

IBM Director 4.1



# Remote Deployment Manager 4.11 Compatibility and Configuration Guide



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**Note:** Before using this information and the product it supports, read the general information in Appendix A, “Getting help and technical assistance”, on page 23.



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## Preface

This document includes information about the hardware and software that IBM® Remote Deployment Manager (RDM) supports. You will find tables that detail which IBM systems are supported as RDM systems. Supported network interface cards (NICs) are listed here as well. RDM requires certain levels of firmware for both system hardware and network adapter to function properly. See the applicable table for proper BIOS levels.

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## How this book is organized

Chapter 1, “IBM systems”, on page 1 contains comprehensive listings of IBM systems and network cards supported by RDM 4.11.

Chapter 2, “Non-IBM systems”, on page 21 contains comprehensive listings of non-IBM systems supported by RDM 4.11.

Appendix A, “Getting help and technical assistance”, on page 23 contains information about getting help and technical assistance.

Appendix B, “Notices”, on page 25 contains product notices and trademarks.

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## RDM publications

The following publications are available in Portable Document Format (PDF) on the *IBM Remote Deployment Manager version 4.11* CD in the docs directory:

- *Remote Deployment Manager 4.11 Getting Started*
- *Remote Deployment Manager 4.11 Installation Guide*
- *Remote Deployment Manager 4.11 Operations Guide*

You can also obtain these publications from the IBM Support Web site at <http://www.ibm.com/pc/support>.

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## RDM resources on the World Wide Web

The following Web pages provide resources for understanding, using, and troubleshooting RDM and systems-management tools.

### **IBM Remote Deployment Manager 4.11**

[http://www.ibm.com/servers/eserver/xseries/systems\\_management/sys\\_migration/rdm.html](http://www.ibm.com/servers/eserver/xseries/systems_management/sys_migration/rdm.html)

From this Web page, you can download the latest version of the *Remote Deployment Manager 4.11 Compatibility and Configuration Guide*.

### **IBM Support page**

<http://www.ibm.com/pc/support/>

This is the IBM Support Web site for IBM hardware and systems-management software. For systems-management software support, click **Systems management**.

### **IBM Systems Management Software: Download/Electronic Support page**

[http://www.ibm.com/pc/us/eserver/xseries/systems\\_management/dwnl.html](http://www.ibm.com/pc/us/eserver/xseries/systems_management/dwnl.html)

Use this Web page to download IBM systems-management software, including IBM Director.

**IBM xSeries™ Systems Management page**

[http://www.ibm.com/pc/ww/eserver/xseries/systems\\_management/index.html](http://www.ibm.com/pc/ww/eserver/xseries/systems_management/index.html)

This Web page presents an overview of IBM systems management and IBM Director. Click **IBM Director 4.1** for the latest information and publications.

**IBM ServerProven® page**

<http://www.ibm.com/pc/us/compat/index.html>

This Web page provides information about IBM hardware compatibility with IBM systems-management software.

# Chapter 1. IBM systems

This section provides comprehensive listings of systems and network cards supported by RDM 4.11. In addition, BIOS and CMOS procedures for IBM Point of Sale (POS) computers are provided and Wake on LAN<sup>®</sup> issues are discussed.

## Supported computers

This section provides tables of IBM servers, IBM workstations, IBM ThinkPad<sup>®</sup>, and IBM Point of Sale computers supported by RDM version 4.11.

The BIOS levels shown in the matrices indicate the levels that were used in testing. It is recommended that you update your systems to the most recent BIOS level. To obtain BIOS updates, check the support page for a particular system.

## IBM servers

The following table lists the supported firmware and the operating systems that can be deployed on specific IBM servers.

Table 1. IBM servers

System		Maintenance				Native Install									Clone Install				
Type	Model	Tested BIOS level	ISMP flash	CMOS update	RAID config	2000 S	2000 AS	2003 SE	2003 EE	2003 WE	RH 7.3	RH 8.0	RH AS2.1 <sup>14</sup>	2000 S	2000 AS	2003 SE	2003 EE	2003 WE	
8479 <sup>1</sup>	xSeries 200	ZRJT21A	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	
8480 <sup>2,11</sup>	xSeries 205	JPJT39A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	
8645 <sup>3</sup>	xSeries 220	TUJT20A	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	
8646	xSeries 220	JJJT18A	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	
8647 <sup>4,18</sup>	xSeries 225	OPJT30A	Y	Y <sup>13</sup>	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	
8654	xSeries 330	TTJT32A	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	
8668	xSeries 232	QAJT32A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	
8669	xSeries 342	QAJT32A	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	
8670 <sup>7</sup>	xSeries 345	GRJT38A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	
8671 <sup>7,9</sup>	xSeries 235	GRJT38A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	
8672	xSeries 300	ABE117A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	
8673 <sup>20</sup>	xSeries 305	PLE146A	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	
8674	xSeries 330	EMJT13A	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	

Table 1. IBM servers (continued)

System		Maintenance				Native Install										Clone Install				
Type	Model	Tested BIOS level	ISMP flash	CMOS update	RAID config	2000 S	2000 AS	2003 SE	2003 EE	2003 WE	RH 7.3	RH 8.0	RH AS2.1 <sup>14</sup>	2000 S	2000 AS	2003 SE	2003 EE	2003 WE		
8676	xSeries 335	T2JT19A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y		
8678 <sup>17</sup>	Blade Center™ HS20	BRJT25A	Y	Y	Y <sup>21</sup>	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
8682	xSeries 350	ARE125A	Y	Y <sup>13</sup>	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y		
8685 <sup>12</sup>	xSeries 255	AVJT20A	Y	Y	Y	N	N	N	N	N	Y	Y	N	Y	Y	Y	Y	Y		
8686	xSeries 360	RUJT50A	N <sup>16</sup>	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y		
8687 <sup>10</sup>	xSeries 440	VIJT39A	N <sup>16</sup>	Y	Y	Y	Y	Y	Y	Y	N	N	N	N	N	N	N	N		
8832 <sup>17,19</sup>	Blade Center HS20	BSJT05D	Y	Y	Y <sup>21</sup>	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
8870 <sup>15</sup>	xSeries 445	REE118A	N <sup>16</sup>	Y	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y		

