



110/220 GB SDLT Internal Tape Drive

User's Guide

OPTIONS
by IBM

Note: Before using this information and the product it supports, be sure to read the information under "Appendix E. Product warranty and notices" on page E-1.

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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 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® 110/220 GB SDLT Internal Tape Drive.

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 110/220 GB¹ SDLT 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 110 GB of data (uncompressed), or up to 220 GB of data (compressed), assuming a 2:1 compression ratio.

In addition to this guide, the option package contains:

- IBM 110/220 GB SDLT Internal Tape Drive
- Mounting screws
- Jumpers
- Data cartridge
- Backup application CDs (trial versions)
- Device drivers (on User's Guide CD)
- Quick Install Guide

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 110/220 GB SDLT Internal Tape Drive includes trial-version backup application CDs. These CDs contain popular backup and restore applications for Microsoft® Windows NT®, Novell NetWare, and Linux. 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.pc.ibm.com/ww/eserver/xseries/tape.html>

1. GB equals approximately 1 000 000 000 bytes.

and follow the software links. The CDs also contain backup applications that are used with other products but are not applicable to the 110/220 GB SDLT Internal Tape Drive. Supported tape drive configurations can be found on the IBM Server Compatibility Web page at <http://www.ibm.com/pc/compat>

Installation requirements

To install this drive, you must have the following:

- A low voltage differential (Ultra2) SCSI host adapter
- 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 chain²
- Phillips head 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

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 tape drive is compatible with the Netfinity[®] 4500R, 5100, 5600, 6000R, 7100, 7600 and 8500R servers. The tape drive can be installed internally in the IBM eserver xseries 230, 240, 250, 340, and 260. It can be installed externally, using an IBM 3551001 enclosure, in the IBM eserver xseries 200, 220, 230, 240, 250, 330, 340, 350 and 370. Refer to the documentation that comes with the server for detailed instructions on installing the tape drive.

General installation instructions

Follow these steps to install the tape drive.

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 15 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 5.

2. 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.

Note: For optimal performance, it is highly recommended to use a dedicated SCSI bus for this tape device. Mixing this device with hard disk drives on the same SCSI bus will degrade performance.

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:

- 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. Turn off all attached devices.
2. Turn off the computer.
3. Unplug the power cords for the computer.
4. Disconnect all cables from the computer and all attached devices.
5. Open the computer. For specific information on opening your computer, refer to the documentation that comes with your computer.
6. If you are installing the drive in an external storage enclosure, turn off the power to the enclosure.

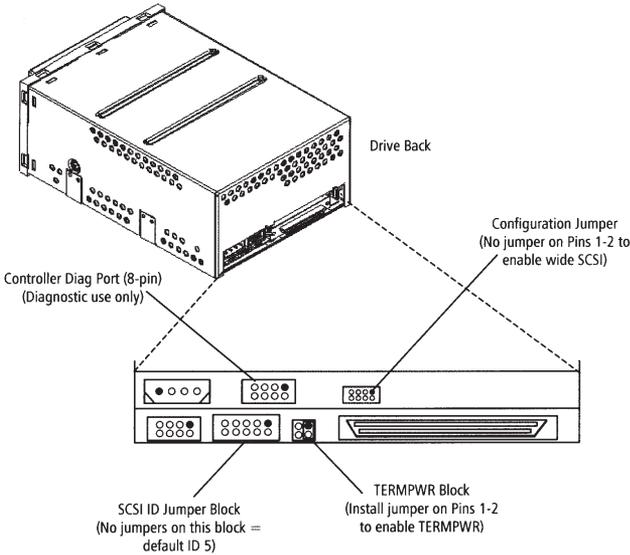
Attention: Tape drives are sensitive to static electricity discharge. The drive is wrapped in a static-protective bag to prevent damage.

Step 3. Setting the SCSI ID, termination and parity

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.

Use the illustration on the following page to locate the SCSI configuration jumper blocks.

Note: Use the chart to set the SCSI ID jumper block pins.



