
IBM[®] ServeRAID[™] -4 Ultra160 SCSI Controller Device Driver Installation Instructions

You can use these instructions for the following controllers:

- ServeRAID-4H
- ServeRAID-4M
- ServeRAID-4Mx
- ServeRAID-4L
- ServeRAID-4Lx
- ServeRAID-3HB
- ServeRAID-3H
- ServeRAID-3L
- ServeRAID-II
- ServeRAID

Installing device drivers

This booklet contains information about the device drivers available for the IBM® ServeRAID™ -4 Ultra160 SCSI controllers. You can also use these device drivers for the IBM ServeRAID-3 controllers, the IBM ServeRAID-II controller, and the IBM ServeRAID controller. This booklet provides instructions for installing the device drivers for Microsoft® Windows® 2000, Microsoft Windows NT® 4.0, Novell NetWare, IBM OS/2®, Red Hat Linux®, SCO OpenServer, and SCO UnixWare.

The device drivers are contained on the *IBM ServeRAID Support* CD. The CD also contains diskette images for the following:

- *IBM ServeRAID Device Drivers* diskette
- *IBM ServeRAID Device Driver for Red Hat Linux* diskette
- *IBM ServeRAID Device Drivers for SCO Operating Systems - UnixWare HBA and OpenServer BTL D* diskette

Note: You must create the diskettes using the instructions (contained in a README file) and diskette images located on the *IBM ServeRAID Support* CD. These files are available in the following directory:

d:/IMAGES

where *d* is the CD-ROM drive.

When using:	Create the:
Windows 2000 Windows NT 4.0 NetWare OS/2	<i>IBM ServeRAID Device Drivers</i> diskette
Red Hat Linux	<i>IBM ServeRAID Device Driver for Red Hat Linux</i> diskette
OpenServer UnixWare	<i>IBM ServeRAID Device Drivers for SCO Operating Systems - UnixWare HBA and OpenServer BTL D</i> diskette

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

If you are installing device drivers for Windows 2000 or Windows NT, refer to "Installing multiple device drivers on Windows 2000 and Windows NT 4.0" on page 4.

When using:	Go to:
Windows 2000	"Installing device drivers for Windows 2000" on page 5.
Windows NT 4.0	"Installing device drivers for Windows NT 4.0" on page 7.
NetWare	"Installing device drivers for NetWare" on page 8.
OS/2	"Installing device drivers for OS/2 (version 4.0 and 5.0)" on page 10.
Red Hat Linux	"Installing device drivers for Red Hat Linux (version 6.2, or later)" on page 13.
OpenServer	"Installing device drivers for OpenServer" on page 16.
UnixWare	"Installing device drivers for UnixWare" on page 17.

Installing multiple device drivers on Windows 2000 and Windows NT 4.0

If you install more than one ServeRAID controller in a server, you might need to install two ServeRAID device drivers. The following groups of ServeRAID controllers use two different device drivers:

	Group 1	Group 2
Device driver	IBM ServeRAID 4M/4Mx/4L/4Lx	IBM ServeRAID (All Others)
Controllers	ServeRAID-4M ServeRAID-4Mx ServeRAID-4L ServeRAID-4Lx	ServeRAID-4H ServeRAID-3HB ServeRAID-3H ServeRAID-3L ServeRAID-II ServeRAID

If you install ServeRAID controllers in a server from only Group 1 *or* only Group 2, you must install one device driver. However, if you install ServeRAID controllers in a server from Group 1 *and* Group 2, you must install two device drivers. In the following procedures, use the IBM ServeRAID 4M/4Mx/4L/4Lx device driver for Group 1 controllers and use the IBM ServeRAID (All Others) device driver for Group 2 controllers.

ServeRAID device driver order on Windows 2000 and Windows NT 4.0

If you install a Group 1 controller and a Group 2 controller in a server, 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 *IBM ServeRAID Support CD* and the ServeRAID Mini-Configuration program.

The startable ServeRAID Manager and the ServeRAID Mini-Configuration programs recognize controllers as members of either Group 1 or Group 2 (see table above). The programs order the ServeRAID controllers by scanning the PCI slots for the first ServeRAID controller found. Then, the programs list all the controllers of the first type scanned before the controllers of the other type.

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

1. ServeRAID-4Mx
2. ServeRAID-4H
3. ServeRAID-4Lx
4. ServeRAID-3HB

Because the first controller scanned is a ServeRAID-4Mx, all ServeRAID-4M, ServeRAID-4Mx, ServeRAID-4L, and ServeRAID-4Lx controllers (Group 1) are listed first. Subsequently, all other ServeRAID models (Groups 2) are listed. In this example, the controller order in the server is the following:

1. ServeRAID-4Mx
2. ServeRAID-4Lx
3. ServeRAID-4H
4. ServeRAID-3HB

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

In contrast, both Windows NT and Windows 2000 order SCSI controllers based on the order that device drivers are loaded. 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. 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.

