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# IBM® Netfinity® ServeRAID™ -4x Ultra160 SCSI Controller Device Driver Installation Instructions



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## Installing device drivers

This booklet contains information about the device drivers available for the IBM® Netfinity® ServeRAID™-4x Ultra160 SCSI controllers. These device drivers are provided with the IBM ServeRAID controllers on the following:

- *IBM ServeRAID Support CD*
- *IBM ServeRAID Device Drivers* diskette
- *IBM ServeRAID Device Drivers for SCO Operating Systems - UnixWare HBA and OpenServer BTLD* diskette
- *IBM ServeRAID Device Driver for Red Hat Linux* diskette

**Note:** If you use a diskette, you must create the diskette using the instructions and diskette images on the *IBM ServeRAID Support CD*. These files are available in the following directory:

`d:/IMAGES`

where *d* is the CD-ROM drive.

If you are installing files for an IBM ServeRAID controller that comes as a standard feature on your IBM Netfinity or PC Server system board, use the installation instructions and CDs provided with your server to install these files.

This booklet provides instructions for installing the device drivers for Microsoft® Windows® 2000, Windows NT® 4.0, Novell NetWare, IBM® OS/2®, Red Hat Linux, SCO OpenServer, and SCO UnixWare.

<b>When using:</b>	<b>Go to:</b>
Windows 2000	"Installing device drivers for Windows 2000" on page 4.
Windows NT 4.0	"Installing device drivers for Windows NT 4.0" on page 6.
NetWare	"Installing device drivers for NetWare" on page 7.
OS/2	"Installing device drivers for OS/2" on page 9.
Red Hat Linux	"Installing device drivers for Red Hat Linux 6.2 (or later)" on page 12.
OpenServer	"Installing device drivers for OpenServer" on page 15.
UnixWare	"Installing device drivers for UnixWare" on page 16.

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## ServeRAID device driver order on Windows 2000 and Windows NT 4.0

For Windows 2000 and Windows NT 4.0, the ServeRAID-4M and ServeRAID-4L controllers use a different device driver than other ServeRAID controller models. If you install ServeRAID-4M or ServeRAID-4L controllers in a server with other ServeRAID controller models, the order that the devices are listed for Windows 2000 and Windows NT might not match the order the devices are listed in the startable (bootable) ServeRAID Manager program on the *ServeRAID Support CD* and the ServeRAID Mini-Configuration program.

The startable ServeRAID Manager program orders the ServeRAID controllers by scanning the PCI slots for the first ServeRAID controller that is one of the following types:

- A ServeRAID-4M or ServeRAID-4L
- Another ServeRAID controller model

Then, the startable ServeRAID Manager program lists the controllers of the first type scanned before the controllers of the other type. The ServeRAID Mini-Configuration program also uses this procedure to order controllers.

For example, a server has four ServeRAID controllers installed in the following PCI-scan order:

1. ServeRAID-4M
2. ServeRAID-4H
3. ServeRAID-4L
4. ServeRAID-3HB

Because the first controller scanned is a ServeRAID-4M, all ServeRAID-4M and ServeRAID-4L controllers are listed first. Subsequently, other ServeRAID models are listed. In this example, the controller order in the server is the following:

1. ServeRAID-4M
2. ServeRAID-4L
3. ServeRAID-4H
4. ServeRAID-3HB

**Note:** To determine the PCI slot scan order, refer to your server reference manual.

Windows NT and Windows 2000 order SCSI controllers based on the device driver load order. For example, the device driver that is loaded first has its controllers listed first. Then, the device driver that is loaded second has its controllers listed second, and so on.

When installing Windows NT, the order that you add device drivers to the server is the order that the device driver is loaded. If you have a ServeRAID-4M or ServeRAID-4L controller and another ServeRAID controller model installed in the server, you can control the order that the controllers are listed by installing the device drivers for the controllers in the same order that you want to have them listed.

When installing Windows 2000, the device driver for ServeRAID models other than the ServeRAID-4L and ServeRAID-4M is included on the *Windows 2000* CD and is loaded before any device drivers you add at installation time, such as the ServeRAID-4M and ServeRAID-4L device drivers. You can change the load order on Windows 2000 *only* by editing the Windows registry after installation.

**Note:** Refer to Microsoft knowledge base articles Q141832 and Q115486 for more information about editing the Windows registry to control the following:

1. The order the device drivers are loaded.
2. The order the controllers are listed.

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## Installing device drivers for Windows 2000

Use the following instructions when you do one the following:

- Install device drivers while installing Windows 2000
- Install device drivers after installing Windows 2000
- Update device drivers after installing Windows 2000

## Installing device drivers while installing Windows 2000

Use the following instructions when you do one of the following:

- Install device drivers for a ServeRAID-4H controller
- Install device drivers for a ServeRAID-4M or ServeRAID-4L controller

## Installing device drivers for a ServeRAID-4H controller

You must install the ServeRAID device driver that comes on the *Windows 2000* CD while installing Windows 2000. The Windows 2000 installation program does not allow you to upgrade a device driver that ships on the *Windows 2000* CD. After installing Windows 2000, you *must* update the ServeRAID device driver to the latest version, which is on the *IBM ServeRAID Support* CD and the *IBM ServeRAID Device Drivers* diskette. Refer to "Installing device drivers after installing Windows 2000".