SCSI ID	Jumper Across Pins:				
	9-10*	7-8	5-6	3-4	1-2
0	1	0	0	0	0
1	1	0	0	0	1
2	1	0	0	1	0
3	1	0	0	1	1
4	1	0	1	0	0
5 (default)	0	0	0	0	0
6	1	0	1	1	0
7	1	0	1	1	1
8	1	1	0	0	0
9	1	1	0	0	1
10	1	1	0	1	0
11	1	1	0	1	1
12	1	1	1	0	0
13	1	1	1	0	1
14	1	1	1	1	0
15	1	1	1	1	1

0 = No Jumper installed 1 = Jumper installed

* Jumpering Pins 9-10 forces the drive to ignore the firmware value and read the value jumpered on the block.

If the tape drive is the last device on the SCSI bus, the bus must be terminated at the drive. Some SCSI cables provide self termination and do not require terminators. To terminate the bus at the drive, attach a SCSI terminator (not provided) to the drive connector before attaching the SCSI cable.

Most SCSI adapters provide termination power. However, if your SCSI adapter does not provide termination power, you must place a jumper in the **enable termination power** position 5 on the jumper block 4. For more information, refer to the documentation that comes with your computer or SCSI adapter.

If you install the tape drive in an external enclosure like the 3503B1X or 3551001, then the enclosure will require an external LVD SCSI terminator.

If you choose the default SCSI address of 5, proceed to Step 4. If you need to change the SCSI address, use the SCSI ID jumper block 3 to set your SCSI ID. Remove and reposition jumpers to set the ID. If necessary, use a pair of flat-nose pliers to remove the jumpers. Use the chart on the previous page to set the jumper block for each ID.

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. 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.

3. 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 (wide) 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. 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 to the four-pin connector on the tape drive. 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.

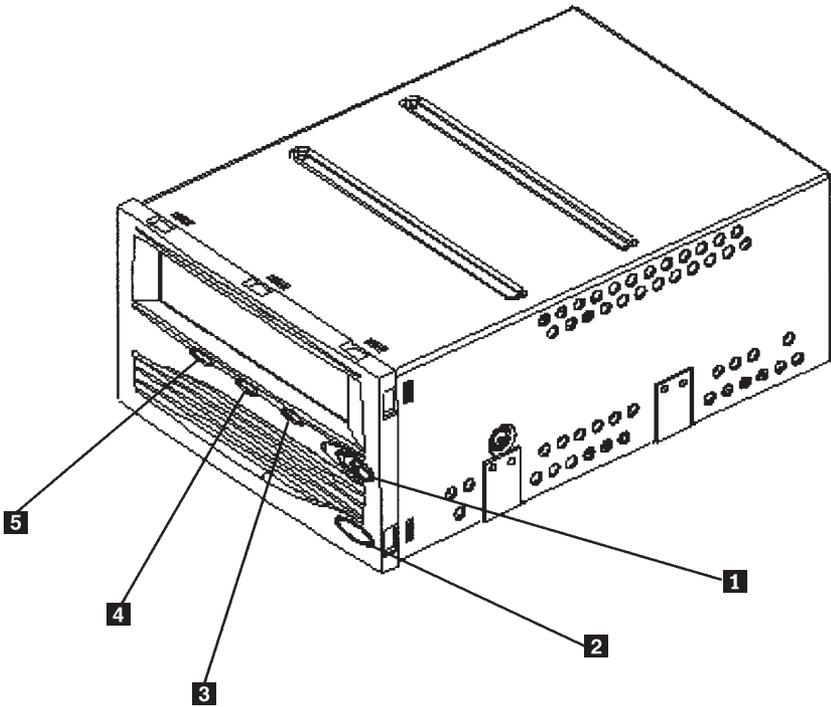
Step 9. Installing backup and restore software

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 native tape 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 button

2 Infrared communication port

3 Reserved

4 Drive status LED

5 Write protect LED

Front Panel LEDs

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

LED indicator activity	Meaning
Write protect (amber)	<ul style="list-style-type: none">• On: the tape is write protected• Off: the tape is write enabled
Drive status (green)	<ul style="list-style-type: none">• Blinking: drive is in use• On: drive is idle, but ready

Selecting data cartridges

For writing data, use only SDLT data cartridges. You can order additional cartridges by calling 1-888-IBM-MEDIA or by contacting your local IBM representative.

