



IBM PCI Ultra 160 SCSI Adapter

User's Guide

OPTIONS
by IBM

Note: Before using this information and the product it supports, read the information under Appendix F, "Product warranties and notices" on page F-1.

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About this book

This manual contains instructions for installing, configuring, and troubleshooting the IBM® PCI Ultra160 SCSI Adapter. The manual is divided into three parts:

Part 1: Quick installation guide

This guide contains abbreviated installation instructions.

Part 2: Installation guide

This guide contains the product description and expanded installation instructions in the following languages:

- English
- French
- Spanish
- Italian
- Brazilian Portuguese
- Traditional Chinese
- Simplified Chinese
- Japanese

Part 3: Appendixes

The appendixes contain product specifications, SCSISelect, configuring multiple host, problem solving, and help and service. It also contains the product warranties and notices.

Note: The illustrations in this manual might be slightly different from your hardware.

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IBM will send you information and updates on your registered product unless you indicate on the Web site questionnaire that you do not want to receive further information.

Safety: Read first

Before installing this product, read the Safety Information.

مج، يجب قراءة دات السلامة

Antes de instalar este produto, leia as Informações de Segurança.

在安装本产品之前，请仔细阅读 **Safety Information** (安全信息)。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtete příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας (safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

製品の設置の前に、安全情報をお読みください。

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Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

安裝本產品之前，請先閱讀「安全資訊」。

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

Part 1: Quick installation guide

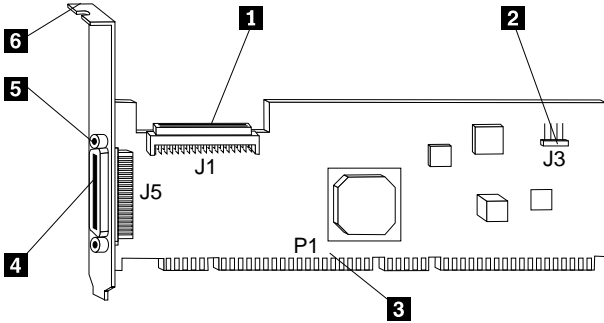
The IBM[®] PCI Ultra160 SCSI Adapter is designed to attach a small computer system interface (SCSI) to a computer that has an available peripheral component interconnect (PCI) expansion slot. After the adapter is installed, SCSI devices can be attached to the external SCSI connector. In addition to this User's Guide, the option package contains:

- The 29160LP SCSI Adapter
- One 68-pin, internal SCSI cable for connecting five 16-bit internal Wide devices
- One 4-pin internal LED cable
- The option CD, which contains the EZ-SCSI and 7800 Family Manager Set device driver and utility packages
- The IBM *Safety Information Book*

This section contains abbreviated installation instructions. If you are familiar with SCSI products and are experienced in installing options, use these instructions. For a description of the SCSI adapter and more detailed information about how to install it see "Part 2: Installation and user's guide" on page 2-1. To install the SCSI adapter, do the following:

1. Set a unique SCSI ID for each device you are connecting to the SCSI chain. The adapter supports SCSI IDs from 0 to 15. The SCSI ID of the SCSI adapter is 7.
2. Turn off all attached devices; then turn off your computer. Unplug the power cords and all attached devices. Remove the cover from your computer. For instructions on how to remove the computer cover, refer to the documentation that comes with your computer.
3. Before opening the static-protective bag containing the SCSI adapter, touch the bag to an unpainted metal surface on your computer for at least two seconds.
4. Remove the adapter from the static-protective bag. If you must put the adapter down, place it on the static-protective bag.

The following is an illustration of the SCSI adapter:



- | | |
|---|--|
| 1 68-pin Internal LVD/SE Connector | 4 68-pin External VHDCI Connector |
| 2 External LED connector | 5 mounting screws |
| 3 PCI bus card-edge connector | 6 bracket |

5. Locate an available 32-bit or 64-bit PCI expansion slot. These slots are shorter than ISA or EISA slots.
6. If you have a newer, lower-profile computer, you will need to use the smaller mounting bracket that comes with the adapter. To install it, reference the illustration and do the following:
 - a. Remove the mounting screws that attach the bracket to the adapter.
 - b. Remove the standard bracket.
 - c. Position the low-profile bracket on the bracket aligning the screw holes in the bracket with the holes in the PCI adapter.
 - d. Insert the two screws and carefully tighten the screws. Do not overtighten.
7. Remove the bracket screw and the metal expansion slot cover.
8. Insert the connector of the adapter, (P1 in the above illustration) into the PCI connector.
9. Press the SCSI adapter into place and secure it with the bracket screw.
10. The internal SCSI cable included in this option package has an adaptive terminator at the end. This terminator serves as the termination device for all SCSI devices that are attached to the cable. Remove or disable termination from all other devices on the SCSI cable.
11. If needed, set the SCSI adapter termination. Termination of the SCSI adapter is controlled by software commands using the SCSISelect utility program. The initial termination setting for the SCSI adapter is **Automatic**. With this setting, the adapter detects the bus cables attached and sets proper termination settings. If you want to manually set the termination for the SCSI adapter, see “Appendix B. Using SCSISelect” on page B-1.

12. Mount and connect each internal SCSI device in your computer. Connect the 68-pin cable into the connector for 16-bit Wide SCSI devices (J1 in the illustration of the adapter).
13. Connect the internal devices to available connectors starting at the end of the SCSI cable farthest from the adapter and closest to the terminator to ensure best signal quality. For each device connect pin-1 on each cable connector to pin-1 on each device, otherwise your SCSI devices will not work correctly.
14. You can connect a light-emitting diode (LED) to indicate SCSI hard disk drive activity. Unplug the LED cable from the connector on the computer system board. Connect the LED cable connector to the external LED connector on the SCSI adapter (J3 in the illustration of the adapter).
15. Connect the power cable for each device to the internal power source, as needed. Replace and secure the cover on your computer.
16. If you have external SCSI devices, connect your external SCSI cable (not provided with this option) to the external connector on the SCSI adapter (J5 in the illustration of the adapter) and then connect your external devices.
17. Reconnect the power cord and other cables. Turn on all attached devices; then turn on your computer. If your computer does not recognize the SCSI adapter, start your configuration program and review and set the configuration options.
18. The initial SCSISelect adapter settings work for most computers with PCI expansion slots. If you need more information about changing the initial settings, see “Appendix B. Using SCSISelect” on page B-1.
19. Install the device driver and utility software.

The Microsoft® Windows® 95, Windows 98, Microsoft Windows NT® Workstation, Novell NetWare, IBM OS/2®, SCO UNIX®, and UnixWare operating systems might already contain device drivers for your SCSI adapter. If this is the case, your operating system will recognize the device after installation and will use the appropriate device drivers. If your operating system does not recognize the SCSI adapter after installation, you will need to use the option CD to install the appropriate device drivers.

Device drivers for the adapter are included in the EZ-SCSI software package which contains device drivers for the following operating systems:

- Windows 95, Windows 98, Microsoft Windows Millennium (Me)
- Windows NT 4.0

The Family Manager software package contains device drivers for the following operating systems:

- Windows 95, Windows 98, Microsoft Windows Professional 2000

- Windows NT
- Novell NetWare
- OS/2
- SCO UNIX
- UnixWare
- Linux

Note: Device drivers for Windows 95, Windows 98, Windows NT and Windows 2000 are included in both the EZ-SCSI and Family Manager packages. You can use either package to install the appropriate drivers.

To find detailed installation instructions for each operating system listed above, do the following:

- a. Insert the option CD into your CD or DVD drive.
- b. Access the available files on the CD, and locate the directory labeled with the name of the operating system installed on your computer.
- c. Read the README.TXT file in the directory for your operating system for detailed installation instructions and additional configuration and usage information.

Part 2: Installation and user's guide

Product description

The IBM PCI Ultra160 SCSI Adapter is designed to attach SCSI devices to a computer that has an available peripheral component interconnect (PCI) expansion slot. You can connect up to 15 SCSI devices to the adapter (disk drives, CD drives, scanners, and other devices) in a daisy-chain fashion. The SCSI adapter can be used in place of, or together with, a standard IDE adapter.

If you need to configure the adapter, use the SCSISelect utility program that is built-in to the SCSI adapter. SCSISelect enables you to change the adapter settings without opening the computer or handling the adapter.

In addition to the User's Guide, this option package contains the following:

- The SCSI 29160LP Adapter
- One 68-pin, internal SCSI cable for connecting five 16-bit Wide SCSI devices
- LED cable
- The option CD which contains the EZ-SCSI and 7800 Family Manager Set device driver and utility packages
- The IBM *Safety Information Book*

Before you begin

The adapter is sensitive to static electricity; even a mild discharge can destroy one or more of its components. Keep the adapter in its static-protective package until you are ready to install it in your computer. Before you handle the adapter, always discharge any charge that might have built up in you by touching an unpainted surface on your computer.

