

100/200 GB HH LTO Internal Tape Drive



User's Guide

100/200 GB HH LTO Internal Tape Drive



User's Guide

Note: Before using this information and the product it supports, be sure to read the information under “Appendix F. Product warranty and notices” on page 23.

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Safety: Read first

Before installing this product, read the Safety Information.

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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 přečtěte 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!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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」。

About this book

This guide contains information on the IBM® 100/200 GB HH LTO Internal Tape Drive. It is translated into the following languages:

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

The guide is divided into two parts:

Part 1: Installation and maintenance guide

This section contains the product description, installation and operating instructions.

Part 2: Appendixes

This section contains maintenance, tape handling, product specifications, troubleshooting, help and service, and warranty and notice information.

Be sure to retain your proof of purchase. It might be required for warranty service.

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

Registering your option

Thank you for purchasing OPTIONS by IBM®. Please take a few moments to register your product and provide us with information that will help IBM to better serve you in the future. Your feedback is valuable to us in developing products and services that are important to you, as well as in developing better ways to communicate with you. Register your option on the IBM Web site at

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

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.

Installation and user's guide

This guide contains product description, hardware and software installation instructions, and product use.

Product description

The IBM 100/200 GB¹ HH LTO Internal Tape Drive is a fast/wide Ultra2 (low voltage differential) SCSI tape drive for backing up and restoring data and archiving files. These files can include multimedia, imaging, transaction processing, large databases, and other storage-intensive applications. Each tape cartridge can store up to 100 GB of data (uncompressed), or up to 200 GB of data (compressed), assuming a 2:1 compression ratio.

In addition to this book, the option package contains:

- IBM 100/200 GB HH LTO Internal Tape Drive
- Mounting screws
- Jumpers
- Data cartridge
- Backup application CDs (trial versions)
- Cleaning cartridge
- Device drivers (on User's Guide CD)
- Mounting bracket

Contact your place of purchase if an item is missing or damaged. Be sure to retain your proof of purchase and packing material. They might be required to receive warranty service.

Software description

The IBM 100/200 GB HH LTO Internal Tape Drive includes trial-version backup application CDs. These CDs contain popular backup and restore applications for Microsoft® Windows NT®, Novell NetWare, and other operating systems. You can install the application you choose for your computer system by following the installation instructions that come with the CD you select. However, these trial versions of the software expire after 30 to 90 days, depending on the application you use.

You can use the trial period to determine the best application for your specific computer configuration. For information on purchasing a permanent installation copy of the desired tape drive backup application, go to the IBM tape drive Web site at <http://www.ibm.com/pc/us/solutions/accessories/tapedrives.html> and follow the software links. The CDs also contain backup applications that are used with other products but are not applicable to the 100/200 GB HH LTO Internal Tape Drive. Supported tape drive configurations can be found on the IBM Server Compatibility Web page at <http://www.ibm.com/pc/compat>

1. GB equals approximately 1 000 000 000 bytes.

Installation requirements

To install this drive, you must have the following:

- A dedicated low voltage differential (Ultra2) or a single-ended (SE)² SCSI host adaptor
- Documentation for your computer, SCSI bus adapter, or external enclosure
- An Ultra2 LVD active terminator if you are installing the tape drive at the end of an Ultra2 LVD SCSI device chain³, or an SE active terminator if you are installing the tape drive at the end of an SE SCSI device chain
- Phillips and flat blade screwdrivers for the mounting screws, and for opening your computer
- Flat-nose pliers (optional) to install and remove jumpers
- An available 5.25-inch half high drive bay
- Supported operating system, Windows NT, Windows 2000, Netware, or Linux
- Supported backup software, Veritas Backup Exec or CA AverServeit

Installing the drive

This section contains information on installing the tape drive in IBM servers and in other computers.

Installing the drive in IBM servers

The IBM 100/200 GB HH LTO Internal Tape Drive can be installed in IBM xSeries 200, 220, 230, 240, 340 as well as IBM Netfinity[®] 4500R, 5100, 5600, 7100, and 7600. It can also be installed externally via a 3551001, or a 3510020, to IBM xSeries 330 or Netfinity 6000R or 8500R. Refer to the documentation that comes with the server for instructions on installing the tape drive.