## Installing device drivers for a ServeRAID-4M or ServeRAID-4L controller

1. Insert the startable *Windows 2000* CD into the CD-ROM drive then, restart the server.
2. A few seconds after restarting the server, the message  
Press F6 if you need to install a third party SCSI or RAID driver...  
  
is displayed, press F6.

**Note:** This message is displayed immediately after the screen changes from black to blue. You have only a few seconds to press F6.

3. After loading some files, Windows 2000 will display a screen where you can manually specify a controller. When this screen displays, press the S key to specify additional devices.
4. When prompted to insert the Manufacturer-supplied hardware support disk, insert the *IBM ServeRAID Device Drivers* diskette into the diskette drive; then, press Enter.
5. Select **IBM Netfinity ServeRAID 4M/4L Controller (Windows 2000)**; then, press Enter. A message similar to the following will be displayed: Setup is loading files (IBM Netfinity ServeRAID 4M/4L Controller (Windows 2000))...
6. When prompted, press Enter to continue.
7. Use the instructions provided in the Windows 2000 manual to complete the normal installation process.
8. After you complete the installation, be sure to install the latest operating system service pack.

## Installing device drivers after installing Windows 2000

You can install the ServeRAID device driver *only* when installing a new ServeRAID controller in the server. During that time, Windows 2000 detects new hardware and displays the New Hardware Found window. Follow the instructions in the window. Be sure to let the server search for device drivers.

## Updating device drivers after installing Windows 2000

To update the ServeRAID device driver after installing Windows 2000:

1. Insert the *IBM ServeRAID Support* CD into the CD-ROM drive or insert the *IBM ServeRAID Device Drivers* diskette into the diskette drive.
2. Click **Start** → **Programs** → **Administrative Tools** → **Computer Management**. The Computer Management windows opens.
3. In the left tree, click **System Tools**; then, click **Device Manager**.
4. In the right tree, click the SCSI adapters and RAID controllers to display all the controllers in the server.

5. Using the right mouse button, click the first ServeRAID controller in the tree; then, click **Properties**. The Properties windows opens.
6. Click the **Driver** tab; then, click **Update Driver**. The Update Device Driver Wizard opens.
7. Click **Next**.
8. Verify that **Display a list of the known drivers...** is checked; then, click **Next**.
9. Click **Have Disk**.
10. In the **Copy manufacturer's files from** field:

For ServeRAID-4M or ServeRAID-4L controllers	If you are installing from diskette, type: <i>a</i> :\win2k\4M_4L
	If you are installing from CD, type: <i>z</i> :\win2k\4M_4L
For ServeRAID-4H controllers	If you are installing from diskette, type: <i>a</i> :\win2k\others
	If you are installing from CD, type: <i>z</i> :\win2k\others

where *a* is the diskette drive letter and *z* is the CD-ROM drive letter.

11. Click **OK**; then, in the next window, click **OK**.
12. After the device driver installs, remove the diskette or the CD from the drive and restart the server.

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## Installing device drivers for Windows NT 4.0

Use the following instructions when you do one the following:

- Install device drivers while installing Windows NT 4.0
- Install or update device drivers after installing Windows NT 4.0

## Installing device drivers while installing Windows NT 4.0

To install the ServeRAID device driver while installing Windows NT 4.0:

1. Insert either of the following:
  - The Windows NT startup (boot) diskette into the diskette drive
  - The startable Windows NT CD into the CD-ROM drive;
 then, restart the server.
2. When the message  
Setup is inspecting your computer's hardware configuration...  
  
is displayed, press the F6 key.
3. After loading some files, Windows displays a screen where you can manually specify a controller. When this screen appears, press the S key to specify additional devices.
4. When prompted in the next window, select **Other** from the list.
5. When prompted to insert the Manufacturer-supplied hardware support disk, insert the *IBM ServeRAID Device Drivers* diskette into the diskette drive; then, press Enter.
6. Select **IBM Netfinity ServeRAID 4M/4L Controller (NT 4.0)**; then, press Enter. A message similar to the following will appear: Setup is loading files (IBM ServeRAID 4M/4L Controller (NT 4.0))...

7. When prompted, press Enter to continue.
8. Use the instructions provided in the Windows NT manual to complete the normal installation process.
9. After you complete the installation, be sure to install the latest operating system service pack.