Caring for tape cartridges

Use the following maintenance guidelines to properly handle your tape cartridges.

- Do not carry loose cartridges in a box or other container that exposes them to unnecessary physical shock.
- Store each cartridge vertically in its protective case when you are not using it.
- Do not drop or bump the cartridge; this might dislodge or damage internal components.
- Avoid opening the cartridge door unnecessarily. Opening the cartridge door might expose the tape to contamination or physical damage.
- Do not allow anything to contact the tape medium or the tape leader. Dust or skin oils can contaminate the tape and hinder performance.
- Do not expose cartridges to moisture, direct sunlight, or condensation.
- Maintain clean operating, working, and storage environments.
- Do not place cartridges on or near devices that might produce magnetic fields, such as computer monitors, motors, or video equipment. Such exposure can alter or erase data on the tape. Magnetic fields are usually not a problem unless you place a tape cartridge a few inches from a magnet or an electric motor.
- Do not attempt to remove a tape cartridge from the tape system unless the Operate Handle indicator is lit steadily. Overriding the system handle causes damage to both the media and the tape drive.
- The ambient operating temperature for the tape cartridge is 10°C to 40°C (50°F to 104°F) and the ambient operating relative humidity (noncondensing) is 20% to 80%. If storage or transportation of a tape cartridge has exposed it to conditions outside these ambient values, allow the tape cartridge to acclimate to proper operating conditions for a 24-hour period before using.
- Place labels only in the front slide slot of the cartridge. Placing a label on the top, bottom, sides, or rear of the cartridge might interfere with normal cartridge operation and might damage other parts of the drive.
- Do not use graphite pencils, water-soluble felt pens, or other debris-producing writing instruments on your labels. Never use an eraser on a label; replace the label.
- Be sure to place unused cartridge labels in the protective box so that you do not inadvertently pick them up along with the cartridge during subsequent

usage. A static electricity charge on a cartridge might cause a label to cling to the cartridge. If you accidentally insert a label into the system along with a cartridge, the hub reel and system gear might not mesh.

- Follow all instructions for tape cartridge handling that come with your cartridges or tape system.

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.

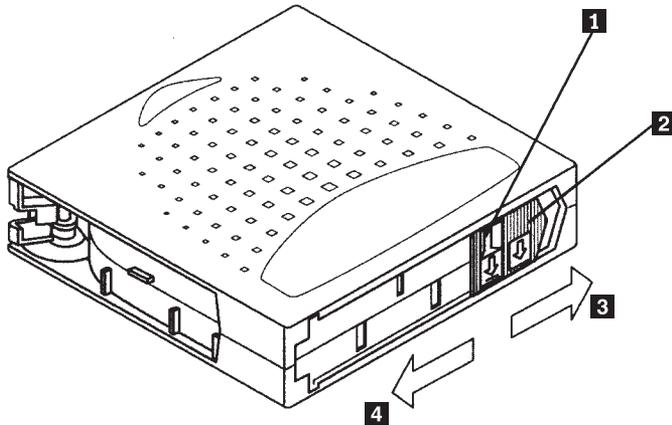
1. Make sure that the tape drive is turned on.
2. Press the Unload button. The drive rewinds the tape and places the tape cartridge in the unload position. The status light will flash green while the tape rewinds, and then turn off when the cartridge is ejected from the drive.
3. After the tape cartridge 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** indicator **1**, and a **write-protect** switch **2** to prevent accidental erasure. Slide the switch to the right to **disable write-protect** **3** or to the left to **enable write-protect** **4**. You can change the write-protect switch before or after inserting the tape. If you change the write-protect switch while the tape is inserted, there is a delay of a few seconds before the write protect indicator on the tape drive changes.



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, press the **Unload** button, or turn the computer off and back on again.

If you reset the tape drive while a cartridge is loaded, the tape rewinds to the beginning. The reset might take as long as two 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.

Packaging the drive for shipping

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.

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.

Appendix A. Maintaining your tape drive

This section contains important information about maintaining your tape drive and caring for your storage media.