System requirements

In addition to this option package, you need the following:

- Personal computer that supports PCI Revision 2.0.
- An available 32-bit or 64-bit PCI expansion slot that is capable of bus mastering. Some PCI-bus computers have both bus-mastering and non-bus-mastering slots. Read your computer documentation to determine the type of PCI slots your computer has.
- Low voltage differential (LVD) or single-ended SCSI devices.

You might also need one or more of the following:

- A 68-pin external SCSI cable for connecting each external 16-bit Wide SCSI device.

- A termination device for external SCSI devices (if needed to terminate external SCSI chain). To provide reliable SCSI device operation, use only an active terminator compatible with the type of devices you are using. For instance, if you are using all LVD SCSI devices, use an LVD termination device. If you have any devices on the external SCSI chain that are LVD devices, you can use both LVD and non-LVD termination devices.

Choosing SCSI cables

Round external SCSI cables vary widely in quality and electrical characteristics. Be sure that external SCSI cables meet LVD SCSI standards. Do not use cables shorter than 30 cm (11.8 in.) between any two SCSI devices.

To ensure reliable operation, the total length of the SCSI bus, including both the internal and external cabling, is an important factor. Follow these guidelines for total SCSI cable length:

- If any Fast SCSI devices are connected to the SCSI adapter, the total length of all cables must not exceed 3 meters (9.8 ft.).
- If no Fast SCSI devices are connected, the total length of all cables must not exceed 6 meters (19.7 ft.).
- If only LVD SCSI devices are connected to the SCSI adapter, the total length of all cables must not exceed 12 meters (39.4 ft.).

Installing the adapter

Follow these steps to install the SCSI adapter.

Step 1. Assigning SCSI IDs

Each device attached to the SCSI adapter, as well as the adapter itself, must have a unique SCSI ID number from 0 to 15. The SCSI ID serves two purposes: it uniquely defines each SCSI device on the SCSI bus, and it determines the device priority for service on the SCSI bus.

The adapter supports the SCSI configured automatically (SCAM) protocol which assigns SCSI IDs dynamically and resolves SCSI ID conflicts automatically at startup. Most SCSI devices currently in use, however, do not support SCAM. The SCSI IDs on these devices must be set manually. Consider the following when assigning a SCSI ID:

- Determine the SCSI ID assignments for devices currently installed. You might be able to use the existing ID assignments. To determine existing SCSI ID assignments, use one of the following.
 - For most IBM computers, press the F1 key during start up after the memory check completes.
 - Use the SCSI utility programs which came with your SCSI devices.
 - Inspect the installed SCSI devices to see how the IDs are set.

- ID 7 is the highest priority ID on the SCSI bus. Make sure ID 7 is assigned to the SCSI adapter. Do not use the SCSISelect utility program to change the ID assignment of the SCSI adapter. The priority of the other IDs in descending priority order are 6 to 0 and 15 to 8.
- Assign higher priority SCSI ID numbers to the devices that are most often used or are faster than other devices in the SCSI chain. (The SCSI ID assigned to a device is not related to the order in which the devices are attached to the SCSI adapter.)
- If you start up your computer from a SCSI device, assign SCSI ID 0 to the startup drive. ID 0 is the SCSISelect initial setting. (If both SCSI and IDE disk drives will be installed, you cannot start up your computer from a SCSI device. In this case, the IDE disk drive is always the startup device.)
- Change the ID settings according to ID assignments you have chosen. Refer to the documentation that comes with your SCSI devices for information on how to change the SCSI ID. One way to remember the SCSI ID for each device is to label the device. When putting the label on a hard disk drive, do not press down on the top of the drive because the pressure might damage it.

You can also use the following table in your planning by writing down the SCSI ID you assign to each device. The SCSI IDs are listed in decreasing priority order.

SCSI ID	Device
7	SCSI Adapter
6	
5	
4	
3	
2	
1	
0	
15	
14	
13	
12	
11	
10	
9	
8	

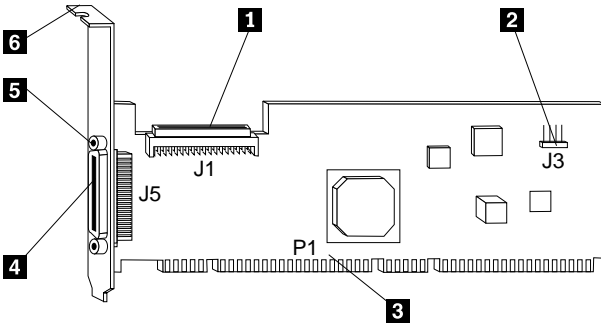
Note that if you install more than one SCSI adapter in your computer, each adapter has a separate SCSI bus, and you can use each SCSI ID once on each bus.

Step 2. Opening your computer

1. Turn off all attached devices; then turn off your computer.
2. Unplug the power cords for your computer and all attached devices; then open your computer. For specific information on opening your computer, refer to the documentation that comes with your computer.

Step 3. Unpacking the SCSI adapter

1. Before opening the static-protective bag containing the SCSI adapter, touch the bag to an unpainted metal surface on your computer for at least two seconds.
2. Remove the adapter from the static-protective bag. If you must put the adapter down, place it on top of the static-protective bag.
3. Inspect the adapter before you install it in your computer for any physical damage. The following illustration identifies the adapter components.

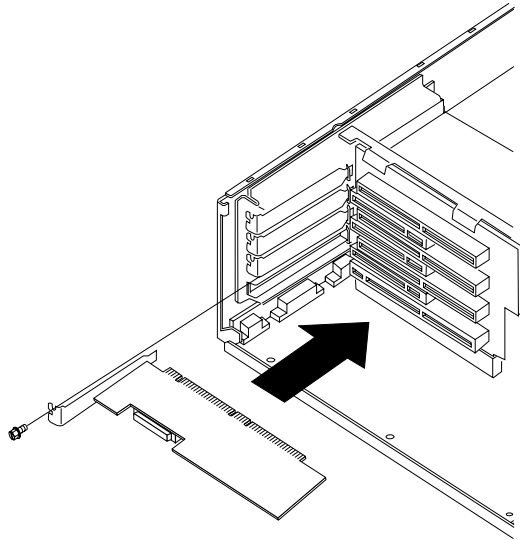


- | | |
|---|--|
| 1 68-pin Internal LVD/SE Connector | 4 68-pin External VHDCI Connector |
| 2 External LED connector | 5 mounting screws |
| 3 PCI bus card-edge connector | 6 bracket |

Step 4. Inserting the adapter into the PCI slot

1. Locate an available 32-bit or 64-bit PCI expansion slot. These slots are shorter than ISA or EISA slots as shown in the illustration. The PCI bus

connectors (inside the computer) are colored white.



2. Remove the bracket screw and metal expansion slot cover.
3. If you have a newer, lower-profile computer, you will need to use the smaller mounting bracket that comes with the adapter. To install it do the following:
 - a. Remove the mounting screws that attach the bracket to the adapter.
 - b. Remove the standard bracket.
 - c. Position the low-profile bracket on the bracket, aligning the screw holes in the bracket with the holes in the PCI adapter.
 - d. Insert the two screws and carefully tighten the screws. Do not overtighten.
4. Insert the card-edge connector, **P1**, into the empty PCI bus connector. Press the SCSI adapter into place and secure it with the bracket screw.

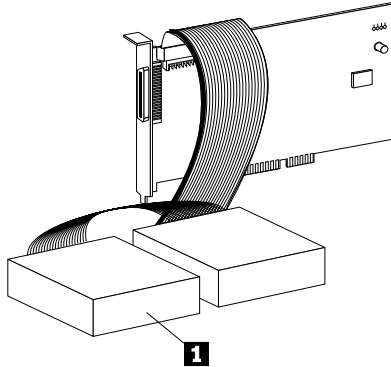
Step 5. Terminating the SCSI bus

SCSI devices connect in series to one another on a SCSI bus in a daisy-chain fashion. For the devices to work properly, SCSI termination is required at both ends. All devices that are between the ends of a SCSI chain must have their termination devices removed or disabled.

