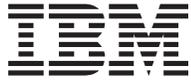




xSeries 455 FAQ  
Hints and Tips







@server

xSeries 455 FAQ  
Hints and Tips

**Note:** Before using this information and the product it supports, be sure to read the general information in “Notices”, on page 35.

**First Edition (December 2003)**

**© Copyright International Business Machines Corporation 2003. All rights reserved.**

US Government Users Restricted Rights – Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

---

# Contents

<b>Chapter 1. Introduction</b> . . . . .	1
xSeries 455 documentation . . . . .	1
Before you begin . . . . .	2
Major components of the xSeries 455 . . . . .	3
Features and specifications of the xSeries 455 . . . . .	4
<b>Chapter 2. Hints and tips</b> . . . . .	5
Device drivers. . . . .	5
Drives . . . . .	5
Error messages and indicators . . . . .	6
Ethernet controllers. . . . .	8
Firmware updates and recovery process . . . . .	8
Keyboards . . . . .	12
Light path diagnostics . . . . .	12
Memory . . . . .	13
Microprocessors . . . . .	13
Operating systems . . . . .	15
PCI hot-plug expansion slots . . . . .	19
PCI hot-plug features with the Linux operating system . . . . .	20
Power supplies . . . . .	27
Remote Supervisor Adapter . . . . .	27
Resource CD . . . . .	30
ServeRAID adapter installation requirements . . . . .	30
Supported options. . . . .	30
Support telephone numbers . . . . .	31
Troubleshooting . . . . .	31
Video . . . . .	31
Wake on LAN . . . . .	31
<b>Chapter 3. Getting help and technical assistance</b> . . . . .	33
Before you call . . . . .	33
Using the documentation . . . . .	33
Getting help and information from the World Wide Web . . . . .	34
Software service and support . . . . .	34
Hardware service and support . . . . .	34
<b>Appendix. Notices</b> . . . . .	35
Edition notice . . . . .	35
Trademarks . . . . .	36
Important notes. . . . .	36



---

## Chapter 1. Introduction

The information provided in this document is based on technical observations, and it is intended to supplement the IBM® @server™ xSeries™ 455 documentation that comes with the server. The topics are arranged alphabetically to help you find the information.

The latest versions of the xSeries 455 documentation is available in Portable Document Format (PDF) from <http://www.ibm.com/pc/support/>.

---

### xSeries 455 documentation

The xSeries 455 documentation includes the following documents:

- *Installation Guide*  
This printed document contains instructions for setting up your server and basic instructions for installing some options.
- *Option Installation Guide*  
This document is in PDF on the IBM *xSeries Documentation* CD. It contains detailed instructions for installing, removing, and connecting optional devices that your server supports.
- *Safety Information*  
This document is in PDF on the IBM *xSeries Documentation* CD. It contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the *Safety Information* document.
- *Rack Installation Instructions*  
This printed document contains instructions for installing your server in a rack.
- *Hardware Maintenance Manual and Troubleshooting Guide*  
This document is in PDF on the IBM *xSeries Documentation* CD. It contains information to help you solve problems yourself, and it contains information for service technicians.
- *IBM @server xSeries 455 User's Guide*  
This document is in PDF on the IBM *xSeries 455 Documentation* CD. It contains general information about the server, including information about features, how to configure the server, and how to get help.
- *IBM @server xSeries 455 Planning and Installation Guide*  
This document is in PDF and is available for download from <http://www.ibm.com/redbooks/>.

You can obtain up-to-date information about the xSeries 455 server and other IBM server products at <http://www.ibm.com/eserver/xseries/>.

Complete the following steps to check for updated documentation and technical updates:

1. Go to <http://www.ibm.com/pc/support/>.
2. In the **Learn** section, click **Online publications**.
3. On the "Online publications" page, in the **Brand** field, select **Servers**.
4. In the **Family** field, select **xSeries 455**.
5. Click **Continue**.

---

## Before you begin

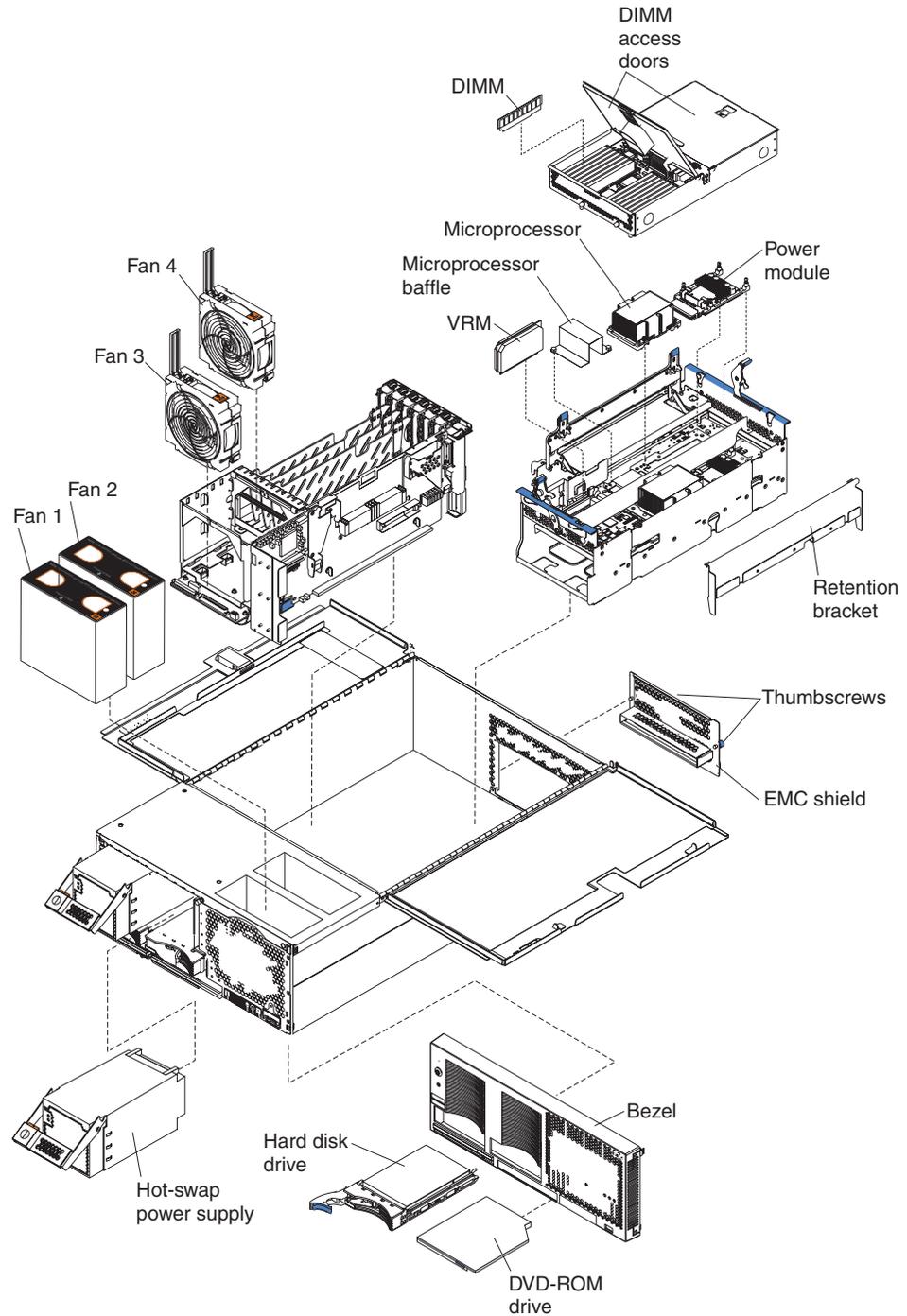
Read the following information before you use the hints and tips in this document:

- Review the "Safety information" and "Handling static-sensitive devices" sections in the documentation that comes with the server. These guidelines will help you work safely while working with the server or options.
- Back up all important data before you make changes to disk drives.
- For a list of supported options for the xSeries 455, go to <http://www.ibm.com/pc/us/compat/>.
- Verify the following server components and connections:
  - All adapters, boards, fans, power supplies, and internal devices are fully seated and connected correctly.
  - All cables and cords are connected securely to the server and to any installed optional devices.
  - Each drive bay contains either a drive or a filler panel.
  - Each unoccupied PCI-X slot contains an expansion-slot cover.
  - Power supplies are installed in both power-supply bays.
  - Both power cords are connected to the power supplies and to an ac power source.
  - For redundant and hot-swappable operation, the power supplies are connected to 200-240 V ac. The power supplies are hot-swappable and redundant only at 200-240 V ac.
  - All microprocessors are the same type and have the same cache size and clock speed.
- Verify the server installation:
  - There is sufficient space around the server to allow the cooling system to work properly.
  - The top cover is closed during normal operation. For proper cooling, do not leave the cover open for more than 15 minutes.
  - The rack into which you plan to install the server has perforated doors.
- When you replace a hot-swap drive, wait 15 seconds after removing the defective drive before you install the new drive.

# Major components of the xSeries 455

The following illustration shows the major components in the xSeries 455 server.

**Note:** The illustrations in this document might differ slightly from the hardware.



## Features and specifications of the xSeries 455

The following table provides a summary of the server features and specifications.

