CD on a server with an HMC attached

Use this procedure to run the stand-alone diagnostics on a system with an HMC attached.

If you have logical partitions, note the following considerations:

- When running diagnostics in a logically partitioned system, you must run diagnostics in the logical partition containing the resource or resources that you want to test.
- The device from which you are loading stand-alone diagnostics must be made available to the logical partition on which you want to run diagnostics. This might require moving the device (for example, the CD drive or network adapter connected to the Network Installation Management (NIM) server that has a stand-alone diagnostic image) from the logical partition that currently contains the device to the logical partition on which you want to run diagnostics.

Perform the following steps from the HMC to run stand-alone diagnostics:

Note: If you need help with any of these steps, contact your system operator.

1. Remove all tapes, diskettes, CDs, or DVDs, and insert the diagnostic CD into the CD drive on the managed system (not the CD drive on the HMC).
2. Shut down the operating system from the HMC by performing the following steps:
 - a. In the navigation area, select **Server and partition** → **Server Management**.

- b. In the contents pane, expand the server that contains the partition you want to test.
 - c. Right-click the partition and select **Open Terminal Window**.
 - d. In the VTerm window, log in as root user and enter any requested passwords.
 - e. Shut down the operating system using one of the following commands:
 - If AIX is running, type the shutdown -F command.
 - If Linux is running, type the shutdown -h now command
 - f. Close the VTerm window.
3. From the HMC, right-click the partition and select **Activate**.
 4. Ensure the **Open a terminal window or console session box** is selected and click **OK**.
 5. When the keyboard POST indicator (the word *keyboard*) is shown on the firmware console, and before the last POST indicator (the word *speaker*) is shown, press the 5 key on either the attached keyboard or the ASCII keyboard to indicate that a service mode boot should be initiated using the default service mode boot list.
 6. Continue with "Selecting testing options."

Selecting testing options:

1. When the keyboard POST indicator (the word *keyboard*) is shown on the firmware console, and before the last POST indicator (the word *speaker*) is shown, press the 5 key on either the attached keyboard or the ASCII keyboard to indicate that a service mode boot should be initiated using the default service mode boot list.
2. When the Welcome screen is shown, define the following items:
 - System console
 - Language to be used
 - Type of terminal

Note: Depending on the terminal emulator selected, the function keys (Fn) might not function. In this case, use the ESC and the number in the screen menus. For example, F3 = ESC key and the #3.
3. When the Diagnostics Operating Instructions appear, press Enter.

Note: If you are unable to load the diagnostics to the point where the "Diagnostic Operating Instructions" display is shown, contact your next level of support or your hardware service provider.
4. From the Function Select screen, select one of the following options:
 - If you want to run diagnostics in Problem Determination mode, continue with the next step.
 - If you want to run diagnostics in Task Selection (Service Aids) mode, go to step 11 on page 26.
5. Select **Problem determination** and press Enter.
6. Check the list of resources that is displayed. Does the list of resources match what you know to be installed in your system or partition?
 - **Yes:** Continue with the next step.
 - **No:** Record any information you have about the missing resource and check to ensure that the missing resource is installed correctly. If you cannot correct the problem with a missing resource, replace the missing resource (contact your service provider if necessary). To test the available resources, continue with the next step.
7. Select **All Resources**, or the specific resource or resources to be tested, and press the P7 (commit) key.
8. Record any error information you receive during the diagnostics, including service request numbers (SRNs) or SRCs, to report to your service provider.
9. When testing is complete, press the F3 key to return to the Diagnostic Operating Instructions.
10. Choose from the following options:

- To continue testing, return to step 7 on page 25.
 - To exit stand-alone diagnostics, select the exit function key from the menu and press Enter. Continue with step 18.
11. Select **Task Selection list** and press Enter.
 12. To perform one of these tasks, select the **Task Selection** option from the Function Selection menu. After a task is selected, a resource menu might be presented showing all resources supported by the task.
 13. From the Task selection list, select the service aid task you want to perform. For example, Update and manage system Flash.
 14. Follow the instructions for the task selected on each menu or panel.
 15. Record any information you receive during the diagnostics, including service request numbers (SRNs), to report to your service provider.
 16. When testing is complete, press the F3 key to return to the Diagnostic Operating Instructions.
 17. Choose from the following options:
 - To continue testing, return to step 13.
 - To exit stand-alone diagnostics, select the exit function key from the menu and press Enter. Continue with the next step.
 18. Remove the CD from the drive.
 19. When finished, contact your next level of support or your hardware service provider with any information you received during the diagnostics, including service request numbers (SRNs) and any missing resources. **This ends the procedure.**

Running the eServer stand-alone diagnostics from a Network Installation Management server

If the system or logical partition where you would like to run diagnostics has AIX installed but it cannot be started, or you have Linux installed, use this procedure to perform diagnostic procedures from a Network Installation Management (NIM) server when directed from another procedure or by your next level of support.

Diagnostics, which are available for AIX and Linux systems and logical partitions, can help you perform hardware analysis. If a problem is found, you will receive a service request number (SRN) that can help pinpoint the problem and determine a corrective action.

A client system connected to a network with a NIM server can boot stand-alone diagnostics from the NIM server if the client-specific settings on both the NIM server and client are correctly configured.

Note:

1. For NIM clients that have adapters that would normally require that supplemental media be installed when stand-alone diagnostics are run from CD, the support code for these adapters must be installed into the directory pointed to by the NIM SPOT from which you wish to boot that client. Before running stand-alone diagnostics on these clients from the NIM server, the NIM server system administrator must ensure that any needed support for these devices is installed on the server.
2. All operations to configure the NIM server require root user authority.
3. If you replace the network adapter in the client, the network adapter hardware address settings for the client must be updated on the NIM server.
4. The **Cstate** for each stand-alone diagnostics client on the NIM server should be kept in the *diagnostic boot has been enabled* state.
5. On the client system, the NIM server network adapter should be put in the bootlist after the boot disk drive. This allows the system to boot in stand-alone diagnostics from the NIM server if there is a problem booting from the disk drive. Refer to the Multiboot section under "SMS" in the client system's service guide for information on setting the bootlist.

Configuring the NIM server

Refer to the "Advanced NIM configuration tasks" chapter of the AIX Installation Guide and Reference for information on performing the following tasks:

- Registering a client on the NIM server
- Enabling a client to run diagnostics from the NIM server

To verify that the client system is registered on the NIM server and the diagnostic boot is enabled, run the command from the command line on the NIM server: `Isnim -a Cstate -z ClientName`. Refer to the following table for system responses.

Note: The ClientName is the name of the system on which you want to run stand-alone diagnostics.

System response	Client status
#name:Cstate:ClientName:diagnostic boot has been enabled:	The client system is registered on the NIM server and enabled to run diagnostics from the NIM server.
#name:Cstate:ClientName:ready for a NIM operation:or #name:Cstate:ClientName:BOS installation has been enabled:	The client is registered on the NIM server but not enabled to run diagnostics from the NIM server. Note: If the client system is registered on the NIM server but Cstate has not been set, no data will be returned.
0042-053 Isnim: there is no NIM object named "ClientName"	The client is not registered on the NIM server.

Configuring the client and running the stand-alone diagnostics from a NIM server

Perform the following steps to run stand-alone diagnostics on a client from the NIM server:

1. Let the system administrator and system users know that the system unit might be shut down.
2. Stop all programs including the AIX or Linux operating system. For details, see Start or stop the system. If you need help, contact the system administrator.
3. Remove all tapes, diskettes, and CDs.
4. Choose from the following options:
 - If you are running stand-alone diagnostics in a full system partition profile, verify with the system administrator and system users that the system unit can shut down using the shutdown command. Then power down the system.
 - If you are running on a logically partitioned system, make sure the CD drive is available to the partition used to run stand-alone diagnostics. Verify with the system administrator and system users using that partition that all applications on that partition must be stopped, and that the partition will be restarted. Stop all programs on that partition, including the operating system.
5. Choose from the following options:
 - If you are in a full system partition, power on the system unit to run stand-alone diagnostics.
 - If you are in a logically partitioned system, restart the partition to run stand-alone diagnostics.
6. When the keyboard indicator is displayed (the word *keyboard* on an HMC virtual terminal window or the keyboard icon on a graphical display) press the number 1 key on the keyboard to display the SMS menu.
7. Enter any requested passwords.
8. Select **Set Up Remote IPL** (Initial Program Load).
9. Enter the client address, server address, gateway address, if applicable, and subnet mask. If there is no gateway between the NIM server and the client, set the gateway address to 0.0.0.0.

To determine if there is a gateway, either ask the system network administrator or compare the first three octets of the NIM server address and the client address. If they are the same, (for example, if

the NIM server address is 9.3.126.16 and the client address is 9.3.126.42, the first 3 octets (9.3.126) are the same), then set the gateway address in the RIPL field to 0.0.0.0.

Note: The RIPL is located under the Utility menu in System Management Services (SMS). Refer to it for information on setting these parameters.

10. If the NIM server is set up to allow pinging from the client system, use the ping utility in the RIPL utility to verify that the client system can ping the NIM server.
11. Under the ping utility, choose the network adapter that provides the attachment to the NIM server to do the ping operation. If the ping returns with an OK prompt, the client is prepared to boot from the NIM server. If ping returns with a FAILED prompt, the client cannot proceed with the NIM boot.

Note: If the ping fails, refer to the Boot problems and concerns information. Then follow the steps for network boot problems.

12. Exit the SMS Main screen.
13. Select **Select Boot Options** → **Install or Boot a Device** → **Network**.
14. Record the current bootlist settings. You will need to set the bootlist back to the original settings after running diagnostics from the NIM server.
15. Change the bootlist so the network adapter attached to the NIM is first in the bootlist.
16. Set the network parameters for the adapter from which you want to boot.
17. Exit completely from SMS. The system will start loading packets while doing a bootp from the network.
18. Follow the on-screen instructions.
 - If Diagnostic Operating Instructions Version x.x.x displays, stand-alone diagnostics have installed successfully.
 - If the AIX login prompt displays, stand-alone diagnostics did not load. Continue with step 19.
19. If the diagnostics did not load, check the following items:
 - The bootlist on the client might be incorrect.
 - Cstate on the NIM server might be incorrect.
 - Network problems might be preventing you from connecting to the NIM server.
 - Verify the settings and the status of the network. If you continue to have problems, refer to the Boot problems/concerns section for the system unit. Then follow the steps for network boot problems.
20. After running diagnostics, restart the system and use SMS to change the IP settings and bootlist sequence back to the original settings.

AIX tasks and service aids

The AIX diagnostic package contains programs called *tasks and service aids*. Tasks and service aids are used to have the AIX diagnostics perform specific functions on resources contained in a system.