However, when installing Windows 2000, the ServeRAID Controller (All Others) device driver is included on the *Windows 2000* CD and is loaded before any device drivers you add at installation time, such as the ServeRAID-4M/4Mx/4L/4Lx device driver. 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.

Installing device drivers for Windows 2000

Use the following instructions when you do one of 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, ServeRAID-3, ServeRAID-II, or a ServeRAID controller
- Install device drivers for a ServeRAID-4Mx, ServeRAID-4M, ServeRAID-4Lx, or a ServeRAID-4L controller

Installing device drivers for a ServeRAID-4H, ServeRAID-3, ServeRAID-II, or a ServeRAID 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" on page 6.

Installing device drivers for a ServeRAID-4Mx, ServeRAID-4M, ServeRAID-4Lx, or ServeRAID-4L controller

Note: You will need an *IBM ServeRAID Device Drivers* diskette. Refer to "Installing device drivers" on page 3 for additional information.

To install the ServeRAID device driver for ServeRAID-4Mx, ServeRAID-4M, ServeRAID-4Lx, or ServeRAID-4L controllers while installing Windows 2000:

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 ServeRAID 4M/4Mx/4L/4Lx Controller (Windows 2000)**; then, press Enter. A message similar to the following is displayed:
Setup is loading files (IBM ServeRAID 4M/4Mx/4L/4Lx 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, install the latest operating system service pack.

Note: This procedure also installs the *IBM Twintail Virtual Adapter*.

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

Note: If you have more than one ServeRAID controller installed in the server and the controllers require different device drivers (see "Installing multiple device drivers on Windows 2000 and Windows NT 4.0" on page 4), repeat the following procedure for each device driver you are updating.

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 window 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 window opens.

Note: If you have more than one ServeRAID controller installed in the server *and* the controllers require different device drivers, click the first ServeRAID controller in the tree that belongs to the group for which you are installing the device driver

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-4Mx, ServeRAID-4M, ServeRAID-4Lx, and 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, ServeRAID-3, ServeRAID-II, and ServeRAID 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.

Note: This procedure also installs the *IBM Twintail Virtual Adapter*.

Installing device drivers for Windows NT 4.0

Use the following instructions when you do one of 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

Note: You will need an *IBM ServeRAID Device Drivers* diskette. Refer to “Installing device drivers” on page 3 for additional information.

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

1. Insert the Windows NT startup (boot) diskette into the diskette drive, or insert the startable Windows NT CD into the CD-ROM drive.
2. Restart the server.
3. When the message

Setup is inspecting your computer's hardware configuration...

is displayed, press the F6 key.

Note: After the message is displayed, you have only a few seconds to press F6.

4. 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.
5. When prompted in the next window, select **Other** from the list.

6. When prompted to insert the Manufacturer-supplied hardware support disk, insert the *IBM ServeRAID Device Drivers* diskette into the diskette drive; then, press Enter.
7. Select **IBM ServeRAID 4M/4Mx/4L/4Lx Controller** if you are installing one of the following controllers: ServeRAID-4M, ServeRAID-4Mx, ServeRAID-4L, or ServeRAID-4Lx. Otherwise, select **IBM ServeRAID Controller (All Others)**.
8. A message similar to the following is displayed:
Setup is loading files (IBM ServeRAID 4M/4L Controller (NT 4.0))...
9. When prompted, press Enter to continue.
10. Use the instructions provided in the Windows NT manual to complete the normal installation process.
11. After you complete the installation, install the latest operating system service pack.

Installing or updating device drivers after installing Windows NT 4.0

Note: If you have more than one ServeRAID controller installed in the server and the controllers require different device drivers (see “Installing multiple device drivers on Windows 2000 and Windows NT 4.0” on page 4), repeat the following procedure for each device driver you are updating.

To install or update 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:

If installing from diskette	a:\nt4_0
If installing from CD	z:\nt4_0

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. Select **IBM ServeRAID 4M/4Mx/4L/4Lx Controller** if you are installing one of the following controllers: ServeRAID-4M, ServeRAID-4Mx, ServeRAID-4L, or ServeRAID-4Lx. Otherwise, select **IBM ServeRAID Controller (All Others)**.
8. After the device driver installs, remove the diskette or the CD from the drive and restart the server.

Installing device drivers for NetWare

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

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

Installing device drivers while installing NetWare

Note: You will need the *IBM ServeRAID Device Drivers* diskette. Refer to “Installing device drivers” on page 3 for additional information.