<p><b>Microprocessor:</b></p> <ul style="list-style-type: none"> <li>Intel® Itanium 2 1.3 MHz or higher, depending on server model</li> <li>3 MB (minimum) Level-3 cache</li> <li>200 MHz front-side bus (FSB), at two data transfers per cycle, yielding a 400 MHz system bus (minimum)</li> <li>Support for up to four microprocessors</li> <li>Xcel4™ Server Accelerator Cache: 64 MB</li> </ul> <p><b>Note:</b> Use the Configuration/Setup Utility program to determine the type and speed of the microprocessors in your server.</p> <p><b>Active Memory™:</b></p> <ul style="list-style-type: none"> <li>Minimum: 1 GB</li> <li>Maximum: 56 GB</li> <li>Type: 2-way interleaved PC2100, ECC DDR SDRAM, registered DIMMs only</li> <li>Supports 512 MB, 1 GB, and 2 GB dual inline memory modules (DIMMs)</li> </ul> <p><b>Drives standard:</b></p> <p>DVD/CD-RW: IDE</p> <p><b>Expansion bays:</b></p> <ul style="list-style-type: none"> <li>Two removable media bays (one DVD/CD-RW preinstalled)</li> <li>Supports up to two internal Ultra320 SCSI hard disk drives</li> </ul> <p><b>Active™ PCI-X expansion slots:</b></p> <p>Six 64-bit Active PCI-X expansion slots:</p> <ul style="list-style-type: none"> <li>Two 66 MHz PCI-X slots</li> <li>Two 100 MHz PCI-X slots</li> <li>Two 133 MHz PCI-X slots</li> </ul> <p><b>Cooling:</b></p> <p>Four hot-swap fans</p> <ul style="list-style-type: none"> <li>Two 150 mm x 51 mm fans</li> <li>Two 150 mm x 38 mm fans</li> </ul> <p><b>Acoustical noise emissions:</b></p> <ul style="list-style-type: none"> <li>Declared sound power, idle: 6.5 bels</li> <li>Declared sound power, operating: 6.5 bels</li> <li>Bystander sound pressure, idle: 49 dBa</li> <li>Bystander sound pressure, operating: 49 dBa</li> </ul>	<p><b>Power supply:</b></p> <p>Two power supplies: 550 watts at 100-127 V ac or 1050 watts at 200-240 V ac (hot-swappable and redundant at 200-240 V ac only)</p> <p><b>Video:</b></p> <ul style="list-style-type: none"> <li>Integrated ATI RageXL video</li> <li>PCI bus interface</li> <li>Compatible with SVGA</li> <li>8 MB SDRAM video memory</li> </ul> <p><b>Size (4 U):</b></p> <ul style="list-style-type: none"> <li>Height: 17.5 cm (6.9 inches, 4 U)</li> <li>Depth: 71.3 cm (28.1 inches)</li> <li>Width: 44 cm (17.3 inches)</li> <li>Maximum weight: 54.3 kg (120 lb), depending on your configuration</li> </ul> <p><b>Integrated functions:</b></p> <ul style="list-style-type: none"> <li>Broadcom 5704 10/100/1000 dual port Ethernet controller</li> <li>Light path diagnostics</li> <li>One external and one internal Ultra320 SCSI port (dual-channel integrated controller with RAID capabilities)</li> <li>Remote Supervisor Adapter (service processor) <ul style="list-style-type: none"> <li>ASM interconnect (peer-to-peer) port</li> <li>Ethernet port</li> <li>Serial port</li> </ul> </li> <li>IDE controller</li> <li>RXE Management Port</li> <li>RXE Expansion Ports</li> <li>USB ports</li> <li>Serial port</li> <li>SMP Expansion Ports</li> <li>Wake on LAN®</li> </ul> <p><b>Environment:</b></p> <ul style="list-style-type: none"> <li>Air temperature: <ul style="list-style-type: none"> <li>Server on: 10° to 35°C (50.0° to 95.0°F). Altitude: 0 to 914 m (2998.7 ft)</li> <li>Server on: 10° to 32°C (50.0° to 89.6°F). Altitude: 0 to 2133 m (6998.0 ft)</li> <li>Server off: -40° to 60°C (-104° to 140°F). Maximum altitude: 2133 m (6998.0 ft)</li> </ul> </li> <li>Humidity: <ul style="list-style-type: none"> <li>Server on: 8% to 80%</li> <li>Server off: 5% to 100%</li> </ul> </li> </ul>	<p><b>Heat output:</b></p> <p>Approximate heat output in British thermal units (Btu) per hour</p> <ul style="list-style-type: none"> <li>Minimum configuration: 854 Btu (250 watts)</li> <li>Maximum configuration: 2646 Btu (775 watts)</li> </ul> <p><b>Electrical input:</b></p> <ul style="list-style-type: none"> <li>Sine-wave input (50-60 Hz) required</li> <li>Input voltage low range: <ul style="list-style-type: none"> <li>Minimum: 100 V ac</li> <li>Maximum: 127 V ac</li> </ul> </li> <li>Input voltage high range: <ul style="list-style-type: none"> <li>Minimum: 200 V ac</li> <li>Maximum: 240 V ac</li> </ul> </li> <li>Input kilovolt-amperes (kVA) approximately: <ul style="list-style-type: none"> <li>Minimum: 0.250 kVA</li> <li>Maximum: 1.3 kVA</li> </ul> </li> </ul> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use.</li> <li>These levels were measured in controlled acoustical environments according to the procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average values stated because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.</li> </ol>
--	--	---

---

## Chapter 2. Hints and tips

This chapter contains installation and troubleshooting hints and tips related to the xSeries 455 server. This information is intended to supplement the xSeries 455 documentation (listed on page 1).

---

### Device drivers

**Related topics:**

- “PCI hot-plug features with the Linux operating system” on page 20.
- “Resource CD” on page 30.

The *Resource* CD that comes with the xSeries 455 server contains the following device drivers:

- Ethernet device driver
- Debug port and debug support EFI device drivers

To download the latest Active PCI, Advanced System Management, and Ethernet device drivers for the xSeries 455 server, go to <http://www.ibm.com/pc/support/>.

---

### Drives

#### DVD/CD-RW drive

The xSeries 455 server supports up to two CD-ROM drives, or two DVD-ROM drives, or a combination.

- If you have only one IDE device, it must be installed in the right removable-media bay.
- A CD-ROM or DVD-ROM drive can be installed in either removable-media bay.

#### Hot-swap hard disk drives

The xSeries 455 server supports up to two internal Ultra160 or Ultra320 SCSI hot-swap hard disk drives. The internal hard disk drive bays are connected directly to the integrated LSI 1030 SCSI controller. To help ensure signal quality, do not mix drives with different speeds and data rates. Always install either two Ultra160 drives or two Ultra320 drives.

**Attention:** Before you hot-swap a drive, make sure that it is defective. If you partially or completely remove a good drive instead of a defective one, your server might lose data.

#### Using the diskpart utility to clear a drive

Complete the following steps to use the diskpart utility:

1. Start the server.
2. Select **EFI Shell** from the EFI Firmware Boot Manager.
3. Make sure that the media or file system (fsx:) where the diskpart utility is located is visible to EFI.
4. Type the following EFI command to start the diskpart utility:  
diskpart

5. Type the following EFI command to view the list of drives that can be modified:

```
list
```

6. Type the following EFI command to select a drive to partition:

```
select x
```

where *x* is the number of a drive listed in step 5.

7. Use one of the following procedures to clear data from the partition:

- To clear all data from the partition:

- a. Type the following EFI command:

```
clean
```

- b. Respond to the prompts as follows:

```
y
```

```
$C
```

- To clear all data from the partition and overwrite the disk with zeros:

- a. Type the following EFI command:

```
clean all
```

- b. Respond to the prompts as follows:

```
y
```

```
$C
```

The process of clearing data from the partition might take a while.

Additional commands are available to create MBR or GPT structures and partitions on the cleared disk. Use the EFI Help command to view a list of the available commands. (Type `help` at the EFI prompt.)

8. Repeat steps 6 and 7 to work with another drive or type the following command to exit the diskpart utility:

```
exit
```

If you created a system partition using the `diskpart.efi` utility, you can use the `efifmt.efi` utility to format the partition. To view the syntax for the `format` command, type the following EFI command from the EFI shell:

```
efifmt
```

---

## Error messages and indicators

### Related topics:

- “Firmware updates” on page 8.
- “Light path diagnostics” on page 12.
- “Power supplies” on page 27.
- “Remote Supervisor Adapter” on page 27.
- “Remote console numeric keypad behaves unpredictably” on page 29.
- “System Health Web page lists intelligent I/O expansion unit fan failures” on page 29.
- “Troubleshooting” on page 31.

## Messages appear after a service processor flash update

**Description:** One or both of the following messages might appear in the event log after a service processor flash update:

```
Service Processor not configured for static partition.
```

```
Recover Service Processor not configured for static partition.
```

**Solution:** No action is required. You can ignore these messages.

## Service processor logs system complex powered up and down messages during a system reset

**Description:** During POST, the xSeries 455 System Abstraction Layer (SAL) code can reset the system if it detects a potential initialization problem. If this occurs, the service processor might identify the reset as a power-off and power-on event, and then log messages similar to the following messages might appear in the event log:

```
1  SERVPROC  03/21/03  18:38:53  System Complex Powered Up
2  SERVPROC  03/21/03  18:37:34  System Complex Powered Down
3  SAL/EFI   03/21/03  18:18:20  System initialization
4  SERVPROC  03/21/03  18:08:53  System Complex Powered Up
5  SERVPROC  03/21/03  18:07:34  System Complex Powered Down
```

The logged messages are normal and will vary, depending on the operating system in use. Windows® Server 2003 normally logs the following messages when you restart the server using the **Start+Shutdown** procedure.

```
1  SAL/EFI   03/21/03  18:18:20  System initialization
2  SERVPROC  03/21/03  18:08:53  System Complex Powered Up
3  SERVPROC  03/21/03  18:07:34  System Complex Powered Down
4  SAL/EFI   03/21/03  18:18:20  Cold reset request
```

SuSE normally logs the following messages after you log off and restart the server:

```
1  SAL/EFI   03/21/03  18:18:20  System initialization
2  SERVPROC  03/21/03  18:08:53  System Complex Powered Up
3  SERVPROC  03/21/03  18:07:34  System Complex Powered Down
4  SAL/EFI   03/21/03  18:18:20  Warm reset request
```

When you press the reset button on the front of the server to reset the server, the following messages are logged:

```
1  SERVPROC  03/21/03  18:08:53  System Complex Powered Up
2  SERVPROC  03/21/03  18:07:34  System Complex Powered Down
```

When ac power is removed from the server, the Remote Supervisor Adapter can no longer function. When this occurs, an entry might not appear in the event log indicating the loss of ac power.

**Solution:** No action is required. These messages are informational only and do not affect server operation.

## Microprocessors report soft corrected errors

**Description:** Unlike IA-32 microprocessors, Itanium 2 microprocessors using the Intel Machine Check Abort architecture might report soft corrected errors to the operating system, such as microprocessor cache soft errors.