General installation instructions

Follow these steps to install the tape drive in other computers.

Step 1. Selecting a SCSI ID

Each device on a SCSI bus must have a unique SCSI ID. You can select a SCSI ID from 0 to 6 for the tape drive. The SCSI ID must be supported by your SCSI adapter. Refer to your SCSI adapter documentation for the range and relative priority of the IDs supported. The tape drive is shipped with the SCSI ID preset to 3.

Follow these guidelines to select a SCSI ID:

- Assign the tape drive to one of the higher priority IDs available (0–6).
- Assign the lower priority ID numbers (8-15) to those devices that are most often used or are faster than other devices in the chain.
- Do not assign an ID of 7, because this is usually used as the SCSI adapter ID.

Depending on your computer, there are several ways to view your current SCSI ID settings:

2. This tape drive can be installed on a single-ended (SE) SCSI device chain, but doing so might limit the performance of the drive.

3. SCSI termination might be provided with your computer or SCSI adapter. Refer to the documentation that comes with your computer or SCSI adapter for more information.

- For many IBM computers, press F1 during the startup after the memory check completes. Other adapters show SCSI settings when you press Ctrl A. Check the documentation that comes with your computer or SCSI adapter for information on how to view configuration information.
- Use SCSI adapter utility programs, if available.
- Inspect the installed SCSI devices to see how the jumpers that determine the IDs are set.

Step 2. Preparing for installation

To prepare for installation:

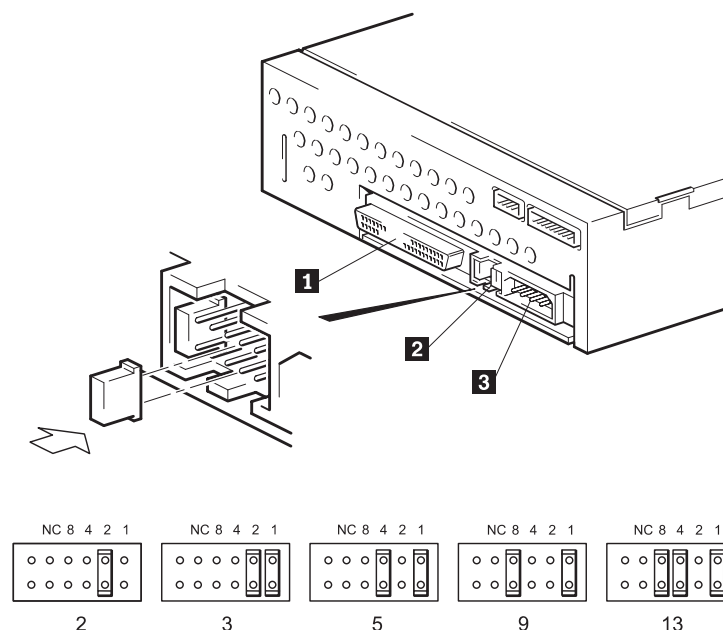
1. Unpack the tape drive and store the packaging. You will need the packaging if you return the drive for service.
2. If you are installing the drive in an external storage enclosure, turn off the enclosure.
3. Turn off all attached devices.
4. Turn off the computer.
5. Disconnect all cables from the computer and all attached devices; then open the computer. For specific information on opening your computer, refer to the documentation that comes with your computer.

Attention: Tape drives are sensitive to static electricity discharge. The drive is wrapped in a static-protective bag to prevent damage.

6. Before opening the static-protective bag containing the tape drive, touch the bag to an unpainted metal surface on the computer for at least two seconds. Remove the drive from the static-protective bag. If you must put the drive down, place the drive on the static-protective bag. Do not touch any exposed components of the tape drive. Instead, handle it carefully by the edges.

Step 3. Setting the SCSI ID

Refer to the following diagram when setting the SCSI ID.



- 1** SCSI connector
- 2** SCSI ID connector
- 3** Power connector

Note:

1. When setting the SCSI ID, use the jumpers that come with the tape drive.
2. If your enclosure uses a remote SCSI ID switch, remove the jumpers from the jumper pins on the tape drive and connect the remote switch.