Tape handling and storage

Most tape is supplied in a sealed cartridge. Tape is provided this way so that the tape will remain in a clean environment. Opening the cartridge allows dirt and airborne particles to enter and then become a source of contamination.

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 mis-load that results in a jam.

The jam ruins the tape and can cause physical damage if the cartridge is not removed properly. When the tapes are stored, they must be reinstalled into their protective containers and stored on their ends. You must store the tapes in a clean, dry area with 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. It is important to operate in a clean, safe environment in order to keep the tape drive functioning properly.

Appendix B. Product specifications

This appendix includes the product specifications and requirements.

<i>Physical specifications</i>	
Height (with bezel)	86.3 mm (3.4 in)
Width (with bezel)	148.3 mm (5.84 in)
Length (with bezel)	221.1 mm (9.6 in)
Weight	2.38 Kg. (6 lb, 7 oz)

<i>Maximum data capacity</i>		
Tape	Uncompressed data	Compressed data (assumes a 2:1 compression ratio)
DLTtape IV	40 GB	80 GB
IBM Data Cartridge (part number 59H3040)	40 GB	80 GB
Super DLTtape	110 GB	220 GB

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

<i>Maximum sustained data-transfer rates</i>	
Compressed data	22 10 MB per second
Uncompressed data	11 MB per second

<i>Power</i>	
Unloaded	16 W
Standby	17 W
Max	43 W

<i>Operating environment</i>	
Tape path temperature range	+10° C to +40° C (+50° F to +104° F)
Relative humidity	20% to 80%, noncondensing

Operating environment	
Wet bulb	25° C (77° F) maximum
Altitude	-152 to +12 192 m (-500 to 30 000 ft)
Temperature gradient	11°C per hour
Humidity gradient	10% per hour

SCSI cable specifications	
Connector	68-pin male, shielded, AMP 786090-7
Maximum length	3 m (10 ft)

Appendix C. Problem solving

Computer problems can be caused by hardware, software, or user error. You might be able to use the information in this section to solve problems yourself, or gather helpful information you can pass on to a service technician.

Review the following list for any problem descriptions that might fit your situation.

- **The software does not recognize the tape drive.**

Take the following actions:

1. Check for proper termination of the SCSI device chain. The SCSI device chain must be terminated at both ends.
2. Check for conflicting SCSI ID settings. Each SCSI ID must be unique on the SCSI device chain.
3. Ensure that the appropriate Advanced SCSI Programming Interface (ASPI) device drivers are installed to support the tape drive. ASPI device drivers usually come with the SCSI host adapter. For more information on the device drivers, see the documentation that came with your SCSI host adapter or your computer system.

- **The tape drive does not operate and the amber indicator is flashing.**

Some problems can be eliminated by simply turning power off then on, and repeating the backup. If this does not work, you should call the IBM HelpCenter who will help you resolve the problem.

Appendix D. 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 E. Product warranty and notices

This section contains the warranty period for your product and the IBM Statement of Limited Warranty.

Machine - 110/220 GB SDLT 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.*

IBM Statement of Limited Warranty

Part 1 - General Terms

This Statement of Limited Warranty includes Part 1 - General Terms and Part 2 - Country-unique Terms. The terms of Part 2 replace or modify those of Part 1. The warranties provided by IBM in this Statement of Limited 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 Limited 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.

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 ("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.

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.

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.

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 a Machine, contact IBM or your reseller. If you do not register your Machine with IBM, you may be required to present proof of purchase.

During the warranty period, IBM or your reseller, if approved by IBM to provide warranty service, provides without charge certain types of repair and exchange service 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. At its discretion, IBM or your reseller will 1) either repair or exchange the failing Machine and 2) provide the service either at your location or a service center. IBM or your reseller will also manage and install selected engineering changes that apply to the Machine.

Some parts of IBM Machines are designated as Customer Replaceable Units (called “CRUs”), e.g., keyboards, memory, or hard disk drives. IBM ships CRUs

to you for replacement by you. You must return all defective CRUs to IBM within 30 days of your receipt of the replacement CRU. You are responsible for downloading designated Machine Code and Licensed Internal Code updates from an IBM Internet Web site or from other electronic media, and following the instructions that IBM provides.