Notes:

1. Many of these programs work on all system model architectures. Some programs are only accessible from online diagnostics in service or concurrent mode, while others may be accessible only from stand-alone diagnostics.
2. The specific tasks available depend on the hardware attributes or capabilities of the system you are servicing. Not all service aids nor tasks will be available on all systems.
3. If the system is running on a logically partitioned system, the following tasks can be executed only in a partition with service authority:
 - Configure scan dump policy
 - Enable platform automatic power restart
 - Configure platform processor diagnostics

To perform one of these tasks, use the **Task Selection** option from the FUNCTION SELECTION menu.

After a task is selected, a resource menu might be displayed showing all resources supported by the task.

You can use a fast-path method to perform a task by using the **diag** command and the **-T** flag. By using the fast path, you can bypass most of the introductory menus to access a particular task. You are presented with a list of resources available to support the specified task. The fast-path tasks are as follows:

- certify - Certifies media
- chkspares - Checks for the availability of spare sectors
- download - Downloads microcode to an adapter or device
- disp_mcode - Displays current level of microcode
- format - Formats media
- identify - Identifies the PCI RAID physical disks
- identifyRemove - Identifies and removes devices (hot plug)

To run these tasks directly from the command line, specify the resource and other task-unique flags. Use the descriptions in this topic to understand which flags are needed for a given task.

Tasks

The following tasks are described in this topic:

- Add resource to resource list
- Analyze adapter internal log
- Backup and restore media
- Certify media
- Change hardware vital product data
- Configure dials and LPF keys
- Configure reboot policy (CHRP) on POWER5™ systems or later
- Configure platform processor diagnostics
- Configure scan dump policy
- Delete resource from resource list
- Disk maintenance

- Disk to disk copy
- Display / alter sector
- Display configuration and resource list
- Display firmware device node information
- Display hardware error report
- Display hardware vital product data
- Display machine check error log
- Display microcode level
- Display multipath I/O (MPIO) device configuration
- Display or change bootlist
- Display or change diagnostic run time options
- Display previous diagnostic results
- Display resource attributes
- Display service hints
- Display software product data
- Display test patterns
- Display USB devices
- Download microcode for systems using AIX 5.2.0.30 and later
- DVD RAM media
- Fault indicators
- Fibre Channel RAID service aids
- Flash SK-NET FDDI firmware
- FlashDrive (USB)
- Format media
- Gather system information
- Generic microcode download
- Hard disk attached to PCI SCSI RAID adapter
- Hard disk attached to SCSI adapter (non-RAID)
- Hot plug task
- Identify indicators
- Identify and system attention indicators
- Local area network analyzer
- Log repair action
- Microcode installation to adapters and devices
- Microcode installation to disk drive attached to PCI SCSI RAID adapters
- Microcode installation to PCI SCSI RAID adapters
- Microcode installation to SES devices
- Microcode tasks
- Optical media
- PCI hot plug manager
- PCI SCSI disk identify array manager
- PCI RAID physical disk identify
- Process supplemental media
- RAID hot plug devices
- Run diagnostics
- Run error log analysis
- SCSI and SCSI RAID hot plug manager
- SCSI bus analyzer
- SCSI hot plug manager
- SCSI RAID physical disk status and vital product data
- SCSD tape drive service aid
- Shell prompt
- Spare sector availability
- SSA service aid
- System fault indicator
- System identify indicator

- Update disk-based diagnostics
- Update system or service processor flash
- Update and manage system flash

Add resource to resource list

Use this task to add resources back to the resource list.

Note: Only resources that were previously detected by the diagnostics and deleted from the diagnostic test list are listed. If no resources are available to be added, then none are listed.

Shell prompt

Note: Use this service aid in online service mode only.

This service aid allows access to the AIX command line. To use this service aid, the user must know the root password (when a root password has been established).

Note: Do not use this task to install code or to change the configuration of the system. This task is intended to view files, configuration records, and data. Using this service aid to change the system configuration or install code can produce unexplained system problems after exiting the diagnostics.

Analyze adapter internal log

The PCI RAID adapter has an internal log that logs information about the adapter and the disk drives attached to the adapter. Whenever data is logged in the internal log, the device driver copies the entries to the AIX system error log and clears the internal log.

The analyze adapter internal log service aid analyzes these entries in the AIX system error log. The service aid displays the errors and the associated service actions. Entries that do not require any service actions are ignored.

When running this service aid, a menu is presented to enter the start time, the end time, and the file name. The start time and end time have the following format: *[mmddHHMMyy]*. (where *mm* is the month (1-12), *dd* is the date (1-31) *HH* is the hour (00-23) *MM* is the minute (00-59), and *yy* is the last two digits of the year (00-99). The file name is the location where the user wants to store the output data.

To invoke the service aid task from the command line, type:

```
diag -c -d devicename -T "adapela [-s start date -e end date]
```

Flag Description

- c** Specifies not console mode.
- d devicename**
Specifies the device whose internal log you want to analyze (for example, SCRAID0)
- s start date**
Specifies all errors after this date are analyzed.
- e end date**
Specifies all errors before this date are analyzed.
- T** Specifies the Analyze Adapter Internal Log task

Note: To specify a file name from the command line, use the redirection operator at the end of the command to specify where the output of the command is to be sent, for example *> filename* (where *filename* is the name and location where the user wants to store the output data (for example, */tmp/adaptlog*).

Backup and restore media

This service aid allows verification of backup media and devices. It presents a menu of tape and diskette devices available for testing and prompts for selecting the desired device. It then presents a menu of available backup formats and prompts for selecting the desired format. The supported formats are **tar**, **backup**, and **cpio**. After the device and format are selected, the service aid backs up a known file to the selected device, restores that file to **/tmp**, and compares the original file to the restored file. The restored file remains in **/tmp** to allow for visual comparison. All errors are reported.

Certify media

This task allows the selection of diskette, DVD-RAM media, or hard files to be certified. Normally, this is done under the following conditions:

- To determine the condition of the drive and media
- To verify that the media is error-free after a format service aid has been run on the media

Normally, run Certify if after running diagnostics on a drive and its media, no problem is found, but you suspect that a problem still exists.

Hard files can be connected either to a SCSI adapter (non-RAID) or a PCI SCSI RAID adapter. The usage and criteria for a hard file connected to a non-RAID SCSI adapter are different from those for a hard file connected to a PCI SCSI RAID adapter.

Certify media can be used in the following ways:

- Certify Diskette

This selection enables you to verify the data written on a diskette. When you select this service aid, a menu asks you to select the type of diskette being verified. The program then reads all of the ID and data fields on the diskette one time and displays the total number of bad sectors found.

- Certify DVD-RAM media

This selection reads all of the ID and data fields. It checks for bad data and counts all errors encountered. If an unrecovered data errors occurs, the data on the media should be transferred to another media and the original media should be discarded. If an unrecovered equipment error occurs or recovered errors exceed the threshold value, the original media should be discarded.

The certify service aid displays the following information:

- Capacity in bytes
- Number of data errors recovered
- Number of data errors not recovered
- Number of equipment check errors
- Number of equipment checks not recovered

If the drive is reset during a certify operation, the operation is restarted.

If the drive is reset again, the certify operation is terminated, and you are asked to run diagnostics on the drive.

This task can be run directly from the AIX command line. The command line syntax is: `diag -c -d -T certify`

Flag	Description
------	-------------

-c	No console mode
----	-----------------

-d	Specifies a device
----	--------------------

-T	Specifies the certify task
----	----------------------------

- Certify Hard file Attached to a Non-RAID and PCI-X RAID SCSI Adapter

For pdisks and hdisks, this selection reads all of the ID and data fields on the hard file. If bad-data errors are encountered, the certify operation counts the errors.

If there are non-recovered data errors that do not exceed the threshold value, do one of the following:

For hdisk hard files, the hard file must be formatted and then certified again.

For pdisk hard files, diagnostics should be run on the parent adapter.

If the non-recovered data errors, recovered data errors, recovered and non-recovered equipment errors exceed the threshold values, the hard file must be replaced.

After the read certify of the disk surface completes for hdisk hard files, the certify operation performs 2000 random-seek operations. Errors are also counted during the random-seek operations. If a disk timeout occurs before the random seeks are finished, the disk needs to be replaced.

The Certify service aid displays the following information:

- For hdisks:
 - Drive capacity in megabytes.
 - Number of data errors recovered.
 - Number of data errors not recovered.
 - Number of equipment checks recovered.
 - Number of equipment checks not recovered.
- For pdisks:
 - Drive capacity in megabytes.
 - Number of data errors not recovered.
 - Number of LBA reassignments
 - Number of equipment checks not recovered.

This task can be run directly from the AIX command line. The command line syntax is: `diag -c -d deviceName -T "certify"`

Flag	Description
------	-------------

- | | |
|----|----------------------------|
| -c | No console mode |
| -d | Specifies a device |
| -T | Specifies the certify task |

- Certify Hard File Attached to a PCI SCSI RAID Adapter

This selection is used to certify physical disks attached to a PCI SCSI RAID adapter. Certify reads the entire disk and checks for recovered errors, unrecovered errors, and reassigned errors. If these errors exceed the threshold values, you are prompted to replace the physical disk.

This task can be run directly from the AIX command line. The command line syntax is: `diag -c -d RAIDadapterName -T "certify {-l chID | -A}"`

Flag	Description
------	-------------

- | | |
|----|--|
| -c | No console mode |
| -d | Specifies the RAID adapter to which the disk is attached |
| -T | Specifies the certify task and its parameters |
| -I | Specifies physical disk channel/ID (for example: -l 27) |
| -A | All disks |

Change hardware vital product data

Use this service aid to display the display/alter VPD selection menu. The menu lists all resources installed on the system. When a resource is selected, a menu displays that lists all the VPD for that resource.

Note: The user cannot alter the VPD for a specific resource unless the VPD is not machine-readable.

Configure dials and LPF keys

Note: The dials and LPF keys service aid is not supported in stand-alone mode (CD-ROM and NIM) on systems with 32 MB or less memory. If you have problems in stand-alone mode, use the hard disk-based diagnostics.

This service aid provides a tool for configuring and removing dials and LPF keys to the asynchronous system ports.

This selection invokes the SMIT utility to allow dials and LPF keys configuration. A TTY must be in the available state on the async port before the dials and LPF keys can be configured on the port. The task allows an async adapter to be configured, then a TTY port defined on the adapter. Dials and LPF keys can then be defined on the port.

Before configuring dials or LPF keys on a system port, you must remove all defined TTYs. To determine if there are any defined TTYs, select **List All Defined TTYs**. After all defined TTYs have been removed, then add a new TTY and configure the dials or LPF keys.