1. Set the SCSI ID.
 - a. Locate the SCSI ID connector **2**.
 - b. Decide on the SCSI ID number you want before you attach the SCSI bus cable to the host. Make sure that the ID number you want is not already being used by another device.
 - c. Find the jumper pin setting that corresponds to the SCSI ID number you choose; then place jumper pins on the SCSI ID blocks as shown. You can use a pair of flat-nose pliers to place the jumpers on the jumper pins.
2. Terminate the SCSI bus by adding the appropriate (LVD or SE) terminator to the last connector on the SCSI bus.

Step 4. Mounting the drive

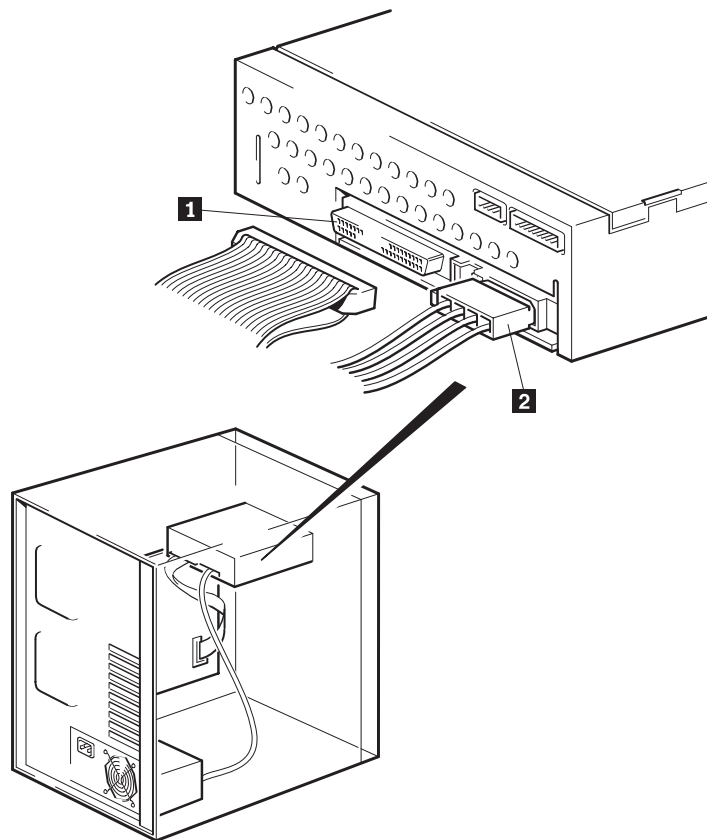
Mount the tape drive; then attach the SCSI and power cables to it. If there is insufficient working space to attach the connectors after mounting the drive, attach the cables first. To mount the drive, follow these steps:

1. Locate an available 5.25-inch bay or space in your computer to mount the tape drive. Remove the cover plate from the bay selected. Place the drive horizontally or vertically.
2. Attach mounting hardware to drive (if applicable).
3. Align the drive-bay screw holes with the threaded holes in the drive housing. When you mount the tape drive, follow these guidelines:
 - Ensure that no objects such as screw heads, cables, or adjacent devices are pressing against the frame.
 - Ensure that nothing blocks the ventilation slots on the bottom and rear of the tape drive.

Attention: Use only the screws that come with the tape drive. Other screws might be too long and can cause damage to the drive.

4. Insert a screw through each of the drive-bay holes into the threaded holes in the drive and tighten the screws with a screwdriver.

Step 5. Attaching cables



To attach the SCSI and power cables to the tape drive:

1. Locate the SCSI cable on your computer (a 68-pin ribbon cable with one end connected to the SCSI adapter) and find the next available connector that is farthest from the adapter. Use all empty bus connectors beginning with the one farthest from the adapter to ensure better signal quality.

Note: The SCSI adapter might be part of the computer system board or might be an adapter installed in an expansion slot.

2. Attach the SCSI cable from your computer to the tape drive 68-pin SCSI connector **1**. The SCSI cable connector at the end of the SCSI cable will attach to the drive only one way. Do not force the cable onto the drive.

Attention: Do not force the power cable into the tape drive power connector. If the power cable is upside down and you force the connection, you might damage the drive.