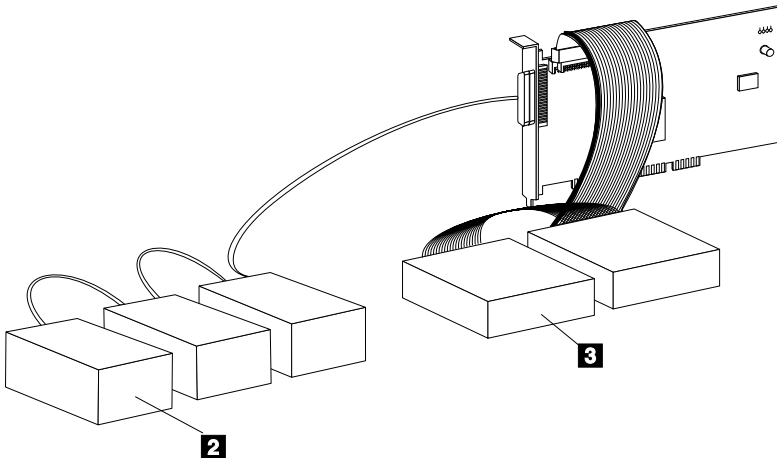
The internal SCSI cable that comes with this option has an LVD SCSI termination device at the end of the cable farthest from the adapter. All SCSI devices that are connected to the internal cable between the SCSI adapter and the termination device at the end of the cable must have termination devices removed or disabled. Any terminators on internal SCSI devices must be

removed also. When no external SCSI devices are attached to the bus, the internal cable is terminated at one end by the SCSI adapter itself, and at the other by the termination device on the internal cable.

The following are possible SCSI termination configurations. If the SCSI configuration consists of one cable, terminate the last device **1** on the cable. Remove termination from other devices on the cable.



If the SCSI bus consists of one internal SCSI cable and one external SCSI cable, terminate the last device **2** on the external SCSI cable and the last device **3** on the internal SCSI cable. Remove termination from the other devices on each cable.



Step 6. Terminating the SCSI adapter

Termination on the SCSI adapter is controlled by software commands using the SCSISelect. The initial termination setting is **Automatic**.

With the **Automatic** termination setting, the adapter detects if SCSI cables are connected to any of the two SCSI connectors. The adapter then sets termination as needed. If you need to manually set the SCSI adapter termination, see “Appendix B. Using SCSISelect” on page B-1 for more information.

Step 7. Connecting internal devices

Follow these steps to connect internal SCSI devices.

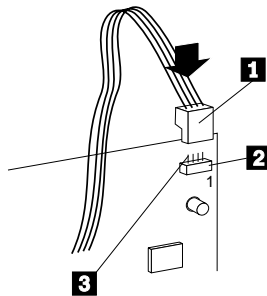
1. Mount each SCSI device in the computer.
2. Connect the 68-pin cable into the connector for 16-bit Wide SCSI devices (**J1** in the adapter illustration).
3. Connect the internal devices into available connectors at the end of the SCSI cable farthest from the adapter to ensure best signal quality. Connect pin-1 on each cable connector to pin-1 on each device throughout the bus. Otherwise your SCSI devices will not work properly.
4. Connect the power cable for each device to the internal power connector, as needed.

Step 8. Connecting the LED cable (Optional)

Most computers have a light-emitting diode (LED) on the front panel that lights up when the hard disk drive is accessed. You can attach the LED cable to the SCSI adapter instead, so it lights up to indicate activity on the SCSI bus. Follow these steps to connect the LED cable to the SCSI adapter.

Note: If you change the LED connection and your computer includes non-SCSI disk drives, the LED will no longer indicate non-SCSI disk activity.

1. Unplug the LED cable from the connector on your computer system board. Refer to your computer documentation to locate the LED cable. If needed, you can use the 4-pin LED cable included with this option.
2. Connect the LED cable connector **1** to the external LED connector **2** on the SCSI adapter as shown in the following illustration.



Ensure that pins on the LED cable are correctly aligned with the pins on the connector **3**. Pin-1 on the LED cable should align with the pin marked 1 in the illustration.

Step 9. Closing the computer

Review your work before closing your computer. Be sure that:

1. The SCSI chain is properly terminated.
2. Each SCSI device on the SCSI chain is set to a unique SCSI ID.
3. The adapter is firmly seated and secured in a PCI expansion slot.
4. Internal SCSI devices are firmly connected to the adapter and pin-1 on each SCSI cable connector attaches to pin-1 on each SCSI device connector.
5. Power and interface connectors are securely attached.

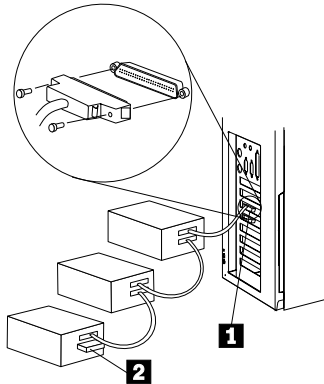
Replace the computer cover and secure it in place.

Step 10. Connecting external SCSI devices

Connect devices to the SCSI adapter using an additional external cable for each device connected. Up to 15 Wide SCSI external devices can be connected to the adapter in a chain.

To start the SCSI chain, do the following:

1. Connect the external SCSI cable to the SCSI adapter **1**. External cable connectors are designed to plug in only one way.



2. Extend the external SCSI cable from the adapter to the connector on the first external device. Plug a second external SCSI cable into the second connector on the first device.
3. Plug the other end of the second external SCSI cable into the next device, and continue in this fashion until all external devices are connected.

4. To terminate the last device on the SCSI chain, insert an active termination device such as the IBM 68-pin External Multimode LVD/SE SCSI Terminator. It inserts into the second connector on the last device in the chain **2**.
5. Set correct SCSI ID for each SCSI device.

Step 11. Configuring the computer

To configure your computer, do the following:

1. Reconnect the power cord and other cables.
2. Turn on all attached devices; then turn on your computer.
3. For most computers, the computer performs a power-on self-test (POST) and the configuration program automatically recognizes the new SCSI adapter. However, you might have to answer questions about your system changes when you restart you computer. If your computer does not recognize the SCSI adapter after it starts up, enter the configuration program and review the PCI configuration options. Some configuration options apply to specific PCI bus slots. Be sure to change configuration options for the PCI bus slot in which the SCSI adapter is installed. Read your computer documentation if you are not sure which slot corresponds to each number. Here are some things you might need to do while using your computer configuration program.
 - If there is an Interrupt Type or Interrupt Line option, select **Int-A** or **Interrupt Type = A**. Depending on your computer design, you might also be required to change a system board jumper setting.
 - If there is a Triggering Interrupt option, select **Level**.
 - If there is an option to enable or disable bus-mastering for the PCI slot, select **Enabled**.
 - If there is an option to enable or disable individual PCI slots, select **Enable** for the slot in which you installed the adapter.
 - If your computer has a combination of ISA (or EISA) and PCI adapters, you might need to mark the IRQs used by ISA/EISA adapters as **Used** so that the computer BIOS will not try to assign these IRQs to other PCI adapters.
 - In some computers the BIOS reserves a set of available IRQs for PCI adapters. You might have to assign the adapter IRQ manually.

Refer to your computer documentation for more information. If you still encounter problems during installation, see “Appendix D. Problem solving” on page D-1.

Step 12. Configuring the SCSI adapter

The SCSISelect initial settings are appropriate for most PCI computers. If you do not need to change any of the initial settings, there is no need to run SCSISelect. Refer to “Appendix B. Using SCSISelect” on page B-1to review or modify the initial adapter settings.

Step 13. Installing device drivers and utility software

The Windows 95, Windows NT, Windows Millennium, Windows 2000, Linux, Novell NetWare, IBM OS/2, SCO Unix, and UnixWare operating systems might already contain device drivers for your SCSI adapter. If this is the case, your operating system will recognize the device after installation and will use the appropriate device drivers. If your operating system does not recognize the SCSI adapter after installation, you will need to use the option CD-ROM to install the appropriate device drivers.

Device drivers for the SCSI adapter are included in the EZ-SCSI and 7800 Family Manager Set (Family Manager) software packages. The EZ-SCSI software package contains device drivers for the following operating systems:

- Windows 95, Windows 98, Windows Me
- Windows NT 4.0

The Family Manager software package contains device drivers for the following operating systems:

- Windows 95, Windows 98, Windows 2000
- Windows NT
- Novell NetWare
- OS/2
- SCO Unix
- UnixWare
- Linux

Note: Device drivers for Windows 95, Windows 98, Windows NT, and Windows 2000 are included in both the EZ-SCSI and Family Manager packages. You can use either package to install the appropriate drivers.

To find detailed installation instructions for each operating system listed above, do the following:

1. Insert the option CD-ROM into your CD drive.
2. Access the available files on the CD, and locate the directory labeled with the name of the operating system you have installed on your computer.

3. Read the README.TXT file in your operating system directory for detailed installation instructions and additional configuration and usage information.

Appendix A. Product specifications

Termination power

Some disk drives allow termination power to be supplied to their resistor modules from the SCSI bus instead of from the drives's power supply. The host adapter supports this function because it always supplies termination power on the SCSI bus.

Physical dimensions

- Length: 174.6 mm (6.875 in.)
- Height: 11.18 mm (.44 in.)
- Width: 64.5 mm (2.54 in.)