Configure reboot policy (CHRP) on systems or later

This service aid controls how the system tries to recover when power is restored after a power outage.

Use this service aid to display and change the following settings for the reboot policy.

Enable platform automatic power restart

When enabled, "Platform auto power restart" allows the platform firmware to restart a system after power is restored following a power outage. If the system is partitioned, each partition that was running when the power outage occurred will be restarted as indicated by that partition's setting of the system management (SMIT) option: "Automatically reboot operating system after a crash".

This service aid may be accessed directly from the command line, by entering:

```
/usr/lpp/diagnostics/bin/uspchrp -b
```

The parameter setting may be read and set directly from the command line. To read the parameter, use the command:

```
/usr/lpp/diagnostics/bin/uspchrp -q platform-auto-power-restart
```

To set the parameter, use the command:

```
/usr/lpp/diagnostics/bin/uspchrp -e platform-auto-power-restart=[0|1]
```

where:

- 1 = Enable Platform Automatic Power Restart
- 0 = Disables Platform Automatic Power Restart

The Platform Boot Speed system parameter can be read or set from the command line only. To read the Platform Boot Speed system parameter, use the command: `/usr/lpp/diagnostics/bin/uspchrp -q PlatformBootSpeed`

To set the Platform Boot Speed system parameter, use the command: `/usr/lpp/diagnostics/bin/uspchrp -e PlatformBootSpeed=[fast|slow]`.

With a fast platform speed, the platform firmware will perform a minimal set of hardware tests before loading the operating system. With a slow platform speed, the platform firmware will perform a comprehensive set of hardware tests before loading the operating system.

For the command:

```
/usr/lpp/diagnostics/bin/uspchrp -q <variable name> | -e <variable name>=value
```

The return codes are:

0 = command successful

1 = command not successful

Configure platform processor diagnostics

This service aid provides the user-interface to specify a system parameter platform processor diagnostics used by the firmware. The firmware uses the parameter setting to determine when a series of processor diagnostics tests are run. Errors from the processor diagnostics tests are logged into the AIX error log and are analyzed by the sysplanar0 diagnostics. Otherwise, there is no notification to AIX when the tests are executed. The possible values of the system parameter and their descriptions are as follow:

disabled

No processor diagnostics.

staggered

Processor diagnostics will be run periodically. All processors will be tested but not scheduled at the same time.

immediate

When setting this value, processor diagnostics will be run immediately. When querying this value, processor diagnostics are currently running.

periodic

Processor diagnostics will be run periodically, all at the same time.

The "periodic" setting cannot be set using this service aid, although it can be read. The HMC is used to set the periodic setting.

The "Configure platform processor diagnostics" is accessed using the **diag** command, then selecting the appropriate topic from the diagnostics task menus.

It also may be accessed directly from the AIX command line, by entering:

```
/usr/lpp/diagnostics/bin/uspchrp -p
```

To query the platform processor diagnostics parameter, enter:

```
/usr/lpp/diagnostics/bin/uspchrp -q PlatformProcessorDiagnostics
```

Note: The output of the query operation may be disabled, staggered, immediate, or periodic.

To set the Platform Processor Diagnostics parameter, enter:

```
/usr/lpp/diagnostics/bin/uspchrp -e PlatformProcessorDiagnostics=[disabled|staggered|immediate]
```

Configure scan dump policy

Configure scan dump policy allows the user to set or view the scan dump policy (scan dump control and size) in NVRAM. Scan dump data is a set of chip data that the service processor gathers after a system malfunction. It consists of chip scan rings, chip trace arrays, and scan COM (SCOM) registers. This data is stored in the scan-log partition of the system's nonvolatile random access memory (NVRAM).

Use this service aid to display and change the following settings for the scan dump policy at run time:

- Scan Dump Control (how often the dump is taken)
- Scan Dump Size (size and content of the dump)

The Scan Dump Control (SDC) settings are as follows:

- As needed: This setting allows the platform firmware to determine whether a scan dump is performed. This is the default setting for the dump policy.
- Always: This setting overrides the firmware recommendations and always performs a dump after a system failure.

The Scan Dump Size (SDS) settings are as follows:

- As Requested - Dump content is determined by the platform firmware.
- Minimum - Dump content collected provides the minimum debug information, enabling the platform to reboot as quickly as possible.
- Optimum - Dump content collected provides a moderate amount of debug information.
- Complete - Dump data provides the most complete error coverage at the expense of reboot speed.

You can access this service aid directly from the AIX command line by typing:

```
/usr/lpp/diagnostics/bin/uspchrp -d
```

Delete resource from resource list

Use this task to delete resources from the resource list.

Note: Only resources that were previously detected by the diagnostics and have not been deleted from the diagnostic test list are listed. If no resources are available to be deleted, then none are listed.

Disk maintenance

This service aid provides the following options for the fixed-disk maintenance:

- Disk to Disk Copy
- Display/Alter Sector

Disk to disk copy

Notes:

1. This service aid cannot be used to update a drive of a different size. The service aid only supports copying from a SCSI drive to another SCSI drive of the same size.
2. Use the **migratepv** command when copying the contents to other disk drive types. This command also works when copying SCSI disk drives or when copying to a SCSI disk drive that is not the same size.

This selection allows you to recover data from an old drive when replacing it with a new drive. The service aid recovers all logical volume manager (LVM) software-reassigned blocks. To prevent corrupted data from being copied to the new drive, the service aid stops if an unrecoverable read error is detected. To help prevent possible problems with the new drive, the service aid stops if the number of bad blocks being reassigned reaches a threshold.

To use this service aid, both the old and new disks must be installed in or attached to the system with unique SCSI addresses. This requires that the new disk drives SCSI address must be set to an address that is not currently in use and the drive be installed in an empty location. If there are no empty locations, then one of the other drives must be removed. When the copy is complete, only one drive can

remain installed. Either remove the target drive to return to the original configuration, or perform the following procedure to complete the replacement of the old drive with the new drive:

1. Remove both drives.
2. Set the SCSI address of the new drive to the SCSI address of the old drive.
3. Install the new drive in the old drive's location.
4. Install any other drives (that were removed) into their original location.

To prevent problems that can occur when running this service aid from disk, it is suggested that this service aid be run, when possible, from the diagnostics that are loaded from removable media.

Display/alter sector

Attention: Use caution when you use this service aid because inappropriate modification to some disk sectors can result in the total loss of all data on the disk.

This selection allows the user to display and alter information on a disk sector. Sectors are addressed by their decimal sector number. Data is displayed both in hex and in ASCII. To prevent corrupted data from being incorrectly corrected, the service aid does not display information that cannot be read correctly.

Display configuration and resource list

If a device is not included in the test list or if you think a diagnostic package for a device is not loaded, check by using the display configuration and resource list task. If the device you want to test has a plus (+) sign or a minus (-) sign preceding its name, the diagnostic package is loaded. If the device has an asterisk (*) preceding its name, the diagnostic package for the device is not loaded or is not available.

This service aid displays the item header only for all installed resources. Use this service aid when there is no need to see the vital product data (VPD). (No VPD is displayed.)

Display firmware device node information

This task displays the firmware device node information. This service aid is intended to gather more information about individual or particular devices on the system. The format of the output data may differ depending on which level of the AIX operating system is installed.

Display hardware error report

This service aid uses the **errpt** command to view the hardware error log.

The display error summary and display error detail selections provide the same type of report as the **errpt** command. The display error analysis summary and display error analysis detail selections provide additional analysis.

Display hardware vital product data

This service aid displays all installed resources, along with any VPD for those resources. Use this service aid when you want to look at the VPD for a specific resource.

Display machine check error log

Note: The display machine check error log service aid is available only on stand-alone diagnostics.

When a machine check occurs, information is collected and logged in an NVRAM error log before the system unit shuts down. This information is logged in the AIX error log and cleared from NVRAM when the system is rebooted from the hard disk, LAN, or stand-alone media. When booting from stand-alone diagnostics, this service aid converts the logged information into a readable format that can be used to

isolate the problem. When booting from the hard disk or LAN, the information can be viewed from the AIX error log using the hardware error report service aid. In either case, the information is analyzed when the `sysplanar0` diagnostics are running in problem determination mode.

Display microcode level

Note: Display microcode level is a subtask that can be accessed after selecting Microcode Tasks, see “Microcode tasks” on page 54.

This task provides a way to display microcode on a device or adapter. When the `sys0` resource is selected, the task displays the levels of both the system firmware and service processor firmware. `sys0` may not be available in all cases.

You can display the current level of the microcode on an adapter, the system, or a device by using the AIX `diag` command. See the following command syntax: `diag -c -d device -T "disp_mcode"`

Flag Description

- | | |
|-----------------|--|
| <code>-c</code> | No console mode. |
| <code>-d</code> | Used to specify a device. |
| <code>-T</code> | Use the <code>disp_mcode</code> option to display microcode. |

The AIX `lsmcode` command serves as a command line interface to the display microcode level task.

Display MultiPath I/O (MPIO) device configuration

This service aid displays the status of MPIO devices and their connections to their parent devices.

This service aid is capable of sending SCSI commands on each available path regardless of the default MPIO path algorithm. Therefore, it is useful for testing the unused path for integrity.

Run this service aid if you suspect a problem with the path between MPIO devices and their parent devices.

Use this service aid for:

- Listing MPIO devices
- Listing the parents of MPIO devices
- Displaying the status and location of specified MPIO devices
- Displaying the hierarchy of MPIO adapters and devices.

If there are no devices with multiple paths, this service aid will not be shown on the Task Selection menu.

Access this service aid directly from the AIX command line by typing:

```
/usr/lpp/diagnostics/bin/umpio
```

Display or change bootlist

This service aid allows the bootlist to be displayed, altered, or erased.

The system attempts to perform an IPL from the first device in the list. If the device is not a valid IPL device or if the IPL fails, the system proceeds in turn to the other devices in the list to attempt an IPL.

Display or change diagnostic run-time options

The display or change diagnostic run-time options task allows the diagnostic run-time options to be set.

Note: The run-time options are used only when selecting the run diagnostic task.

The run-time options are:

- Display Diagnostic Mode Selection Menus
This option allows the user to turn on or off displaying the DIAGNOSTIC MODE SELECTION MENU (the default is on).
- Run Tests Multiple Times
This option allows the user to turn on or off, or specify a loop count, for diagnostic loop mode (the default is off).

Note: This option is only displayed when you run the online diagnostics in service mode.