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:

If installing NetWare 4.x	<code>a:\netware4</code>
If installing 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 or update the ServeRAID device driver after installing NetWare 4.x or 5.x:

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

If installing NetWare 4.x	<code>load install</code>
If installing 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 (Insert) 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:

If installing NetWare 4.x	If you are installing from diskette, type: <i>a</i> : \netware4
	If you are installing from CD, type: <i>d</i> : \programs\netware\driver\netware4
If installing NetWare 5.x	If you are installing from diskette, type: <i>a</i> : \netware5
	If you are installing from CD, type: <i>d</i> : \programs\netware\driver\netware5

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 the files, verify the ServeRAID slot number using the Driver IPSRAID Parameter Actions window.
 14. 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`).

Installing device drivers for OS/2 (version 4.0 and 5.0)

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

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

Note: During the OS/2 installation, you might receive the following messages:

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

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

<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* or the *OS/2 Warp Server for e-Business Diskette 1* and label it *Copy of OS/2 Diskette 1*.
2. Insert the *IBM ServeRAID Device Drivers* diskette or the *IBM ServeRAID Support CD* into the server.
3. Copy the IPSRAID.ADD file to the *Copy of OS/2 Diskette 1* diskette.

If you are using the *IBM ServeRAID Device Drivers* diskette, copy this file from the OS2 directory on the *IBM ServeRAID Device Drivers* diskette to the *Copy of OS/2 Diskette 1*.

If you are using the *IBM ServeRAID Support CD*, copy this file from the Programs\OS2\driver directory on the *IBM ServeRAID Support CD* 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.

4. Edit the CONFIG.SYS file on the *Copy of OS/2 Diskette 1* to add the following lines:

```
BASEDEV=IPSRAID.ADD
SET COPYFROMFLOPPY=1
```

5. Install OS/2, but when you are prompted to insert Diskette 1, use the updated *Copy of OS/2 Diskette 1*.

Note: (For OS/2 Warp[®] SMP only) After the OS/2 installation copies all the files to the C drive, the installation prompts you to do one of the following:

- Remove the diskette from the diskette drive and press Enter.
- Keep the diskette in the diskette drive and press F3.

You *must* keep the diskette in the diskette drive and press F3 to install the OS/2 patches. Type the following at the OS/2 command prompt:

```
a:os21drfx
```

where *a* is the diskette drive letter.

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.

Installing or updating device drivers after installing OS/2

Note: You will need an *IBM ServeRAID Device Drivers* diskette. Refer to “Installing device drivers” on page 3 for additional information.

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.

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

<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.

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

Use the following instructions when you do one of 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 updrh62.img from the Red Hat Web site:

http://www.redhat.com/support/errata/partners/ibm/ibm_netfinity.html

- If you are creating the diskette on Linux, go 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	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 creating the diskette on Windows 2000, Windows NT 4.0, or OS/2, 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 or OS/2, do the following:

- Insert the *IBM ServeRAID Support CD* into the CD-ROM drive.
- If you are creating the diskette on Windows 2000, Windows NT 4.0, or OS/2, go 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 creating the diskettes on Windows or OS/2, go 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

This section provides instructions for installing the ServeRAID device driver 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 13).

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 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

This section provides instructions for installing or updating the ServeRAID device drivers after installing Red Hat Linux (version 6.2, or later).

This set of instructions assumes the following:

- You already have a Red Hat Linux (version 6.2, or later) 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 after installing Red Hat Linux:

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.

Installing device drivers for OpenServer

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

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

Note: You will need the *IBM ServeRAID Device Drivers for SCO Operating Systems - UnixWare HBA and OpenServer BTLD* diskette. Refer to “Installing device drivers” on page 3 for additional information.

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 logical unit number (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 5.0.5 and 5.0.6:

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 BTLD* 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 BTLD 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 BTLD* 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 BTLD* 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 20.

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 20.

- 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 19.

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 20.

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 20; 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 18; 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 on page 19 through step 3f on page 19 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 19; 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 or 7.1.1:

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.

Note: You will need the *IBM ServeRAID Device Drivers for SCO Operating Systems - UnixWare HBA and OpenServer BTL D* diskette. Refer to “Installing device drivers” on page 3 for additional information.

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 SCOAdmin

1. Insert the *IBM ServeRAID Device Drivers for SCO Operating Systems - UnixWare HBA and OpenServer BTL D* diskette into the diskette drive.
2. Start the SCOAdmin utility program by typing SCOADMIN at the system prompt.
3. Click **Software_Management**.
4. Click **Application Installer**.
5. Click the **Install From** tab.
6. Click **Disk_A**.
7. If nothing appears in the window, click **Update View**.
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.