Power requirements

- Voltage: +5.0 V dc ± 0.25 V
- Current: .65 Amps maximum

Temperature requirements

Operation and Storage: 0°C (32°F) to 55°C (131°F)

Appendix B. Using SCSISelect

The SCSI adapter comes with a built-in menu-driven utility program called SCSISelect. SCSISelect includes a configuration program and a disk utility program.

When your computer starts up, the following prompt is displayed briefly:

Press <Ctrl><A> for SCSISelect (TM) Utility!

You can start the SCSISelect program by pressing Ctrl+A. The first menu that is displayed prompts you to choose either to configure and view the adapter settings or to use the SCSI disk utilities.

SCSISelect uses menus to list options you can select.

- To select an option, use the ↑ and ↓ keys to move the cursor to the option; then press the Enter key.
- In some cases, selecting an option displays another menu. You can return to the previous menu at any time by pressing the Esc key.
- To restore the original SCSISelect settings, press the F6 key.
- To toggle the display between color and monochrome, press the F5 key. (This feature might not work on some monitors.)

To exit SCSISelect, press the Esc key until a message prompts you to exit. If you changed any adapter settings, you are prompted to save the changes before you exit. At the prompt, select **Yes** to exit; then press any key to restart your computer. Any changes you made in SCSISelect will take effect after your computer restarts.

Configuration utility program

If you choose to configure or view the adapter settings, you can review settings in the following areas: basic SCSI adapter, boot device, SCSI device, and advanced SCSI adapter. The following sections provide information on each of these setting areas.

Basic SCSI adapter settings

The basic SCSI adapter settings are most likely to require some modification.

- **SCSI adapter SCSI ID** - This option sets the SCSI adapter SCSI ID. The initial value of 7 gives the adapter the highest priority on the SCSI bus. Do not change this setting.

- **SCSI parity checking** - This option determines whether the adapter verifies the accuracy of data transfer on the SCSI bus. The initial setting is *Enabled*.
 - Leave it set to **Enabled**. Most SCSI devices support SCSI parity.
 - Select **Disable** if any device connected to the SCSI adapter does not support SCSI parity. If you are not sure whether a device supports SCSI parity, see the documentation that comes with the device.
- **SCSI adapter SCSI termination** - This option sets termination on the SCSI adapter. The initial setting is **Automatic**. This setting is appropriate for most situations. If you want to manually set the termination setting, refer to the following table for the appropriate low and high settings. (The low byte controls 8-bit SCSI; the low and high bytes together control 16-bit, Wide SCSI.)

Low	High	Devices Are Attached to
On	On	68-pin internal connector only
On	On	68-pin external connector only
On	On	50-pin internal connector only
Off	Off	68-pin internal and 68-pin external connectors
Off	On	50-pin and 68-pin internal connectors
Off	On	50-pin internal and 68-pin external connectors
N/A	N/A	50-pin and 68-pin internal connectors, and 68-pin external connector

Boot-device settings

These settings enable you to specify the startup device.

- **Boot target ID** - This option specifies the SCSI ID of the device from which to start up. The initial setting is SCSI ID **0**. The SCSI ID selected must correspond to the SCSI ID configured on the startup device.
- **Boot LUN number** - If your startup device has multiple Logical Unit Numbers (LUNS) and multiple LUN support enabled, this option allows you to specify which LUN to start up from on your startup device. The initial setting is LUN **0**. (You can set the multiple LUN support in the “Advanced SCSI adapter settings” on page B-4.)

SCSI device settings

The SCSI device settings enable you to configure certain parameters for each device on the SCSI bus. To configure a specific device, use the SCSI ID assigned to that device. If you are not sure of the SCSI ID, see “SCSI disk utilities” on page B-6.

- **Initiate sync negotiation** - Synchronous negotiation is a SCSI feature that enables the adapter and its attached SCSI devices to transfer data in synchronous mode. Synchronous data transfer mode is faster than asynchronous data transfer. This option determines whether the adapter initiates synchronous negotiation between the device and SCSI adapter. The initial setting is **Yes** (enabled).
 - Normally leave this option enabled (**Yes**); most SCSI devices support synchronous negotiation, because it provides data transfer.
 - Some older SCSI-1 devices do not support synchronous negotiation. This might cause your computer to operate erratically or to stop responding if this option is set to **Yes**. Set this option to **No** (disabled) for these devices.

The SCSI adapter always responds to synchronous negotiation if the SCSI device initiates it. If neither the SCSI adapter nor the SCSI device initiate synchronous negotiation, data is transferred asynchronously.

- **Initiate Wide negotiation** - This option determines whether the SCSI adapter initiates 16-bit data transfer (Wide negotiation) instead of 8-bit data transfer. The effective transfer rate is doubled when 16-bit data transfer is used, because the data path is twice the size of normal 8-bit SCSI. For example, a transfer rate of 20 MB²/sec becomes 40 MB/sec. The initial setting is **Yes** (Enabled).
 - When this option is set to **Yes**, the SCSI adapter attempts 16-bit transfer.
 - Some 8-bit SCSI devices might be unable to handle Wide negotiation; this might cause unpredictable problems or the computer to stop responding. For these devices, set this option to **No**.
 - When this options is set to **No**, 8-bit data transfer is used unless the SCSI device itself requests Wide negotiation.
- **Maximum sync transfer rate** - This option sets the maximum synchronous data transfer rate that the SCSI adapter supports. The initial setting is 20 MB/sec. This setting supports an effective rate up to the UltraSCSI maximum of 160 MB/sec with 16-bit, Wide transfers.
 - If your device is a Wide UltraSCSI device, you can use a maximum rate of 40 MB/sec.
 - If your device is not Wide UltraSCSI device, select a lower transfer rate that is compatible with your device.
 - If this option is set to **No**, the maximum synchronous transfer rate is the maximum rate that the adapter accepts from the device during negotiation.

- **Enable disconnection** - This option determines whether the SCSI adapter allows a SCSI device to disconnect from the SCSI bus (sometimes called disconnect/reconnect). Enabling disconnect enables the adapter to perform other operations on the SCSI bus while the SCSI device is temporarily disconnected. The initial setting is **Yes** (enabled).
 - If two or more SCSI devices are connected to the SCSI adapter, leave this option set to **Yes**. This optimizes SCSI bus performance.
 - If only one SCSI device is connected to the adapter, set this option to **No** to achieve slightly better performance.
- **Send Start Unit Command** - This option determines whether the Start Unit Command is sent to the SCSI device at start up (most devices do not require this). The initial setting is **Yes** (enabled) for all SCSI IDs except 7. This option is only valid if the SCSI adapter BIOS is set to **Enabled**.
 - Setting this option to **Yes** reduces the load on your computer power supply by enabling the SCSI adapter to start up SCSI devices one at a time when you start up your computer. With this option set to **Yes** for many devices, the start up time will vary depending how long it takes each device to start.
 - When this option is set to **No**, the devices start up at the same time. Most devices require you to set a jumper before they can respond to this command.

Advanced SCSI adapter settings

Do not change the advanced SCSI adapter settings unless absolutely necessary.

- **Plug and Play SCAM support** - This option determines whether the SCSI adapter automatically assigns SCSI IDs to attached SCSI devices that support the SCAM protocol. The initial setting is **Disabled**.
 - Most non-SCAM devices work correctly with the SCAM protocol, so you can select **Enable** even for non-SCAM devices.
 - In rare cases, an old SCSI-1 device might not work with SCAM. This might cause the computer to stop responding or operate erratically. If this happens, select **Disable**.
- **SCSI adapter BIOS** - This option enables or disables the SCSI adapter BIOS. The initial setting is **Enabled**.
If you are starting up your computer from a SCSI disk drive connected to the adapter, the BIOS must be set to **Enabled**. Do not disable the SCSI adapter BIOS if the devices on the SCSI bus (for example, CD-ROM drives) are all controlled by the device drivers and do not need the BIOS.
- **Support removable disks under BIOS as fixed disks** - This option enables you to control which removable-media drives are supported by the SCSI adapter BIOS. The initial setting is **Boot Only**. The **Boot Only** setting is only valid only if the SCSI adapter BIOS is set to **Enabled**. The choices are as follows:

- **Boot Only:** Only the removable-media drive designated as the startup device is treated as a hard disk.
- **All Disks:** All removable-media drives supported by the BIOS are treated as hard disks.
- **Disabled:** No removable-media drives are treated as hard disk drives. In this situation, device drivers are needed because the drives are not controlled by the BIOS.

Attention: If the SCSI adapter BIOS controls a removable-media SCSI device, do not remove the media while the drive is on or you might lose data. If you want to be able to remove media while the device is on, install your removable-media device driver and set this option to **Disabled**.