Y = Supported, N = Not supported, NA = Not applicable

**2000 S** = Microsoft® Windows® 2000 Server, **2000 AS** = Windows 2000 Advanced Server, **2003 SE** = Windows Server 2003 Standard Edition, **2003 EE** = Windows Server 2003 Enterprise Edition, **2003 WE** = Windows Server 2003 Web Edition, **RH 7.3** = Red Hat Linux Version 7.3, **RH 8.0** = Red Hat Linux Version 8.0, **RH AS 2.1** = Red Hat Linux Advanced Server Version 2.1

**Notes on Table 1 on page 1:**

1. For xSeries 200, machine type 8479: With Flash Update Diskette, version ZRE123A, system does not wake.
2. For xSeries 205, machine type 8480: Requires BIOS level 33. Complete the following steps to boot to the network with an external NIC:
  - a. Flash BIOS to the 33A level
  - b. Add the PCI base Intel® NIC
  - c. Restart the system
  - d. Press F1 at early POST
  - e. Type Ctrl+S at Intel Boot Agent
  - f. Set the option of Intel Boot Agent to “network first and then local devices”
  - g. Set BIOS start sequence to network1, network0, CDROM, and hard drive
  - h. Restart the system
3. For xSeries 220, machine type 8645: Discovery hangs after contact with Token Ring card on startup with a firmware level of cs118l, cs118k, or cs118q.

4. For xSeries 225, machine type 8647: With BIOS level 20A and using onboard Ethernet, the system continues to reboot after scan.
5. Limited information about blades is collected by the Management Module. You need to run RDM scan on the blade objects that Director creates when you discover systems. Drag the blade objects to the built-in scan task. RDM will then collect all the required information and add it to those objects.
6. No matter what switch module is connected to the chassis, the blades are collected using the first Ethernet adapter seen in the BIOS, which is the Ethernet adapter that is connected to switch module number two. If you have only one switch module and connect it to slot number one, the blade cannot be scanned nor managed with RDM, since you have a wrong MAC address. Put the switch in slot 2 for proper operation.
7. For 8670 and 8671 systems: You may have to set the ServeRAID™ write cache to “write through” mode in order to run the Secure Data Disposal task.
8. Any machine whose cmosutil program uses - s and - r to save and restore, instead of /s and /r, requires a LCCMOS.BAT file. Make note of what syntax that particular system uses when you create the .cms file initially. One of the following commands should go into the batch file:

```
cmosutil.exe - r filename.cms
```

or

```
cmosutil.exe - r %1
```

Create the batch file on the BIOS flash diskette; then, create a BIOS image as you normally would and a CMOS image with the BIOS. The batch file should show up as the executable in the CMOS image.

9. For xSeries 235, machine type 8671: BIOS must be at level GRJT31A for Scan to detect ISMP firmware level.
10. For xSeries 440 systems: Cloning is not supported (Get Donor task and Windows Clone Install task).
11. For xSeries 205, machine type 8480: Fails to boot from PXE following a Wake on LAN.
12. For xSeries 255, machine type 8685: Does not support Windows Native Install task.
13. A user-modified LCCMOS.BAT file is required to update CMOS. If you see one of the following lines in LCCMOS.BAT:

```
cmosutil.exe - s %1
```

or

```
cmosutil.exe /s %1
```

you must change it to:

```
cmosutil.exe /R %1
```

14. Deployment of Red Hat Linux AS 2.1 may hang intermittently if you select the “Message and Web Tools” package group (the group containing the Mozilla package) while creating a Linux Native Install task. If this occurs, redeploy the task or reboot the target server prior to the timeout being reported by RDM.
15. For xSeries 445, machine type 8870: Does not support Linux Native Install task.
16. Refer to the section, “Flashing RSA firmware with a Custom task” in Chapter 4 of the *Remote Deployment Manager 4.11 Operations Guide* for information on flashing RSA code.

17. HS20 Blade errors (blue screen) while installing either Windows 2000 Server or Windows 2003 Server. The HS20 Blade BIOS enables the built-in IDE RAID adapter by default when Windows 2000 Server or Windows 2003 Server detects the RAID adapter. It attempts to load an OEM driver that is not compatible with Windows at that stage. The system then immediately reboots and loops over and over.

Resolution:

**Note:** The HS20 Blade Server should have BIOS level 5D. If not, update the BIOS level before continuing.

- a. Remove the HS20 Blade client from IBM Director Console, including the scheduled tasks for this client.
  - b. Power on the HS20 Blade manually and press F1 to display the system BIOS configuration.
  - c. From the **Configuration/Setup Utility** menu, select **Device and I/O ports** using the up and down arrow keys.
  - d. From the **Device and I/O ports** menu, select **IDE Configuration Menu**.
  - e. Select **IDE Raid feature**, and then change the value in the bracket to [Disabled] by using the left and right arrow keys.
  - f. Press F10 to save the new configuration, and then press ESC to exit the System configuration screen.
  - g. Power off the server.
  - h. From IBM Director Console, remove the OEM driver from RDM by editing the Windows Native Install template's Device Driver Manager: **Remote Deployment Manager** → **Windows Native Install** → **Edit Template**
  - i. Click the **Setup** tab.
  - j. Select **Text Mode** as the driver type. A list of OEM drivers is displayed.
  - k. Scroll down the list of descriptions and select the applicable driver. If you are installing Windows 2000 Server, select LSI Logic MegaRAID IDE 100 Driver For MAGNIA Z500 (Server 2000). If you are installing Windows 2003 Server, select LSI Logic MegaRAID IDE 100 Driver For MAGNIA Z500 (Server 2003).
  - l. Click **Delete**.
  - m. Verify information in the Delete Driver panel, and click **OK**. The reference to the driver is removed.
  - n. Click **OK** to return to the "Windows Native Install" window.
  - o. Scroll down the list of descriptions and select the applicable driver. If you are installing Windows 2000 Server, select IBM CSB-6 IDE 100 RAID Controller (Server 2000). If you are installing Windows 2003 Server, select IBM CSB-6 IDE 100 RAID Controller (Server 2003).
  - p. Repeat steps l through n.
  - q. Click **OK** to close the "Windows Native Install" window.
  - r. From IBM Director Console, rescan the HS20 Blade server.
  - s. Once the HS20 Blade server is scanned, redeploy the WNI task to the server.
18. For xSeries x225, type 8647: Does not support IBM Remote Supervisor Adapter II.
  19. BladeCenter™ model 8832 will not wake with the Management Module during an RDM task.
  20. For xSeries 305, model 8673 with SCSI drives: Windows Native Install tasks and Linux Native Install tasks fail if the BIOS level is 48 through 56.
  21. RAID configured through LSI, not a RAID adapter.