3. Connect the power cable connector **2** to the four-pin connector on the tape drive as shown in the illustration. If all the power cables are in use, purchase a dc Y-splitter cable, which is available at most electronics stores. Split a cable to make a connection available for the tape drive.

Step 6. Completing the installation

Check your work before closing the computer.

1. Be sure that the power and SCSI connectors are securely attached. Be sure that the cables are neatly routed.

2. Replace the computer cover and secure it in place. Reconnect the power cords and cables.

Step 7. Turning on the device

Turn on all attached devices; then turn on your computer. The tape drive performs a power-on self-test (POST) within 15 seconds and then performs a drive reset.

Step 8. Updating the configuration

For most computers, the configuration-setup utility program automatically recognizes the new tape drive. However, you might have to provide information about your system changes after you restart your computer.

Ensure that the appropriate advanced SCSI programming interface (ASPI) device drivers are installed to support the tape drive. Device drivers are usually provided with the SCSI adapter.

If your computer does not recognize the tape drive after startup or if you receive startup errors, run the configuration-setup utility program as described in the documentation that comes with your computer. If all the indicators on either side of the tape drive blink in unison, there is a problem with the tape drive. Press the Unload button on the right side of the drive front panel to eject any tape that might be inserted and to reset the drive. If the problem persists, turn off the computer; then turn it back on. If the problem continues, see "Appendix D. Troubleshooting" on page 17 for further steps.

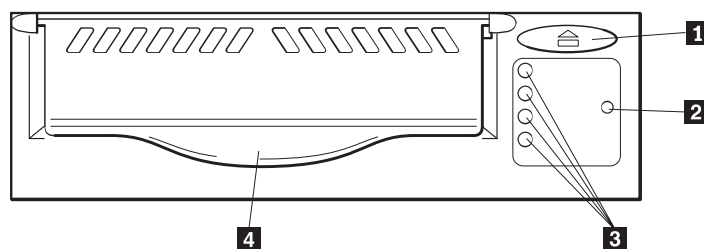
Step 9. Installing backup and restore software

To use the drive, you must install an appropriate backup and restore application for your computer operating system. If you are using software not included in the option package, follow the directions that come with your software. If you are using the trial software that comes with the option, insert a trial application CD into the CD-ROM drive and follow the on-screen installation and operating instructions.

If you are using the hardware installation support that your operating system provides, and the operating system requests a device driver, insert the User's Guide CD and look in the "device driver" folder.

Using the drive

This illustration shows the front panel of the 100/200 GB LTO Internal Tape Drive.



- 1 Eject cartridge button
- 2 Emergency reset

- 3 Four LEDs
- 4 Cartridge door

Front Panel LEDs

The following table describes the LED (light emitting diode) indicators on the drive front panel.

Indicator activity	Meaning
Ready (top, green)	<ul style="list-style-type: none">• On: the tape drive is ready for use• Off: the drive power is off or there was a failure during self-test• Flashing: the drive is busy
Drive Error (second, amber)	<ul style="list-style-type: none">• Off: no fault has been detected• Flashing: a problem has occurred with the drive hardware
Tape Error (third, amber)	<ul style="list-style-type: none">• Off: no fault has been detected• Flashing: the tape currently in the drive is faulty. This LED could come on for a number of reasons, but they all relate to a problem with the tape, such as unreadable cartridge memory or unsupported tape. Do not use the cartridge; replace it. The LED will go out when a tape load is started.
Use Cleaning Cartridge (bottom, amber)	<ul style="list-style-type: none">• On: cleaning cartridge is being used• Off: the drive does not require cleaning• Flashing: the drive needs cleaning