- **Extended BIOS translation for DOS drives > 1 GB** - This option determines whether extended the translation scheme is available for SCSI hard disks with capacities greater than 1 GB. The standard translation scheme for SCSI adapters provides a maximum accessible capability of 1 GB. The initial setting is **Enabled**.
 - This option is valid only if the SCSI adapter BIOS is set to **Enabled**.
 - Do not select **Enable** for this option with NetWare, OS/2, Windows NT, or UNIX. This option is only used with DOS 5.0 or later.

Attention: If you decide to change the translation scheme; back up your disk drives first. All data is erased when you change from one translation scheme to another.

- When set to **Enabled**, the adapter supports disk drives up to 8 GB under DOS with a maximum partition size of 2 GB.
- When you partition a disk larger than 1 GB, use the DOS FDISK utility program as you normally would. Because the cylinder size increases to 8 MB under extended translation, the partition size you choose must be a multiple of 8 MB. If you request a size that is not a multiple of 8 MB, FDISK rounds up to the nearest whole number that is a multiple of 8 MB.
- **Display <Ctrl-A> message during BIOS initialization** - This option determines whether the Press <Ctrl> <A> for SCSISelect (TM) Utility! message is displayed on your screen during system start up. The initial setting is **Enabled**. This option is valid only if the SCSI adapter BIOS is **Enabled**. If this setting is set to **Disabled**, you can still invoke the SCSISelect by pressing Ctrl+A after the SCSI adapter BIOS banner appears.
- **Multiple logical unit (LUN) support** - This option determines whether starting up from a SCSI device that has multiple LUNs is supported. The initial setting is **Disabled**. Select **Enable** for this option if your startup device has multiple LUNs. This option is valid only if the SCSI adapter BIOS is set to **Enabled**.
- **BIOS support for more than two drives** - This option determines whether the SCSI adapter BIOS provides support for two to eight hard disk drives. This feature is supported by DOS 5.0 and later. The initial setting is **Enabled**.

This option is valid only if the SCSI adapter BIOS is set to **Enabled**. For example with this setting **Enabled**, DOS can support two IDE drives on the IDE adapter, and up to six SCSI drives (supported by the BIOS) on the SCSI adapter.

- **BIOS support for bootable CD-ROM** - This option determines whether the SCSI adapter BIOS provides support for starting up from a CD-ROM drive. The initial setting is set to **Disabled**. This option is valid only if the SCSI adapter BIOS is set to **Enabled**.
- **BIOS support for int 13 extensions** - This option determines whether the SCSI adapter BIOS supports disks with more than 1024 cylinders. The initial setting is **Disabled**. This option is valid only if the SCSI adapter BIOS is set to **Enabled**.
- **BIOS support for UltraSCSI speed** - This option determines whether the SCSI adapter supports the Fast transfer rates (13.4, 16, 20.0) of UltraSCSI devices. The initial setting is **Enabled**.

SCSI disk utilities

When you select the SCSI disk utilities program, the program immediately scans the SCSI bus, then displays a list of all SCSI IDs and the devices assigned to each ID. When you select a specific ID and device, a menu is displayed, that shows the options to format and verify the disk media.

To access the SCSI disk utilities, follow these steps:

1. Select the **SCSI Disk Utilities** option from the menu that appears after starting SCSI Select. SCSI Select scans the SCSI bus (to determine the devices installed) and displays a list of all SCSI IDs and the devices assigned to each ID.
 2. Use the arrow keys to move the cursor to a specific ID and device, then press **Enter**.
 3. A small menu appears, displaying the options **Format Disk** and **Verify Disk Media**.
- **Format Disk** - This program enables you to perform a low-level format on a hard disk drive. Most SCSI disk devices are preformatted at the factory and do not need to be formatted again. This disk utility program is compatible with the vast majority of SCSI disk drives.
Attention: A low-level format erases all data on the hard disk. Back up your data on the disk to be formatted before performing this operation. You cannot abort a low-level format once it is started. Hard drive manufacturer's may not warranty the drive after a low level format. Check HDD Warranty for more information.
 - **Verify Disk Media** - This program scans the hard disk for defects. If the program finds bad blocks on the disk, it prompts you to reassign them; if you select **Yes** to reassign them, these blocks are no longer used. You can press the **Esc** key at any time to cancel the program.

Appendix C. Configuring multiple SCSI adapters

You can install as many SCSI adapters in your computer as there are PCI expansion slots.

In computers with multiple SCSI adapters, consider the following:

- If you are starting up from the SCSI adapter, you might have to install the startup adapter in the lowest numbered PCI bus slot. (Most IBM and Intel[®] based PCI computers do not have this requirement.) Refer to your computer documentation to determine the PCI bus slot number.
- If you have two adapters and each has a startup device connected, the computer starts up from the adapter in the lowest numbered PCI bus slot. If you want to select a specific adapter from which to start up, enable the BIOS on that adapter only.
- If you are starting up from the SCSI adapter and you also have an ISA/EISA-based adapter installed, you must disable the BIOS on the ISA/EISA-based adapter.
- If you are starting up from an ISA/EISA-based adapter and you have a PCI Wide Ultra2 SCSI Adapter installed with a startup device connected, the ISA/EISA-based adapter will start up before the SCSI adapter.
- When running the SCSISelect, if the program finds multiple PCI Wide Ultra2 SCSI Adapters in your computer, it displays the PCI bus number and PCI device number of each adapter. To determine which of the adapters SCSISelect is configuring, view the red LEDs on the adapters as you move the highlight bar to different adapters with the ↑ and ↓ keys. (The computer cover must be removed to view the LEDs.)

Appendix D. Problem solving

You might be able to solve the problem yourself. The SCSI adapter has been tested for compatibility with a wide range of SCSI devices. Most problems that occur during installation result from errors in preparing and connecting devices on the SCSI bus. If you have problems when using the SCSI adapter, check these items first:

- Are all SCSI devices turned on?
- Are the power cables and SCSI interface cables properly connected?
- Is the SCSI adapter firmly seated and secured in a 5-volt, PCI bus slot that is capable of bus-mastering?
- Is pin-1 orientation maintained throughout the SCSI bus? (See “Step 7. Connecting internal devices” on page 2-7.)
- Is each SCSI device, including the SCSI adapter, set to a unique SCSI ID, 0 to 15? (See “Step 1. Assigning SCSI IDs” on page 2-2.)
- Are all the devices on the SCSI bus terminated properly? (See “Step 5. Terminating the SCSI bus” on page 2-5.)
- Are the PCI bus and slot parameters set correctly in your computer setup configuration program? The PCI bus is designed to assign IRQ, port address, and BIOS address settings automatically to the adapter. You might need to assign some of these values manually in the setup program. (See “Step 11. Configuring the computer” on page 2-9.)
- Is the SCSI device jumpered correctly? (See “Step 11. Configuring the computer” on page 2-9).

If your problem is still not resolved, continue with the next section.

Troubleshooting in Windows 95 and Windows 98

If the system locks up when using Windows 95 or Windows 98 do the following to verify if the SCSI adapter is functioning normally:

1. Start or restart your computer
2. (For Windows 95:) When the message “Starting Windows 95” is displayed, press and release the **F8** function key while the text is on your screen.
(For Windows 98:) When the message “Starting Windows 98” is displayed, press and release the **Ctrl** key while the text is on your screen.)
3. From the menu that is displayed, select **Safe Mode**. (It may take several minutes for Windows 95 or Windows 98 to load.)
4. If the system completes the boot to the desktop, the core software is functional; resources, software conflicts, and/or hardware need to be checked.

5. If the system still fails to boot, and the boot drive is connected to an EIDE controller; shut down the system, remove the Adaptec SCSI adapter, and restart the computer.
6. Verify that an IRQ is available by viewing resources in System Properties.
7. Right click on the **My Computer** icon on the Windows desktop.
8. Select **Properties** from the menu.
9. Click the **Performance** tab.
10. Verify that your system is configured for optimal performance. (Make sure you are not in Safe Mode.)

Using the hardware conflict troubleshooter in Windows 95 and Windows 98

To use the hardware conflict troubleshooter in Windows 95 and Windows 98, do the following:

1. Click the **Start** button, then click **Help**.
2. From the Contents tab, double-click **Troubleshooting**. (Windows 98, click Troubleshooting and then click **Windows 98 Troubleshooting**.)

Other Problems and Solutions

- If you are starting up from a SCSI hard disk drive, make sure the **Drives** setting (in your computer configuration setup program) that corresponds to the drive is set to **None** or **No Drives Installed**. (See your computer documentation for more information.)

If both the SCSI and non-SCSI (for example, IDE) disk drives are installed, then the non-SCSI disk drive is always the startup device.