## Installing or updating device drivers after installing Windows NT 4.0

To install the ServeRAID device driver after installing Windows NT 4.0:

1. Insert the *IBM ServeRAID Device Drivers* diskette into the diskette drive or insert the *IBM ServeRAID Support* CD into the CD-ROM drive.
2. Click **Start** → **Settings** → **Control Panel**.
3. Select SCSI Adapter; then, click the **Drivers** tab.
4. Click **Add**; then, click **Have Disk**.
5. In the **Copy manufacturer's files from** field, type one of the following:

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Installing from diskette	a:\nt4_0
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Installing from CD	z:\nt4_0
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where *a* is the diskette drive letter and *z* is the CD-ROM drive letter.

6. Click **OK**; then in the next dialog box, click **OK** again.
7. After the device driver installs, remove the diskette or the CD from the drive and restart the server.

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## Installing device drivers for NetWare

Use the following instructions when you do one the following:

- Install device drivers while installing NetWare
- Install or update device drivers after installing NetWare

## Installing device drivers while installing NetWare

**Note:** There is a known problem with the FAT partition table created by Caldera DR-DOS when the following are installed on any new physical drive:

- NetWare 5.0
- NetWare 5.1 (English only)

The physical drive does not have to be a RAID drive.

Other versions of DOS (including Windows 95) cannot read the partition table created by DR-DOS. The operating systems fail to recognize the partition as valid. When the ServeRAID startable (bootable) CD starts, Windows 95 fails to start because it cannot successfully read the C drive.

The International version of NetWare 5.1 corrects this problem. To avoid this problem, use FDISK and FORMAT to create your start (boot) drive with a different version of DOS (for example, PC DOS 7) before beginning the NetWare install process.

To install the ServeRAID device driver while installing NetWare 4.x or 5.x:

1. Use the instructions provided in the NetWare manual to begin the installation.

2. When the Choose the Server Drivers - Disk Driver prompt appears during the install process, insert the *IBM ServeRAID Device Drivers* diskette.
3. Click **Select additional or modify selected Disk/LAN drivers**.
4. If IPSRAID appears, select **Deselect a selected driver**.
5. Click **Select an additional driver**; then, press the Ins (Insert) key to add an unlisted new device driver.
6. Press F3 to specify a path; then, type one of the following:

For NetWare 4.x	<code>a:\netware4</code>
For NetWare 5.x	<code>a:\netware5</code>

where *a* is the diskette drive letter.

7. Click **IPSRAID.HAM** from the list of device drivers that appears in the window; then, press Enter.

**Note:** The IPSRAID.HAM and support files will be copied to the system volume.

8. Click **OK** to overwrite the existing files.
9. Follow the instructions in the NetWare manual to complete the installation.

## Installing or updating device drivers after installing NetWare

**Note:** If the device driver and operating system is already installed, do the following before starting this procedure:

1. Type:  
`Unload IPSRAID`
2. Press Enter; then, go to step 1 in the following instructions.

To install the files after installing NetWare 4.x or 5.x, do the following:

1. From the system console, start the NetWare installation utility program by typing one of the following:

For NetWare 4.x	<code>load install</code>
For NetWare 5.x	<code>load nwconfig</code>

2. Press Enter.
3. Insert the *IBM ServeRAID Device Drivers* diskette into the diskette drive or insert the *IBM ServeRAID Support CD* into the CD-ROM drive.
4. Click **Driver options** from the Installation Options list.
5. Click **Configure disk and storage** from the Driver Options window.
6. Select **Select an additional driver** from the Additional Drivers Actions window.
7. When the next window opens, press the Ins key to install an unlisted driver.
8. When the next window opens, press the F3 key to specify a different path.
9. In the **Specify a directory path** field, type one of the following:

For NetWare 4.x	If you are installing from diskette, type: <code>a:\netware4</code>
	If you are installing from CD, type: <code>d:\programs\netware\driver\netware4</code>



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For NetWare 5.x	If you are installing from diskette, type: <code>a: \netware5</code>
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	If you are installing from CD, type: <code>d: \programs\netware\driver\netware5</code>
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where *a* is the diskette drive letter and *d* is the CD-ROM drive letter.

10. When prompted to select a device driver to install, select IPSRAID.HAM.
11. Click **Yes** when prompted to copy the IPSRAID.HAM driver.
12. When the prompt appears to specify the server boot path, type:  
`c: \nwserver`

**Notes:**

- a. This instruction assumes that you installed NetWare in its default directory. If you did not install NetWare in the NWSERVER directory on drive C, modify step 12 accordingly.
  - b. If any of the files you are installing already exist on the server, NetWare will prompt you to save the older files. Although it is not necessary to save the older files, it might be useful to do so.
13. After the installation program copies all files, you can edit parameters (such as the ServeRAID slot number) from the Driver IPSRAID Parameter Actions window.
  14. After you edit the parameters, click **Save Parameters and load driver** to load the ServeRAID device driver.

**Note:** If the device driver is not installed already and the operating system is installed, an error message stating that the device driver failed to load should appear after you complete the previous step. If that happens, do the following:

- a. Press Esc to exit from the installation screens.
  - b. Shut down the server.
  - c. Restart the server by typing the following at the system prompt:  
`server`
  - d. The server automatically loads and installs the device driver.
15. Press Esc to exit from the installation screens.