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. 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.

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), except for any liability that cannot be waived or limited by applicable laws, 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 charges (if recurring, 12 months' charges apply) for the Machine that is subject of the claim. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code.

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, LOST PROFITS OR LOST 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.

Governing Law

Both you and IBM consent to the application of the laws of the country in which you acquired the Machine to govern, interpret, and enforce all of your and IBM's rights, duties, and obligations arising from, or relating in any manner to, the subject matter of this Agreement, without regard to conflict of law principles.

Part 2 - Country-unique Terms

AMERICAS

BRAZIL

Governing Law: *The following is added after the first sentence:*

Any litigation arising from this Agreement will be settled exclusively by the court of Rio de Janeiro.

NORTH AMERICA

Warranty Service: *The following is added to this Section:*

To obtain warranty service from IBM in Canada or the United States, call 1-800-IBM-SERV (426-7378).

CANADA

Governing Law: *The following replaces “laws of the country in which you acquired the Machine” in the first sentence:*
laws in the Province of Ontario.

UNITED STATES

Governing Law: *The following replaces “laws of the country in which you acquired the Machine” in the first sentence:*
laws of the State of New York.

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 similar legislation and are only limited to the extent permitted by the applicable legislation.

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 or other similar legislation, 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.

Governing Law: *The following replaces “laws of the country in which you acquired the Machine” in the first sentence:*
laws of the State or Territory.

CAMBODIA, LAOS, AND VIETNAM

Governing Law: *The following replaces “laws of the country in which you acquired the Machine” in the first sentence:*
laws of the State of New York.

The following is added to this Section:

Disputes and differences arising out of or in connection with this Agreement

shall be finally settled by arbitration which shall be held in Singapore in accordance with the rules of the International Chamber of Commerce (ICC). The arbitrator or arbitrators designated in conformity with those rules shall have the power to rule on their own competence and on the validity of the Agreement to submit to arbitration. The arbitration award shall be final and binding for the parties without appeal and the arbitral award shall be in writing and set forth the findings of fact and the conclusions of law.

All proceedings shall be conducted, including all documents presented in such proceedings, in the English language. The number of arbitrators shall be three, with each side to the dispute being entitled to appoint one arbitrator.

The two arbitrators appointed by the parties shall appoint a third arbitrator before proceeding upon the reference. The third arbitrator shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the ICC. Other vacancies shall be filled by the respective nominating party. Proceedings shall continue from the stage they were at when the vacancy occurred.

If one of the parties refuses or otherwise fails to appoint an arbitrator within 30 days of the date the other party appoints its, the first appointed arbitrator shall be the sole arbitrator, provided that the arbitrator was validly and properly appointed.

The English language version of this Agreement prevails over any other language version.

HONG KONG AND MACAU

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*
laws of Hong Kong Special Administrative Region.

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 Limited Warranty, IBM's liability will be limited to the charge paid by you for the individual Machine that is the subject of the claim.

JAPAN

Governing Law: *The following sentence is added to this Section:*

Any doubts concerning this Agreement will be initially resolved between us in good faith and in accordance with the principle of mutual trust.

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.

PEOPLE'S REPUBLIC OF CHINA (PRC)

Governing Law: *The following replaces this Section:*

Both you and IBM consent to the application of the laws of the State of New York (except when local law requires otherwise) to govern, interpret, and enforce all your and IBM's rights, duties, and obligations arising from, or relating in any manner to, the subject matter of this Agreement, without regard to conflict of law principles.

Any disputes arising from or in connection with this Agreement will first be resolved by friendly negotiations, failing which either of us has the right to submit the dispute to the China International Economic and Trade Arbitration Commission in Beijing, the PRC, for arbitration in accordance with its arbitration rules in force at the time. The arbitration tribunal will consist of three arbitrators. The language to be used therein will be English and Chinese. An arbitral award will be final and binding on all the parties, and will be enforceable under the Convention on the Recognition and Enforcement of Foreign Arbitral Awards (1958).

The arbitration fee will be borne by the losing party unless otherwise determined by the arbitral award.