## IBM workstations

The following table lists the supported firmware and the operating systems that can be deployed on specific IBM workstations.

Table 2. IBM workstations

System		Maintenance		Native Install		Clone Install	
Type	Model	Tested BIOS level	CMOS update	Windows 2000 Pro	Windows XP Pro	Windows 2000 Pro	Windows XP Pro
6219 <sup>1</sup>	IntelliStation <sup>®</sup> M Pro	M6E125A	Y	Y	Y	Y	Y
6220 6230 <sup>2</sup>	IntelliStation M Pro	T6JT12A	Y	Y	Y	Y	Y
6221 <sup>3</sup>	IntelliStation Z Pro	OPE128A	Y	Y	Y	Y	Y
6216 6226	IntelliStation E Pro	JPE139A	Y	Y	Y	Y	Y

**Y** = Supported, **N** = Not supported, **NA** = Not applicable

### Notes on Table 2:

1. For IntelliStation M Pro, machine type 6219: Discovery hangs after contact with Token Ring card on startup with a firmware level of cs118l, cs118k, or cs118q.
2. For IntelliStation M Pro, machine types 6220 and 6230: Wake on LAN is disabled temporarily after completing any RDM task on this system.
3. For IntelliStation Z Pro, machine type 6221: System does not shut down after firmware flash (OPJT23A).
4. On the first boot of Windows XP after being installed with a Windows Native Install task, two instances of "Found New Hardware" popup windows occur on systems that have IBM Director Agent installed. After completing the wizard for each, the SMBus drivers will be installed.

## IBM desktops

The following table lists the supported firmware and the operating systems that can be deployed on specific IBM desktops.

Table 3. IBM desktops

System		Maintenance			Native Install		Clone Install	
Type	Model	Tested BIOS level	CMOS update	Asset ID™ support	Windows 2000 Pro	Windows XP Pro 32-bit	Windows 2000 Pro	Windows XP Pro 32-bit
6792	NetVista™ M41	20KT42A	Y	N	Y	Y	Y	Y
6837	NetVista A40p	WOKT14A	Y	Y	Y	Y	Y	Y
6847	NetVista A40p	WOKT14A	Y	Y	Y	Y	Y	Y
8183	ThinkCentre™ S50	2AKT25A	Y	N	Y	Y	Y	Y
8185	ThinkCentre M50	2AKT25A	Y	N	Y	Y	Y	Y
8191	ThinkCentre A30	24KT44A	Y	N	Y	Y	Y	Y
8319	NetVista S42	28JT20A	Y	N	Y	Y	Y	Y

Y = Supported, N = Not supported, NA = Not applicable

## IBM ThinkPad computers

The following table lists the supported firmware and the operating systems that can be deployed on specific IBM ThinkPad computers.

Table 4. ThinkPad computers

System		Maintenance			Native Install		Clone Install	
Type	Model	Tested BIOS level	CMOS update	Asset ID support	Windows 2000 Pro	Windows XP Pro 32-bit	Windows 2000 Pro	Windows XP Pro 32-bit
1829	R50	1RET62WW	Y	Y	Y	Y	Y	Y
2366	T30	1IET65WW	Y	Y	Y	Y	Y	Y
2373	T40 <sup>1, 3</sup>	1RET34WW	Y	Y	Y	Y	Y	Y
2387	G40	1TET73WW	Y	Y	Y	Y	Y	Y
2388	G40	1TET73WW	Y	Y	Y	Y	Y	Y
2389	G40	1TET73WW	Y	Y	Y	Y	Y	Y
2647	T21	KZET33WW	Y	Y	Y	Y	Y	Y
2652	A30	1EET70WW	Y	Y	Y	Y	Y	Y
2653	A31p	1GET35WW	Y	Y	Y	Y	Y	Y
2656	R31 <sup>2</sup>	1FETE8WW	Y	Y	Y	Y	Y	Y
2658	R32 <sup>4</sup>	1MET92WW	Y	Y	Y	Y	Y	Y
2662	X23	1DET70WW	Y	Y	Y	Y	Y	Y
2672	X31	1QET34WW	Y	Y	Y	Y	Y	Y
2684	R40	1SET47WW	Y	Y	Y	Y	Y	Y

Y = Supported, N = Not supported, NA = Not applicable

### Notes on Table 4:

- The Intel Pro/1000mt mobile connection Ethernet card in the IBM ThinkPad T40/p has poor unicast performance when used with a NetGear (DS108) 8 port 10/100 Mbps Dual Speed Hub. To run Get Donor or Windows Clone Install tasks on a T40/T40p, you should use a switch or different brand hub. This problem affects all NETGEAR DS100 series of 10/100 Mbps Dual Speed Hubs.
- (ThinkPad R31, type 2656) Running the Update Latest BIOS task stops the System Firmware Flash task. When this happens, the Update Latest BIOS task is completed, but the target system is powered off. To solve this problem, perform one of the following actions:
  - Manually power the system back on to ensure that the System Firmware task finishes.
  - From the IBM Director Console, cancel the System Firmware Flash task and run a Basic Scan task on the target system.
- On the IBM ThinkPad T40, the Get Donor task fails with various hubs due to response problems. The workaround is to change the CommandList file's timeout from 240 minutes to a higher value.
- (ThinkPad R32, type 2658) Running the Update Latest BIOS task might stop the System Firmware Flash task. When this happens, the Update Latest BIOS task is completed, but the target system is powered off. To solve this problem, perform one of the following actions:
  - Manually power the system back on to ensure that the System Firmware task finishes.
  - From the IBM Director Console, cancel the System Firmware Flash task and run a Basic Scan task on the target system.

