

xSeries Server



80/160 GB VS160 Internal Tape Drive

User's Guide

Important:

Please carefully review the information in Chapter 2, "Maintenance and troubleshooting" on page 2-1, as periodic maintenance (cleaning, firmware updates, etc.) is not covered by the IBM warranty. Repairs or exchanges resulting from improper maintenance may result in billable service charges.

xSeries Server



80/160 GB VS160 Internal Tape Drive

User's Guide

Note: Before using this information and the product it supports, be sure to read the information under Chapter 2, "Maintenance and troubleshooting," on page 2-1 and Appendix C, "IBM Statement of Limited Warranty - Z125-4753-07 - 11/2002," on page C-1.

Third Edition (July 2003)

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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 prečítajte 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」。

General safety guidelines

Always observe the following precautions to reduce the risk of injury and property damage.

Service

Do not attempt to service a product yourself unless instructed to do so by the IBM HelpCenter. Use only an IBM authorized service provider who is approved to repair your particular product.

Note: Some parts can be upgraded or replaced by the customer. These parts are referred to as Customer Replaceable Units, or CRUs. IBM expressly identifies CRUs as such, and provides documentation with instructions when it is appropriate for customers to replace those parts. You must closely follow all instructions when performing such replacements. Always make sure that the power is turned off and that the product is unplugged from any power source before you attempt the replacement. If you have any questions or concerns, contact the IBM HelpCenter.

Power cords and power adapters

Use only the power cords and power adapters supplied by the product manufacturer.

Never wrap a power cord around the power adapter or other object. Doing so can stress the cord in ways that can cause the cord to fray, crack or crimp. This can present a safety hazard.

Always route power cords so that they will not be walked on, tripped over, or pinched by objects.

Protect the cord and power adapters from liquids. For instance, do not leave your cord or power adapter near sinks, tubs, toilets, or on floors that are cleaned with liquid cleansers. Liquids can cause a short circuit, particularly if the cord or power adapter has been stressed by misuse. Liquids can also cause gradual corrosion of the power cord terminals and/or the connector terminals on the adapter which can eventually result in overheating.

Always connect power cords and signal cables in the correct order and ensure that all power cord connectors are securely and completely plugged into receptacles.

Do not use any power adapter that shows corrosion at the ac input pins and/or shows signs of overheating (such as deformed plastic) at the ac input or anywhere on the power adapter.

Do not use any power cords where the electrical contacts on either end show signs of corrosion or overheating or where the power cord appears to have been damaged in any way.

Extension cords and related devices

Ensure that extension cords, surge protectors, uninterruptible power supplies, and power strips that you use are rated to handle the electrical requirements of the product. Never overload these devices. If power strips are used, the load should not exceed the power strip input rating. Consult an electrician for more information if you have questions about power loads, power requirements, and input ratings.

Plugs and outlets

If a receptacle (power outlet) that you intend to use with your computer equipment appears to be damaged or corroded, do not use the outlet until it is replaced by a qualified electrician.

Do not bend or modify the plug. If the plug is damaged, contact the manufacturer to obtain a replacement.

Some products are equipped with a three-pronged plug. This plug fits only into a grounded electrical outlet. This is a safety feature. Do not defeat this safety feature by trying to insert it into a non-grounded outlet. If you cannot insert the plug into the outlet, contact an electrician for an approved outlet adapter or to replace the outlet with one that enables this safety feature. Never overload an electrical outlet. The overall system load should not exceed 80 percent of the branch circuit rating. Consult an electrician for more information if you have questions about power loads and branch circuit ratings.

Be sure that the power outlet you are using is properly wired, easily accessible, and located close to the equipment. Do not fully extend power cords in a way that will stress the cords.

Connect and disconnect the equipment from the electrical outlet carefully

Batteries

All IBM personal computers contain a non-rechargeable coin cell battery to provide power to the system clock. In addition many mobile products such as Thinkpad notebook PCs utilize a rechargeable battery pack to provide system power when in portable mode. Batteries supplied by IBM for use with your product have been tested for compatibility and should only be replaced with IBM approved parts.

Never attempt to open or service any battery. Do not crush, puncture, or incinerate batteries or short circuit the metal contacts. Do not expose the battery to water or other liquids. Only recharge the battery pack strictly according to instructions included in the product documentation.