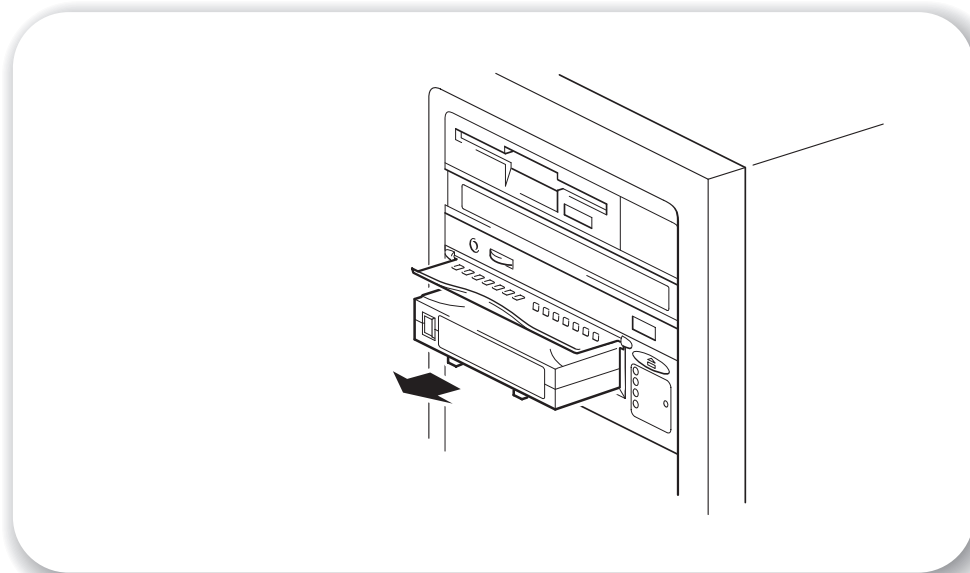
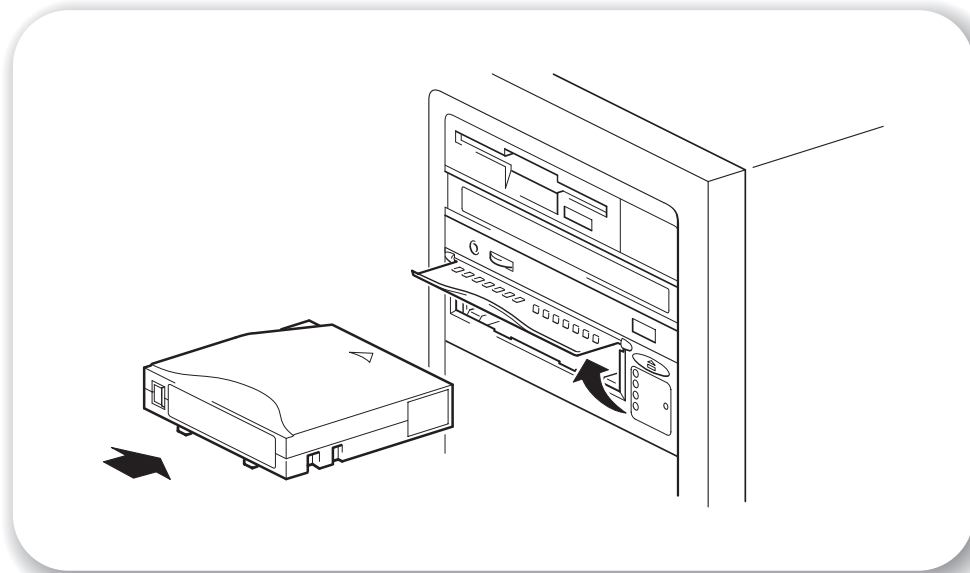
Loading tape cartridges

To load a tape cartridge, refer to the following diagram, and perform the following steps:

1. Make sure the tape drive is turned on.
2. Make sure the write-protection switch on the tape cartridge is properly set.
3. Grasp the tape cartridge so that the write-protect switch faces you.
4. Slide the tape cartridge into the tape load compartment.

Note: If the tape cartridge is already in the unload position (partially ejected) and you want to reload it, remove the cartridge and then load it again. If the tape cartridge is already loaded and you turn the power off, then turn the power back on. The tape cartridge will reload.

5. The drive will pull in the cartridge and flash the green LED while loading. Once loaded, the green LED returns to a solid state.



Unloading tape cartridges

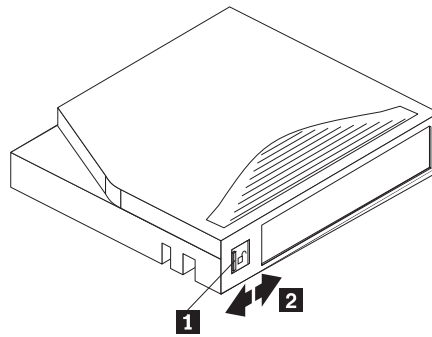
To unload a tape cartridge, perform the following steps.