- If you changed any values on a SCSI adapter in a computer setup program, or on a SCSI device, did you turn power off and on to ensure the new values are loaded?
- If you tried to use the Format/Verify utility program on a disk device and received an Unexpected SCSI Command Failure message with detailed error information, the utility program encountered a problem with the disk device or the media and therefore cannot run. You can probably determine from the error number (for example, 06h - Unit Attention) both the cause of the problem and its solution. Here are some of the more common error numbers and their meanings:

02h - Not ready:

The media is not ready to format. Be sure that media is inserted in the drive and that the media is has had time to come up to the correct spinning rate.

03h - Medium error:

The disk media might be defective. If it is a removable-media drive,

try using a different disk media. If it is a hard disk drive, the disk might be physically damaged. Verify and format the media with the SCSISelect.

04h - Hardware error:

The disk drive might be defective. Consult the hardware documentation and contact the manufacturer.

05h - Illegal request:

The SCSISelect formatting utility program does not support a low-level format of this device; however, the device might already below-level formatted by the manufacturer. (This error rarely occurs.)

06h - Unit attention:

The removable media might be write-protected. Disable write protection and run the utility program again.

The Additional Sense Code field provides more information about the error. The meaning of these codes might be listed in your hardware manual.

BIOS startup messages

After you have installed your SCSI adapter, the SCSI adapter BIOS displays a message when you start up your computer. Normally, this message lists the SCSI ID, manufacturer, model number, and other information for each SCSI device that the BIOS detects.

If the SCSI Adapter BIOS is set to **Enabled**, but it fails to initialize, the computer displays a specific error message followed by a BIOS Installation Failure message. Here are some of these error messages and their meanings:

Device Connected, but not ready

The adapter received no answer when it requested data from an installed SCSI device. Try setting the Send Start Unit Command to **Yes** for the SCSI adapter. (See “Appendix B. Using SCSISelect” on page B-1 for more information.) If the error continues, follow the drive manufacturer instructions to make sure the drive is set to spin up when the power is turned on.

Start unit request failed

The BIOS was unable to send a Start Unit Command to the device. Run the SCSISelect and set to **Disable** Send Start Unit Command for the device.

Time-out failure during

An unexpected time-out occurred. Check the SCSI bus termination. Try disconnecting the SCSI device cables from the SCSI adapter and then starting up the computer. If the computer successfully restarts,

check SCSI bus termination and cable connections. One of the devices on the SCSI bus might be defective. Also check SCSI device jumper setting.

Appendix E. Help and service information

This section contains information on how to obtain online and telephone technical support.

Online technical support

Online technical support is available during the life of your product. Online assistance can be obtained through the Personal Computing Support Web site and the IBM Automated Fax System.

<i>Online technical support</i>	
IBM Personal Computing Support Web site	http://www.ibm.com/pc/support
IBM Automated Fax System	1-800-426-3395 (U.S. and Canada)

During the warranty period, assistance for replacement or exchange of defective components is available. In addition, if your IBM option is installed in an IBM computer, you might be entitled to service at your location. Your technical support representative can help you determine the best alternative.

Telephone technical support

Installation and configuration support through the HelpCenter will be withdrawn or made available for a fee, at IBM's discretion, 90 days after the option has been withdrawn from marketing. Additional support offerings, including step-by-step installation assistance, are available for a nominal fee.

To assist the technical support representative, have available as much of the following information as possible:

- Option name
- Option number
- Proof of purchase
- Computer manufacturer, model, serial number (if IBM), and manual
- Exact wording of the error message (if any)
- Description of the problem
- Hardware and software configuration information for your system

If possible, be at your computer. Your technical support representative might want to walk you through the problem during the call.

For the support telephone number and support hours by country, refer to the following table or to the enclosed technical support insert. Support phone numbers are also available by clicking **HelpCenter phone list** on the IBM support Web page at

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

If the number is not provided, contact your IBM reseller or IBM marketing representative. Response time may vary depending on the number and nature of the calls received.

<i>Support 24 hours a day, 7 days a week</i>	
Canada (Toronto only)	416-383-3344
Canada (all other)	1-800-565-3344
U.S.A. and Puerto Rico	1-800-772-2227

Appendix F. Product warranties and notices

Warranty Statements

The warranty statements consist of two parts: Part 1 and Part 2. Part 1 varies by country. Part 2 is the same for both statements. Be sure to read both the Part 1 that applies to your country and Part 2.

- **United States, Puerto Rico, and Canada (Z125-4753-05 11/97)** (see “IBM Statement of Limited Warranty for United States, Puerto Rico, and Canada (Part 1 - General Terms)”)
- **Worldwide except Canada, Puerto Rico, Turkey, and United States (Z125-5697-01 11/97)** (see “IBM Statement of Warranty Worldwide except Canada, Puerto Rico, Turkey, United States (Part 1 - General Terms)” on page F-5)
- **Worldwide Country-Unique Terms** (see “Part 2 - Worldwide Country-Unique Terms” on page F-8)

IBM Statement of Limited Warranty for United States, Puerto Rico, and Canada (Part 1 - General Terms)

This Statement of Warranty includes Part 1 - General Terms and Part 2 - Country-unique Terms. The terms of Part 2 may replace or modify those of Part 1. The warranties provided by IBM in this Statement of Warranty apply only to Machines you purchase for your use, and not for resale, from IBM or your reseller. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. The term "Machine" does not include any software programs, whether pre-loaded with the Machine, installed subsequently or otherwise. Unless IBM specifies otherwise, the following warranties apply only in the country where you acquire the Machine. Nothing in this Statement of Warranty affects any statutory rights of consumers that cannot be waived or limited by contract. If you have any questions, contact IBM or your reseller.

Machine - IBM PCI Ultra160 SCSI Adapter **Warranty period*** - One year

** Contact your place of purchase for warranty service information. Some IBM Machines are eligible for on-site warranty service depending on the country where service is performed.*

The IBM Warranty for Machines

IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications. The warranty period for a Machine is a specified, fixed period commencing on its Date of Installation. The date on your sales receipt is the Date of Installation, unless IBM or your reseller informs you otherwise.

During the warranty period IBM or your reseller, if approved by IBM to provide warranty service, will provide repair and exchange service for the Machine, without charge, under the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine.

If a Machine does not function as warranted during the warranty period, and IBM or your reseller are unable to either 1) make it do so or 2) replace it with one that is at least functionally equivalent, you may return it to your place of purchase and your money will be refunded. The replacement may not be new, but will be in good working order.

Extent of Warranty

The warranty does not cover the repair or exchange of a Machine resulting from misuse, accident, modification, unsuitable physical or operating environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible. The warranty is voided by removal or alteration of Machine or parts identification labels.

THESE WARRANTIES ARE YOUR EXCLUSIVE WARRANTIES AND REPLACE ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU. IN THAT EVENT, SUCH WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD.

Items Not Covered by Warranty

IBM does not warrant uninterrupted or error-free operation of a Machine.

Unless specified otherwise, IBM provides non-IBM machines **WITHOUT WARRANTIES OF ANY KIND.**

Any technical or other support provided for a Machine under warranty, such as assistance via telephone with “how-to” questions and those regarding Machine set-up and installation, will be provided **WITHOUT WARRANTIES OF ANY KIND.**

Warranty Service

To obtain warranty service for the Machine, contact your reseller or IBM. In the United States, call IBM at 1-800-772-2227. In Canada, call IBM at 1-800-565-3344. (In Toronto, call 416-383-3344.) You may be required to present proof of purchase.

IBM or your reseller provides certain types of repair and exchange service, either at your location or at a service center, to keep Machines in, or restore them to, conformance with their Specifications. IBM or your reseller will inform you of the available types of service for a Machine based on its country of installation. IBM may repair the failing Machine or exchange it at its discretion.

When warranty service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours. You represent that all removed items are genuine and unaltered. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced. The replacement assumes the warranty service status of the replaced item.

Any feature, conversion, or upgrade IBM or your reseller services must be installed on a Machine which is 1) for certain Machines, the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade. Many features, conversions, or upgrades involve the removal of parts and their return to IBM. A part that replaces a removed part will assume the warranty service status of the removed part.

Before IBM or your reseller exchanges a Machine or part, you agree to remove all features, parts, options, alterations, and attachments not under warranty service.

You also agree to

1. ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange;
2. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and
3. where applicable, before service is provided
 - a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provides,
 - b. secure all programs, data, and funds contained in a Machine,
 - c. provide IBM or your reseller with sufficient, free, and safe access to your facilities to permit them to fulfill their obligations, and
 - d. inform IBM or your reseller of changes in a Machine's location.

IBM is responsible for loss of, or damage to, your Machine while it is 1) in IBM's possession or 2) in transit in those cases where IBM is responsible for the transportation charges.