Battery abuse or mishandling can cause the battery to overheat, which can cause gasses or flame to “vent” from the battery pack or coin cell. If your battery is damaged, or if you notice any discharge from your battery or the buildup of foreign materials on the battery leads, stop using the battery and obtain a replacement from the battery manufacturer.

Batteries can degrade when they are left unused for long periods of time. For some rechargeable batteries (particularly Lithium Ion batteries), leaving a battery unused in a discharged state could increase the risk of a battery short circuit, which could

shorten the life of the battery and can also pose a safety hazard. Do not let rechargeable Lithium-Ion batteries completely discharge or store these batteries in a discharged state.

Heat and product ventilation

Computers generate heat when turned on and when batteries are charging. Notebook PCs can generate a significant amount of heat due to their compact size. Always follow these basic precautions:

- Do not leave the base of your computer in contact with your lap or any part of your body for an extended period when the computer is functioning or when the battery is charging. Your computer produces some heat during normal operation. Extended contact with the body could cause discomfort or, potentially, a skin burn.
- Do not operate your computer or charge the battery near flammable materials or in explosive environments.
- Ventilation slots, fans and/or heat sinks are provided with the product for safety, comfort, and reliable operation. These features might inadvertently become blocked by placing the product on a bed, sofa, carpet, or other flexible surface. Never block, cover or disable these features.

CD and DVD drive safety

CD and DVD drives spin discs at a high speed. If a CD or DVD is cracked or otherwise physically damaged, it is possible for the disc to break apart or even shatter when the CD drive is in use. To protect against possible injury due to this situation, and to reduce the risk of damage to your machine, do the following:

- Always store CD/DVD discs in their original packaging
- Always store CD/DVD discs out of direct sunlight and away from direct heat sources
- Remove CD/DVD discs from the computer when not in use
- Do not bend or flex CD/DVD discs, or force them into the computer or their packaging
- Check CD/DVD discs for cracks before each use. Do not use cracked or damaged discs

About this book

This guide contains information on the IBM[®] 80/160 GB VS160 Tape Drive. It is translated into the following languages:

- English
- German
- French
- Spanish
- Italian
- Korean
- Simplified Chinese
- Traditional Chinese
- Japanese

The guide is divided into three parts:

Part 1: Installation and user's guide

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

Part 2: Maintenance and troubleshooting

This section contains information on maintenance, tape handling and troubleshooting.

Part 3: Appendixes

This section contains product specifications, service and support, 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.

Chapter 1. Installation and user's guide

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

Product description

The IBM 80/160 GB (GB equals approximately 1 000 000 000 bytes) VS160 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 80 GB of data (uncompressed), or up to 160 GB of data (compressed), assuming a 2:1 compression ratio.

In addition to this guide on CD, the option package contains:

- IBM 80/160 GB VS160 Tape Drive
- Mounting screws
- Cleaning cartridge
- Device drivers (on User's Guide CD)
- Quick Installation Guide
- SCSI cable
- SCSI ID jumpers (maybe preinstalled on drive)

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.

Installation requirements

To install this drive, you must have the following:

- A dedicated low voltage differential (Ultra2) or a Ultra160 SCSI host adaptor
- Documentation for your computer, SCSI bus adapter, or external enclosure
- 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[®], Netware, Linux, etc
- Supported backup software, Veritas Backup Exec, CA Brightstor, etc.

Installing the drive

The IBM 80/160 GB DLTVS Internal Tape Drive can be installed in several types of IBM xSeries[®] servers. For a list of supported servers, go to <http://www.pc.ibm.com/compat> and click on "Tape Backup Units." Instructions for installing the tape drive are included in your server documentation.

If you cannot find your server documentation, follow these general steps to install the tape drive.

Step 1. 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 package to prevent damage.

6. Before opening the static-protective package 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 package. If you must put the drive down, place the drive on the static-protective package. Do not touch any of the exposed components of the tape drive. Instead, handle it carefully by the edges.