- Linux users might find occasional reports of corrected errors when they view the Linux error log.
- Windows users might see that a machine check event LED on the remote console device is lit, indicating that an error condition was reported to the Windows error log. Upon examination, you might find occasional entries in the event log of corrected errors reported by microprocessors.

**Solution:** Occasional soft correctable microprocessor errors are normal and can occur at any time with any operating system. These errors are handled with error correcting codes and other mechanisms, and server operation is not affected.

---

## Ethernet controllers

**Related topics:**

- “Resource CD” on page 30.
- “Wake on LAN” on page 31.

For device drivers and information about configuring the integrated Ethernet controllers, see the *Resource CD* that comes with the xSeries 455 server. For updated information about configuring the controllers, go to <http://www.ibm.com/pc/support/>.

---

## Firmware updates and recovery process

**Related topics:**

- “Creating a backup copy of the nonvolatile EFI variables” on page 28.
- “Restoring the nonvolatile EFI variables” on page 28.
- “Remote video graphics look incomplete in Linux” on page 31.

## Firmware updates

IBM will periodically make firmware updates available for the xSeries 455 server. Firmware updates for the xSeries 455 server are available from <http://www.ibm.com/pc/support/>.

**Note:** UpdateXpress does not provide support for the xSeries 455 server.

The update package will contain a zipped file and an ISO image. The zipped file and ISO image will contain xSeries 455 updates for the following firmware:

- System Abstraction Layer Extensible Firmware Interface (SAL/EFI) code
- Service Processor Drawer Management Controller (SP-DMC) code
- Diagnostic code

The method you use to update the xSeries 455 firmware depends on the operating system in use:

- If you are using the Windows Server 2003 operating system, see “Creating an update directory when using Windows Server 2003” for more information.
- If you are using the SuSE Linux Enterprise Server 8 (SLES8) for the Itanium Processor Family (IPF) operating system, see “Creating an update CD when using SLES8” on page 9 for more information.

### Creating an update directory when using Windows Server 2003

If you are using the Windows Server 2003 operating system, use the instructions in this section to create an update directory on the EFI system partition; then, see the `readme.txt` file in the root directory, under EFI.

Complete the following steps to create the update directory:

1. Log on to the server with administrator privileges.
2. Open a command prompt.
3. Type the following command to gain access to the EFI system partition:

```
mountvol d: /s
```

where *d* is any available drive letter. You now can access the EFI system partition as you would any other system drive.

4. Create a directory on the EFI-system-partition drive (*d:*) to store the firmware update files.
5. Go to the IBM support site at <http://www.ibm.com/pc/support/>; then, download the update package for the xSeries 455 server to the directory that you created in step 4.
6. Extract the xSeries 455 update package into the directory that you created in step 4.

**Notes:**

- a. When you extract the files, be sure to maintain the folder structure.
  - b. Detailed instructions for updating the firmware are provided in the readme file in each code-specific folder.
7. Shut down the operating system; then, restart the server to the EFI shell.
  8. Change to the file system (*fsx:*) that corresponds to the EFI system partition; then, change directories to the update directory.
  9. Follow the instructions provided in the package *readme.txt* files to install the firmware updates.

### Creating an update CD when using SLES8

If you are using the SLES8 operating system, use the instructions in this section to create a firmware update CD from the ISO image; then, see the *readme.txt* file in the root directory of the firmware update CD, under EFI.

**Note:** Detailed instructions for using the CD to update the firmware are provided with the code in each code-specific subdirectory.

The Linux IDE ATAPI CD-ROM device driver uses SCSI emulation for CD read and write operations. If a boot option to enable IDE-SCSI emulation was not included during the installation process, you must add the boot option to the *elilo.conf* file. In most cases, the IDE DVD/CD-RW drive in the xSeries 455 server is the first IDE device. To enable the IDE-SCSI emulation, add the following boot option to the stanza for the kernel you are booting:

```
append="hda=ide-scsi"
```

For example, the kernel might have the following stanza:

```
image=/vmlinuz
label=linux
root=802
initrd=/initrd
append="console=ttyS0,115200n8, console=tty0"
```

After it is modified, the stanza appears as follows:

```
image=/vmlinuz
label=linux
root=802
initrd=/initrd
append="console=ttyS0,115200n8, console=tty0 hda=ide-scsi"
```

Restart the server.

Complete the following steps to create the CD:

1. Type the following command to verify that the IDE-SCSI device driver is loaded; then, review the list of modules currently loaded and look for `ide-scsi`.

```
# lsmod
```

2. If the IDE-SCSI device driver is in the list, go to step 3. If the IDE-SCSI device driver is not in the list, type the following command to load the IDE-SCSI device driver:

```
# insmod ide-scsi
```

3. Type the following command to determine the SCSI bus, target, and lun parameters for the DVD/CD-RW drive in the server:

```
# cdrecord -scanbus
```

Data similar to the following example is displayed:

```
scsibus0:
```

```
0,0,0 0) 'IBM-ESXS' 'ST318305LC !#' 'B244' Disk
0,1,0 1) 'IBM-ESXS' 'ST318305LC !#' 'B244' Disk
0,2,0 2) *
0,3,0 3) *
0,4,0 4) *
0,5,0 5) *
0,6,0 6) *
0,7,0 7) *
0,8,0 8) 'IBM ' '25P3495a S320 1' '1 ' Processor
```

```
scsibus2:
```

```
2,0,0 200) 'HL-DT-ST' 'RW/DVD GCC-4160N' '0012' Removable CD-ROM
2,1,0 201) *
2,2,0 202) *
2,3,0 203) *
2,4,0 204) *
2,5,0 205) *
2,6,0 206) *
2,7,0 207) *
```

4. Insert a blank, writable CD into the DVD/CD-RW drive; then, type the following command to copy the firmware update from the xSeries 455 ISO image to the CD:

```
# cdrecord -v dev=b,t,l ISO_image_file
```

where *ISO\_image\_file* is the name of the xSeries 455 ISO image file, *b* is the SCSI bus, *t* is the SCSI target, and *l* is the SCSI lun for your DVD/CD-RW device.

5. Use the instructions that come with the ISO image to install the firmware updates.

## Recovering SAL/EFI code

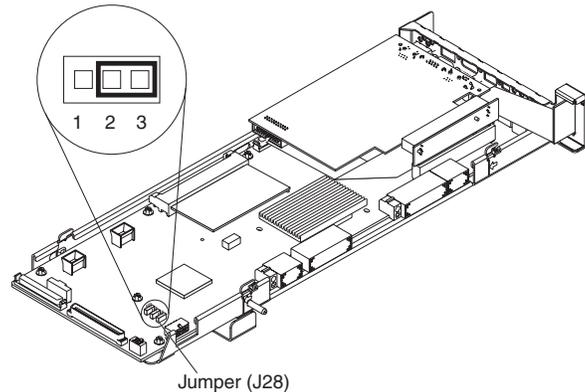
If the SAL/EFI code becomes damaged, such as from a power failure during a flash update, you can recover the SAL/EFI code using the SAL/EFI code-page jumper (J28 on the I/O board) and the Recovery program on the *Resource* CD that comes with the xSeries 455 server.

Complete the following steps to recover the SAL/EFI code:

1. Insert the *Resource* CD into the DVD/CD-RW drive.

2. Shut down the server; then, turn off the server.
3. Disconnect the cables and power cords from the rear of the server.
 

**Attention:** When you handle static-sensitive devices, take precautions to avoid damage from static electricity. See the documentation that comes with the server for details about handling these devices.
4. Remove fans 3 and 4.
5. Locate the SAL/EFI code-page jumper (J28) on the I/O board.



6. If there is a jumper on J28, move the jumper from pins 1 and 2 to pins 2 and 3 to enable the SAL/EFI backup code page. If there is no jumper, add one to J28 pins 2 and 3.
7. Replace fans 3 and 4.
8. Reconnect the cables and power cords to the rear of the server.
9. Restart the server and follow the instructions on the screen. Within 2 minutes, the drive activity LED on the DVD/CD-RW drive flashes several times, indicating that the recovery flash image is being read. If the LED does not flash, repeat this process using a different CD containing the recovery flash image.
 

If the LED still does not flash, you might need to have the I/O board replaced to correct the problem. Call for service.
10. When the drive activity LED stops flashing, wait at least 5 minutes for the flash update to be completed.
11. Remove the *Resource* CD from the drive.
12. Repeat steps 2 through 5. Then, continue with step 13.
13. Move the jumper on J28 to pins 1 and 2 to return to the normal startup mode.
14. Replace fans 3 and 4; then, close the covers.
15. Reconnect the cables and power cords to the rear of the server.
16. Restart the server.

**Note:** You also might have to update the SAL/EFI to the current level. See “Firmware updates” on page 8 for more information.

## Remote update of SAL/EFI code using the service processor might fail

**Description:** While the SAL/EFI code is being updated remotely using the service processor, the update might fail and the following message might appear in the error log: Flash of BIOS (I32) via LAN failed for USERID ... Failed due to incorrect checksum.

**Solution:** In the unlikely event that this problem occurs, retry the remote update.

## Changing the startup order

Use the following instructions to change the order in which the EFI Firmware Boot Manager attempts the startup options.

1. Select **Boot Option Maintenance**.
2. Select **Change Boot Order** and use the following commands:
  - Type D to lower the option in the startup order.
  - Type U to raise the option in the startup order.
3. Select **Save Settings to NVRAM** to save the startup order.

---

## Keyboards

**Related topics:** “Remote console numeric keypad behaves unpredictably” on page 29.

The TrackPoint® keyboard is not supported on the xSeries 455 server.

## Integrated mouse does not work

**Description:** The integrated mouse on the TrackPoint keyboard does not work in the Extensible Firmware Interface (EFI).

**Solution:** The TrackPoint keyboard is not supported on the xSeries 455 server. If you want to use a mouse with the EFI, use a standard USB mouse.

## Repeat characters appear

**Description:** When the Extensible Firmware Interface (EFI) is used, the repeat-key sequence occasionally is initiated incorrectly.

**Solution:** In the unlikely event that this problem occurs, you can backspace over the repeated characters; then, type the characters that you want.