- Include Advanced Diagnostics
This option allows the user to turn on or off including the advanced diagnostics (the default is off).
- Number of Days Used to Search Error Log
This option allows the user to select the number of days for which to search the AIX error log for errors when running the error log analysis. The default is seven days, but it can be changed from one to sixty days.
- Display Progress Indicators
This option allows the user to turn on or off the progress indicators when running the diagnostic applications. The progress indicators, in a box at the bottom of the screen, indicate that the test is being run (the default is on).
- Diagnostic Event Logging
This option allows the user to turn on or off logging information to the diagnostic event log (the default is on).
- Diagnostic Event Log File Size
This option allows the user to select the maximum size of the diagnostic event log. The default size for the diagnostic event log is 100 KB. The size can be increased in 100 KB increments to a maximum of 1 MB.

Use the **diaggetrto** command to display one or more diagnostic run-time options. Use the following AIX command syntax:

```
/usr/lpp/diagnostics/bin/diaggetrto [-a] [-d] [-l] [-m] [-n] [-p] [-s]
```

Use the **diagsetrto** command to change one or more diagnostic run-time options. Use the following AIX command syntax:

```
/usr/lpp/diagnostics/bin/diagsetrto [-a on|off] [-d on|off] [-l size]  
[-m on|off] [-n days] [-p on|off]
```

Flag descriptions for the **diaggetrto** and **diagsetrto** commands are as follows:

Flag	Description
-a	Displays or changes the value of the include advanced diagnostics option.
-d	Displays or changes the value of the diagnostic event logging option.
-l	Displays or changes the value of the diagnostic event log file size. Allowable size are between 100K and 1000K in increments of 100K. The size may never be decreased.
-m	Displays or changes the value of the display diagnostic mode selection menu option.

- n Displays or changes the value of the number of days used to search the error log option. Allowable values are between 1 and 60 days. 7 days is the default.
- p Displays or changes the value of the display progress indicators option.
- s Displays all of the diagnostic run-time options.

Display previous diagnostic results

Note: This service aid is not available when you load the diagnostics from a source other than a hard disk drive or a network.

This service aid allows a service representative to display results from a previous diagnostic session. When the display previous diagnostic results option is selected, the user can view up to 25 no trouble found (NTF) and service request number (SRN) results.

This service aid displays diagnostic event log information. You can display the diagnostic event log in a short version or a long version. The diagnostic event log contains information about events logged by a diagnostic session.

This service aid displays the information in reverse chronological order.

This information is not from the AIX operating system error log. This information is stored in the `/var/adm/ras` directory.

You can run the command from the AIX command line by typing: `/usr/lpp/diagnostics/bin/diagrpt [[-o] ? [-s mmdyy] ? [-a] ? [-r]]`

Flag	Description
------	-------------

- | | |
|-----------------|--|
| -o | Displays the last diagnostic results file stored in the <code>/etc/lpp/diagnostics/data</code> directory |
| -s <i>mmdyy</i> | Displays all diagnostic result files logged since the date specified |
| -a | Displays the long version of the diagnostic event log |
| -r | Displays the short version of the diagnostic event log |

Display resource attributes

This task displays the customized device attributes associated with a selected resource. This task is similar to running the `lsattr -E -l resource` command.

Display service hints

This service aid reads and displays the information in the CEREADME file from the diagnostics media. This file contains information that is not contained in the publications for this version of the diagnostics. The file also contains information about using this particular version of diagnostics.

Display software product data

This task uses SMIT to display information about the installed software and provides the following functions:

- List Installed Software
- List Applied but Not Committed Software Updates
- Show Software Installation History
- Show Fix (APAR) Installation Status

- List Fileset Requisites
- List Fileset Dependents
- List Files Included in a Fileset
- List File Owner by Fileset

Display test patterns

This service aid provides a means of adjusting system display units by providing test patterns that can be displayed. The user uses a series of menus to select the display type and test pattern. After the selections are made, the test pattern displays.

Display USB devices

The following are the main functions of this service aid:

- Display a list of USB controllers on an adapter.
- Display a list of USB devices that are connected to the selected controller.

To run the USB devices service aid, go to the diagnostics TASKS SELECTION menu, select **Display USB Devices**. From the controller list that displayed on the screen, select one of the items that begins with "OHCDX", where "X" is a number. A list of devices attached to the controller displays.

Download microcode

Note: Download microcode is a subtask that can be accessed after selecting **Microcode Tasks**, see "Microcode tasks" on page 54.

This service aid provides a way to copy microcode to an adapter or device. The service aid presents a list of adapters and devices that use microcode. After the adapter or device is selected, the service aid provides menus to guide you in checking the current level and installing the needed microcode.

This task can be run directly from the AIX command line. Most adapters and devices use a common syntax as identified in the "Microcode Installation to Adapters and Devices" section. Information for adapters and devices that do not use the common syntax can be found following this section.

Microcode installation to adapters and devices

For many adapters and devices, microcode installation occurs and becomes effective while the adapters and devices are in use. Ensure that a current backup is available and the installation is scheduled during a non-peak production period.

Notes:

1. If the source is /etc/microcode, the image must be stored in the /etc/microcode directory on the system. If the system is booted from a NIM server, the image must be stored in the usr/lib/microcode directory of the SPOT the client is booted from.
2. If the source is CD (cdX), the CD must be in ISO 9660 format. There are no restrictions as to what directory in which to store the image.
3. If the source is diskette (fdX), the diskette must be in backup format and the image stored in the /etc/microcode directory.

The following is the common syntax command: `diag [-c] -d device -T "download [-s {/etc/microcode|source}] [-l {latest|previous}] [-f]"`

Flag Description

-c No console mode. Run without user interaction.

- d *device***
Run the task on the device or adapter specified.
- T **download****
Install microcode.
- s **/etc/microcode****
Microcode image is in /etc/microcode. This is the default.
- s *source***
Microcode image is on specified source. For example, fd0, cd0.
- l **latest****
Install latest level of microcode. This is the default.
- l **previous****
Install previous level of microcode.
- f** Install microcode even if the current level is not on the source.

Microcode installation to a SES device

Notes:

1. If the source is /etc/microcode, the image must be stored in the /etc/microcode directory on the system. If the system is booted from a NIM server, the image must be stored in the usr/lib/microcode directory of the SPOT the client is booted from.
2. If the source is CD (cdX), the CD must be in ISO 9660 format. There are no restrictions as to what directory to store the image.
3. If the source is diskette (fdX), the diskette must be in backup format and the image stored in the /etc/microcode directory.

The following is the common syntax command: `diag [-c] -d device -T "download [-s {/etc/microcode|source}]"`

Flag Description

- c** No console mode. Run without user interaction.
- d *device***
Run the task on the device or adapter specified.
- T **download****
Install microcode.
- s **/etc/microcode****
Microcode image is in /etc/microcode.
- s *source***
Microcode image is on specified source. For example, fd0, cd0.

Microcode installation to PCI SCSI RAID adapters

PCI SCSI RAID adapters that support this type of installation are:

- Type 4-H, PCI SCSI-2 Fast/Wide RAID Adapter (Feature Code 2493)
- Type 4-T, PCI 3-Channel Ultra2 SCSI RAID Adapter (Feature Code 2494)
- Type 4-X, PCI 4-Channel Ultra3 SCSI RAID Adapter (Feature Code 2498)

Notes:

1. If the image is on the hard drive, it must be stored in the /etc/microcode directory on the system. If the system is booted from a NIM server, the image must be stored in the usr/lib/microcode directory of the SPOT the client is booted from.
2. If the image is on a diskette, the diskette must be in backup format and the image stored in the /etc/microcode directory.

syntax: diag [-c] -d *RAIDadapterName* -T "download [-B] [-D] [-P]"

Flag	Description
------	-------------

- | | |
|---------------------------|---|
| -c | No console mode. Run without user interaction. |
| -d <i>RAIDadapterName</i> | Run the task on the RAID adapter specified. |
| -T download | Install microcode. |
| -B | Install boot block microcode. Default is functional microcode. |
| -D | Microcode image is on diskette. Default is /etc/microcode. |
| -P | Install the previous level of microcode. Default is latest level. |

Microcode installation to disk drive attached to PCI SCSI RAID adapters

Microcode for a disk drive attached to a PCI SCSI RAID adapter is installed through the adapter to the drive. PCI SCSI RAID adapters that support this type of installation are:

- Type 4-H, PCI SCSI-2 Fast/Wide RAID Adapter (Feature Code 2493)
- Type 4-T, PCI 3-Channel Ultra2 SCSI RAID Adapter (Feature Code 2494)
- Type 4-X, PCI 4-Channel Ultra3 SCSI RAID Adapter (Feature Code 2498)

Notes:

1. If the image is on the hard drive, it must be stored in the /etc/microcode directory on the system. If the system is booted from a NIM server, the image must be stored in the usr/lib/microcode directory of the SPOT the client is booted from.
2. If the image is on a diskette, the diskette must be in backup format and the image stored in the /etc/microcode directory.

syntax:diag [-c] -d *RAIDadapterName* -T "download {-l *chID* | -A} [-D] [-P]"

Flag	Description
------	-------------

- | | |
|---------------------------|---|
| -c | No console mode. Run without user interaction. |
| -d <i>RAIDadapterName</i> | Name of the RAID adapter the disk is attached to. |
| -T download | Install microcode. |
| -l | Physical disk channel/ID of RAID disk drive (example: 27). |
| -A | All disk drives attached to specified RAID adapter. |
| -D | Microcode image is on diskette. Default is /etc/microcode. |
| -P | Install the previous level of microcode. Default is latest level. |

Fault indicators

This task is only available through a command line interface. It is not available from the diagnostic menu nor from stand-alone diagnostics.

The fault indicators are used to identify a fault with the system. These indicators may be set automatically by hardware, firmware, or diagnostics when a fault is detected in the system.

The System Attention Indicator is turned off when a Log Repair Action is performed. All other Fault Indicators are turned off when the failing unit is repaired or replaced. After a serviceable event is complete, do a System Verification to verify the fix. Also, do a Log Repair Action if the test on the resource was good, and that resource had an entry in the error log.

For additional information concerning the use of these indicators, refer to the system unit service information.

Note: The AIX command does not allow you to set the fault indicators to the fault state.

Use the following command syntax:

```
/usr/lpp/diagnostics/bin/usysfault [-s normal] [-l location code | -d devicename]  
/usr/lpp/diagnostics/bin/usysfault [-t]
```

Flag	Description
------	-------------

-s *normal*

Sets the fault indicator to the normal state.

-l *location code*

Identifies the resource by physical location code.

-d *device name*

Identifies the resource by device name.

-t

Displays a list of all supported fault indicators by physical location codes.

When the command is used without the **-s** flag, the current state of the indicator is displayed as normal or fault.

When the command is used without the **-l** or **-d** flag, the System Attention Indicator is used.

Use the **-l** or **-d** flags only in systems that have more than one fault indicator.