Step 2. Selecting a SCSI ID

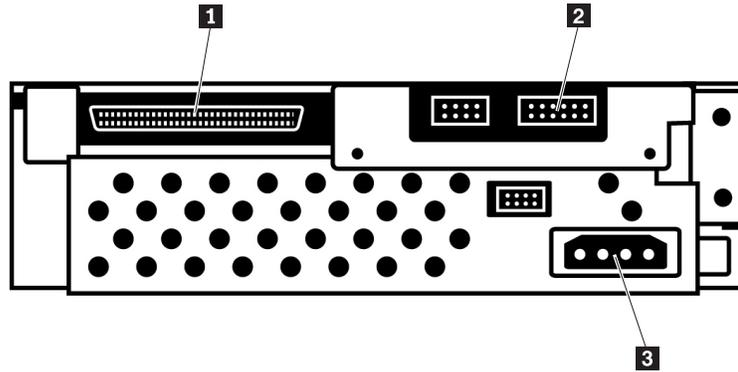
Each device on a SCSI bus must have a unique SCSI ID. Select a SCSI ID from 0 to 15 for the tape drive. The SCSI ID must be supported by your SCSI adapter. Refer to your SCSI adapter documentation for the range and relative priority of the IDs supported. The tape drive is shipped with the SCSI ID preset to 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:
- 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 3. Setting the SCSI ID

Refer to the following figure when setting the SCSI ID.



- 1** 68-pin high density SCSI connector **2** SCSI ID jumpers **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.

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.

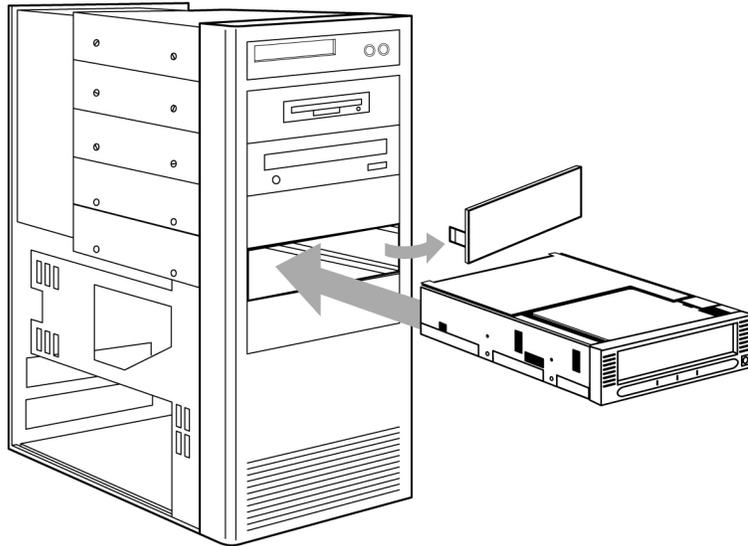
1	0	1	2	3	4	5	6	7
2								
1	8	9	10	11	12	13	14	15
2								

- 1** SCSI ID **2** Jumper block

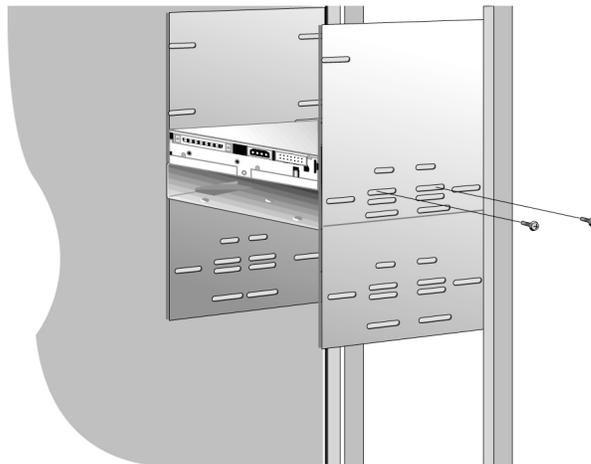
Step 4. Mounting the drive

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. Install the drive horizontally or vertically, depending on the bay.