**Note:** If you want NetWare to load the ServeRAID device driver automatically during startup, you must add the appropriate LOAD command (for example, `load ipsraid.ham slot=1`) to the NetWare startup command file (usually `C:\NWSERVER\STARTUP.NCF`).

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## Installing device drivers for OS/2

Use the following instructions when you do one the following:

- Install device drivers while installing OS/2
- Install or update device drivers after installing OS/2

**Note:** The ServeRAID-4M and ServeRAID-4L controllers are not supported on OS/2. The ServeRAID-4H is supported on OS/2.

## Installing device drivers while installing OS/2

You can use the following instructions to install the ServeRAID device driver files while installing OS/2 Warp Server.

**Note:** When starting the OS/2 Diskette 1 in Drive A after the logo screen appears and the Please Wait messages, you might receive the following message:

- \* Initializing Raid SCSI Subsystem.
- \* Unable to allocate IRQ resources.
- \* RMCreat Device Adapter failure.
- \* RMCreat Device (disk) failure.
- \* RMCreat Device (disk) failure.
- \* RMCreat Device (disk) failure.
- \* RMCreat Device (disk) failure.

If you receive these messages, disregard them during installation. The installation will complete successfully. After the installation completes, install an updated RESOURCE.SYS file that is available from the OS/2 Device Driver Pak On-Line Web site at the following address:

<http://service.software.ibm.com/os2ddpak/index.htm>

At this Web site, follow these steps to obtain the updated RESOURCE.SYS file:

1. Scroll down to the bottom and click **Yes, I agree. Show the Device Category list.**
2. Scroll down and select **OS/2 Component Updates** from the list.
3. Select **OS/2 Base Device Driver Updates.**
4. Select **RESOURCE.SYS update; pre-requisite for updated IBM RAID Driver.**
5. Follow the instructions at the Web site for installing the RESOURCE.SYS update after you have installed OS/2.

To install the ServeRAID files while installing OS/2:

1. Make a copy of the *OS/2 Warp Diskette 1* and label it *Copy of OS/2 Diskette 1*.
2. Copy the IPSRAID.ADD file from the OS2 directory on the *IBM ServeRAID Device Drivers* diskette to the *Copy of OS/2 Diskette 1*.

If there is not enough space, delete files not needed in your installation (such as proprietary CD-ROM or SCSI device drivers). Make sure you remove all entries referring to any device drivers you delete from the CONFIG.SYS file.

**Note:** If you have more than one ServeRAID or SCSI adapter in your server, make sure that the BASEDEV statement for the adapter or controller controlling the startup (boot) device appears first in the CONFIG.SYS file before the BASEDEV statements for other ServeRAID or SCSI adapters.

3. Edit the CONFIG.SYS file on the *Copy of OS/2 Diskette 1* to add the following lines:  
BASEDEV=IPSRAID.ADD  
SET COPYFROMFLOPPY=1
4. Install OS/2, but when you are prompted to insert Diskette 1, use the updated *Copy of OS/2 Diskette 1*.
5. After you complete the OS/2 installation, insert the *IBM ServeRAID Device Drivers* diskette.

6. From an OS/2 window, type:  
*a*:  
  
where *a* is the drive letter for the diskette drive that contains the ServeRAID diskette.
7. Press Enter; then, type:  
ddinstal
8. Press Enter. The OS/2 Device Driver Installation window opens.
9. In the **Source** field type *a*: (where *a* is the letter of the diskette drive where the *IBM ServeRAID Device Drivers* diskette is located). In the **Destination** field, type the full path where you want the device driver files to be copied.
10. Click **Install**. The program copies the IPSRAID.ADD ServeRAID device driver to the OS/2 subdirectory on your hard disk.
11. Edit the CONFIG.SYS file and verify that there is only one copy of the line BASEDEV=IPSRAID.ADD.

**Notes:**

- a. If you have more than one ServeRAID or SCSI adapter in your server, make sure that the BASEDEV statement for the adapter or controller controlling the startup (boot) device appears first in the CONFIG.SYS file before the BASEDEV statements for other ServeRAID or SCSI adapters.
  - b. After you install any service packs, check the path for the IPSRAID.ADD device driver and verify that the correct device driver is installed.
12. Restart the server.

## Installing or updating device drivers after installing OS/2

You can use the following instructions to install the ServeRAID device driver files after installing OS/2 Warp Server.

To install the ServeRAID files after installing OS/2:

1. After you complete the OS/2 installation, insert the *IBM ServeRAID Device Drivers* diskette.
2. From an OS/2 window, type:  
*a*:  
  
where *a* is the letter for the diskette drive that contains the ServeRAID diskette.
3. Press Enter; then, type:  
ddinstal
4. Press Enter. The OS/2 Device Driver Installation window opens and prompts you for the source and destination drives. The source directory shows where to insert the *IBM ServeRAID Device Drivers* diskette. The destination directory shows where the program will copy the device driver files.
5. Click **Install**.
  - The program copies the following ServeRAID device driver statement to your CONFIG.SYS file: BASEDEV=IPSRAID.ADD
  - The program copies the IPSRAID.ADD ServeRAID device driver to the OS/2 subdirectory on your hard disk.
6. Edit the CONFIG.SYS file and verify that there is only one copy of the line BASEDEV=IPSRAID.ADD.