Note: See also the Identify and system attention indicators.

Fibre channel RAID service aids

The fibre channel RAID service aids contain the following functions:

Certify LUN

This selection reads and checks each block of data in the logical unit number (LUN). If excessive errors are encountered, you are notified.

You can run this task from the AIX command line. Use the following fast-path command:

```
diag -T "certify"
```

Certify spare physical disk

This selection certifies (check integrity of the data) drives that are designated as spares.

You can run this task from the AIX command line. Use the following fast-path command:

```
diag -T "certify"
```

Format physical disk

This selection formats a selected disk drive.

You can run this task from the AIX command line. Use the following fast-path command:

```
diag -T "format"
```

Array controller microcode download

This selection updates the microcode on the fibre channel RAID controller when required.

You can run this task from the AIX command line. Use the following fast-path command:

```
diag -T "download"
```

Physical disk microcode download

This selection updates the microcode on any of the disk drives in the array.

You can run this task from the AIX command line. Use the following fast-path command:

```
diag -T "download"
```

Update EEPROM

This selection updates the contents of the electronically erasable programmable read-only memory (EEPROM) on a selected controller.

Replace controller

Use this selection when it is necessary to replace a controller in the array.

Flashdrive (USB)

Use to update microcode images or boot images for stand-alone diagnostics from a flash memory device.

After loading an ISO9660 or later image onto a supported USB flashdrive. The user will be prompted to connect a flashdrive, select a flashdrive from a list of available flashdrives, and finally select a source ISO image. The source image may be located on the filesystem or on removable media.

This service aid is also used to copy the contents of optical media and other flashdrives to a flashdrive.

Note: There is no command line interface for this task.

Flash SK-NET FDDI firmware

This task allows the flash firmware on the SysKconnect SK-NET FDDI adapter to be updated.

Format media

This task allows the selection of diskettes, hard disks, or optical media to be formatted. Each selection is described below.

Hard disk attached to SCSI adapter (non-RAID)

- **Hard disk Format**

Writes all of the disk. The pattern written on the disk is device-dependent; for example some drives may write all 0s, while some may write the hexadecimal number 5F. No bad block reassignment occurs

- **Hard disk Format and Certify**

Performs the same function as hard disk format. After the format is completed, Certify is run. Certify then reassigns all bad blocks encountered.

- **Hard disk Erase Disk**

This option can be used to overwrite (remove) all data currently stored in user-accessible blocks of the disk. The derase disk option writes one or more patterns to the disk. An additional option allows data in a selectable block to be read and displayed on the system console.

To use the erase disk option, specify the number (0-3) of patterns to be written. The patterns are written serially; that is, the first pattern is written to all blocks. The next pattern is written to all blocks, overlaying the previous pattern. A random pattern is written by selecting the **Write Random Pattern?** option.

Note: The erase disk service aid has not been certified as meeting the Department of Defense or any other organization's security guidelines.

To overwrite the data on the drive, use the following steps :

1. Select **Erase Disk**.
2. Do a format without certify.
3. Select **Erase Disk** to run it a second time.

For a newly installed drive, you can ensure that all blocks on the drive are overwritten with your pattern by using the following procedure:

1. Format the drive.
2. Check the defect MAP by running the erase disk option.

Note: If you use the format and certify option, there may be some blocks which get placed into the grown defect MAP.

3. If there are bad blocks in the defect MAP, record the information presented and ensure that this information is kept with the drive. This data is used later when the drive is to be overwritten.
4. Use the drive as you would normally.
5. When the drive is no longer needed and is to be erased, run the same version of the erase disk option which was used in step 2.

Note: Using the same version of the service aid is only critical if any bad blocks were found in step 3.

6. Compare the bad blocks which were recorded for the drive in step 3 with those that now appear in the grown defect MAP.

Note: If there are differences between the saved data and the newly obtained data, all sectors on this drive cannot be overwritten. The new bad blocks are not overwritten.

7. If the bad block list is the same, continue running the service aid to overwrite the disk with the chosen pattern(s).

This task can be run directly from the AIX command line. The command syntax is: `diag -c -d deviceName -T "format [-s* fmtcert | erase -a {read | write} -P {comma separated list of patterns}] [-F]*`

Note: The following flags are not available for pdisk devices.

Flag	Description
------	-------------

fmtcert	Formats and certifies the disk.
erase	Overwrites the data on the disk.
*	Available in no-console mode only.
-F	Forces the disk erasure even if all blocks cannot be erased because of errors accessing the grown defect map.
-P	Comma separated list of hexadecimal patterns to be written to the drive serially. Up to eight patterns can be specified using a single command. The patterns must be 1, 2, or 4 bytes long without a leading 0x or 0X. Example using five patterns: -P ff, a5c0, 00, fdb97531, 02468ace

Note: If no patterns are specified for the erase disk option in command line mode, then the default pattern of 00 is used.

Hard disk attached to PCI SCSI RAID adapter

This function formats the physical disks attached to a PCI SCSI RAID adapter. This task can be run directly from the AIX command line. The command line syntax is: `diag -c -d RAIDadapterName -T "format {-l chld | -A }"`

Flag Description

- l** Physical disk channel/ID (An example of a physical disk channel/ID is 27, where the channel is 2 and the ID is 7.)
- A** All disks

Optical media

Use the following functions to check and verify optical media:

- **Optical Media Initialize**
Formats the media without certifying. This function does not reassign the defective blocks or erase the data on the media. This option provides a quick way of formatting the media and cleaning the disk.

Note: It takes approximately one minute to format the media.
- **Optical Media Format and Certify**
Formats and certifies the media. This function reassigns the defective blocks and erases all data on the media.

This task can be run directly from the AIX command line. The command line syntax is: `diag -c -d deviceName -T "format [-s {initialize | fmtcert}]"`

Option Description

initialize

Formats media without certifying

fmtcert

Formats and certifies the media

DVD-RAM media

- **Initialize**
Formats the media without certifying. This function does not reassign the defective blocks or erase the data on the media. This format type can only be used with previously formatted media.
- **Format and Certify**
Formats and certifies the media. This function reassigns the defective blocks and erases the data on the media by writing an initialization pattern to the entire media.

This task can be run directly from the AIX command line. The command line syntax is: `diag -c -d deviceName -T "format [-s {initialize|fmtcert}]"`

Flag Description

- c** No console mode
- d** Used to specify a device
- s initialize**
Initialize the media (quick format). This is the default.

-s fmtcert

Formats and certifies the media.

-T

Used to specify the format task

Diskette format

This selection formats a diskette by writing patterns to it.

Gather system information

This service aid uses the AIX `snap` command to collect configuration information on networks, file systems, security, the kernel, the ODM, and other system components. You can also collect SSA adapter and disk drive configuration data, or AIX trace information for software debugging.

The output of the SNAP service aid can be used by field service personnel, or it can be put on removable media and transferred to remote locations for more extensive analysis.

To use the SNAP task, select **Gather system information** from the task list. You can select which components you want to collect information for, and where to store the data (hard disk or removable media).

Generic microcode download

Note: Generic microcode download is a subtask that can be accessed after selecting **Microcode Tasks**, see "Microcode tasks" on page 54.

The generic microcode download service aid provides a means of executing a gencode script from a diskette or tape. The purpose of this generic script is to load microcode to a supported resource.

The gencode program should be downloaded onto diskette or tape in **tar** format while the microcode image itself goes onto another one in **restore** format. Running the generic microcode download task will search for the gencode script on diskette or tape and execute it. It will ask for a gencode media to be inserted into the drive. The service aid moves the gencode script file to the **/tmp** directory and runs the program that downloads the microcode to the adapter or device.

This service aid is supported in both concurrent and stand-alone modes from disk, LAN, or loadable media.

Hot plug task

Attention: The Linux operating system does not support some hot pluggable procedures. Also, Linux does not support hot plugging any hot pluggable PCI adapters or devices. A system with Linux installed on one or more partitions must be shut down and powered off before replacing any PCI adapter or device assigned to a Linux partition. Follow the non-hot pluggable adapter or device procedures when replacing a PCI adapter or device in any partition with Linux installed.

The hot plug task provides software function for those devices that support hot plug or hot plug capability. This includes PCI adapters, SCSI devices, and some RAID devices. This task was previously known as "SCSI Device Identification and Removal" or "Identify and Remove Resource."

The hot plug task has a restriction when running in stand-alone or online service mode; new devices cannot be added to the system unless there is already a device with the same FRU part number installed in the system. This restriction is in place because the device software package for the new device cannot be installed in stand-alone or online service mode.

Depending on the environment and the software packages installed, selecting this task displays the following subtasks:

- PCI hot plug manager
- SCSI hot plug manager
- RAID hot plug devices

To run the hot plug task directly from the command line, type the following: `diag -T"identifyRemove"`

If you are running the diagnostics in online concurrent mode, run the missing options resolution procedure immediately after removing any device.

If the missing options resolution procedure runs with no menus or prompts, device configuration is complete. Select the device that has an uppercase M in front of it in the resource list so that missing options processing can be done on that resource.

PCI hot plug manager

Attention: The Linux operating system does not support some hot pluggable procedures. Also, Linux does not support hot plugging any hot pluggable PCI adapters or devices. A system with Linux installed on one or more partitions must be shut down and powered off before replacing any PCI adapter or device assigned to a Linux partition. Please follow the non-hot pluggable adapter or device procedures when replacing a PCI adapter or device in any partition with Linux installed.

The PCI hot plug manager task is a SMIT menu that allows you to identify, add, remove, or replace PCI adapters that are hot pluggable. The following functions are available under this task:

- List PCI hot plug slots

The list PCI hot plug slots function lists all PCI hot plug slots. Empty slots and populated slots are listed. Populated slot information includes the connected logical device. The slot name consists of the physical location code and the description of the physical characteristics for the slot.

- Add a PCI hot plug adapter

The add a PCI hot plug adapter function is used to prepare a slot for the addition of a new adapter. The function lists all the empty slots that support hot plug. When a slot is selected, the visual indicator for the slot blinks at the identify rate. After the slot location is confirmed, the visual indicator for the specified PCI slot is set to the action state. This means the power for the PCI slot is off and the new adapter can be plugged in.

- Replace/remove a PCI hot plug adapter

The replace/remove a PCI hot plug adapter function is used to prepare a slot for adapter exchange. The function lists all the PCI slots that support hot plug and are occupied. The list includes the slot's physical location code and the device name of the resource installed in the slot. The adapter must be in the defined state before it can be prepared for hot plug removal. When a slot is selected, the visual indicator for the slot is set to the identify state. After the slot location is confirmed, the visual indicator for the specified PCI slot is set to the action state. This means the power for the PCI slot is off, and the adapter can be removed or replaced.