## Initial keystrokes not recognized

**Description:** If the keyboard remains idle for 30 minutes or longer when the Extensible Firmware Interface (EFI) is used, your initial keystrokes might not be recognized when you start typing again.

**Solution:** Type a few characters; the keyboard will respond correctly.

---

## Light path diagnostics

You can use the light path diagnostics panel to identify the possible cause of a problem. The light path diagnostics panel is inside the drawer on the right front of the server. If the system-error LED on the front of the drawer is lit, press on the front of the drawer to open it and view the LEDs on the light path diagnostics panel. Additional LEDs to help you isolate and identify a failing device are on the top of the server and on various boards and devices inside the server.

See the *IBM @server xSeries 455 Hardware Maintenance Manual and Troubleshooting Guide* for more information.

---

## Memory

### DIMM installation

See the ServerProven<sup>®</sup> list at <http://www.ibm.com/pc/compat/> on the World Wide Web for a list of memory modules you can use with the xSeries 455 server.

Review the following guidelines before installing additional memory in the xSeries 455 server:

- The xSeries 455 server supports 512 MB, 1 GB, and 2 GB DIMMs, for a maximum of 56 GB of system memory. The server supports 2.5 V, 184-pin, PC2100, ECC DDR SDRAM, 133 MHZ DIMMs.
- The xSeries 455 server comes with a minimum of two 512 MB DIMMs, installed in slots 1 and 14.
- When installing additional DIMMs, you must install two DIMMS at a time. Each DIMM in a pair must be of the same size and technology to ensure that the server will operate correctly.
- When using memory mirroring, you must install two pairs of DIMMs at a time. The four DIMMs in each set must be identical.
- You can replace a failed DIMM while the server is on, provided that you have enabled memory mirroring and that you have installed all DIMMs in the sequence to support memory mirroring.

See the *IBM @server xSeries 455 Option Installation Guide* on the *IBM xSeries Documentation* CD for complete memory-installation instructions.

### POST reports incorrect amount of installed memory

**Description:** POST reports less memory than the amount of memory installed in the server.

**Solution:** To correct or isolate the problem, complete the following procedures:

- Verify that the installed DIMMs are supported on the xSeries 455 server.
- Reseat the DIMMs and VRMs to make sure that they are correctly installed and fully seated in the connectors.
- Using the Configuration/Setup Utility program, make sure that the DIMM connectors are enabled.
- Make sure that the DIMM configuration of port 1 is identical to the DIMM configuration of port 2 before you enable memory mirroring. If the memory-port configurations are not identical when you enable memory mirroring, the server will disable the connectors associated with the unmatched DIMMS.

---

## Microprocessors

**Related topics:** "Microprocessors report soft corrected errors" on page 7.

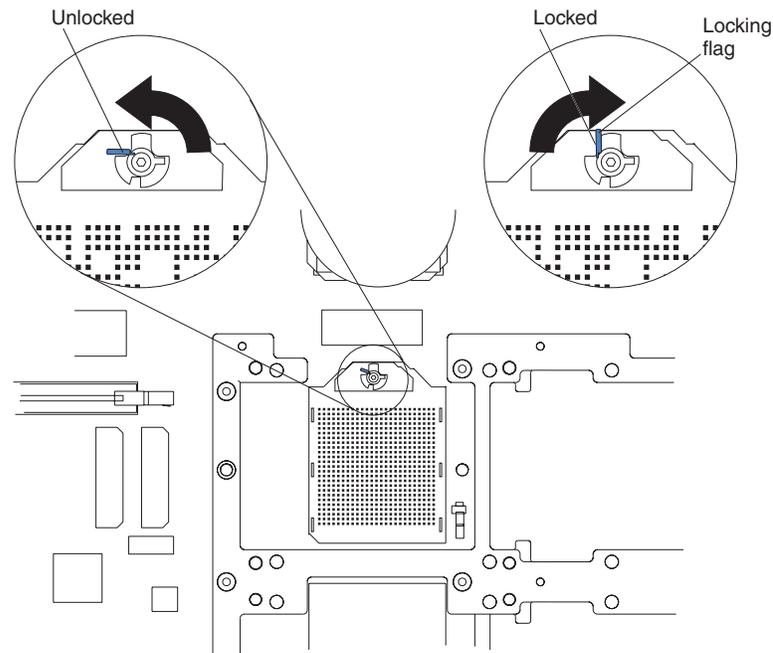
### Microprocessor installation and replacement requirements

**Attention:** To avoid irreparable damage to the microprocessor, processor-board assembly, or other server components when you install additional microprocessors or replace existing microprocessors, observe the following guidelines:

- The socket for the Itanium microprocessor has a locking mechanism that is very difficult to see when the microprocessor assembly is in place. Before you attempt to seat a microprocessor in the socket, be sure to become familiar with the

socket locking mechanism. Use the hex wrench that comes with the microprocessor to lock and unlock the socket. As you rotate the hex wrench, observe the position of the locking flag. Also note the resistance of the locking mechanism when it is in the locked position. Forcing the locking mechanism beyond the locked position might damage the microprocessor socket.

**Note:** Using a flashlight might improve the visibility of the locking flag.



- Follow the installation instructions that come with the microprocessor option verbatim. Failure to do so might result in damage to the server, the microprocessor, or both.
- Follow the microprocessor removal instructions that come with the microprocessor and in the *xSeries 455 Hardware Maintenance Manual and Troubleshooting Guide*. Failure to do so might result in damage to the server, the microprocessor, or both.
- To ensure proper server operation, always install microprocessors that are of the same type and have the same cache size and clock speed.

## Microprocessor testing

During startup, POST performs basic functionality tests on each installed microprocessor, and each microprocessor performs its own built-in-self test (BIST). If you suspect that an installed microprocessor is failing, complete the following steps:

1. Shut down the server; then, turn off the server.
2. Restart the server.
3. Watch the monitor to see whether POST reports any microprocessor errors.

---

## Operating systems

**Related topics:**

- “Using the diskpart utility to clear a drive” on page 5.
- “Firmware updates and recovery process” on page 8.
- “PCI hot-plug features with the Linux operating system” on page 20.
- “Enabling Wake on LAN with Linux” on page 31.
- “Remote console numeric keypad behaves unpredictably” on page 29.

Instructions for installing an operating system on the server are at <http://www.ibm.com/pc/support/>. Each set of instructions specifies everything you need to perform the installation. Operating systems and versions that are officially supported for the xSeries 455 server are listed on the ServerProven Web site at <http://www.ibm.com/pc/us/compat/>.

### Creating a CD from an ISO image when using SLES8

If you are using the SLES8 operating system, you can use the following instructions to create a CD from an ISO image; then, see the documentation that comes with the ISO image for further instructions.

The Linux IDE ATAPI CD-ROM device driver uses SCSI emulation for CD read and write operations. If a boot option to enable IDE-SCSI emulation was not included during the installation process, you must add the boot option to the `elilo.conf` file. In most cases, the IDE DVD/CD-RW drive in the xSeries 455 server is the first IDE device. To enable the IDE-SCSI emulation, add the following boot option to the stanza for the kernel you are booting:

```
append="hda=ide-scsi"
```

For example, the kernel might have the following stanza:

```
image=/vmlinuz
label=linux
root=802
initrd=/initrd
append="console=ttyS0,115200n8, console=tty0"
```

After it is modified, the stanza appears as follows:

```
image=/vmlinuz
label=linux
root=802
initrd=/initrd
append="console=ttyS0,115200n8, console=tty0 hda=ide-scsi"
```

Restart the server.

Complete the following steps to create the CD:

1. Type the following command to verify that the IDE-SCSI device driver is loaded; then, review the list of modules currently loaded and look for `ide-scsi`.

```
# lsmod
```

2. If the IDE-SCSI device driver is in the list, go to step 3 on page 16. If the IDE-SCSI device driver is not in the list, type the following command to load the IDE-SCSI device driver:

```
# insmod ide-scsi
```

3. Type the following command to determine the SCSI bus, target, and lun parameters for the DVD/CD-RW drive in the server:

```
# cdrecord -scanbus
```

Data similar to the following example is displayed:

```
scsibus0:
```

```
0,0,0 0) 'IBM-ESXS' 'ST318305LC !#' 'B244' Disk
0,1,0 1) 'IBM-ESXS' 'ST318305LC !#' 'B244' Disk
0,2,0 2) *
0,3,0 3) *
0,4,0 4) *
0,5,0 5) *
0,6,0 6) *
0,7,0 7) *
0,8,0 8) 'IBM ' '25P3495a S320 1' '1 ' Processor
```

```
scsibus2:
```

```
2,0,0 200) 'HL-DT-ST' 'RW/DVD GCC-4160N' '0012' Removable CD-ROM
2,1,0 201) *
2,2,0 202) *
2,3,0 203) *
2,4,0 204) *
2,5,0 205) *
2,6,0 206) *
2,7,0 207) *
```

4. Insert a blank, writable CD into the DVD/CD-RW drive; then, type the following command to copy the firmware update from the xSeries 455 ISO image to the CD:

```
# cdrecord -v dev=b,t,l ISO_image_file
```

where *ISO\_image\_file* is the name of the xSeries 455 ISO image file, *b* is the SCSI bus, *t* is the SCSI target, and *l* is the SCSI lun for your DVD/CD-RW device.

5. Use the instructions that come with the ISO image to install the firmware updates.

## Linux operating system unable to mount root file system

**Description:** Changes to the hard disk drive enumeration can invalidate the root partition specified in the `elilo.conf` file so that the operating system cannot locate the root file system. In this event, the operating system will not start, and a kernel panic condition will occur. Review the following actions that might change the hard disk drive enumeration:

- Moving the startup drive from one hard disk drive bay to another.
- Adding hard disk drives to any node in a single-node or multinode configuration.
- Changing the scalable partition by adding or removing nodes with hard disk drives attached.