1. Make sure that the 100/200 GB HH LTO Internal Tape Drive is turned on.
2. Press the Unload button. The drive rewinds the tape and places the tape cartridge in the unload position. The status light will flash green while the tape rewinds, and then turn off when the cartridge is ejected from the drive.
3. After the tape cartridge has been ejected, grasp the cartridge and remove it.

Emergency unload

If a cartridge fails to eject using the normal unload procedure, press and hold the Eject button for 5 seconds. This will instruct the drive to perform an emergency unload.

Setting write protection on the cartridge



The front of the cartridge has an orange write-protect switch **1** to prevent accidental erasure. Slide the switch to the right to write-protect **2** or to the left to enable writing.

Resetting the drive

The reset procedure rewinds the tape and clears the buffer of previous tape drive commands and data. To reset the tape drive, insert a paper clip into the emergency reset button on the front of the device, or turn the computer off and back on again. When reset, all front LEDs turn on and then off, with the top green LED remaining on to indicate a ready condition.

If you reset the tape drive while a cartridge is loaded, the tape rewinds to the beginning. The reset might take as long as 2 minutes if the tape is positioned near the end. After the drive has been reset, tape operation starts from the beginning of the data cartridge. After resetting the drive, restart your backup tape software.

Packing the drive for shipping

Attention: To avoid damaging the tape drive, use the original shipping materials when you ship it. Your proof of purchase might be required to receive warranty service. If you are returning the tape drive for service, remove and keep all cartridges, cables, and terminators.

If you are shipping the tape drive to another location or returning it for repair, pack the tape drive in its original shipping container and packing materials.

Appendix A. Maintenance

You need to perform regular maintenance on your 100/200 GB HH LTO Internal Tape Drive. This section explains how to care for the tape cartridges and how to clean the drive head.

Caring for tape cartridges

The following points are guidelines for storing and using the cartridges:

- Do not open the tape access door of the cartridge or touch the tape itself.
- Keep your cartridges away from sources of electromagnetic fields, such as telephones, dictation equipment, mechanical or printing calculators, motors, and bulk erasers. Do not place the cartridges on the computer monitor or on the base unit of the computer.
- Keep cartridges away from direct sunlight and heat sources, such as radiators or warm air ducts.
- Keep cartridges free of moisture. Do not wet or submerge cartridges in any liquid.
- Do not expose cartridges to temperature extremes.

Cleaning cartridges

You must use Ultrium cleaning cartridges with Ultrium tape drives, as other cleaning cartridges will not load and run. A cleaning cartridge is supplied with each tape drive and should only be used when the 'Use Cleaning Cartridge' amber LED is flashing. Insert the cleaning cartridge and the drive will carry out its cleaning cycle and eject the cartridge on completion (which can take up to 5 minutes). During the cleaning cycle the amber 'Use Cleaning Cartridge' LED will light solidly and the green 'Ready' LED will flash.

Each cleaning cartridge can be used up to 15 times. If the cleaning cartridge is ejected immediately with the 'Tape Error' LED on, it has expired. New cleaning cartridges are available from your supplier, and can be ordered following the insert-card instructions that come with the cleaning cartridge.

Appendix B. Tape handling

This section describes how to properly handle your tape cartridges to reduce wear on the 100/200 GB HH LTO Internal Tape Drive.

Tape handling and storage

Most tapes are supplied in sealed cartridges. Tapes are provided this way so that the tape will remain in a clean environment. Opening the cartridge enables dirt and airborne particles to enter and contaminate the cartridge. The cartridge must only be opened by the tape drive and not by an operator. The tape is also held under proper tension inside the cartridge. If the cartridge is dropped, this tension is relaxed. Inserting a dropped cartridge into a tape drive can often cause a misload that results in a jam. The jam ruins the tape and can cause physical damage if the cartridge is not removed properly. When you store tapes, place them in their protective containers and store them on their ends. Store the tapes in a clean, dry area at normal room temperature and away from magnetic fields.