## IBM Point of Sale computers

The following table lists the supported firmware and the operating systems that can be deployed on specific IBM Point of Sale (POS) systems.

Table 5. IBM Point of Sale computers

System		Maintenance			Native Install		Clone Install	
Type	Model	Tested BIOS level	CMOS update	Asset ID support	Windows 2000 Pro	Windows XP Pro 32-bit	Windows 2000 Pro	Windows XP Pro 32-bit
4614-A04 4614-A05	SureOne®	M.06	N	N	Y	Y	Y	Y
4694	SurePOS™ 4694	E17	Y	N	Y	Y	Y	Y
4800	Aspen P3	80KT006	Y	N	Y	Y	Y	Y
4800	Aspen P4	81KT006	Y	N	Y	Y	Y	Y
4810-310	SurePOS 300	K.09	Y	N	Y	Y	Y	Y
4840-532 4840-622	SurePOS 500/600	V1.19	Y	N	Y	Y	Y	Y

Y = Supported, N = Not supported, NA = Not applicable

## POS system procedures

The following section contains BIOS and CMOS procedures specific to SurePOS systems.

### Creating a BIOS flash diskette with support for multiple SurePOS 4800 models

Complete the following steps to create a BIOS flash diskette with support for SurePOS 4800 models:

1. Download the appropriate BIOS from the IBM SurePOS site at <http://www2.clearlake.ibm.com/store/support/index.html>.
2. Unpack the downloaded BIOS executable onto a diskette in diskette drive A.
3. From the BIOS diskette, obtain the new BIOS level number. If your diskette has a readme or a .TXT file, open the file and find the version information.
4. Double-click the **My Computer** icon on your desktop. Right-click the diskette drive, and then select **Properties**. The "Properties" window opens.
5. If the value for the label is not the same as the BIOS you want to flash, then change the label in the Properties window. For BIOS diskettes with multiple flash files, you can change to the BIOS you want to use.
6. The disk should now be ready to create a system firmware image in RDM.
7. The newly created BIOS diskette should have a file called `lcreflsh.bat`. If the file `lcreflsh.bat` does not exist, then you will have to create one. This file should contain the flash update executable and the BIOS image. For example:

```
@echo off
CLS
echo IBM 4800 SurePOS 730 Series Flash BIOS Update
echo          Version R1KT136
echo          11/04/2002
echo.
savecmos.exe -progress
cd\
```

```

PHLASH /x /mode=3 /p /exit R1KT136.rom
loadcmos.exe -progress -save
echo.
echo The system BIOS has been updated.
echo.
pwoff.com
echo System is re-booting...
rbtio64.com
:quit
echo The system BIOS has NOT been updated.

```

## Creating a SurePOS 469x, 4810, or 4614 BIOS image in RDM

Complete the following steps to create a SurePOS 469x, 4810, or 4614 BIOS image:

1. Download the appropriate BIOS for model 469x from the IBM SurePOS site at <http://www2.clearlake.ibm.com/store/support/index.html>.
2. Unpack the downloaded BIOS executable onto diskette drive A.
3. From the BIOS diskette, obtain the new BIOS level number. If your diskette has a readme or a .TXT file, open the file, and find the version information in the file.

**Note:** For SureOne models, both the BIOS level and the product ID are taken from the BIOS update version number in the readme.txt file. Open the readme.txt file and look for the Flash BIOS update version number. For example, this number could be M.07, where M is the product ID and 07 is the BIOS level number.

4. Get the product ID from the system information screen of the client machine and find the BIOS level; the first letter of the BIOS level is the product ID. The following example is a list the BIOS information displayed:

```

>Primary Master[40016mb]
>Primary Slave[none]
>Secondary Master[none]
>Secondary Slave[none]

CPU:VIA C3
CPU Speed:6.5x133
System Memory:640 KB
Extended Memory:126975 KB
BIOS Level:K.05
LAN Node ID:000255E82B3E

```

**Note:** On SurePOS 4694 model 206, there is no reference to the BIOS level when you press F1. The BIOS level is on the screen when you bootup. You must press Pause to read the screen. The screen should display:

```
IBM POS Device Channel Subsystem Version Ver E.17
```

5. Create a lcreflash.bat file, or use the one that has been created. The lcreflash.bat file should have the BIOS command to flash the BIOS along with the unattended option, usually /r, for example:
 

```
4810prog /r
```
6. Insert the BIOS diskette into diskette drive A of the RDM server. Make sure the diskette does not contain any volume labels.
7. Create a BIOS image by clicking **Tasks** → **Remote Deployment Manager** → **Image Management** → **Create** → **System Firmware Flash**.
8. Type the Image Name and Image Description.
9. Click the **Setup** tab.

10. Click **Read Diskette**.
11. Insert the information obtained from step 3, 4, and 5.

You should now be able to have the BIOS task import this diskette.

### Cloning CMOS settings for SurePOS 500 systems

Complete the following steps to load a given set of CMOS settings across SurePOS 500 systems:

1. Obtain a BIOS diskette compatible with the POS system to be cloned, that is, contains the same BIOS level.
2. Save the CMOS settings from that system by booting the BIOS diskette and issuing the following command:

```
savecmos -verbose -norom
```

The `savecmos` command creates a file called `lccmos.dat` that contains the CMOS settings for the system.