**Notes:**

- a. If you have more than one ServeRAID or SCSI adapter in your server, make sure that the BASEDEV statement for the adapter or controller controlling the startup (boot) device appears first in the CONFIG.SYS file before the BASEDEV statements for other ServeRAID or SCSI adapters.
  - b. After you install any service packs, check the path for the IPSRAID.ADD device driver and verify that the correct device driver is installed.
7. Restart the server.

**Note:** When booting OS/2 after installing the new ServeRAID device driver, you might receive the following messages:

- \* Initializing Raid SCSI Subsystem.
- \* Unable to allocate IRQ resources.
- \* RMCreat Device Adapter failure.
- \* RMCreat Device (disk) failure.
- \* RMCreat Device (disk) failure.
- \* RMCreat Device (disk) failure.
- \* RMCreat Device (disk) failure.

If you receive these messages, install an updated RESOURCE.SYS file that is available from the OS/2 Device Driver Pak On-Line Web site at the following address:

<http://service.software.ibm.com/os2ddpak/index.htm>

At this Web site, follow these steps to obtain the updated RESOURCE.SYS file:

- a. Scroll down to the bottom and click **Yes, I agree. Show the Device Category list.**
- b. Scroll down and click **OS/2 Component Updates** from the list.
- c. Click **OS/2 Base Device Driver Updates.**
- d. Click **RESOURCE.SYS update; pre-requisite for updated IBM RAID Driver.**
- e. Follow the instructions at the Web site for installing the RESOURCE.SYS update after you have installed OS/2.

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## Installing device drivers for Red Hat Linux 6.2 (or later)

Use the following instructions when you do one the following:

- Install device drivers while installing Red Hat Linux
- Install or update device drivers after installing Red Hat Linux

## Creating Red Hat diskettes

Use the following instructions to create the *Updated Red Hat Installation* diskette and the *IBM ServeRAID Device Driver for Red Hat Linux* diskette.

### Creating the Updated Red Hat Installation diskette

To create the *Updated Red Hat Installation* diskette on Windows 95, Windows 98, Windows NT 4.0, Windows 2000, Linux, or OS/2, do the following:

1. Download the following file from the Red Hat Web site:

<ftp://ftp.redhat.com/pub/redhat/support/enterprise/ibm/netfinity/updrh62.img>

- If you are creating the diskette on Linux, continue to step 3. Otherwise, insert the *IBM ServeRAID Support CD* into the CD-ROM drive.
- Insert a formatted diskette into the diskette drive.
- Do one of the following:

For Windows 2000, Windows NT 4.0, Windows 98, or Windows 95	At a DOS prompt, type the following and press Enter: <code>d:\tools\dsk4w32 c:\temp\updrh62.img</code>
For Linux	Type the following (all on one line) and press Enter: <code>dd if=/tmp/updrh62.img of=/dev/diskettedevicefile bs=32k</code>
For OS/2 Warp	At an OS/2 prompt, type the following and press Enter: <code>d:\tools\dsk4wrp c:\temp\updrh62.img</code>

where

- `d` is the drive letter of the CD-ROM drive.
  - `c:\temp\updrh62.img` is the path to the *Updated Red Hat Installation* diskette image.
  - `diskettedevicefile` is the specific device file for the diskette block device. Typically, this is `/dev/fd0`.
- Remove the diskette from the diskette drive and label it *Updated Red Hat Installation* diskette.
  - If you are not creating the diskette on Linux, remove the *IBM ServeRAID Support CD* from the CD-ROM drive.

### Creating the IBM ServeRAID Device Driver for Red Hat Linux diskette

To create the *IBM ServeRAID Device Driver for Red Hat Linux* diskette on Windows 95, Windows 98, Windows NT 4.0, Windows 2000, Linux, or OS/2, do the following:

- Insert the *IBM ServeRAID Support CD* into the CD-ROM drive.
- If you are not creating the diskettes on Linux, continue to step 3. Otherwise, type the following and press Enter:

```
mount -t iso9660 /dev/cdromdevicefile /mnt
```

where `cdromdevicefile` is the specific device file for the CD-ROM block device. Typically, this is `/dev/cdrom`.

- Insert a formatted diskette into the diskette drive.
- Do one of the following:

For Windows 2000, Windows NT 4.0, Windows 98, or Windows 95	At a DOS prompt, type the following and press Enter: <code>d:\tools\dsk4w32 images\redhatdd.img a:</code>
For Linux	Type the following (all on one line) and press Enter: <code>dd if=/mnt/images/redhatdd.img of=/dev/diskettedevicefile bs=32k</code>
For OS/2	At an OS/2 prompt, type the following and press Enter: <code>d:\tools\dsk4wrp images\redhatdd.img a:</code>

where

- `d` is the drive letter of the CD-ROM drive.
- `a` is the drive letter of the diskette drive.