Neither IBM nor your reseller is responsible for any of your confidential, proprietary or personal information contained in a Machine which you return to IBM or your reseller for any reason. You should remove all such information from the Machine prior to its return.

Production Status

Each IBM Machine is manufactured from new parts, or new and used parts. In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine's production status, IBM's appropriate warranty terms apply.

Limitation of Liability

Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), IBM is liable for no more than

1. damages for bodily injury (including death) and damage to real property and tangible personal property; and
2. the amount of any other actual direct damages, up to the greater of U.S. \$100,000 (or equivalent in local currency) or the charges (if recurring, 12 months' charges apply) for the Machine that is the subject of the claim.

This limit also applies to IBM's suppliers and your reseller. It is the maximum for which IBM, its suppliers, and your reseller are collectively responsible.

UNDER NO CIRCUMSTANCES IS IBM LIABLE FOR ANY OF THE FOLLOWING: 1) THIRD-PARTY CLAIMS AGAINST YOU FOR DAMAGES (OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE); 2) LOSS OF, OR DAMAGE TO, YOUR RECORDS OR DATA; OR 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS OR SAVINGS), EVEN IF IBM, ITS SUPPLIERS OR YOUR RESELLER IS INFORMED OF THEIR POSSIBILITY. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

IBM Statement of Warranty Worldwide except Canada, Puerto Rico, Turkey, United States (Part 1 - General Terms)

This Statement of Warranty includes Part 1 - General Terms and Part 2 - Country-unique Terms. The terms of Part 2 may replace or modify those of Part 1. The warranties provided by IBM in this Statement of Warranty apply only to Machines you purchase for your use, and not for resale, from IBM or your reseller. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. The term "Machine" does not include any software programs, whether pre-loaded with the Machine, installed subsequently or otherwise. Unless IBM specifies otherwise, the following warranties apply only in the country where you acquire the Machine. Nothing in this Statement of Warranty affects any statutory rights of consumers that cannot be waived or limited by contract. If you have any questions, contact IBM or your reseller.

Machine - IBM PCI Ultra160 SCSI Adapter **Warranty period*** - One year

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During the warranty period IBM or your reseller, if approved by IBM to provide warranty service, will provide repair and exchange service for the Machine, without charge, under the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine.

If a Machine does not function as warranted during the warranty period, and IBM or your reseller are unable to either 1) make it do so or 2) replace it with one that is at least functionally equivalent, you may return it to your place of purchase and your money will be refunded. The replacement may not be new, but will be in good working order.

Extent of Warranty

The warranty does not cover the repair or exchange of a Machine resulting from misuse, accident, modification, unsuitable physical or operating environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible. The warranty is voided by removal or alteration of Machine or parts identification labels.

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Items Not Covered by Warranty

IBM does not warrant uninterrupted or error-free operation of a Machine.

Unless specified otherwise, IBM provides non-IBM machines **WITHOUT WARRANTIES OF ANY KIND.**

Any technical or other support provided for a Machine under warranty, such as assistance via telephone with “how-to” questions and those regarding Machine set-up and installation, will be provided **WITHOUT WARRANTIES OF ANY KIND.**

Warranty Service

To obtain warranty service for the Machine, contact your reseller or IBM. You may be required to present proof of purchase.

IBM or your reseller provides certain types of repair and exchange service, either at your location or at a service center, to keep Machines in, or restore them to, conformance with their Specifications. IBM or your reseller will inform you of the available types of service for a Machine based on its country of installation. IBM may repair the failing Machine or exchange it at its discretion.

When warranty service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours. You represent that all removed items are genuine and unaltered. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced. The replacement assumes the warranty service status of the replaced item.

Any feature, conversion, or upgrade IBM or your reseller services must be installed on a Machine which is 1) for certain Machines, the designated,

serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade. Many features, conversions, or upgrades involve the removal of parts and their return to IBM. A part that replaces a removed part will assume the warranty service status of the removed part.

Before IBM or your reseller exchanges a Machine or part, you agree to remove all features, parts, options, alterations, and attachments not under warranty service.

You also agree to

1. ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange;
2. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and
3. where applicable, before service is provided
 - a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provides,
 - b. secure all programs, data, and funds contained in a Machine,
 - c. provide IBM or your reseller with sufficient, free, and safe access to your facilities to permit them to fulfill their obligations, and
 - d. inform IBM or your reseller of changes in a Machine's location.

IBM is responsible for loss of, or damage to, your Machine while it is 1) in IBM's possession or 2) in transit in those cases where IBM is responsible for the transportation charges.

Neither IBM nor your reseller is responsible for any of your confidential, proprietary or personal information contained in a Machine which you return to IBM or your reseller for any reason. You should remove all such information from the Machine prior to its return.

Production Status

Each IBM Machine is manufactured from new parts, or new and used parts. In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine's production status, IBM's appropriate warranty terms apply.

Limitation of Liability

Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), IBM is liable for no more than

1. damages for bodily injury (including death) and damage to real property and tangible personal property; and
2. the amount of any other actual direct damages, up to the greater of U.S. \$100,000 (or equivalent in local currency) or the charges (if recurring, 12 months' charges apply) for the Machine that is the subject of the claim.

This limit also applies to IBM's suppliers and your reseller. It is the maximum for which IBM, its suppliers, and your reseller are collectively responsible.

UNDER NO CIRCUMSTANCES IS IBM LIABLE FOR ANY OF THE FOLLOWING: 1) THIRD-PARTY CLAIMS AGAINST YOU FOR DAMAGES (OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE); 2) LOSS OF, OR DAMAGE TO, YOUR RECORDS OR DATA; OR 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS OR SAVINGS), EVEN IF IBM, ITS SUPPLIERS OR YOUR RESELLER IS INFORMED OF THEIR POSSIBILITY. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

Part 2 - Worldwide Country-Unique Terms

ASIA PACIFIC

AUSTRALIA: The IBM Warranty for Machines: The following paragraph is added to this Section: The warranties specified in this Section are in addition to any rights you may have under the Trade Practices Act 1974 or other legislation and are only limited to the extent permitted by the applicable legislation.

Extent of Warranty: The following replaces the first and second sentences of this Section: The warranty does not cover the repair or exchange of a Machine resulting from misuse, accident, modification, unsuitable physical or operating environment, operation in other than the Specified Operating Environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible.

Limitation of Liability: The following is added to this Section: Where IBM is in breach of a condition or warranty implied by the Trade Practices Act 1974, IBM's liability is limited to the repair or replacement of the goods or the supply of equivalent goods. Where that condition or warranty relates to right to sell, quiet possession or clear title, or the goods are of a kind ordinarily acquired for personal, domestic or household use or consumption, then none of the limitations in this paragraph apply.

PEOPLE'S REPUBLIC OF CHINA: Governing Law: The following is added to this Statement: The laws of the State of New York govern this Statement.

INDIA: Limitation of Liability: The following replaces items 1 and 2 of this Section:

1. liability for bodily injury (including death) or damage to real property and tangible personal property will be limited to that caused by IBM's negligence;
2. as to any other actual damage arising in any situation involving nonperformance by IBM pursuant to, or in any way related to the subject of this Statement of Warranty, IBM's liability will be limited to the charge paid by you for the individual Machine that is the subject of the claim.

NEW ZEALAND: The IBM Warranty for Machines: The following paragraph is added to this Section: The warranties specified in this Section are in addition to any rights you may have under the Consumer Guarantees Act 1993 or other legislation which cannot be excluded or limited. The Consumer Guarantees Act 1993 will not apply in respect of any goods which IBM provides, if you require the goods for the purposes of a business as defined in that Act.

Limitation of Liability: The following is added to this Section: Where Machines are not acquired for the purposes of a business as defined in the Consumer Guarantees Act 1993, the limitations in this Section are subject to the limitations in that Act.

EUROPE, MIDDLE EAST, AFRICA (EMEA)

The following terms apply to all EMEA countries.

The terms of this Statement of Warranty apply to Machines purchased from an IBM reseller. If you purchased this Machine from IBM, the terms and conditions of the applicable IBM agreement prevail over this warranty statement.

Warranty Service

If you purchased an IBM Machine in Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland or United Kingdom, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM.

If you purchased an IBM Personal Computer Machine in Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Hungary, Kazakhstan, Kirghizia, Federal Republic of Yugoslavia, Former

Yugoslav Republic of Macedonia (FYROM), Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, or Ukraine, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM.

The applicable laws, Country-unique terms and competent court for this Statement are those of the country in which the warranty service is being provided. However, the laws of Austria govern this Statement if the warranty service is provided in Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Federal Republic of Yugoslavia, Georgia, Hungary, Kazakhstan, Kirghizia, Former Yugoslav Republic of Macedonia (FYROM), Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, and Ukraine.