2. Attach server mounting rails to the 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.

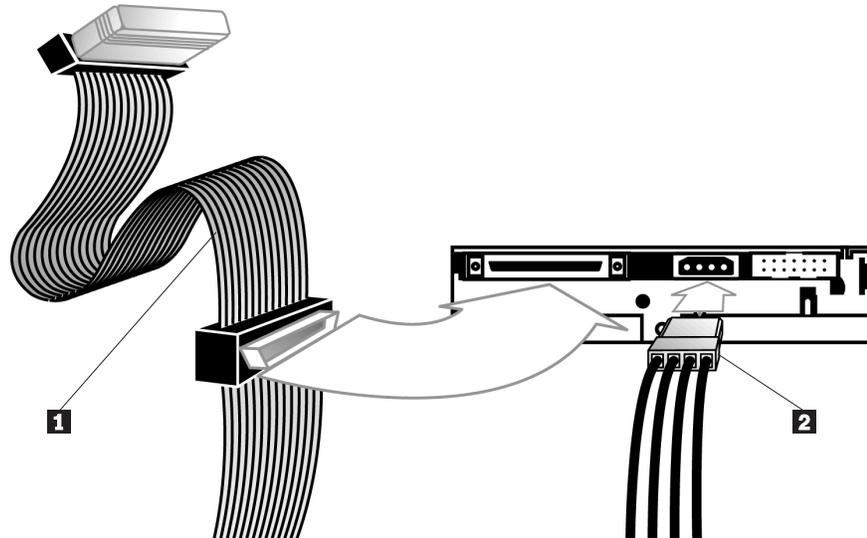
Attention: Use only the screws that come with the tape drive. Other screws might be too long and might damage the drive.

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.
5. If your server requires slide rails, mount the slide rails to the tape drive first, then slide the assembly into the server.

Step 5. Attaching cables

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

1. Use the SCSI cable provided and attach the terminated end to the drive and the unterminated end to the SCSI host adaptor.



1 SCSI cable (shown with terminator installed)

2 Power cable

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

2. Connect the power cable connector to the four-pin connector on the tape drive as shown in the illustration.

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.

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.
3. Reconnect the cables and then reconnect the power cords.

Step 7. Turning on the device

Turn on all the 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. You may hear a slight buzzing sound as POST completes. This is normal

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. 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 "Troubleshooting" on page 2-2 for further steps.

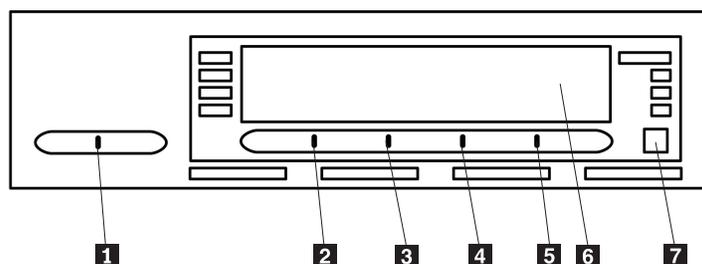
Step 9. Installing backup and restore software

The tape drive is used for backing up and restoring data. Consequently, to use the drive, you must install an appropriate backup and restore application for your computer operating system. Use the instruction below that best fits your situation:

- If you are using your own software, follow the directions that come with your software.
- If you are using the hardware installation support that your operating system provides, and the operating system requests a device driver, insert the *Documentation CD* and look in the "device driver" folder. If the required device driver is not included on the *Documentation CD*, you can go to www-3.ibm.com/pc/support and search for "59P6745" for a list of new and updated drivers.

Using the drive

This illustration shows the front panel of the 80/160 GB DLTVS Tape Drive installed in an external enclosure.



- 1** External power LED
- 2** Ready LED
- 3** Fault LED
- 4** Clean LED
- 5** Media LED
- 6** Cartridge door
- 7** Unload/Eject Button

Front Panel LEDs

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

Indicator	State	Operating condition
Fault	Blinking or on	There is an unrecoverable hard drive error or a POST error. Refer to the Troubleshooting section in Chapter 2.
	Off	No drive errors.
Ready (Green)	On	Power to the drive.
	Off	No power to the drive.
	Blinking	Tape is in motion.
Clean	Blinking	Cleaning in progress.
	On	Cleaning is required.
	Off	Cleaning is not required.
Media	Blinking	Unsupported or damaged media.
	On	Supported media.
All three LEDs	On, on at a time, left to right	Power On Self Test is starting.
	Blinking	Firmware upgrade is in progress.