- *diskettedevicefile* is the specific device file for the diskette block device. Typically, this is */dev/fd0*.
5. Remove the diskette from the diskette drive and label it *IBM ServeRAID Device Driver for Red Hat Linux* diskette.
  6. If you are not creating the diskettes on Linux, continue to step 7. Otherwise, type the following and press Enter:
 

```
umount /mnt
```
  7. Remove the *IBM ServeRAID Support* CD from the CD-ROM drive.

## Installing device drivers while installing Red Hat Linux 6.2 (or later)

This section provides instructions for installing the ServeRAID device driver (version 4.20) from diskette. Before you can install the device driver, you must download an updated installation diskette image from the Red Hat Web site and create the *Updated Red Hat Installation* diskette and the *IBM ServeRAID Device Driver for Red Hat Linux* diskette (see “Creating Red Hat diskettes” on page 12).

1. Insert the *Updated Red Hat Installation* diskette into the diskette drive.
2. Turn on or restart the server.
3. At the command prompt, type:
 

```
linux dd
```

and any other options for your installation; then, press Enter.

4. Insert the *Red Hat 6.2 Installation* CD into the CD-ROM drive.
5. Follow the prompts to complete the installation.

## Installing or updating device drivers after installing Red Hat Linux 6.2 (or later)

This section provides instructions for installing or updating the ServeRAID device drivers after installing Red Hat Linux 6.2.

This set of instructions assumes the following:

- You already have a Red Hat 6.2 Linux operating system installed on your server.
- You want to add a ServeRAID controller to your server *or* update the ServeRAID device driver.

To install or update device drivers from diskette after installing Linux, do the following:

1. Insert the *IBM ServeRAID Device Driver for Red Hat Linux* diskette into the diskette drive.
2. Type the following and press Enter:
 

```
mount -t vfat /dev/diskettedevicefile /mnt/floppy
```

where *diskettedevicefile* is the specific device file for the diskette block device. Typically, this is */dev/fd0*.

3. Type the following and press Enter:
 

```
cd /mnt/floppy
```
4. Type the following and press Enter:
 

```
sh updrh.sh
```
5. Type the following and press Enter:
 

```
cd /
```
6. Type the following and press Enter:

- ```
umount /mnt/floppy
```
7. Remove the diskette from the diskette drive.
  8. Restart your server by typing:

```
shutdown -r now
```
  9. Press Enter.

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## Installing device drivers for OpenServer

Use the following instructions when you do one the following:

- Install device drivers while installing OpenServer
- Install *or* update device drivers after installing OpenServer

### Installing device drivers while installing OpenServer

Before you begin the installation, review the following information:

- You must install logical drives as Bus Number 0 when using the MKDEV program, regardless of the channel that the physical drives are on.
- You must install a nondisk device, such as a CD-ROM or tape drive, as Bus Number 1, 2, 3, or 4 relative to the channel to which it is attached. Internal Channel 1 is Bus Number 1, Internal Channel 2 is Bus Number 2, External Channel 1 is Bus Number 1, External Channel 2 is Bus Number 2, External Channel 3 is Bus Number 3, and External Channel 4 is Bus Number 4.

To configure the default nondisk devices during the initial installation:

1. Redefine the default tape drive in the initial boot string. For example, to install the boot-time loadable driver IPSRAID BTLD and redefine the tape drive, go to the B00T prompt and type:

```
link Stp=ips(0, 1, 2, 0)
```

The numbers in parentheses represent the host adapter number, the bus number, the SCSI ID, and the LUN respectively.

2. When prompted for the location of the installation CD, change the bus number and SCSI ID, as required.

### Adding IPSRAID BTLD at startup time

To install the ServeRAID device driver for OpenServer 5.x.5:

1. At the B00T prompt, type:

```
link
```
2. Press Enter; then, when prompted for the name of the package, type:

```
ipsraid
```
3. Press Enter.
4. After the kernel loads but before it runs, the link program prompts you to insert the *IBM ServeRAID Device Drivers for SCO Operating Systems - UnixWare HBA and OpenServer BTLD* diskette.

While the installation program copies the files, one or both of the following messages might appear:

- Extracting BTLD distribution for ipsraid... /etc/uadmin getdev b ips:  
No such device (error 19)
- dynamic linker: dlvr\_audit: Cannot open /dev/zero for file  
/lib/libprot.so.1

You can ignore the first message; if the second message appears, however, you must press Enter when prompted to continue the installation.

5. Keep the *IBM ServeRAID Device Drivers for SCO Operating Systems - UnixWare HBA and OpenServer BTL D* diskette available. You will need it to configure the device driver into the link kit.

For additional information about adding a boot-time loadable driver at boot time, refer to “Using Boot-Time Loadable Drivers” in the *SCO OpenServer Handbook*.