The following terms apply to the country specified:

EGYPT: Limitation of Liability: The following replaces item 2 in this Section: 2. as to any other actual direct damages, IBM's liability will be limited to the total amount you paid for the Machine that is the subject of the claim.

Applicability of suppliers and resellers (unchanged).

FRANCE: Limitation of Liability: The following replaces the second sentence of the first paragraph of this Section: In such instances, regardless of the basis on which you are entitled to claim damages from IBM, IBM is liable for no more than: (items 1 and 2 unchanged).

GERMANY: The IBM Warranty for Machines: The following replaces the first sentence of the first paragraph of this Section: The warranty for an IBM Machine covers the functionality of the Machine for its normal use and the Machine's conformity to its Specifications.

The following paragraphs are added to this Section: The minimum warranty period for Machines is six months.

In case IBM or your reseller are unable to repair an IBM Machine, you can alternatively ask for a partial refund as far as justified by the reduced value of the unrepaired Machine or ask for a cancellation of the respective agreement for such Machine and get your money refunded.

Extent of Warranty: The second paragraph does not apply.

Warranty Service: The following is added to this Section: During the warranty period, transportation for delivery of the failing Machine to IBM will be at IBM's expense.

Production Status: The following paragraph replaces this Section: Each Machine is newly manufactured. It may incorporate in addition to new parts, re-used parts as well.

Limitation of Liability: The following is added to this Section: The limitations and exclusions specified in the Statement of Warranty will not apply to damages caused by IBM with fraud or gross negligence and for express warranty.

In item 2, replace "U.S. \$100,000" with "1.000.000 DEM."

The following sentence is added to the end of the first paragraph of item 2: IBM's liability under this item is limited to the violation of essential contractual terms in cases of ordinary negligence.

IRELAND: Extent of Warranty: The following is added to this Section: Except as expressly provided in these terms and conditions, all statutory conditions, including all warranties implied, but without prejudice to the generality of the foregoing all warranties implied by the Sale of Goods Act 1893 or the Sale of Goods and Supply of Services Act 1980 are hereby excluded.

Limitation of Liability: The following replaces items one and two of the first paragraph of this Section: 1. death or personal injury or physical damage to your real property solely caused by IBM's negligence; and 2. the amount of any other actual direct damages, up to the greater of Irish Pounds 75,000 or 125 percent of the charges (if recurring, the 12 months' charges apply) for the Machine that is the subject of the claim or which otherwise gives rise to the claim.

Applicability of suppliers and resellers (unchanged).

The following paragraph is added at the end of this Section: IBM's entire liability and your sole remedy, whether in contract or in tort, in respect of any default shall be limited to damages.

ITALY: Limitation of Liability: The following replaces the second sentence in the first paragraph: In each such instance unless otherwise provided by mandatory law, IBM is liable for no more than: (item 1 unchanged) 2) as to any other actual damage arising in all situations involving non-performance by IBM pursuant to, or in any way related to the subject matter of this Statement of Warranty, IBM's liability, will be limited to the total amount you paid for the Machine that is the subject of the claim.

Applicability of suppliers and resellers (unchanged).

The following replaces the second paragraph of this Section: Unless otherwise provided by mandatory law, IBM and your reseller are not liable for any of the following: (items 1 and 2 unchanged) 3) indirect damages, even if IBM or your reseller is informed of their possibility.

SOUTH AFRICA, NAMIBIA, BOTSWANA, LESOTHO AND SWAZILAND:

Limitation of Liability: The following is added to this Section: IBM's entire liability to you for actual damages arising in all situations involving nonperformance by IBM in respect of the subject matter of this Statement of Warranty will be limited to the charge paid by you for the individual Machine that is the subject of your claim from IBM.

TURKIYE: Production Status: The following replaces this Section: IBM fulfills customer orders for IBM Machines as newly manufactured in accordance with IBM's production standards.

UNITED KINGDOM: Limitation of Liability: The following replaces items 1 and 2 of the first paragraph of this Section:

1. death or personal injury or physical damage to your real property solely caused by IBM's negligence;
2. the amount of any other actual direct damages or loss, up to the greater of Pounds Sterling 150,000 or 125 percent of the charges (if recurring, the 12 months' charges apply) for the Machine that is the subject of the claim or which otherwise gives rise to the claim.

The following item is added to this paragraph: 3. breach of IBM's obligations implied by Section 12 of the Sale of Goods Act 1979 or Section 2 of the Supply of Goods and Services Act 1982.

Applicability of suppliers and resellers (unchanged).

The following is added to the end of this Section: IBM's entire liability and your sole remedy, whether in contract or in tort, in respect of any default will be limited to damages.

NORTH AMERICA

CANADA: Warranty Service: The following is added to this section: To obtain warranty service from IBM, call **1-800-565-3344**. In Toronto, call **416-383-3344**.

UNITED STATES OF AMERICA: Warranty Service: The following is added to this section: To obtain warranty service from IBM, call **1-800-772-2227**.

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Federal Communications Commission (FCC) Statement

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an IBM authorized dealer or service representative for help.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Proper cables and connectors are available from IBM authorized dealers. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference,

and (2) this device must accept any interference received, including interference that may cause undesired operation.

Responsible party:

International Business Machines Corporation
New Orchard Road
Armonk, NY 10504
Telephone: 1-919-543-2193



Tested To Comply
With FCC Standards

FOR HOME OR OFFICE USE

Industry Canada Class B emission compliance statement

This Class B digital apparatus complies with Canadian ICES-003.

Avis de conformité a la réglementation d'Industrie Canada

Cet appareil numérique de classe B est conforme à la norme NMB-003 du Canada.

Deutsche EMV-Direktive (electromagnetische Verträglichkeit)

Dieses Gerät ist berechtigt in Übereinstimmung mit dem deutschen EMVG vom 9.Nov.92 das EG-Konformitätszeichen zu führen.

Der Aussteller der Konformitätserklärung ist die IBM UK, Greenock.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse B.

European Union - emission directive

This product is in conformity with the protection requirements of EU Council Directive 89/366/ECC on the approximation of the laws of the Member States relating to electromagnetic compatibility.

IBM can not accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

This product has been tested and found to comply with the limits for Class B Information Technology Equipment according to CISPR 22/European Standard

EN 55022. The limits for Class B equipment were derived for typical residential environments to provide reasonable protection against interference with licensed communication devices.

Union Européenne - Directive Conformité électromagnétique

Ce produit est conforme aux exigences de protection de la Directive 89/336/EEC du Conseil de l'UE sur le rapprochement des lois des États membres en matière de compatibilité électromagnétique.

IBM ne peut accepter aucune responsabilité pour le manquement aux exigences de protection résultant d'une modification non recommandée du produit, y compris l'installation de cartes autres que les cartes IBM.

Ce produit a été testé et il satisfait les conditions de l'équipement informatique de Classe B en vertu de CISPR22/Standard européen EN 55022. Les conditions pour l'équipement de Classe B ont été définies en fonction d'un contexte résidentiel ordinaire afin de fournir une protection raisonnable contre l'interférence d'appareils de communication autorisés.

Unione Europea - Directiva EMC (Conformidad electromagnética)

Este producto satisface los requisitos de protección del Consejo de la UE, Directiva 89/336/CEE en lo que a la legislatura de los Estados Miembros sobre compatibilidad electromagnética se refiere.

IBM no puede aceptar responsabilidad alguna si este producto deja de satisfacer dichos requisitos de protección como resultado de una modificación no recomendada del producto, incluyendo el ajuste de tarjetas de opción que no sean IBM.

Este producto ha sido probado y satisface los límites para Equipos Informáticos Clase B de conformidad con el Estándar CISPR22 y el Estándar Europeo EN 55022. Los límites para los equipos de Clase B se han establecido para entornos residenciales típicos a fin de proporcionar una protección razonable contra las interferencias con dispositivos de comunicación licenciados.

Unione Europea - Normativa EMC

Questo prodotto è conforme alle normative di protezione ai sensi della Direttiva del Consiglio dell'Unione Europea 89/336/CEE sull'armonizzazione legislativa degli stati membri in materia di compatibilità elettromagnetica.

IBM non accetta responsabilità alcuna per la mancata conformità alle normative di protezione dovuta a modifiche non consigliate al prodotto, compresa l'installazione di schede e componenti di marca diversa da IBM.

Le prove effettuate sul presente prodotto hanno accertato che esso rientra nei limiti stabiliti per le apparecchiature di informatica Classe B ai sensi del CISPR 22/Norma Europea EN 55022. I limiti delle apparecchiature della Classe B sono stati stabiliti al fine di fornire ragionevole protezione da interferenze mediante dispositivi di comunicazione in concessione in ambienti residenziali tipici.

Korean B급 규격 증명서

이 장치는 옥내용으로 보증되었으며 모든 환경에서 사용할 수 있습니다.

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