- Identify a PCI hot plug slot

The identify a PCI hot plug slot function is used to help identify the location of a PCI hot plug adapter. The function lists all the PCI slots that are occupied or empty and support hot plug. When a slot is selected for identification, the visual indicator for the slot is set to the identify state.

- Unconfigure devices

The unconfigure devices function attempts to put the selected device, in the PCI hot plug slot, into the defined state. This action must be done before any attempted hot plug function. If the unconfigure function fails, it is possible that the device is still in use by another application. In this case, the customer or system administrator must be notified to quiesce the device.

- Configure devices

The configure devices function allows a newly added adapter to be configured into the system for use. This function should also be used when a new adapter is added to the system.

- Install/configure devices added after IPL

The install/configure devices added after IPL function attempts to install the necessary software packages for any newly added devices. The software installation media or packages are required for this function.

Stand-alone diagnostics has restrictions on using the PCI hot plug manager. For example:

- Adapters that are replaced must be exactly the same FRU part number as the adapter being replaced.
- New adapters cannot be added unless a device of the same FRU part number already exists in the system, because the configuration information for the new adapter is not known after the stand-alone diagnostics are booted.
- The following functions are not available from the stand-alone diagnostics and will not display in the list:
 - Add a PCI hot plug adapter
 - Configure devices
 - Install/configure devices added after IPL

You can run this task directly from the command line by typing the following command: `diag -d device -T"identifyRemove"`

However, note that some devices support both the PCI hot plug task and the RAID hot plug devices task. If this is the case for the *device* specified, then the hot plug task displays instead of the PCI hot plug manager menu.

SCSI hot plug manager

This task was previously known as SCSI Device Identification and Removal or Identify and Remove Resources. This task allows the user to identify, add, remove, and replace a SCSI device in a system unit that uses a SCSI Enclosure Services (SES) device. The following functions are available:

- List the SES Devices

The List the SES devices function lists all the SCSI hot plug slots and their contents. Status information about each slot is also available. The status information available includes the slot number, device name, whether the slot is populated and configured, and location.

- Identify a Device Attached to an SES Device

The identify a device attached to an SES device function is used to help identify the location of a device attached to an SES device. This function lists all the slots that support hot plug that are occupied or empty. When a slot is selected for identification, the visual indicator for the slot is set to the Identify state.

- Attach a Device to an SES Device

The attach a device to an SES device function lists all empty hot plug slots that are available for the insertion of a new device. After a slot is selected, the power is removed. If available, the visual indicator for the selected slot is set to the remove state. After the device is added, the visual indicator for the selected slot is set to the normal state, and power is restored.

- Replace/Remove a Device Attached to an SES Device

The replace/remove a device attached to an SES device function lists all populated hot plug slots that are available for removal or replacement of the devices. After a slot is selected, the device populating that slot is unconfigured; then the power is removed from that slot. If the unconfigure operation fails, it is possible that the device is in use by another application. In this case, the customer or system administrator must be notified to quiesce the device. If the unconfigure operation is successful, the visual indicator for the selected slot is set to the remove state. After the device is removed or replaced, the visual indicator, if available for the selected slot, is set to the normal state, and power is restored.

Note: Before you remove the device, be sure that no other host is using it.

- Configure Added/Replaced Devices

The configure added/replaced devices function runs the configuration manager on the parent adapters that had child devices added or removed. This function ensures that the devices in the configuration database are configured correctly.

Stand-alone diagnostics has restrictions on using the SCSI hot plug manager. For example:

- Devices being used as replacement devices must be exactly the same type of device as the device being replaced.
- New devices may not be added unless a device of the same FRU part number already exists in the system, because the configuration information for the new device is not known after the stand-alone diagnostics are booted.

You can run this task directly from the command line. The command line syntax is:

```
diag -d device-T"identifyRemove"  
OR  
diag [-c] -d device -T"identifyRemove -a [identify?remove]"
```

Flag	Description
------	-------------

- | | |
|----|--|
| -a | Specifies the option under the task. |
| -c | Run the task without displaying menus. Only command line prompts are used. This flag is only applicable when running an option such as identify or remove. |
| -d | Indicates the SCSI device. |
| -T | Specifies the task to run. |

SCSI and SCSI RAID hot plug manager

This task was previously called SCSI hot-swap manager, SCSI device identification and removal or Identify and remove resources. This task allows the user to identify, add, remove, and replace a SCSI device in a system unit that uses a SCSI hot plug enclosure device. This task also performs these functions on a SCSI RAID device attached to a PCI-X RAID controller. The following functions are available:

- List the SCSI hot plug enclosure devices
The list the SCSI hot plug enclosure devices function lists all the SCSI hot plug slots and their contents. Status information about each slot is also available. The status information available includes the slot number, device name, whether the slot is populated and configured, and location.
- Identify a device attached to a SCSI hot plug enclosure device
The identify a device attached to an SCSI hot plug enclosure device function is used to help identify the location of a device attached to a SCSI hot plug enclosure device. This function lists all the slots that support hot plug that are occupied or empty. When a slot is selected for identification, the visual indicator for the slot is set to the identify state.
- Attach a device to a SCSI hot plug enclosure device
The attach a device to a SCSI hot plug enclosure device function lists all empty hot plug slots that are available for the insertion of a new device. After a slot is selected, the power is removed. If available, the visual indicator for the selected slot is set to the remove state. After the device is added, the visual indicator for the selected slot is set to the normal state, and power is restored.
- Replace/remove a device attached to an SCSI hot plug enclosure device
The replace/remove a device attached to an SCSI hot plug enclosure device function lists all populated hot plug slots that are available for removal or replacement of the devices. After a slot is selected, the device populating that slot is unconfigured, the power is removed from that slot. If the unconfigure operation fails, it is possible that the device is in use by another application. In this case, the customer or system administrator must be notified to quiesce the device. If the unconfigure operation is

successful, the visual indicator for the selected slot is set to the remove state. After the device is removed or replaced, the visual indicator, if available for the selected slot, is set to the normal state, and power is restored.

Note: Before you remove the device, be sure that no other host is using it.

- Configure added/replaced devices

The configure added/replaced devices function runs the configuration manager on the parent adapters that had child devices added or removed. This function ensures that the devices in the configuration database are configured correctly.

Stand-alone diagnostics has restrictions on using the SCSI hot plug manager. For example:

- Devices being used as replacement devices must be exactly the same type of device as the device being replaced
- New devices may not be added unless a device of the same FRU part number already exists in the system, because the configuration information for the new device is not known after the stand-alone diagnostics are booted.

You can run this task directly from the command line. The command syntax is:

```
diag -d device -T"identifyRemove
```

OR

```
diag -d device -T"identifyRemove -a [identify|remove ]
```

Flags	Description
-------	-------------

- | | |
|----|--------------------------------------|
| -a | Specifies the option under the task. |
| -d | Indicates the SCSI device. |
| -T | Specifies the task to run. |

RAID hot plug devices

This task allows the user to identify or remove a RAID device in a system unit that uses a SCSI Enclosure Services (SES) device. The following subtasks are available:

- **Normal**
- **Identify**
- **Remove**

The normal subtask is used to return a RAID hot plug device to its normal state. This subtask is used after a device has been identified or replaced. This subtask lists all channel/IDs of the RAID and the status of the devices that are connected. A device in its normal state has power and the check light is off.

The identify subtask is used to identify the physical location of a device or an empty position in the RAID enclosure. This subtask lists all channel/IDs of the RAID and the status of the devices that are connected to the RAID enclosure. If a device is attached to the selected channel/ID, the check light on the device will begin to flash. If the channel/ID does not have a device attached, the light associated with the empty position on the enclosure will begin to flash.

The remove subtask is used to put the RAID hot plug device in a state where it can be removed or replaced. This subtask lists all channel/IDs of the RAID adapter that have devices that can be removed. Only devices with a status of Failed, Spare, Warning, or Non Existent can be removed. A device's status can be changed with the AIX **smitty pdam** command. After a device is selected for removal, the check light on the device will begin to flash, indicating that you may physically remove that device.

Stand-alone diagnostics has restrictions on using the RAID hot plug manager:

- Devices being used as replacement devices must be exactly the same type of device as the device being replaced.
- New devices may not be added unless a device of the same FRU part number already exists in the system because the configuration information for the new device is not known after the stand-alone diagnostics are booted.

You can run this task directly from the command line. The command line syntax is:

```
diag -c -d devicename -T "identifyRemove -l ChId -s {identify|remove|normal}
```

Flags Description

- c** Run the task without displaying menus. Only command line prompts are used.
- d** Raid adapter device name (for example, *scaid0*).
- s** Subtask to execute such as *identify*, *remove*, or *normal*.
- l** *CHId* is the channel number of the RAID adapter and SCSI ID number of the position in the enclosure concatenated together (for example, *27* for channel 2, device 7).
- T** Task to run.

Identify indicators

The component and attention LEDs assist in identifying failing components in your server.

Identify and system attention indicators

This task is used to display or set the identify indicators and the single system attention indicator on the systems that support this function.

Some systems may support only the identify indicators or only the attention indicator. The identify indicators are used to help physically identify the system, enclosure, or FRU in a large equipment room. The attention indicator is used to alert a user that the system needs attention and may have a hardware problem. In most cases, when an identify indicator is set to the Identify state, this results in a flashing LED, and when an attention indicator is set to the Attention state, this results in a solid LED.

When a hardware problem has been detected on a system that supports the attention indicator, the indicator is set to an attention state. After the failure has been identified, repaired, and a repair action has been logged, the attention indicator is reset to the normal state.

This task can also be run directly from the command line by typing

```
/usr/lpp/diagnostics/bin/usysident [-s {normal | identify}][-l location code | -d device name]  
/usr/lpp/diagnostics/bin/usysident [-t]
```

Flag Description

- s {normal | identify}**
Sets the state of the system identify indicator to either normal or identify.
- l *location code***
Identifies the resource by physical location code.
- d *device name***
Identifies the resource by device name
- t** Displays a list of all supported identify indicators by physical location codes.

When this command is used without the **-l** or the **-d** flags, the primary enclosure resource is used.

Use the `-l` flag only in systems that have more than one identify indicator. Use of the `-d` flag is preferred over use of the `-l` flag.

When this command is used without the `-s` flag, the current state of the identify indicator is displayed.

Local area network analyzer

This selection is used to exercise the LAN communications adapters (token ring, Ethernet, and (FDDI) Fiber Distributed Data Interface). The following services are available:

- Connectivity testing between two network stations. Data is transferred between the two stations, requiring the user to provide the Internet addresses of both stations.
- Monitoring ring (token ring only). The ring is monitored for a specified period of time. Soft and hard errors are analyzed.