Environmental issues

The operating environment might adversely affect tape drive operation. The tape drive is designed to operate in a clean environment. When tape is installed in a tape drive, the clearance between the heads and the tape is measured in microns. Even particles of smoke are larger than the space available between the tape and the heads. Other environmental factors that adversely affect tape drive operation are dirt, dust, fibers, and airborne particles. Ensure that you operate in a clean environment.

Tape drive cleaning

Even if the operating environment is clean, dirt might build up on the heads of any tape drive. Every time tape motion occurs, some of the media surface comes off on the heads. Over time, this material builds up, causing the tape head clearance to increase. The increased tape head clearance produces reading and writing errors. Most tape drives today have a built-in cleaning indicator to notify you when the tape needs cleaning.

Do not use any non-LTO cleaning cartridges with these tape drives. You can use cleaning cartridges only for a limited number of times. A cleaning cartridge is expired after it has been used for the maximum number of times as indicated. When a cleaning cartridge is expired, you must replace it. Never reuse an expired cleaning cartridge. If you continue to use an expired cleaning cartridge, you might reintroduce dirt to the tape drive and you might not clean the drive. To make sure that you know when your cleaning cartridge expires, make a notation on the cleaning cartridge each time you clean the tape drive.

Appendix C. Product specifications

This appendix includes the product specifications and requirements.

<i>Physical specifications</i>	
Height (with bezel)	41.45 mm (1.625 in)
Width (with bezel)	148 mm (5.8 in)
Length (with bezel)	221 mm (8.7 in)
Weight 2.9 Kg.	2 Kg. (4.4 lb)

<i>Input voltages</i>	
Standard +5 V dc and +12 V dc \pm 5%	

<i>Maximum sustained data-transfer rates</i>	
Uncompressed data	8 MB per second

<i>Operating environment</i>	
Tape path temperature range	+10°C to +35°C (+50°F to +104°F)
Relative humidity	20% to 80%, noncondensing
Wet bulb	25°C (77°F) maximum
Altitude	-152 m to +12 192 m (-500 to +40 000 ft)
Temperature gradient	11°C (51.8°F) per hour
Humidity gradient	10% per hour

Appendix D. Troubleshooting

The first step in problem solving is establishing whether the problem lies with the cartridge, the drive, the host computer and its connections, the backup software or with the way the system is being operated. If none of the following advice helps you solve the problem, contact your supplier.

The computer does not restart after installation

Possible reason	Recommended action
You have connected the tape drive to an existing SCSI bus that has other devices connected to it and the SCSI address of your drive is identical to the address used by another device.	Make sure that each device on the SCSI bus has a unique ID. For best results, connect the tape drive to a dedicated host bus adapter. Do not connect the drive to a disk RAID controller.
You have installed an additional SCSI host bus adapter and its resources are conflicting with an existing adapter.	Remove the new host bus adapter and check the server documentation.
You have disconnected the power or SCSI cable from the computer start disk during the drive installation process.	Check that the cables to all devices are firmly connected.

The computer starts but does not recognize the tape drive

Possible reason	Recommended action
The power or SCSI cable is not connected properly.	Check that the cables to the tape drive are firmly connected. Ensure that the SCSI cable is LVD-compliant and that it does not have any bent pins. Replace if necessary.
The SCSI bus is not terminated correctly.	Check that the SCSI bus is actively terminated. (Refer to the documentation for your SCSI controller and any other SCSI devices you have).
The SCSI ID address of the tape drive is not unique.	Make sure that each device connected to the SCSI controller has a unique SCSI ID. Remember that 7 is normally reserved for the host bus adapter.

The application does not recognize the tape drive

Possible reason	Recommended action
The application does not support the tape drive.	Refer to your manufacturer's World Wide Web site for details of backup applications that support the Ultrium tape drive. Load any service packs as necessary.
Some applications require drivers to be loaded.	Check that the correct SCSI and tape drive drivers are installed. Consult the installation notes of the backup application for details.

The drive does not work

Possible reason	Recommended action
If the drive does not turn on, the power cable might not be connected to the drive correctly.	Make sure that the power cable is firmly connected. Try another power cable. If the power supply is present and all LEDs remain off, try the reset button to power cycle the drive. If this fails, call for assistance.
If the self-test fails, there might be a hardware or firmware failure.	If there is a cartridge in the drive, remove it. Turn off the drive and turn it on again. If the self-test still fails, call for assistance.