3. After using `savecmos` to create a `lccmos.bat` file on the diskette, put the following command into the `lccmos.bat` file:

```
loadcmos -verbose -nochecks -save -rom=CURRENT
```
4. Create a file called `lctest.cms` on the diskette, of which the content of the file can be anything, including a few blank lines.
5. Create a BIOS image of the diskette using the RDM Image Management tool.
6. Create a CMOS image using the RDM Image Management tool, selecting the BIOS image you just created in step 5. The name of the image should have the format "ModelxxxLevel!", for example, Kxxx05!.

**Note:** Delete the information in the **Executable parameter** field before clicking **OK** to build the CMOS image.

The CMOS task is ready to deploy.

### Cloning CMOS settings for SurePOS 300 - 4810-31x systems

The CS4810.EXE and CMOSSET.COM program pair *must* be used when configuring the 4810-31x model or SurePOS 300 models with CPU upgrades.

CS4810.EXE can be run on the SurePOS 300 or any available PC. It is used to create a file, named CS4810.DAT, that contains the new settings. Then CMOSSET.COM should be run on the SurePOS 300 to update its CMOS settings.

Complete the following steps to clone CMOS settings for SurePOS 300 systems:

1. Obtain a BIOS diskette compatible with the POS system you are trying to clone, that is, contains the same BIOS level as what is installed on the POS system.
2. Download the CS4810.EXE CMOS utility from the IBM SurePOS site at <http://www2.clearlake.ibm.com/store/support/index.html>.
3. Copy the utility to the BIOS diskette.
4. To save the CMOS settings from that system, boot the BIOS diskette in that system and issue the following command:

```
CS4810 /b
```

The CS4810.EXE command creates a file called CS4810.DAT that contains the CMOS settings for the system.

5. Create a file named `1ccmos.bat` on the diskette (or modify the existing `1ccmos.bat` file). The file should contain only the following command:  
`CMOSSET.COM`

**Note:** Make sure the `CS4810.DAT` file is in the same directory as `CMOSSET.COM`.

6. Create a file called `1ctest.cms` on the diskette, of which the content of the file can be anything, including a few blank lines.
7. Create a CMOS image using the RDM Image Management tool, selecting the BIOS image you just created. The name of the image should have the format "ModelxxxLevel!", for example, `Kxxx05!`.

**Note:** Delete the information in the **Executable parameter** field before clicking **OK** to build the CMOS image.

The CMOS task is ready to deploy.

### Cloning CMOS settings for SurePOS 4694 systems

The `CS4694.EXE` and `CMOSSET.COM` program pair **MUST** be used when configuring the SurePOS 4694 model with CPU upgrades.

`CS4694.EXE` can be run on the SurePOS 4694 or any available PC. It is used to create a file, named `CS4694.DAT`, that contains the new settings. Then `CMOSSET.COM` should be run on the SurePOS 4694 to update its CMOS settings.

Follow these steps to clone CMOS settings for SurePOS 4694 systems:

1. Obtain a BIOS diskette compatible with the POS system you are trying to clone, that is, contains the same BIOS level as what is installed on the POS system.
2. Download the `CS4694.EXE` CMOS utility from the IBM SurePOS site at <http://www2.clearlake.ibm.com/store/support/index.html>.
3. Make sure `CS4694.CMS` and `CMOSSET.COM` are on the BIOS diskette. (Copy them onto the diskette if they are not already there.)
4. Create a file named `1ccmos.bat` on the diskette (or modify the existing `1ccmos.bat` file.). The file should contain only the following commands:

```
COPY %1 CS4694.DAT
CMOSSET.COM
```

Save and close the file.

5. Create a file containing the new CMOS settings by running the `CS4694.EXE` program. Run that program with a single system-dependent parameter (see the `README` file to find the correct parameter for your system model). For example:

```
CS4694 /r
```

The `CS4694.EXE` command creates a file called `CS4694.DAT` that contains the CMOS settings for the system. Rename the file to a user-friendly name, for example, `MyCmos.CMS`.

6. Use the RDM Image Management function to create an RDM System Firmware Flash image using the modified BIOS diskette as input (use the procedure described earlier).
7. Use the RDM Image Management function to create an RDM CMOS image using the file created in step 5 as input (for example, `MyCmos.CMS`).

## Supported adapters

RDM will automatically scan, configure, and recognize supported network cards. Use the following links for flash updates and other networking information:

- For IBM Auto Wake Token-Ring ISA Adapter flash updates, required for IntelliStation M Pro -- 6898, go to <http://www.ibm.com/networking/support/products.nsf/support/home?OpenDocument>
- For IBM PCI Wake on LAN Token-Ring Adapter flash updates, required to support a DHCP boot environment, go to <http://www.ibm.com/networking/support/products.nsf/support/home?OpenDocument>
- For IBM adapters, go to <http://www.ibm.com/networking/support/>
- For Intel adapters, go to <http://www.intel.com>

## Ethernet adapters

The following table lists the supported Ethernet adapters and their support of the Preboot Execution Environment (PXE) and the Wake on LAN feature.

Table 6. Ethernet adapters.