## Adding IPSRAID BTL D after installing OpenServer

1. Start the server in system maintenance mode, and log in as ROOT.
2. Type:  
`installpkg`
3. Press Enter; then, select the diskette drive in which you will insert your installation diskette.
4. When prompted, insert the *IBM ServeRAID Device Drivers for SCO Operating Systems - UnixWare HBA and OpenServer BTL D* diskette.
5. When prompted for the name of the package, type:  
`ipsraid`
6. Press Enter; then, relink the kernel (as described in “Relinking the kernel” in the *SCO OpenServer Handbook*) by typing the following command:  
`cd /etc/conf/cf.d`
7. Press Enter; then type:  
`./link_unix`
8. Press Enter.
9. After the kernel rebuilds, the following message appears:  
The UNIX kernel has been rebuilt. Do you want this kernel to boot by default?  
To continue, type y  
The system backs up the old kernel by moving /unix to /unix.old.
10. When the system asks for the kernel environment to be rebuilt, type y  
The system will respond with a message.
11. Remove the *IBM ServeRAID Device Drivers for SCO Operating Systems - UnixWare HBA and OpenServer BTL D* diskette from the diskette drive.
12. Shut down the server; then, restart the server.

---

## Installing device drivers for UnixWare

Use the following instructions when you do one of the following:

- Install device drivers while installing UnixWare
- Install or update device drivers after installing UnixWare

## Installing device drivers while installing UnixWare

The instructions that you use for installing the ServeRAID files when using UnixWare depend on the number of IDE and SCSI disk-storage adapters and controllers installed in the server. If all of the direct-access-storage devices (DASD) in the server are attached to a single disk-storage adapter or controller (such as the ServeRAID controller), you can skip the instructions in this section and go directly to “Installing the device drivers while installing UnixWare” on page 19.



## Attaching devices to multiple disk-storage adapters or controllers

If you are attaching devices to multiple disk-storage adapters or controllers (including IDE and SCSI controllers integrated on the system board), use the following instructions. If you are not using multiple disk-storage adapters and controllers go to “Installing the device drivers while installing UnixWare” on page 19.

- If you are installing UnixWare on a drive attached to a ServeRAID controller, follow the instructions in “Installing UnixWare on a ServeRAID drive”.
- If you are installing UnixWare on a drive attached to a non-ServeRAID adapter or controller and you intend to store only data on the drives attached to your ServeRAID controllers, follow the instructions in “Installing UnixWare on a non-ServeRAID drive” on page 18.

**Installing UnixWare on a ServeRAID drive:** Use the following instructions if you are using multiple disk-storage adapters or controllers and you are installing UnixWare on a drive attached to a ServeRAID controller. If you not using multiple disk-storage adapters and controllers, go to “Installing the device drivers while installing UnixWare” on page 19.

1. Install all ServeRAID controllers that you intend to use in your server.
2. Using the ServeRAID Manager program, create all of your arrays and define all of your logical drives.
3. Make a list of all of the ServeRAID controllers, including the order and slot number, installed in the server. To do this:
  - a. Turn on the server.
  - b. If the ServeRAID Mini-Configuration prompt appears, press Ctrl+I. When a server contains more than one ServeRAID controller, a selection window appears.
  - c. The menu lists the ServeRAID controllers in order. Select the first ServeRAID controller from the menu.
  - d. Select **Advanced Functions** from the Main Menu.
  - e. Select **View Controller and PCI Information** from the Advanced Functions menu.
  - f. Record the slot number for the ServeRAID controller; then, press Esc three times to return to the controller-selection window.
  - g. Repeat step 3c through step 3f until you record the slot number for each ServeRAID controller that appears on the selection screen.
4. Turn off the server; then, remove all ServeRAID controllers except the first one on your list.

**Note:** If one of the ServeRAID controllers that you need to remove is on the system board, you must do one of the following:

- If the CD-ROM drive that you are using to install your operating system is attached to the integrated ServeRAID controller, disconnect or remove all disk drives attached to the integrated controller.
  - If only disk drives are attached to the integrated controller, disconnect the SCSI cable from the ServeRAID connector on the system board. See the label inside the server cover for the location of the ServeRAID connector.
5. Remove all other non-ServeRAID IDE and SCSI disk-storage adapters or controllers.

**Note:** If one of the disk-storage controllers that you need to remove is on the system board, you must do one of the following:

- If the CD-ROM drive that you are using to install your operating system is attached to the integrated disk-storage controller, disconnect or remove all disk drives attached to the integrated controller.
  - If only disk drives are attached to the integrated controller, disconnect the cable for the integrated controller from the IDE or SCSI connector on the system board. See the label inside the server cover for the location of the IDE or SCSI controller connector.
6. Follow the instructions in “Installing the device drivers while installing UnixWare” on page 19; then, return here and continue with step 7.
  7. Turn off the server.
  8. Install any non-ServeRAID disk-storage adapters or controllers in the server; then, attach the drives to the disk-storage adapters and controllers.
  9. Install the second ServeRAID controller from the list you created in step 3f on page 17; then, attach the drives to the ServeRAID controller.
  10. Turn on the server and allow UnixWare to detect the new disk-storage adapters and controllers.
  11. Turn off the server.
  12. Repeat step 9 through step 11 until all ServeRAID adapters, ServeRAID controllers, and drives are installed.
  13. You can now partition and format the logical drives attached to the additional ServeRAID adapters and controllers. See the information provided with UnixWare for more instructions.