The following notes describe additional information you must consider when troubleshooting the condition:

- The following variables affect the hard disk drive enumeration:
  - PCI bus number

- Controller sequence on a PCI bus
- SCSI ID on the SCSI bus
- Partition on the hard disk drive
- The PCI buses number devices in the following order:
  1. Node 1 internal devices
  2. Node 1 PCI slots
  3. Node 1 RXE-100 PCI slots, if configured
  4. Node 2 internal devices
  5. Node 2 PCI slots
  6. Node 2 RXE-100 PCI slots, if configured
  7. Node 3 internal devices
  8. Node 3 PCI slots
  9. Node 3 RXE-100 PCI slots, if configured
  10. Node 4 internal devices
  11. Node 4 PCI slots
  12. Node 4 RXE-100 PCI slots, if configured
- The controller for the internal media bays is configured before the controller for the external media bays.
- The left removable-media bay is assigned SCSI ID 0, and the right removable-media bay is assigned SCSI ID 1. You define the SCSI IDs that are assigned to devices attached to the external controller or to PCI adapters.

**Solution:** Update the root partition in the `elilo.conf` file after moving or installing hard disk drives or changing the scalable partition. For example:

Edit `fsx:\efi\SuSE\elilo.conf` where `x` is the EFI file system number containing the Linux loader.

Locate all lines that start with `root=\dev` and change all occurrences to `root=\dev\sdxy` where `x` is the drive letter and `y` is the partition number. Alternatively, change the lines to `root=xyy` where `x` is the major device number and `yy` is the minor device number.

## SLES8 identifies nonexistent DVD/CD-RW drives

**Description:** When two DVD/CD-RW drives are installed in the xSeries 455 server, SLES8 assigns a logical unit number (LUN) to multiple nonexistent drives. However, SLES8 configures only the two installed drives.

**Solution:** This problem does not occur with the Unitedlinux 1.0 Service Pack 3 for IPF installed on the operating system. Download and install the service pack, when it is available.

**Workaround:** Type the following command:

```
hda1un=0 hdb1un=0
```

To issue the command on every restart, edit the `elilo.conf` file and add the boot option to the stanza for the kernel you are booting. For example:

```
image=/vmlinuz
label=linux
root=803
initrd=/initrd
append="hda=ide-scsi hda1un=0 hdb1un=0"
```

## Using the Unitedlinux hwinfo and hwscan utilities

**Description:** The hwinfo and hwscan utilities provided in Unitedlinux distributions are used to detect the system configuration and to maintain the SuSE hardware configuration database. Excessive use of these utilities can cause software failures (such as process hangs or system crashes) that might result in data damage. Typically, these utilities run once during startup to perform a hardware scan and reconfiguration, or to configure hot-added hardware that requires configuration, or to create a detailed report of the system hardware and kernel configuration information.

Two specific problems are known to occur when these utilities are run excessively. These problems are generic kernel bugs, and they are not specific to SLES8 or the Unitedlinux kernel. Both problems can occur with SLES8 or Red Hat Advanced Server 2.1 for IPF.

- IDE driver bug: This problem occurs when specific control commands are issued to an IDE device while the system is under relatively heavy load. A fix has been identified for this problem, and a patch will be available when Unitedlinux 1.0 Service Pack 1 for IPF is released.
- Excessive loading and unloading of kernel modules: Running the hwscan utility with specific options, such as printer and storage--ctrl, causes process hangs and kernel panics because of the excessive loading and unloading of the device drivers. If you believe that you are experiencing such a problem, examine the kernel log buffer to determine whether the kernel has a fault.

A typical backtrace might look similar to the following example:

```
ia64_page_valid+0x70
statm_pgd_range+0x3a0
proc_pid_statm+0x410
proc_info_read+0xe0
sys_read+0x1c0
```

**Solution:** While the server is being used for normal operation, avoid running the hwinfo and hwscan utilities excessively, for example, continuously in a script. In addition, avoid running any sequence of commands that would result in device drivers being loaded and unloaded multiple times while concurrently running any utility (such as top, ps, and so on) that might access specific process-table attributes.

## Windows Server 2003 problem fixes

If you plan to use the Microsoft® Windows Server 2003 operating system, you must call Microsoft product support to obtain and install problem fixes. See the following table for the Microsoft problem fixes.

Fix	Problem description
820364 Installation recommended	A diskette drive for the Windows automatic system recovery feature is not supported. Setupldr.efi does not read winnt.sif using the optional USB diskette drive.
817708 Installation recommended	Windows displays the message Setup was unable to Format during the automated system recovery restore operation.
827909 Installation required	Time stamps might appear to be incorrect on large multinode configurations.
829482 Installation required	The memory page color is incorrectly initialized.

Fix	Problem description
828402 Installation recommended	The backup (NTBackup.exe) utility stops during the backup procedure. Windows logs event 8017.

## PCI hot-plug expansion slots

**Related topics:** “PCI hot-plug features with the Linux operating system” on page 20.

The xSeries 455 server has six hot-plug expansion slots on the PCI-X board. You can install 64-bit, 3.3 V and universal adapters in these PCI slots. (5.0 V adapters are not supported.)

- You can install both PCI and PCI-X adapters on the same bus. However, if you install a PCI adapter and a PCI-X adapter on the same bus, the PCI-X features of the PCI-X adapter will be disabled, and the adapter will function as a PCI adapter.
- You can install PCI or PCI-X adapters with speeds faster than what is labeled for a particular PCI-X bus. For example, if you install two 133 MHz adapters into slots that are labeled as 100 MHz slots, the adapters will operate at 100 MHz.
- If you install a 33 MHz adapter and a 66 MHz adapter on the same bus, the bus speed will match that of the slower adapter.
- Each expansion slot has a green power LED and an amber attention LED. The attention LED is visible on the back of the server, but you must open the server cover to view both LEDs. With the server cover open, you can use the light pipes on the PCI-X dividers to view the LEDs.
- The internal PCI scan order for the xSeries 455 is as follows: first, the integrated devices are scanned; then, PCI slots 1, 2, 3, 4, 5, and 6 are scanned.

If an RXE-100 enclosure is attached to an xSeries 455 server, the scan order is as follows: first the integrated devices are scanned; then, PCI slots 1, 2, 3, 4, 5, 6; then, the RXE-100 PCI slots 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18.

See the following table for additional information about the expansion slots.

Slot	Bus <sup>1</sup>	Bus <sup>2</sup>	Supported adapter speed (MHz)
1	A	2	66
2	A	2	66
3	B	9	100 (133 if slot 4 is empty)
4	B	9	100 (133 if slot 3 is empty)
5	C	7	133
6	D	5	133

**Notes:**

1. The PCI bus letter designators appear in the documentation, on the system labels, and in some configuration utilities.
2. The PCI bus numeric designators might appear in some error logs and diagnostic programs.

- See the following table for the xSeries 455 PCI slot numbering assignments.

Configuration	Node 1	RXE-100 Side A	Node 2	RXE-100 Side B	Node 3	RXE-100 Side A	Node 4	RXE-100 Side B
One Node	1-6							
One Node RXE-100 Side A	1-6	7-12						
One Node RXE-100 Sides A and B	1-6	7-12		13-18				
Two Nodes	1-6		7-12					
Two Nodes RXE-100 Side A	1-6	7-12	13-18					
Two Nodes RXE-100 Sides A and B	1-6	7-12	13-18	19-24				
Four Nodes	1-6		7-12		13-18		19-24	
Four Nodes One RXE-100 Sides A and B	1-6	7-12	13-18	19-24	25-30		31-36	
Four Nodes Two RXE-100s Sides A and B	1-6	7-12	13-18	19-24	25-30	31-36	37-42	43-48

---

## PCI hot-plug features with the Linux operating system

The SuSE Linux Enterprise Server 8 (SLES8) for the Itanium Processor Family (powered by Unitedlinux 1.0) operating system does not build or load the PCI hot-plug device driver by default. Use the instructions and information in the following sections to build and load the device driver and use the PCI hot-plug features with the SLES8 operating system.

### Building the PCI hot-plug device driver

The kernel-source RPM must be installed before you can build the device driver. Type the following command to determine whether the kernel-source RPM is installed:

```
# rpm -q kernel-source
```

If the kernel source is installed, start at step 2 on page 21. Otherwise, start at step 1.

Complete the following steps to build the device driver;

1. Complete the following steps to install the kernel-source RPM:
  - a. Insert the Unitedlinux for IPF CD 2 into the DVD/CD-RW drive on the xSeries 455 server.
  - b. Type the following command:

```
# yast2
```
  - c. Click **Software** → **Install or remove software**.
  - d. Click **Search** from the **Filter** menu and search for `kernel-source`.
  - e. Mark the kernel-source package for installation using the check box or the **Actions** menu.
  - f. Click **OK** or **Accept** and wait for the installation to be completed.

- g. Exit from yast2.
2. Complete the following steps to build the hot-plug device driver (acpiphp):

**Note:** To build the acpiphp device driver, you can copy the contents of the kernel-source directory (/usr/src/linux--2.4.19.SuSE) to a local subdirectory, or you can build the device driver directly from the kernel source directory.

- a. Copy the default kernel configuration file (/boot/vmlinuz.config) to the top-level directory containing the Linux kernel source; then, rename the configuration file from vmlinuz.config to .config. For example, type the following commands:

```
# cd /usr/src/linux-2.4.19.SuSE
# cp /boot/vmlinuz.config .config
```
- b. From the top-level directory containing the kernel source, complete the following steps:
  - 1) Type the following command:

```
# make menuconfig
```
  - 2) Select **General setup** → **PCI Hotplug Support**.
  - 3) Move the cursor to ACPI PCI Hotplug driver and type m to build the device driver as a loadable module.
  - 4) Exit the menu program and select **Yes** when prompted to save the kernel configuration.
  - 5) Type the following command:

```
# make depend
```
  - 6) Type the following command:

```
# make modules SUBDIRS=drivers/hotplug
```
3. Complete the following steps to install the acpiphp device driver:
  - a. From the top-level directory containing the kernel source, type the following command to copy the acpiphp device driver to the /lib/modules directory:

```
# cp drivers/hotplug/acpiphp.o \
/lib/modules/2.4.19-SMP/kernel/drivers/hotplug
```
  - b. Type the following command:

```
# depmod
```
  - c. View the /lib/modules/2.4.19-SMP/modules.dep file and search for the pci\_hotplug entry; then, make sure that the following text was included in the file:

```
/lib/modules/2.4.19-SMP/kernel/drivers/hotplug/acpiphp.o
/lib/modules/2.4.19-SMP/kernel/drivers/hotplug/pci_hotplug.o
```

## Loading the PCI hot-plug device driver

1. Type the following command to load the pci\_hotplug and acpiphp device drivers:

```
# modprobe acpiphp
```
2. Type the following command to verify that both the pci\_hotplug and acpiphp modules are loaded:

```
# lsmod
```
3. Type the following command to mount the PCI hot-plug file system:

```
# mount -t pcihpf none /proc/bus/pci/slots
```

There is now a subdirectory for each hot-plug PCI slot in the `/proc/bus/pci/slots` directory.