Part number	FRU number	Name	Remote boot protocol		Wake on LAN
			PXE 2.0 or 2.1	PXE 1.0 <sup>1</sup>	
34L4401 (3DES US) 34L4410	34L4409	IBM 10/100 EtherJet™ Secure Management Adapter	Y	N	Y
34L4501 (DES non-US) 34L4510	34L4509	IBM 10/100 EtherJet Secure Management Adapter	Y	N	Y
34L1101 34L1110	34L1109	IBM 10/100 EtherJet PCI Adapter with Alert on LAN™ 2	Y	N	Y
34L1201 34L1210	34L1209	IBM 10/100 EtherJet PCI Management Adapter	Y	N	Y
34L0201 34L0210	30L5929	IBM 10/100 EtherJet PCI Adapter with Wake on LAN1	Y	N	Y
08L2565 08L2567	08L2566	IBM 10/100 EtherJet PCI Adapter with Wake on LAN1	Y	Y	Y
85H9921 85H9930	85H9928	IBM 10/100 EtherJet PCI Adapter with Wake on LAN1	Y	Y	Y
06P3601	06P3609	IBM 10/100 Ethernet Server Adapter	Y	Y	Y
09N9901	09N9901	10/100 EtherLink Server Adapter by 3Com	Y	N	Y
09N3609	09N3609	10/100 EtherLink PCI Management Adapter by 3Com	Y	N	Y
34L4401 (3DES US), 34L4410	34L4409	IBM 10/100 EtherJet Secure Management Adapter	Y	N	Y
34L4501 (DES non-US), 34L4510	34L4509	IBM 10/100 EtherJet Secure Management Adapter	Y	N	Y
34L1101, 34L1110	34L1109	IBM 10/100 EtherJet PCI Adapter with Alert on LAN 2	Y	N	Y
34L1201, 34L1210	34L1209	IBM 10/100 EtherJet PCI Management Adapter	Y	N	Y
34L0201, 34L0210	30L5929	IBM 10/100 EtherJet PCI Adapter with Wake on LAN1	Y	Y	Y

Table 6. Ethernet adapters (continued).

Part number	FRU number	Name	Remote boot protocol		Wake on LAN
			PXE 2.0 or 2.1	PXE 1.0 <sup>1</sup>	
08L2565, 08L2567	08L2566	IBM 10/100 EtherJet PCI Adapter with Wake on LAN1	Y	N	Y
85H9921, 85H9930	85H9928	IBM 10/100 EtherJet PCI Adapter with Wake on LAN1	Y	N	Y
		Intel Gigabit Copper (82543) PRO 1000 XT	Y	N	Y
		Intel Gigabit Copper (82544) PRO 1000 XT	Y	N	Y
		Broadcom Gigabit Fiber (5704) NetXtreme Dual Port	Y	N	Y
		Broadcom Gigabit Copper (5703) NetXtreme 1000 SX	Y	N	Y
10L1407	10L1423	IBM 10/100 EtherJet miniPCI adapter	Y	N	Y
08K3124	08K3125	IBM 10/100 EtherJet miniPCI adapter with 56K modem (Intel current card)	Y	N	Y
09N9774	00N8117	IBM 10/100 EtherJet miniPCI adapter with 56K modem by 3Com	Y	N	Y
06P3801	06P3809	Intel PRO/100 SP Mobile Combo adapter	Y	N	Y
26P8039	26P8069	Ethernet Daughter Card	Y	N	Y
Ships with system	26P8100	IEEE 1394/LAN Combo Card	Y	N	Y
Ships with system	N/A	On board Ethernet Adapter for ThinkPad R30	Y	N	Y
22P4501	22P4509	Intel PRO/100S Desktop Adapter	Y	N	Y
22P4701	22P4709	Intel PRO/100S Low Profile Desktop Adapter	Y	N	Y
19K5543		Intel PRO/100 VE Desktop Connection	Y	N	Y
19K5282		Intel PRO/100 VE Desktop Connection (riser)	Y	N	Y
PILA8460B		Intel PRO/100+ PCI Management Adapter	Y	N	Y

Y indicates the adaptor is supported, N indicates the adaptor is not supported.

**Notes on Table 6 on page 12:**

1. PXE 1.0 is not supported with the Linux Native Install task.

## Token Ring adapters

The following table lists the supported Token Ring adapters and their support of the Preboot Execution Environment (PXE) and the Wake on LAN feature.

**Note:** The minimum firmware level for any Token Ring adapter used with RDM is 118r.

Table 7. Token Ring adapters

Part number	FRU number	Name	Remote boot protocol		Wake on LAN
			PXE 2.0 or 2.1	PXE 1.0 <sup>1</sup>	
34L0501 34L0510	30L5980	IBM High-Speed 100/16/4 Token-Ring PCI Adapter	Y	Y	Y
34L0701 34L0710	30L6817	IBM 16/4 Token-Ring PCI Adapter 2 with Wake on LAN	Y	Y	Y
86H1880 86H1886 86H1887 08L3340 08L3294	08L3335	IBM PCI Wake on LAN Token-Ring Adapter	Y	Y	Y
34L5001 34L5010	34L5009	IBM 16/4 Token-Ring PCI Management Adapter	Y	Y	Y
34L5201 34L5210	34L5209	IBM High-Speed 100/16/4 Token-Ring PCI Management Adapter	Y	Y	Y

**Y** indicates the adaptor is supported, **N** indicates the adaptor is not supported.

### Notes on Table 7:

1. PXE 1.0 is not supported with the Linux Native Install task.

## RAID adapters

The following tables list the supported RAID adapters.

*Table 8. ServeRAID adapters*

<b>Name</b>	<b>Part number</b>	<b>FRU number</b>
ServeRAID – 4H	37L6889	37L6892
ServeRAID – 4M	37L6080	37L7258
ServeRAID – 4L	37L6091	09N9540
ServeRAID – 4Mx	06P5740	06P5741
ServeRAID – 4Lx	06P5736	06P5737
ServeRAID – 5i	25P3492	32P0016
ServeRAID – 6i	71P8595	71P8627
ServeRAID – 6M	32P0033	02R0985

*Table 9. LSI RAID controllers*

<b>Name</b>	<b>Part number</b>
Single Channel LSI Ultra320 SCSI controller	LSI53C1020
Dual Channel LSI Ultra320 SCSI controller	LSI53C1030
LSI MegaRAID IDEal RAID controller	LSI MegaRAID IDEal RAID

### **Notes on Table 9:**

1. The LSI RAID controllers are onboard controllers.

## BladeCenter products

The following table lists the supported BladeCenter products.