Log repair action

The log repair action task logs a repair action in the AIX error log. A repair action log indicates that a FRU has been replaced, and error log analysis should not be done for any errors logged before the repair action. The log repair action task lists all resources. Replaced resources can be selected from the list, and when **commit** (F7 key) is selected, a repair action is logged for each selected resource.

To locate the failing part in a system or partition running AIX, do the following:

1. Log in as root user.
2. At the command line, enter `diag`.
3. Select the **Diagnostics Routines** option.
4. When the DIAGNOSTIC MODE SELECTION menu displays, select **Problem Determination**.
5. When the ADVANCED DIAGNOSTIC SELECTION menu displays, do one of the following: To test a single resource, select the resource from the list. To test all the resources available to the operating system, select All Resources.
6. Press Enter, and wait until the diagnostic programs run to completion, responding to any prompts that appear on the console.
7. Use the location information for the failing part to activate the indicator light that identifies the failing part. For instructions, see Activate the indicator light for the failing part.

Microcode tasks

Similar microcode tasks are combined under a single task topic, while providing a way to access the microcode and flashing features. The combined tasks that are included under Microcode tasks are:

- Display microcode level
- Download microcode
- Generic microcode download
- Update system or service processor flash
- Update and manage system flash

PCI RAID physical disk identify

For a description of the PCI RAID physical disk identify task, see SCSI RAID Physical Disk Status and Vital Product Data.

PCI-X SCSI disk array manager

Restriction:

- There are limits to the amount of disk drive capacity allowed in a single RAID array. For example, when using the 32 bit kernel, there is a capacity limitation of 1 TB per RAID array and when using the 64 bit kernel, there is a capacity limitation of 2 TB per RAID array. For RAID adapters and RAID enablement cards, this limitation is enforced by the AIX operating system when the RAID arrays are created using the PCI-X SCSI disk array manager.
- When creating a RAID array of up to 2 TB using AIX stand-alone diagnostics, ensure version 5.3.0.40 or higher is used. Previous versions of AIX stand-alone diagnostics has a capacity limitation of 1 TB per RAID array.

This service aid calls the **smitty pdam** fastpath, and is used to manage a RAID array connected to a SCSI RAID adapter. It may also be run from stand-alone diagnostics, which are available on systems or partitions with operating systems other than AIX installed on them (these environments do not allow you to run the **smitty pdam** command).

Some of the tasks performed using this service aid include:

- Check device status for the disk array on your system.
- Display information of physical drives and disk arrays.
- Run recovery options on the RAID (which needs to be done at the end of a service call in which you replaced the RAID adapter cache card or changed the RAID configuration)

Other RAID functions are available using this service aid; they should only be used by the system administrator who is familiar with the RAID configuration. These functions are normally done when booting AIX by running **smitty pdam** from the command line.

Attention: Without knowledge of how the RAID was set up, these functions can cause loss of data stored on the RAID.

Process supplemental media

Diagnostic supplemental media contains all the necessary diagnostic programs and files required to test a particular resource. The supplemental media is normally released and shipped with the resource as indicated on the diskette label. Diagnostic supplemental media must be used when the device support has not been incorporated into the latest diagnostic CD-ROM.

This task processes the diagnostic supplemental media. Insert the supplemental media when you are prompted; then press Enter. After processing has completed, go to the resource selection list to find the resource to test.

Notes:

1. This task is supported in stand-alone diagnostics only.
2. Process and test one resource at a time. Run diagnostics after each supplemental media is processed. (For example, if you need to process two supplemental media, run diagnostics twice, once after each supplement media is processed.)

Run diagnostics

The run diagnostics task invokes the resource selection list menu. When the commit key is pressed, diagnostics are run on all selected resources.

The procedures for running the diagnostics depend on the state of the diagnostics run-time options. See Display or change diagnostic run-time options.

Run error log analysis

The run error log analysis task invokes the resource selection list menu. When the commit key is pressed, error log analysis is run on all selected resources.

SCSI bus analyzer

This service aid allows you to diagnose a SCSI bus problem in a freelance mode.

To use this service aid, the user should understand how a SCSI bus works. Use this service aid when the diagnostics cannot communicate with anything on the SCSI bus and cannot isolate the problem. Normally the procedure for finding a problem on the SCSI bus with this service aid is to start with a single device attached, ensure that it is working, then start adding additional devices and cables to the bus, ensuring that each one works. This service aid works with any valid SCSI bus configuration.

The SCSI bus service aid transmits a SCSI inquiry command to a selectable SCSI address. The service aid then waits for a response. If no response is received within a defined amount of time, the service aid displays a timeout message. If an error occurs or a response is received, the service aid then displays one of the following messages:

- The service aid transmitted a SCSI Inquiry Command and received a valid response back without any errors being detected.
- The service aid transmitted a SCSI Inquiry Command and did not receive any response or error status back.
- The service aid transmitted a SCSI Inquiry Command and the adapter indicated a SCSI bus error.
- The service aid transmitted a SCSI Inquiry Command and an adapter error occurred.
- The service aid transmitted a SCSI Inquiry Command and a check condition occur.

When the SCSI bus service aid is started a description of the service aid displays.

Pressing Enter displays the adapter selection menu. Use this menu to enter the address to transmit the SCSI Inquiry Command.

When the adapter is selected, the SCSI bus address selection menu displays. Use this menu to enter the address to transmit the SCSI inquiry command.

After the address is selected, the SCSI bus test run menu displays. Use this menu to transmit the SCSI inquiry command by pressing Enter. The service aid then indicates the status of the transmission. When the transmission is completed, the results of the transmission displays.

Notes:

1. A check condition can be returned when the bus or device is working correctly.
2. If the device is in use by another process, AIX does not send the command.

SCSI RAID physical disk status and vital product data

Note: This task was previously known as the PCI RAID physical disk identify task.

Use this service aid when you want to look at the vital product data for a specific disk attached to a RAID adapter. This service aid displays all disks that are recognized by the PCI RAID adapter, along with their status, physical location, microcode level, and other vital product data. The physical location of a disk consists of the channel number of the RAID adapter and the SCSI ID number of the position in the enclosure. The microcode level is listed next to the physical location of the disk.

You can run this task directly from the command line with the following command syntax:

```
diag -c -d devicename -T "identify"
```

Flags	Description
-------	-------------

- | | |
|----|--|
| -c | Run the task without displaying menus. Only command line prompts are used. |
| -d | RAID adapter device name (for example, <i>scaid0</i>). |
| -T | Task to run. |

SCSD tape drive service aid

This service aid allows you to obtain the status or maintenance information from a SCSD tape drive. Not all models of SCSD tape drive are supported.

The service aid provides the following options:

- Display time since a tape drive was last cleaned. The time since the drive was last cleaned displays on the screen, as well as a message regarding whether the drive is recommended to be cleaned.
- Copy a tape drive's trace table. The trace table of the tape drive is written to diskettes or a file. The diskettes must be formatted for DOS. Writing the trace table may require several diskettes. The actual number of diskettes is determined by the size of the trace table. Label the diskettes as follows: TRACE*x*.DAT (where *x* is a sequential diskette number). The complete trace table consists of the sequential concatenation of all the diskette data files.
When the trace table is written to a disk file, the service aid prompts for a file name. The default name is: **/tmp/TRACE. x**, where *x* is the AIX name of the SCSD tape drive being tested.
- Display or copy a tape drive's log sense information. The service aid provides options to display the log sense information to the screen, to copy it to a DOS formatted diskette, or to copy it to a file. The file name **LOGSENSE.DAT** is used when the log sense data is written to the diskette. The service aid prompts for a file name when you have selected that the log sense data is to be copied to a file.

This service aid can be run directly from the AIX command line. See the following command syntax (path is **/usr/lpp/diagnostics/bin/utape**):

```
utape [-h | -?] [-d device] [-n | -l | -t]  
OR  
utape -c -d device [-v] {-n | {-l | -t} { -D | -f [ filename]}}
```

Flag	Description
------	-------------

- | | |
|--------|---|
| -c | Run the service aid without displaying menus. The return code indicates success or failure. The output is suppressed except for the usage statement and the numeric value for hours since cleaning (if -n and -D flags are used). |
| -D | Copy data to diskette. |
| -f | Copy data to the file name given after this flag or to a default file name if no name is specified. |
| -h, -? | Display a usage statement and/or return code. If the -c flag is present, only the return code displays to indicate the service aid did not run. If the -c is not used, a usage statement displays and the service aid exits. |
| -l | Display or copy log sense information. |
| -n | Display time since drive was last cleaned. |
| -t | Copy trace table. |
| -v | Verbose mode. If the -c flag is present, the information displays on the screen. If the -n flag is present, the information about tape-head cleaning is printed. |

Spare sector availability

This selection checks the number of spare sectors available on the optical disk. The spare sectors are used to reassign when defective sectors are encountered during normal usage or during a format and certify operation. Low availability of spare sectors indicates that the disk must be backed up and replaced. Formatting the disk does not improve the availability of spare sectors.

You can run this task directly from the AIX command line. The command syntax is: `diag -c -d deviceName -T chkspares`

SSA service aid

This service aid provides tools for diagnosing and resolving problems on SSA-attached devices. The following tools are provided:

- Set Service Mode
- Link Verification
- Configuration Verification
- Format and Certify Disk

System fault indicator

If a failing component is detected in your system, an amber-colored attention LED on the front of the system unit is turned on solid (not blinking).

System identify indicator

To identify a system from a group of systems, an amber-colored attention LED on the front of the system unit is blinking.

Update disk-based diagnostics

This service aid allows fixes (APARs) to be applied.

This task invokes the SMIT update software by fix (APAR) task. The task allows the input device and APARs to be selected. You can install any APAR using this task.

Update system or service processor flash

Notes:

1. Update system or service processor flash is a subtask that can be accessed after selecting **Microcode Tasks**, see "Microcode tasks" on page 54.
2. This task has been replaced with the Update and manage system Flash" task, see "Update and manage system flash" on page 60.

Attention: If the system is running on a logically partitioned system, ask the customer or system administrator if a service partition has been designated.

- If a service partition has been designated, ask the customer or system administrator to shut down all of the partitions except the one with service authority. The firmware update can then be done using the service aid or the AIX command line in that partition.
- If a service partition has not been designated, the system must be shut down. If the firmware update image is available on backup diskettes or optical media, the firmware update can then be done from the service processor menus as a privileged user. If the firmware update image is in a file on the system, reboot the system in a full system partition and use the following normal firmware update procedures.

If the system is already in a full system partition, use the following normal firmware update procedures.