## Installing a hot-plug PCI adapter

See the information that comes with the xSeries 455 server and the following instructions to install a hot-plug PCI adapter in an empty slot.

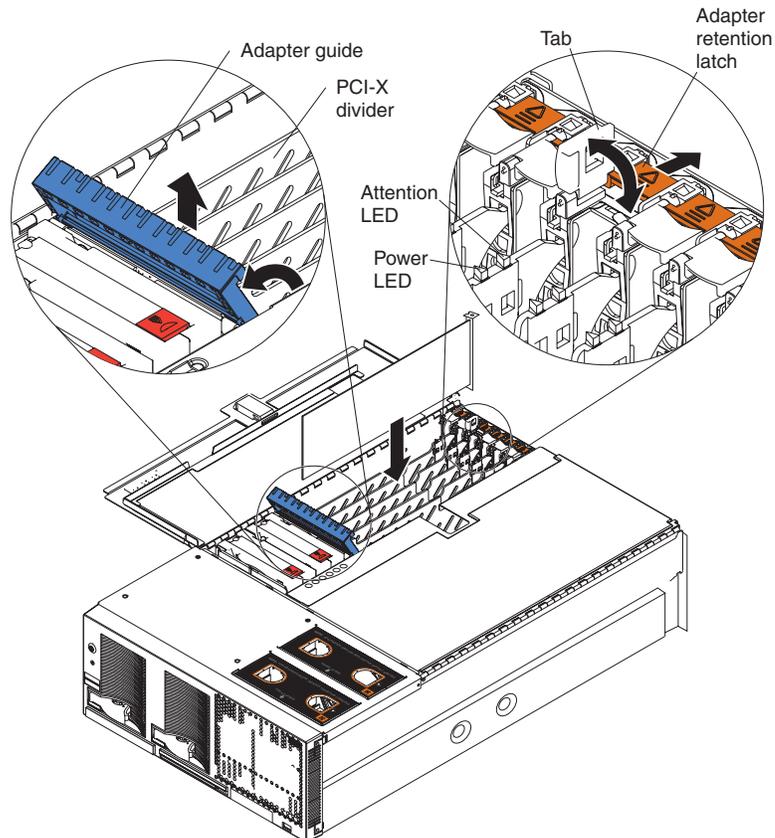
**Note:** You must log in as root to issue hot-plug commands.

1. Type the following command and examine the output to verify that the `pci_hotplug` and `acpihp` device drivers are loaded:  

```
# lsmod
```
2. Type the following command and examine the output to verify that the PCI hot-plug file system is mounted:  

```
# mount
```
3. Save a listing of the PCI devices that are currently installed. For example, type the following command:  

```
# lspci > /tmp/lspci$$$.out1
```
4. Slide the adapter-retention latch while lifting the tab for an empty PCI slot.



5. Install the new PCI adapter:
  - a. If you are installing a full-length adapter, open the blue adapter guide by lifting the front edge, as shown in the illustration.
  - b. Carefully grasp the adapter by its top edge or upper corners, and align it with the connector on the PCI-X board.
  - c. Press the adapter *firmly* into the adapter connector.

**Attention:** When you install an adapter, make sure that the adapter is correctly seated in the connector. Improperly seated adapters might cause damage to the PCI-X board or to the adapter.

- d. Connect the cables for the adapter, if required.
  - e. Push down on the blue adapter guide to keep the adapter steady.
  - f. Close the tab; then, make sure that the adapter-retention latch clicks into place, securing the adapter.
6. Make sure that the green power LED beside the slot in which you just installed the adapter is now lit.
  7. Save an updated listing of the installed PCI devices. For example, type the following command:  

```
# lspci > /tmp/lspci$.out2
```
  8. Compare the original and updated installation listings to confirm that the new PCI adapter was detected and to determine the bus and slot numbers where it is installed. For example, type the following command:  

```
# diff /tmp/lspci$.out1 /tmp/lspci.out2
```
  9. Change to the directory (in `/proc/bus/pci/slots`) for the PCI slot that is identified by the bus number and slot number in step 8. For example, type the following command:  

```
# cd /proc/bus/pci/slots/ACPI*-busnum:slotnum
```
  10. Type the following command to verify that the power file contains a value of 1, which indicates that the PCI slot power is turned on:  

```
# cat power
```

## Removing a hot-plug PCI adapter

See the information that comes with the xSeries 455 server and the following instructions to remove an existing hot-plug PCI adapter.

**Note:** You must log in as a root user to issue hot-plug commands.

1. Type the following command and examine the output to verify that the `pci_hotplug` and `acpihp` drivers are loaded:  

```
# lsmod
```
2. Type the following command and examine the output to verify that the PCI hot-plug file system is mounted:  

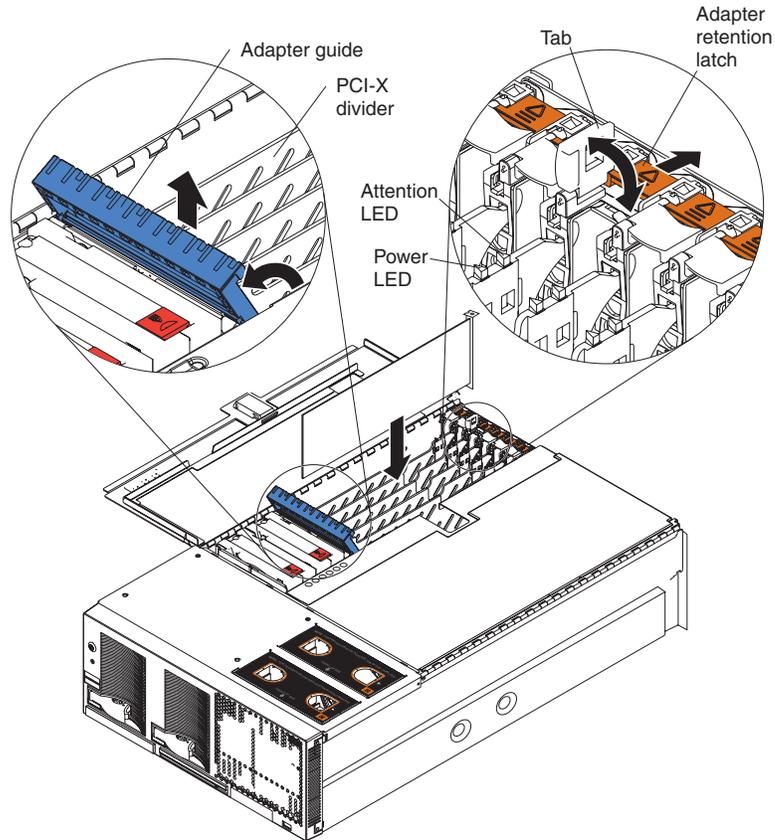
```
# mount
```
3. Type the following command and examine the output to determine the bus and slot numbers for the existing PCI adapter:  

```
# lspci
```
4. Type the following command to confirm that the output shows the PCI adapter that you want to remove:  

```
# lspci -s busnum:slotnum
```
5. Change to the directory (in `/proc/bus/pci/slots`) for the PCI slot that is identified by `busnum:slotnum` in step 4. For example, type the following command:  

```
# cd /proc/bus/pci/slots/ACPI*-busnum:slotnum
```

6. Make sure that the green power LED beside each populated slot is lit.



7. Type the following command to verify that the power file contains a value of 1, which indicates that the PCI slot power is turned on:  

```
# cat power
```
8. Type the following command to turn off the PCI slot power:  

```
# echo 0 > power
```
9. Type the following command to verify that the power file contains a value of 0, which indicates that the PCI slot power is turned off:  

```
# cat power
```
10. Make sure that the amber attention LED beside the slot that was turned off is lit and the green power LED is off.
11. Type the following command to verify that the output no longer shows the PCI adapter that you want to remove:  

```
# lspci -s busnum:slotnum
```
12. If cables are attached to the adapter that you are removing, disconnect the cables and remove them from the server.
13. Slide the adapter-retention latch while lifting the tab; then, remove the PCI adapter.
14. Close the tab; then, make sure that the adapter-retention latch clicks into place.

## Replacing a hot-plug PCI adapter

See the information that comes with the xSeries 455 server and the following instructions to replace an existing hot-plug PCI adapter.