Table 10. BladeCenter products

Name	Part number	FRU number
IBM @server™ BladeCenter HS20 Fibre Channel Expansion Card <sup>1</sup>	48P7061	59P6624
Myrinet Cluster Expansion Card for IBM @server BladeCenter <sup>2</sup>	73P6000	73P6001
IBM @server BladeCenter Optical Pass-thru Module	02R9080	02R9082
Nortel Network Layer 2-7 GbE Switch Module for IBM @server BladeCenter	73P9057	73P9004
IBM @server BladeCenter 2-Port Fibre Channel Switch Module	48P7062	59P6621
IBM @server BladeCenter Gigabit Ethernet Expansion Card	73P9030	13N2306 replaces 73P9031

### Notes on Table 10:

1. The IBM @server BladeCenter HS20 Fibre Channel Expansion Card has limited support. The following tasks are supported:
  - Deploying the Windows operating system to a fibre boot drive.
  - Deploying the Windows operating system to permit access of shared fibre data drives.
  - Deploying the Linux operating system to a local drive with fibre data drives.
2. For all supported operating systems, to successfully install the Myrinet Cluster Expansion Card for IBM @server BladeCenter, you must manually install this product's device drivers.

## Fibre adapters

The following table lists the supported Fibre adapters.

Table 11. Fibre adapters

Name	Qlogic product name	Part number	FRU number
IBM FAStT Host Adapter	QLA2200	00N6881	09N7292
IBM FAStT FC-2 Host Bus Adapter <sup>3</sup>	QLA2310	19K1246	19K1273

### Notes on Table 11:

- The Fibre adapters have limited support. The following tasks are supported:
  - Deploying the Windows operating system to a fibre boot drive.
  - Deploying the Windows operating system to permit access of shared fibre data drives.
  - Deploying the Linux operating system to a local drive with fibre data drives.
- Complete the following steps to correct an installation problem with any of the Fibre adapters:
  - Open the txtsetup.oem file for the Fibre adapter in an ASCII text editor.
  - Replace all occurrences of the string OEMSCSI with the following string:  
`OEMQLQlogic_product_number`  
  
where *Qlogic\_product\_number* is the number in the Qlogic product name listed in Table 11. For example, use the string OEMQL2200 for the IBM FAStT Host Adapter.
  - Save and close the file.
  - Add the driver to the textmode driver repository.
- If you are adding QLA23nn device drivers (where *nn* completes the Qlogic product name) to the textmode driver repository, complete the following steps:
  - Open the txtsetup.oem file for the QLA23nn adapter in an ASCII text editor.
  - Delete the applicable line:  
**For Windows 2000:** id12 = "PCI\VEN\_1077&DEV\_2312&SUBSYS\_027D1014", "q12300"  
**For Windows 2003:** id13 = "PCI\VEN\_1077&DEV\_2312&SUBSYS\_010C1077", "q12300"
  - Save and close the file.
  - Add the driver to the textmode driver repository.

## SCSI adapters

Typically, RDM automatically supports SCSI cards. On Windows 2000, RDM supports the cards compatible with the operating system.

## Advanced Systems Management adapters

RDM cannot configure X Windows support for machines with the Remote Supervisor Adapter II. If you want X Windows support, you must configure it after the installation is complete. See the *RDM Operations Guide* for more information.

The following table lists the supported Advanced Systems Management adapters.

Table 12. Advanced Systems Management adapters

Part number	FRU	Name
01K7209	24P6538	Netfinity® Advanced System Management PCI Adapter
09N7585	36L9912	Remote Supervisor Adapter
59P2984	59P2998	Remote Supervisor Adapter II

---

## Wake on LAN issues

Check the system BIOS, using F1, and ensure the Wake on LAN option is enabled, and that the alternate start sequence has the network listed ahead of the hard disk.

## Wake on LAN notes

- For model 8672: To enable the Wake on LAN feature, you must configure the Configuration/Setup BIOS Utilities (by pressing F1 at boot). Select the Power Management Setup option, and then select Automatic Power On. Enable Wake on PCIPME, and then enable Wake Up on LAN/Ring.
- For model 8645: To enable the Wake on LAN feature, the following conditions must be met:
  - A Wake on LAN-enabled NIC adapter must be installed in PCI slot 1, and connected to the system board by the Wake on LAN cable that comes with the Wake on LAN adapter. The adapter must be a Wake on LAN-enabled adapter as identified in the xSeries 220 ServerProven list at [www.ibm.com/pc/compat](http://www.ibm.com/pc/compat).
  - Wake on LAN must be enabled in Configuration/Setup (F1 on boot). By default, it is not.
  - The boot agent of the network adapter should have the Legacy OS wake up support enabled, if supported.
  - The on-board Ethernet controller should be disabled.
  - Network Boot Protocol - PXE is the default; do not change.
  - Boot Order - ensure network is listed before hard disk on alternate boot.
  - Legacy OS wake up support. This option allows or disallows a non-Windows operating system to use adapter remote wake up capability. Disabled is the default. Enable this for RDM to use.
  - The server is either off or shut down from an Advanced Configuration and Power Interface (ACPI) operating system; that is, if you turn off the server by pressing the power button, Wake on LAN will not work.
- For model 6849 systems, the following BIOS settings should be set to enable the Wake on LAN feature:
  - Advanced/Peripheral Configuration/LAN device is enabled if using the on-board Ethernet, disabled if using a Wake on LAN-capable adapter.
  - Power/ACPI/Wake on LAN should be set to Power On.
  - Boot - confirm the appropriate network is listed before the hard disk. Note this is reset to default settings if any changes are made to BIOS. Check this, and then save immediately.
  - If using an adapter for the Wake on LAN feature:
    - adapter must be in slot 1, PCI slot numbers are shown on the system board.
    - adapter must be connected to the system board with the Wake on LAN cable that comes with the adapter.