Post-installation troubleshooting

Remember that the system recognizes devices during start-up. If you swap or connect a product when your system is running, you will need to restart the system. Restarting the system will reset devices and will often resolve problems. Restart the computer every time you add a driver or install firmware.

Understanding LEDs

Your tape drive has four LEDs (light emitting diodes) on the front panel, which indicate drive status. These LEDs provide useful troubleshooting information.

The tape drive performs a power-on self-test whenever power is applied or the drive is reset. The test takes about 5 seconds.

The green Ready light and the three amber lights for the other LEDs flash briefly and then go out.

The green Ready LED flashes and then remains on if the drive passes the self-test.

If the self-test fails, the Drive Error and Tape Error LEDs flash, while the Ready and Use Cleaning Cartridge LEDs are off. This continues until the drive is reset.

Use the following table to interpret the LED sequences and the appropriate action to take.

Symptom	Action
Drive fails to execute power-on self-test. LEDs remain off.	Check power is being supplied to the drive. Try another power connector. If the power supply is present and all LEDs remain off, call for service.
Drive fails to execute power-on self-test. The Drive Error and Tape Error LEDs flash, while the Ready and Use Cleaning Cartridge LEDs are off.	Unload the tape cartridge. Power cycle or reset the drive. Use the end of a paperclip to press the Reset button on the front of the tape drive. If the condition clears, load a new tape and discard the 'suspect' tape cartridge. If the error condition reappears, call for service.
The Use Cleaning Tape LED is flashing.	The drive requires cleaning. Load the cleaning cartridge.
The cleaning cartridge is ejected immediately after loading and the Tape Error LED is flashing.	Make sure that you are using a cleaning cartridge that has been used fewer than 15 times.

Symptom	Action
The Drive Error LED is flashing.	The drive mechanism has detected an error. Power cycle or reset the drive. If the condition clears, load a new tape. If the Drive Error LED remains on, call for service.
The Tape Error LED is flashing.	Unload the tape cartridge. Load a new cartridge. If the Tape Error LED is now off, discard the 'suspect' tape cartridge. If it is still on, call for service.
The tape is ejected immediately and the Tape Error LED is flashing, or the Drive Error LED flashes on unloading tape.	The tape cartridge memory (CM) might be faulty. Write-protect the cartridge by sliding the red switch on the tape cartridge. The tape can be loaded and the data read. Once the data is recovered, the cartridge must be discarded.

Fault diagnosis

If an error occurs with the tape drive, follow these steps to eliminate possible causes.

Note: After each step, retry the backup operation. If the backup still fails, go on to the next step.

- Clean the tape drive.
- Retension the data cartridge.
- Replace the data cartridge.
- Go to the IBM support Web site at <http://www.ibm.com/pc/support>

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. 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
All other countries	Go to http://www.ibm.com/pc/support/ , and click HelpCenter Phone List .

Appendix F. Product warranty 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)** (Part 1 - General Terms on page 23).
- **Worldwide except Canada, Puerto Rico, Turkey, and United States (Z125-5697-01 11/97)** (Part 1 - General Terms on page 26).
- **Worldwide Country-Unique Terms** (Part 2 - Country-Unique Terms on page 29).

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 - 100/200 GB HH LTO Internal Tape Drive

Warranty period* - Three years

** 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 - 100/200 GB HH LTO Internal Tape Drive
Warranty period* - Three years

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

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

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

*IBM Director of Licensing
IBM Corporation
North Castle Drive*

Armonk, NY 10504-1785
U.S.A.

The following paragraph does not apply to the United Kingdom or any country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

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

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you. Any references in this publication to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product, and use of those Web sites is at your own risk. Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Trademarks

The following terms are trademarks of the IBM Corporation in the United States or other countries or both:

IBM
HelpCenter
Netfinity

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

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

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:

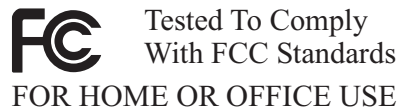
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an IBM authorized dealer or service representative for help.

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



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.

Union 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

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