**Note:** You must log in as a root user to issue hot-plug commands.

1. Type the following command and examine the output to verify that the `pci_hotplug` and `acpiphp` drivers are loaded:

```
# lsmod
```

2. Type the following command and examine the output to verify that the PCI hot-plug file system is mounted:

```
# mount
```

3. Type the following command and examine the output to determine the bus and slot numbers for the existing PCI adapter:

```
# lspci
```

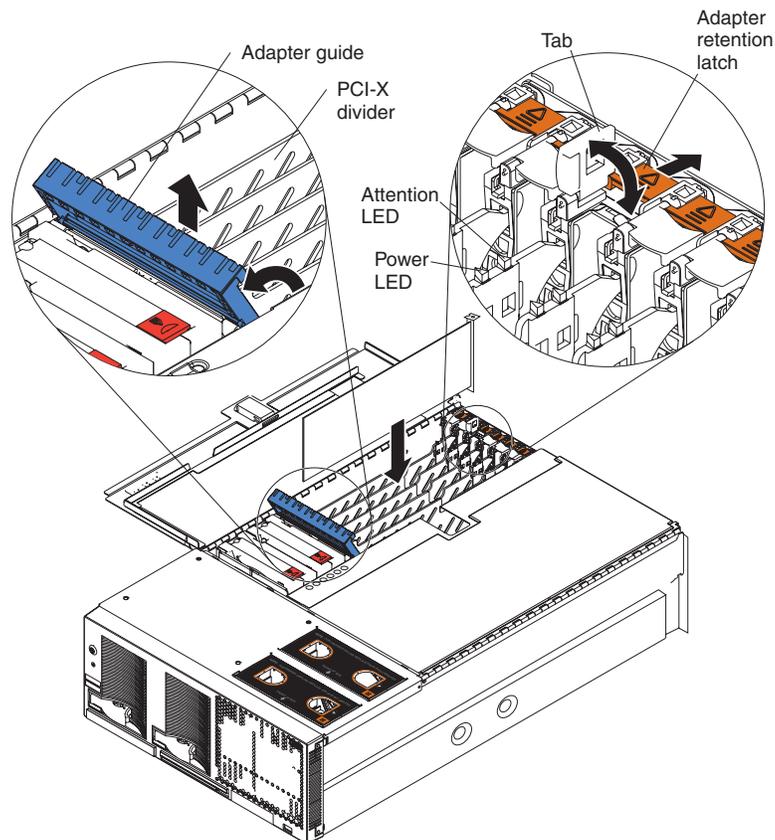
4. Type the following command to confirm that the output shows the PCI adapter you want to replace:

```
# lspci -s busnum:slotnum
```

5. Change to the directory (in `/proc/bus/pci/slots`) for the PCI slot that is identified by `busnum:slotnum` in step 4. For example, type the following command:

```
# cd /proc/bus/pci/slots/ACPI*-busnum:slotnum
```

6. Make sure that the green power LED beside each populated slot is lit.



7. Type the following command to verify that the power file contains a value of 1, which indicates that the PCI slot power is turned on:

```
# cat power
```

8. Type the following command to turn off the PCI slot power:

```
# echo 0 > power
```

9. Type the following command to verify that the power file contains a value of 0, which indicates that the PCI slot power is turned off:

```
# cat power
```

10. Make sure that the amber attention LED beside the slot that was turned off is lit and the green power LED is off.
11. Type the following command to verify that the output no longer shows the PCI adapter that you want to replace:
 

```
# lspci -s busnum:slotnum
```
12. If cables are attached to the adapter that you are replacing, disconnect the cables and remove them from the server.
13. Slide the adapter-retention latch while lifting the tab; then, remove the existing PCI adapter.
14. Install the new PCI adapter:
  - a. If you are installing a full-length adapter, open the blue adapter guide by lifting the front edge, as shown in the illustration.
  - b. Carefully grasp the adapter by its top edge or upper corners and align it with the connector on the PCI-X board.
  - c. Press the adapter *firmly* into the adapter connector.
 

**Attention:** When you install an adapter, make sure that the adapter is correctly seated in the connector. Improperly seated adapters might cause damage to the PCI-X board or to the adapter.
  - d. Connect the cables for the adapter, if required.
  - e. Push down on the blue adapter guide to keep the adapter steady.
  - f. Close the tab; then, make sure that the adapter-retention latch clicks into place, securing the adapter.
15. Make sure that the green power LED is now lit and the amber attention LED is off.
16. Type the following command to verify that the output shows the new PCI adapter:
 

```
# lspci -s busnum:slotnum
```
17. Type the following command to verify that the power file contains a value of 1, which indicates that the PCI slot power is turned on:
 

```
# cat power
```

## Using the PCI hot-plug interface

You can use the open-source PCI hot-plug graphical interface application (pcihpview) to perform hot-plug operations and to view the status of each of the PCI slots.

You can obtain a copy of the pcihpview application at <http://www.ibiblio.org/pub/linux/X11/xutils>. The instructions for building the pcihpview GUI are included in the compressed image.

Complete the following steps to perform a hot-plug operation using the interface:

1. Make sure that the PCI hot-plug device drivers and pcihpfs file system are loaded (see “Loading the PCI hot-plug device driver” on page 21); then, type the following command to start the interface:
 

```
# pcihpview
```
2. Highlight the slot description for the adapter you plan to replace.
3. Right-click in the interface to open the menu; then, select **Power Off**.
4. Make sure that the amber attention LED beside the slot that was turned off is lit and the green power LED is off.

5. If cables are attached to the adapter that you are replacing, disconnect the cables and remove them from the server.
6. Slide the adapter-retention latch while lifting the tab; then, remove the existing PCI adapter.
7. Install the new PCI adapter:
  - a. If you are installing a full-length adapter, open the blue adapter guide by lifting the front edge.
  - b. Carefully grasp the adapter by its top edge or upper corners and align it with the connector on the PCI-X board.
  - c. Press the adapter firmly into the adapter connector.

**Attention:** When you install an adapter, make sure the adapter is correctly seated in the connector. Improperly seated adapters might cause damage to the PCI-X board or to the adapter.
  - d. Connect the cables for the adapter, if required.
  - e. Push down on the blue adapter guide to keep the adapter steady.
  - f. Close the tab; then, make sure that the adapter-retention latch clicks into place, securing the adapter.
8. Make sure that the green power LED is now lit and the amber attention LED is off.
9. In the interface, make sure that the new adapter is present.

---

## Power supplies

The xSeries 455 server comes with two power supplies, each providing 550 watts at 100-127 V ac or 1050 watts at 200-240 V ac. The power supplies are hot-swappable and redundant at 200-240 V ac only. Both power supplies must be connected to the power source for operation at 100-127 V ac.

The xSeries 455 server also comes with two power cords. The power cords can be connected to an external source, such as a properly grounded electrical outlet, or to a primary power unit inside the rack cabinet, such as a properly grounded power distribution unit or uninterruptible power supply.

**Important:** During normal operation, always make sure that both power supplies are installed and that both power cords are connected to the power supplies and to an ac power source. Failure to do so might cause system errors. For example, the system might hang during startup.

---

## Remote Supervisor Adapter

**Related topics:**

- “Error messages and indicators” on page 6.
- “Firmware updates” on page 8.
- “Remote update of SAL/EFI code using the service processor might fail” on page 11.
- “Remote video graphics look incomplete in Linux” on page 31

## Operating system watchdog timer feature causes inadvertent system restarts

**Description:** The operating system watchdog timer feature specifies the number of minutes between checks of the operating system by the Remote Supervisor

Adapter. If the operating system fails to respond, the Remote Supervisor Adapter generates an OS timeout alert and restarts the server. The xSeries 455 server might inadvertently restart when the operating system is running normally, if you enable the feature.

**Solution:** If you enable the operating system watchdog timer feature, define the timeout period as the maximum of four minutes. The default setting for the feature is disabled.

## Replacing the Remote Supervisor Adapter

The Extensible Firmware Interface (EFI) in the xSeries 455 server stores its variables with nonvolatile attributes in NVRAM on the Remote Supervisor Adapter. Before you remove or replace the Remote Supervisor Adapter or clear the NVRAM, be sure to make a backup copy of the nonvolatile EFI variables. After you install a new Remote Supervisor Adapter, you must restore the EFI variables previously stored in NVRAM.

The following EFI variables are stored in NVRAM on the Remote Supervisor Adapter:

- Console definitions
- Boot options and device drivers
- Boot order and timeout

You can use the xSeries 455 Backup and Restore utilities to back up or restore the nonvolatile EFI variables that are stored in NVRAM. These utilities are included in the most current version of the System Abstraction Layer Extensible Firmware Interface (SAL/EFI) code. See “Creating a backup copy of the nonvolatile EFI variables” and “Restoring the nonvolatile EFI variables” for instructions.

### Creating a backup copy of the nonvolatile EFI variables

Complete the following steps to create a backup copy of the EFI variables:

1. Make sure that the formatted medium where you plan to store the backup file is inserted.
2. Start the server.
3. Select **EFI Shell** from the EFI Firmware Boot Manager.
4. Change to the file system for the formatted medium where you want to store the backup copy.
5. Type the following EFI command to create a backup copy of the EFI variables:

```
backup filename
```

Where *filename* is the name (eight-characters or fewer) that you want to assign to the backup copy (for example, `efibckup.001`).

6. Type `dir` or `ls` to verify that the backup file was created successfully.

### Restoring the nonvolatile EFI variables

Complete the following steps to restore the nonvolatile EFI variable settings:

1. Make sure that the formatted medium that contains the backup copy of the EFI variables is inserted.
2. Start the server.
3. Select **EFI Shell** from the EFI Firmware Boot Manager.
4. Change to the file system that contains the backup copy of the EFI variables.
5. Type `dir` or `ls` to verify that the backup file exists.
6. Type the following EFI command to restore the EFI variables:

```
restore filename
```

Where *filename* is the name that you assigned to the backup copy.

7. When the message Delete existing non-volatile efi variables? [y/n] appears, type y.
8. Type the following EFI command to reset the system:  
reset

## Remote console numeric keypad behaves unpredictably

**Description:** The symptoms vary depending on the operating system in use:

- Windows Server 2003: Using the number-lock button bar icon has no effect on the signals that are sent to the server from the numeric-keypad keys of the client. The numeric keypad behavior is controlled solely by the Num Lock key on the client keyboard.
- SuSE Linux Enterprise Server 8 (SLES8): When the number-lock function is turned on at both the client and server, numeric characters are sent when you press the keys on the numeric keypad. Otherwise, the action signals (Home, PgUp, and so on) are sent.
- Red Hat Advanced Server 2.1 for IPF: When the number-lock function is turned on at both the client and server, incorrect characters are sent when you press the keys on the numeric keypad. Otherwise, the action signals (Home, PgUp, and so on) are sent.

**Solution:** Avoid using the numeric keypad when running any version of Linux. Instead, use the regular keyboard keys. You can use the numeric keypad when running Windows, but only the number-lock state at the client has any effect.

## RXE-100 enclosures are not viewable from the Web interface

**Description:** In a multinode configuration, the attached RXE-100 enclosures are not viewable from the Remote Supervisor Adapter Web interface. This condition occurs when the firmware is updated in one xSeries 455 server that is part of a multinode configuration. The firmware must be at the same level in all nodes for the RXE-100 enclosures to be viewable.