**Installing UnixWare on a non-ServeRAID drive:** Use the instructions in this section if you are using multiple disk-storage adapters or controllers, you are installing UnixWare on a drive attached to a non-ServeRAID adapter or controller, and you intend to store only data on the drives attached to your ServeRAID adapters and controllers.

1. Install all ServeRAID controllers that you intend to use in your server.
2. Using the ServeRAID Manager program, create all of your arrays and define all of your logical drives.
3. Make a list of all of the ServeRAID controllers, including the order and slot numbers, installed in the server. To do this:
  - a. Turn on the server.
  - b. When the ServeRAID Mini-Configuration prompt appears, press Ctrl+I. When a server contains more than one ServeRAID controller, a selection screen appears.
  - c. The menu lists the ServeRAID controllers in order. Select the first ServeRAID controller from the menu.
  - d. Select **Advanced Functions** from the Main Menu.
  - e. Select **View Controller and PCI Information** from the Advanced Functions menu.
  - f. Record the slot number for the ServeRAID controller; then, press Esc three times to return to the controller-selection screen.
  - g. Repeat step 3c through step 3f until you record the slot number for each ServeRAID controller that appears on the selection screen.

4. Turn off the server; then, remove all ServeRAID, IDE, and SCSI disk-storage adapters and controllers except the one attached to the drive where you intend to install UnixWare.

**Note:** If one of the disk-storage or ServeRAID controllers that you need to remove is on the system board, do one of the following:

- If the CD-ROM drive that you are using to install your operating system is attached to the integrated controller, disconnect or remove all disk drives attached to the integrated controller.
  - If only disk drives are attached to the integrated controller, disconnect the SCSI or IDE cable for the integrated controller from the connector on the system board. See the label inside the server cover for the location of the SCSI and IDE cable connectors.
5. Follow the instructions in “Installing the device drivers while installing UnixWare”; then, return here and continue with step 6.
  6. Turn off the server.
  7. Install any non-ServeRAID disk-storage adapters or controllers in the server; then, attach the drives to the disk-storage adapters and controllers.
  8. Install the first ServeRAID controller from the list you created in step 3f on page 18; then, attach the drives to the ServeRAID controller.
  9. Turn on the server and allow UnixWare to detect the new disk-storage adapters and controllers.
  10. Turn off the server.
  11. Repeat step 8 through 10 until all ServeRAID adapters, ServeRAID controllers, and drives are installed.
  12. You can now partition and format the logical drives attached to the ServeRAID adapters and controllers. See the information provided with UnixWare for more instructions.

### **Installing the device drivers while installing UnixWare**

To install the ServeRAID device drivers while installing UnixWare 7.1:

1. Use the instructions provided with UnixWare to begin the installation.
2. When a message appears asking if you want to install any HBA diskettes, insert the *IBM ServeRAID Device Drivers for SCO Operating Systems - UnixWare HBA and OpenServer BTL D* diskette; then, select **Install HBA diskette**.
3. Use the instructions provided in the UnixWare manual to complete the normal installation process.

## **Installing or updating device drivers after installing UnixWare**

Use the following instructions to install the ServeRAID files after you install UnixWare, or use these instructions to update a previously installed ServeRAID file with a newer version. You can use the UnixWare Pkgadd or the UnixWare SCOAdmin utility program to install the files.

### **Installing an HBA diskette file using Pkgadd**

1. Insert the *IBM ServeRAID Device Drivers for SCO Operating Systems - UnixWare HBA and OpenServer BTL D* diskette into the diskette drive.
2. Type:  

```
pkgadd -d /dev/dsk/f0t
```
3. Press Enter.
4. When the message Insert diskette into Floppy Drive 1 appears, press Enter.

5. When the message Installation of IBM ServeRAID SCSI IHV HBA (ips) was successful appears, type:  
q
6. Press Enter.
7. After the device driver is installed, shut down and restart the server.

### **Installing an HBA diskette file using SCAdmin**

1. Insert the *IBM ServeRAID Device Drivers for SCO Operating Systems - UnixWare HBA and OpenServer BTLT* diskette into the diskette drive.
2. Start the SCAdmin utility program by typing SCADMIN at the system prompt.
3. Click **Software\_Management**.
4. Click **Application Installer**.
5. Click the **Install From** tab.
6. Click **Disk\_A**.
7. Click **Update View** if nothing appears in the window.
8. When the icon labeled ips appears in the window, click **Install**.
9. After the device driver is installed, remove the diskette from the diskette drive; then, shut down and restart the server.