## Intel PRO/1000 adapters

The Intel® PRO/1000 XT and Intel PRO/1000 XF and newer server adapters support the Intel Boot Agent, but are shipped with Wake on LAN and PXE disabled. To enable these features, use the IBAUTIL.EXE utility found in the BootAgent directory on your driver CD-ROM or at the root of your Web-downloaded image.

Use the following procedure to enable the PRO/1000 XT adapter for Wake on LAN and PXE:

1. Go to [www.intel.com](http://www.intel.com) and search on Boot Agent.
2. Select the entry that contains the desired adapter, in this case, Intel® PRO/1000 Family of Gigabit Desktop and Server Adapters.

The Intel PRO/1000 XT Server and Intel PRO/1000 XF Server Adapters ship with Boot ROM onboard - enable using IBAUTIL.EXE (at DOS prompt, type IBAUTIL -NIC=X -FE).

Download the Boot Agent image, PROBOOT.EXE. Execute this, (works in a Windows 2000 environment), to find the tool, IBMUTIL.EXE. Copy to a DOS diskette. Use this to boot the client that has the PRO/1000 adapter. Execute the following commands:

```
ibauti1 -FE
ibauti1 -PXE
ibauti1 -WOLE
```

The adapter should then be ready for PXE and Wake on LAN.

### **IBAUTIL.EXE**

IBAUTIL is a utility program that changes the default settings of your Intel WfM-compatible adapter. IBAUTIL can be used to enable or disable the Wake-on-LAN and Boot Agent capabilities, as well as enable or disable some settings used by the Boot Agent.

#### **Wake-On-LAN**

When enabled, the adapter can react to special 'wake up' packets and power up the computer without end user intervention.

#### **Intel Boot Agent**

When enabled, the computer can initiate PXE/RPL boot if a valid flash image is present on the NIC.

**Note:** Desktop adapters are normally shipped with both Wake on LAN and the Boot Agent (for PXE) enabled. Server adapters are normally shipped with both Wake on LAN and the Boot Agent (for PXE) disabled.

To enable or disable these features you **MUST** use IBAUTIL. Other tools, like PROSet, can only be used to upgrade the Boot Agent image and change Boot Agent configuration settings.

If the Boot Agent on the NIC is currently disabled, use the IBAUTIL utility to enable the Boot Agent before using IBAUTIL or PROSet to upgrade the image stored in the NIC.

A reboot is required for any changes to take effect.

**Running IBAUTIL:** IBAUTIL [-option]...

**Note:** IBAUTIL (for DOS) must be run with the computer booted to DOS only. This utility cannot be run in a DOS window in any Microsoft Windows product or in DOS compatibility mode in IBM OS/2.

Command Line Parameters

**-ALL**

Selects all adapters found in system, works for both EEPROM and Flash activity.

**-NIC=XX**

Selects a specific adapter (1-16).

**-FLASHENABLE or -FE**

Enables Boot ROM.

**-WOLENABLE or -WOLE**

Enables Wake on LAN bit on Fast Ethernet and enables APMPME and APME EEPROM bits on Gigabit.

**-PXE**

Sets the network boot protocol to PXE.

## Chapter 2. Non-IBM systems

This section provides tables of non-IBM servers and desktop computers supported by RDM version 4.11.

### OEM servers

The following table lists the supported firmware and the operating systems that can be deployed on specific OEM servers.

Table 13. OEM servers

System		Maintenance			Native Install								Clone Install				
Type	Model	Tested BIOS level	CMOS update	RAID config	2000 S	2000 AS	2003 SE	2003 EE	2003 WE	RH 7.3	RH 8.0	RH AS2.1	2000 S	2000 AS	2003 SE	2003 EE	2003 WE
Compaq	Proliant DL380 <sup>1</sup>		N	N	Y	Y	N	N	N	N	N	N	N	N	N	N	N
Dell	PowerEdge 2450	A03	N	N	Y	Y	N	N	N	N	N	N	Y	Y	N	N	N
Dell	PowerEdge 2600	A04	N	N	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y
Dell	PowerEdge 2650	A10	N	N	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y
Dell	PowerEdge 6650 <sup>2</sup>	v.09	N	N	Y	Y	N	N	N	N	N	N	Y	Y	N	N	N

**Y** = Supported, **N** = Not supported, **NA** = Not applicable  
**2000 S** = Windows 2000 Server, **2000 AS** = Windows 2000 Advanced Server, **2003 SE** = Windows Server 2003 Standard Edition, **2003 EE** = Windows Server 2003 Enterprise Edition, **2003 WE** = Windows Server 2003 Web Edition, **RH 7.3** = Red Hat Linux Version 7.3, **RH 8.0** = Red Hat Linux Version 8.0, **RH AS 2.1** = Red Hat Linux Advanced Server Version 2.1

#### Notes on Table 13:

1. Compaq Proliant DL380 Server does not shutdown after tasks.
2. Dell 6650 reboots instead of shutting down after receiving a shutdown command.

## OEM desktops

The following table lists the supported firmware and the operating systems that can be deployed on specific OEM desktops.

Table 14. OEM desktops

System		Maintenance			Native Install		Clone Install	
Type	Model	Tested BIOS level	CMOS update	Asset ID support	Windows 2000 Pro	Windows XP Pro 32-bit	Windows 2000 Pro	Windows XP Pro 32-bit
Compaq	iPAQ	686J5 v1.09	N	N	Y	Y	Y	Y
Compaq	EVO D510				Y	Y	Y	Y
Compaq	Presario 6000	3.14	N	N	Y	Y	Y	Y
Dell	Precision 340	F82010A	N	N	Y	Y	Y	Y
Gateway	E-4400	A05	N	N	Y	Y	Y	Y

**Y** = Supported, **N** = Not supported, **NA** = Not applicable

---

## Appendix A. 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® system, and whom to call for service, if it is necessary.

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### 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.
- 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.
- Use an IBM discussion forum on the IBM Web site to ask questions.

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/>.

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## 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).

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