**Solution:** The Remote Supervisor Adapter firmware update option does not globally update all Remote Supervisor Adapters in a multinode configuration. Log in to the Remote Supervisor Adapter of each node individually and update the firmware. You can refresh the Web page to view the RXE-100 enclosures.

## System Health Web page lists intelligent I/O expansion unit fan failures

**Description:** The Remote Supervisor Adapter System Health Web page might list intelligent I/O expansion unit fan failures for either side A or side B. All fans in the intelligent I/O expansion unit are shared between side A and side B. The Remote Supervisor Adapter System Health Web page might list an intelligent I/O expansion unit fan failure as being detected by side A when the system event log lists the same fan failure as being detected by side B.

**Solution:** The detected fan is the same regardless of whether the fault was detected by side A or side B. Replace the fan if it is failing.

## Unable to save event log using the Web interface

**Description:** The event log contains all entries that are currently stored in the error log and POST error log. If your browser is Microsoft Internet Explorer version 6.x or earlier, you cannot save the event log as a text file.

**Solution:** Install a later version of the Windows Explorer browser.

**Workaround:** You can also copy and paste the event log to a text file one page at a time.

---

## Resource CD

**Related topics:**

- “Device drivers” on page 5.
- “Firmware updates and recovery process” on page 8.

The *Resource* CD contains the following code:

- Ethernet device driver for Windows Server 2003
- Broadcom Ethernet diagnostic code
- Operating-system installation information
- SAL/EFI recovery code
  - SAL/EFI recovery instructions
  - Information regarding the EFI disk utilities

You can download the latest device drivers and other code updates from the World Wide Web. Go to <http://www.ibm.com/eserver/xseries/>, click **IBM Server Support**, and make the selections for the server.

---

## ServeRAID adapter installation requirements

See the ServerProven list at <http://www.ibm.com/pc/compat/> for a list of ServeRAID™ adapters that you can use with the xSeries 455 server.

Review the following guidelines before installing a ServeRAID adapter:

- The xSeries 455 server comes with one SCSI cable attached to a SCSI connector on the I/O board and to the SCSI backplane behind fans 3 and 4.
- The xSeries 455 server comes with a second SCSI cable preinstalled along the inside of the server. Both ends are loose inside the server. When you install a ServeRAID adapter, you can optionally connect this cable to the adapter and to the SCSI backplane.

See the *IBM @server xSeries 455 Option Installation Guide* on the *IBM xSeries Documentation* CD and the ServeRAID documentation for complete ServeRAID adapter installation instructions.

---

## Supported options

For a list of supported options for the xSeries 455 server, go to <http://www.ibm.com/pc/us/compat/>.

---

## Support telephone numbers

View support telephone numbers at <http://www.ibm.com/planetwide/>.

---

## Troubleshooting

### Related topics:

- “Error messages and indicators” on page 6.
- “Messages appear after a service processor flash update” on page 6.
- “Service processor logs system complex powered up and down messages during a system reset” on page 7.
- “Microprocessors report soft corrected errors” on page 7.
- “Integrated mouse does not work” on page 12.
- “Repeat characters appear” on page 12.
- “Initial keystrokes not recognized” on page 12.
- “Light path diagnostics” on page 12.
- “POST reports incorrect amount of installed memory” on page 13.
- “Improper server shutdown disables the Wake on LAN function” on page 32.
- “SLES8 identifies nonexistent DVD/CD-RW drives” on page 17.
- “Linux operating system unable to mount root file system” on page 16.
- “RXE-100 enclosures are not viewable from the Web interface” on page 29.
- “Operating system watchdog timer feature causes inadvertent system restarts” on page 27.

---

## Video

### Local video controller disabled in the absence of remote video capability

**Description:** Some versions of the SAL/EFI firmware for the xSeries 455 server provide the capability of disabling the local video controller. If remote video is also disabled or is not available, all video capability is lost.

**Solution:** A future release of the xSeries 455 SAL/EFI firmware will correct this problem by removing the capability of disabling the local video controller.

### Remote video graphics look incomplete in Linux

**Description:** In 64-bit Linux operating systems, the color of remote-graphic images appears incomplete. All colors do not appear in screen-resolution settings of 256 colors in the 8-bit mode.

**Solution:** A future release of Remote Supervisor Adapter firmware will correct this problem. Use the 16-bit or 65 535 color mode until the firmware update becomes available.

---

## Wake on LAN

### Enabling Wake on LAN with Linux

By default, the Wake on LAN function in some Ethernet device drivers is disabled. If you are using a Linux operating system, such as SuSE Linux Enterprise Server 8

(SLES8) for the Itanium Processor Family (powered by Unitedlinux 1.0) or Red Hat Advanced Server 2.1 for IPF, you can use the `ethtool` command to enable the Wake on LAN function. Complete the following steps:

1. Type the following command to determine whether the Wake on LAN function is enabled for a specific Ethernet interface:

```
# ethtool ethx
```

where *x* is the Ethernet interface number.

If the `ethtool` command returns a `No data available` message, the Ethernet device driver does not support the `ethtool` software interface. If the Ethernet device driver supports the `ethtool` software interface, data regarding various Ethernet adapter settings is displayed.

The **Supports Wake-on** entry indicates whether the Ethernet controller supports the Wake on LAN function. The **Wake-on** entry indicates whether the Wake on LAN function is enabled or disabled. A `d` indicates that the Wake on LAN function is disabled. A `g` indicates that the Magic Packet frame is enabled.

2. Type the following command to enable the Magic Packet frame:

```
# ethtool -s ethX wol g
```

The Wake on LAN function is enabled for the Ethernet adapter that is associated with `ethx`.

## Improper server shutdown disables the Wake on LAN function

**Description:** If a server is not properly shut down, the server cannot restart using the Wake on LAN feature. An improper shutdown occurs when you turn off the server power by pressing and holding the power button on the server front panel while the operating system is running or while the Extensible Firmware Interface (EFI) is loading.

**Solution:** There are two ways to re-enable the Wake on LAN feature:

- Turn off the ac power; then, turn on the ac power.
- Perform a proper server shutdown; then, press the power button on the server front panel to turn on the server.

---

## Chapter 3. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This appendix contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your xSeries or IntelliStation<sup>®</sup> system, and whom to call for service, if it is necessary.

---

### Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system is turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM xSeries Documentation CD or in the *IntelliStation Hardware Maintenance Manual* at the IBM Support Web site.
- Go to the IBM Support Web site at <http://www.ibm.com/pc/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the publications that are provided with your system and software. The information that comes with your system also describes the diagnostic tests that you can perform. Most xSeries and IntelliStation systems, operating systems, and programs come with information that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the information for the operating system or program.

---

### Using the documentation

Information about your IBM xSeries or IntelliStation system and preinstalled software, if any, is available in the documentation that comes with your system. That documentation includes printed books, online books, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to <http://www.ibm.com/pc/support/> and follow the instructions. Also, you can order publications through the IBM Publications Ordering System at <http://www.elink.ibm.com/public/applications/publications/cgibin/pbi.cgi>.

---

## Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM xSeries and IntelliStation products, services, and support. The address for IBM xSeries information is <http://www.ibm.com/eserver/xseries/>. The address for IBM IntelliStation information is <http://www.ibm.com/pc/intellistation/>.

You can find service information for your IBM products, including supported options, at <http://www.ibm.com/pc/support/>.

---

## Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with xSeries servers, IntelliStation workstations, and appliances. For information about which products are supported by Support Line in your country or region, go to <http://www.ibm.com/services/sl/products/>.

For more information about Support Line and other IBM services, go to <http://www.ibm.com/services/>, or go to <http://www.ibm.com/planetwide/> for support telephone numbers. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

---

## Hardware service and support

You can receive hardware service through IBM Integrated Technology Services or through your IBM reseller, if your reseller is authorized by IBM to provide warranty service. Go to <http://www.ibm.com/planetwide/> for support telephone numbers, or in the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.

---

## Appendix. Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

*IBM Director of Licensing  
IBM Corporation  
North Castle Drive  
Armonk, NY 10504-1785  
U.S.A.*

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product, and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

---

### Edition notice

**© COPYRIGHT INTERNATIONAL BUSINESS MACHINES CORPORATION, 2003.  
All rights reserved.**

U.S. Government Users Restricted Rights — Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

---

## Trademarks

The following terms are trademarks of International Business Machines Corporation in the United States, other countries, or both:

Active Memory	PS/2
Active PCI	ServeRAID
Active PCI-X	ServerGuide
Alert on LAN	ServerProven
C2T Interconnect	TechConnect
Chipkill	ThinkPad
EtherJet	Tivoli
e-business logo	Tivoli Enterprise
@server	Update Connector
FlashCopy	Wake on LAN
IBM	XA-32
IntelliStation	XA-64
NetBAY	X-Architecture
Netfinity	Xcel4
NetView	XpandOnDemand
OS/2 WARP	xSeries
Predictive Failure Analysis	

Lotus, Lotus Notes, SmartSuite, and Domino are trademarks of Lotus Development Corporation and/or IBM Corporation in the United States, other countries, or both.

Intel, MMX, and Pentium are trademarks of Intel Corporation in the United States, other countries, or both.

Microsoft, Windows, and Windows NT are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Java and all Java-based trademarks and logos are trademarks or registered trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Other company, product, or service names may be trademarks or service marks of others.

---

## Important notes

Processor speeds indicate the internal clock speed of the microprocessor; other factors also affect application performance.

CD-ROM drive speeds list the variable read rate. Actual speeds vary and are often less than the maximum possible.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for approximately 1000 bytes, MB stands for approximately 1 000 000 bytes, and GB stands for approximately 1 000 000 000 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity may vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard disk drive bays with the largest currently supported drives available from IBM.

Maximum memory may require replacement of the standard memory with an optional memory module.

IBM makes no representation or warranties regarding non-IBM products and services that are ServerProven, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. These products are offered and warranted solely by third parties.

IBM makes no representations or warranties with respect to non-IBM products. Support (if any) for the non-IBM products is provided by the third party, not IBM.

Some software may differ from its retail version (if available), and may not include user manuals or all program functionality.







Part Number: 88P9214

Printed in U.S.A.

(1P) P/N: 88P9214