This selection updates the system or service processor flash. Some systems may have separate images for system and service processor firmware; newer systems have a combined image that contains both in one image.

Look for additional update and recovery instructions with the update kit. You need to know the fully qualified path and file name of the flash update image file provided in the kit. If the update image file is on a diskette or optical media, the service aid can list the files on the diskette or optical media for selection. The diskette must be a valid backup format diskette.

Refer to the update instructions with the kit, or the service information for the system unit to determine the current level of the system unit or service processor flash memory.

When this service aid is run from online diagnostics, the flash update image file is copied to the **/var** file system. Put the source of the microcode that you want to download into the **/etc/microcode** directory on the system. If there is not enough space in the **/var** file system for the new flash update image file, an error is reported. If this error occurs, exit the service aid, increase the size of the **/var** file system, and retry the service aid. After the file is copied, a screen requests confirmation before continuing with the flash update. When you continue the update flash, the system reboots using the **shutdown -u** command. The system does not return to the diagnostics, and the current flash image is not saved. After the reboot, you can remove the **/var/update_flash_image** file.

When this service aid is run from stand-alone diagnostics, the flash update image file is copied to the file system from diskette, optical media, or from the Network Installation Management (NIM) server. Using a diskette, the user must provide the image on backup format diskette because the user does not have access to remote file systems or any other files that are on the system. If using the NIM server, the microcode image must first be copied onto the NIM server in the **/usr/lib/microcode** directory pointed to the NIM SPOT (from which you plan to have the NIM client boot stand-alone diagnostics) prior to performing the NIM boot of diagnostics. Next, a NIM check operation must be run on the SPOT containing the microcode image on the NIM server. After performing the NIM boot of diagnostics, you can use this service aid to update the microcode from the NIM server by choosing the **/usr/lib/microcode** directory when prompted for the source of the microcode that you want to update. If not enough space is available, an error is reported, stating additional system memory is needed. After the file is copied, a screen requests confirmation before continuing with the flash update. When you continue with the update, the system reboots using the **reboot -u** command. You may receive a Caution: some process(es) wouldn't die message during the reboot process. You can ignore this message. The current flash image is not saved.

You can use the **update_flash** command in place of this service aid. The command is located in the **/usr/lpp/diagnostics/bin** directory. The command syntax is as follows:

```
update_flash [-q ]-f file_name
update_flash [-q ]-D device_name -f file_name
update_flash [-q ]-D update_flash [-q ]-D device_name -l
```

Attention: The `update_flash` command reboots the entire system. Do not use this command if more than one user is logged in to the system.

Flag	Description
------	-------------

- | | |
|-----------------|--|
| <code>-D</code> | Specifies that the flash update image file is on diskette. The <code>device_name</code> variable specifies the device. The default <code>device_name</code> is <code>/dev/fd0</code> . |
| <code>-f</code> | Flash update image file source. The <code>file_name</code> variable specifies the fully qualified path of the flash update image file. |
| <code>-l</code> | Lists the files on a diskette, from which the user can choose a flash update image file. |
| <code>-q</code> | Forces the <code>update_flash</code> command to update the flash EPROM and reboot the system without asking for confirmation. |

Update and manage system flash

Notes: Update and manage system flash is a subtask that can be accessed after selecting **Microcode Tasks**, see “Microcode tasks” on page 54.

Attention: If the system is managed by an HMC, the firmware update must be done through the HMC. If the system is not managed by an HMC, the firmware update can be done using the service aid or the AIX command line.

This selection validates a new system firmware flash image and uses it to update the system temporary flash image. This selection can also be used to validate a new system firmware flash image without performing an update, commit the temporary flash image, and reject the temporary flash image.

When this service aid is run from online diagnostics, the flash update image file is copied to the `/var` file system. If there is not enough space in the `/var` file system for the new flash update image file, an error is reported. If this error occurs, exit the service aid, increase the size of the `/var` file system, and retry the service aid. After the file is copied, a screen requests confirmation before continuing with the flash update. When you continue the update flash, the system reboots using the `shutdown -u` command. The system does not return to the diagnostics, and the current flash image is not saved. After the reboot, you can remove the `/var/update_flash_image` file.

When this service aid is run from stand-alone diagnostics, the flash update image file is copied to the file system from optical media, or from the NIM server. If using the NIM server, the server firmware image must first be copied onto the NIM server in the `/usr/lib/microcode` directory pointed to the NIM SPOT (from which you plan to have the NIM client boot stand-alone diagnostics) prior to performing the NIM boot of diagnostics. Next, a NIM check operation must be run on the SPOT containing the microcode image on the NIM server. After performing the NIM boot of diagnostics one can use this service aid to update the microcode from the NIM server by choosing the `/usr/lib/microcode` directory when prompted for the source of the microcode that you want to update. If not enough space is available, an error is reported, stating additional system memory is needed. After the file is copied, a screen requests confirmation before continuing with the flash update. When you continue with the update, the system reboots using the `reboot -u` command. You may receive a message that says: "Caution: some process(es) wouldn't die" during the reboot process; you can ignore this message. The current flash image is not saved.

You can use the `update_flash` command in place of this service aid. The command is located in the `/usr/lpp/diagnostics/bin` directory. The command syntax is as follows:

```
update_flash [-q | -v] -f file_name
update_flash [-q | -v] -D device_name -f file_name
update_flash [-q | -v] -D update_flash [-l]
update_flash -c
update_flash -r
```

Attention: The `update_flash` command reboots the entire system. Do not use this command if more than one user is logged in to the system.

Flag	Description
<code>-D</code>	Specifies that the flash update image file is on diskette. The <code>device_name</code> variable specifies the device. The default <code>device_name</code> is <code>/dev/fd0</code> .
<code>-f</code>	Flash update image file source. The <code>file_name</code> variable specifies the fully qualified path of the flash update image file.
<code>-l</code>	Lists the files on a diskette, from which the user can choose a flash update image file.
<code>-q</code>	Forces the <code>update_flash</code> command to update the flash EPROM and reboot the system without asking for confirmation.
<code>-v</code>	Validates the flash update image. No update will occur. This flag is not supported on all systems.
<code>-c</code>	Commits the temporary flash image when booted from the temporary image. This overwrites the permanent image with the temporary image. This flag is not supported on all systems.
<code>-r</code>	Rejects the temporary image when booted from the permanent image. This overwrites the temporary image with the permanent image. This flag is not supported on all systems.

Examples: Commands

To download the adapter microcode, use this command syntax: `diag -c -d deviceName -T "download [-B] [-D] [-P]"`

Flag	Description
<code>-B</code>	Download boot block microcode (default to functional microcode)
<code>-D</code>	Microcode is on diskette (default to <code>/etc/microcode</code> directory)
<code>-P</code>	Download the previous level of microcode (default to latest level)

To download physical disk microcode, use this command syntax : `diag -c -d deviceName -T "download -l ChId [-D] [-P]"`

Flag	Description
<code>-D</code>	Microcode is on diskette (default to <code>/etc/microcode</code> directory)
<code>-l</code>	Physical disk channel/ID (for example, 27)
<code>-P</code>	Download the previous level of microcode (default to latest level)

To format a physical disk, use this command syntax: `diag -c -d deviceName -T "format -l ChId"`

Flag	Description
<code>-l</code>	Physical disk channel/ID (for example, 27)

To certify a physical disk, use this command syntax: `diag -c -d deviceName -T "certify -l ChId"`

Flag	Description
<code>-l</code>	Physical disk channel/ID (for example, 23)

To identify a physical disk, use this command syntax: `diag -c -d deviceName -T "identify"`

Component and attention LEDs

The component and attention LEDs assist in identifying devices and components in your server when an action is needed or if there is a failure.

If a failing component is detected in your system, an amber attention LED on the front of the system unit is turned on solid (not blinking). You can use the service processor menus (available from the Advanced System Management Interface) or AIX Service Aid menu to blink the FRU LED for the failing FRU.

Individual LEDs are located on or near the failing field replaceable unit (FRU). The LEDs are located either on the component itself or on the carrier of the component (for example, memory card, fan, memory module, CPU). LEDs are either green or amber.

Green LEDs indicate either of the following:

- Electrical power is present.
- Activity is occurring on a link. (The system could be sending or receiving information.)

Amber LEDs indicate a fault or identify condition. If your system or one of the components in your system has an amber LED turned on or blinking, identify the problem and take the appropriate action to restore the system to normal.

The following table identifies the color and status of the component and attention LEDs. Units or FRUs may not have all of the LEDs listed in the table.

Unit (FRU)	LED Function	LED Color	Off	On	Blink
System attention	Attention	Amber	Normal	Fault	Identify
System power	Power	Green	No ac power	System on	Standby
Fan	Identify	Amber	Normal		Identify
	Power	Green	No power	Power on	
Power supply	ac power input good	Green	No Input	Input good	
	Identify	Amber	Normal	Fault	Identify
	dc power output good	Green	All power supply outputs off	All power supply outputs on	Control voltage good
Disk drives	Activity	Green	No disk activity	Disk being accessed	
	Identify	Amber			Identify
PCI slot	Power	Green	No power	Power on	
	Identify	Amber	Normal		Identify
RIO/HSL	Identify	Amber	Normal		Identify
Memory DIMM	Identify	Amber	Normal		Identify
System backplane	Identify	Amber	Normal		Identify
PCI riser card	Power	Green	No power	Power on	
	Identify	Amber	Normal		Identify
Disk drive backplane	Identify	Amber	Normal		Identify

Unit (FRU)	LED Function	LED Color	Off	On	Blink
Media backplane	Identify	Amber	Normal		Identify
Service processor card	Identify	Amber	Normal		Identify
Voltage regulator module	Identify	Amber	Normal		Identify
RAID adapter card	Identify	Amber	Normal		Identify
HMC port	Link	Green	No link	Link	
	Activity	Green	No activity		Activity
Imbedded Ethernet	Link	Green	No link	Link	
	Activity	Green	No activity		Activity
Node assembly	Power	Green	No power	Power on	
	Identify	Amber	Normal		Identify
Bulk power controller (BPC)	Activity	Green	No power	Power on	
	Identify	Amber	Normal		Identify
Motor drive assembly (MDA)	Power	Green	No power	Power on	
Motor scroll assembly (MSA)	Identify	Amber	Normal		Identify
MCM	Identify	Amber	Normal		Identify
Light strip	Power	Green	No power	Power on	
	Identify	Amber	Normal		Identify

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Industry Canada Compliance Statement

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Avis de conformité à la réglementation d'Industrie Canada

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European Community contact:
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Technical Regulations, Department M456
IBM-Allee 1, 71139 Ehningen, Germany
Tele: +49 7032 15-2937
email: tjahn@de.ibm.com

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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

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Generelle Informationen:

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