During the course of arbitration, this Agreement will continue to be performed except for the part which the parties are disputing and which is undergoing arbitration.

EUROPE, MIDDLE EAST, AFRICA (EMEA)

THE FOLLOWING TERMS APPLY TO ALL EMEA COUNTRIES:

The terms of this Statement of Limited Warranty apply to Machines purchased from IBM or an IBM reseller.

Warranty Service:

If you purchase 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 purchase 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.

If you purchase an IBM Machine in a Middle Eastern or African country, you may obtain warranty service for that Machine from the IBM entity within the country of purchase, if that IBM entity provides warranty service in that country, or from an IBM reseller, approved by IBM to perform warranty service on that Machine in that country. Warranty service in Africa is available within 50 kilometers of an IBM authorized service provider. You are responsible for transportation costs for Machines located outside 50 kilometers of an IBM authorized service provider.

Governing Law:

The applicable laws that govern, interpret and enforce rights, duties, and obligations of each of us arising from, or relating in any manner to, the subject matter of this Statement, without regard to conflict of laws principles, as well as Country-unique terms and competent court for this Statement are those of the country in which the warranty service is being provided, except that in 1) Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Hungary, Former Yugoslav Republic of Macedonia, Romania, Slovakia, Slovenia, Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan, the laws of Austria apply; 2) Estonia, Latvia, and Lithuania, the laws of Finland apply; 3) Algeria, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Congo, Djibouti, Democratic Republic of Congo, Equatorial Guinea, France, Gabon, Gambia, Guinea, Guinea-Bissau, Ivory Coast, Lebanon, Mali, Mauritania, Morocco, Niger, Senegal, Togo, and Tunisia, this Agreement will be construed and the legal relations between the parties will be determined in accordance with the French laws and all disputes arising out of this Agreement or related to its

violation or execution, including summary proceedings, will be settled exclusively by the Commercial Court of Paris; 4) Angola, Bahrain, Botswana, Burundi, Egypt, Eritrea, Ethiopia, Ghana, Jordan, Kenya, Kuwait, Liberia, Malawi, Malta, Mozambique, Nigeria, Oman, Pakistan, Qatar, Rwanda, Sao Tome, Saudi Arabia, Sierra Leone, Somalia, Tanzania, Uganda, United Arab Emirates, United Kingdom, West Bank/Gaza, Yemen, Zambia, and Zimbabwe, this Agreement will be governed by English Law and disputes relating to it will be submitted to the exclusive jurisdiction of the English courts; and 5) in Greece, Israel, Italy, Portugal, and Spain any legal claim arising out of this Statement will be brought before, and finally settled by, the competent court of Athens, Tel Aviv, Milan, Lisbon, and Madrid, respectively.

THE FOLLOWING TERMS APPLY TO THE COUNTRY SPECIFIED:

AUSTRIA AND 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 is 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.

Limitation of Liability: *The following paragraph is added to this Section:*

The limitations and exclusions specified in the Statement of Limited Warranty will not apply to damages caused by IBM with fraud or gross negligence and for express warranty.

The following sentence is added to the end of item 2:

IBM's liability under this item is limited to the violation of essential contractual terms in cases of ordinary negligence.

EGYPT

Limitation of Liability: *The following replaces item 2 in this Section:*

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. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code.

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).*

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 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:

1. *(unchanged)*
2. as to any other actual damage arising in all situations involving

nonperformance 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 third 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.

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 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 shall be limited to damages.

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*IBM Director of Licensing
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Federal Communications Commission (FCC) statement

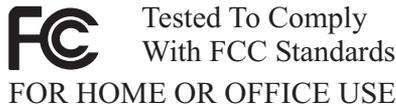
Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate 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



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 - Direttiva EMC (Conformidad electromagnética)

Este producto satisface los requisitos de protección del Consejo de la UE, Directiva 89/336/CEE en lo que a la legislación 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.

이 기기는 가정용으로 전자파 적합등록을 기기로서

주거지역에서는 물론 모든 지역에서 사용 할 수 있습니다.

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Japanese statement of compliance for products less than or equal to 20 A per phase

高調波ガイドライン適合品



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