Loading tape cartridges

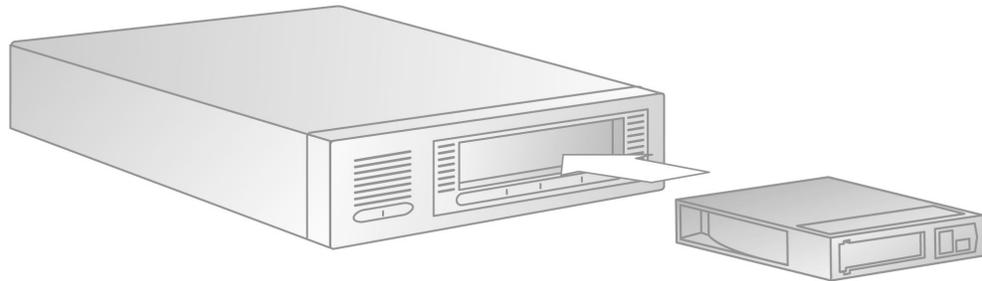
Attention: For best results, use only IBM recommended data and cleaning cartridges. A current list of IBM recommended media can be found by going to www-3.ibm.com/pc/support and searching for "MIGR-39931".

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

1. Make sure that the tape drive is turned on.
2. Make sure that 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: The drive will automatically eject unsupported cartridges.

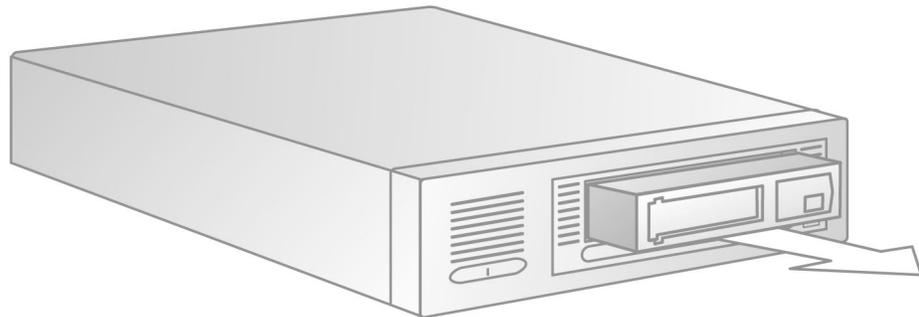
5. The drive pulls in the cartridge and flashes the green LED while loading. Once loaded, the green LED stops flashing.



Unloading tape cartridges

To unload a tape cartridge, perform the following steps.

1. Make sure that the 80/160 GB VS160 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 flashes green while the tape rewinds, and then turns off when the cartridge is ejected from the drive.



3. After the tape cartridge ejects, grasp the cartridge and remove it.

Using cleaning cartridges

Clean the tape drive whenever the **Cleaning** LED status light comes on or a system I/O error related to the device occurs.

Attention: For best results, use only IBM recommended cartridges. A current list of IBM recommended media can be found by going to www-3.ibm.com/pc/support and searching for "MIGR-39931".

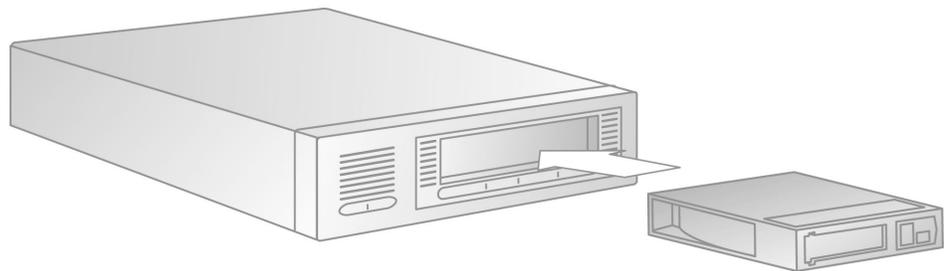
To clean the tape drive:

1. Make sure that the power is on.

2. If a tape cartridge is in the tape drive, eject and remove the cartridge.

Notes:

- a. Cleaning cartridges can be used approximately 20 times. Once a cleaning cartridge has been used to its maximum number of uses, the cartridge is considered expired. The tape drive will detect, and automatically eject, an expired cartridge. Never attempt to reuse an expired cleaning cartridge as it will reintroduce debris removed during a previous cleaning of the tape drive.
 - b. The IBM cleaning cartridge is shipped with a label on it that has 20 boxes that are designed to be used to log the use of the cartridge. Each time the cartridge is used, mark one of the boxes on the label with a pen or marker. When all of the boxes have been marked, discard the cleaning cartridge.
3. Grasp the cleaning cartridge by the outer edges, with the window side up and the write-protect switch facing you.
 4. Slide the cartridge into the opening on the front of the tape drive until the loading mechanism pulls the cartridge into the drive and the drive door closes.



After the cleaning cartridge has been inserted, the remainder of the cleaning process is automatic. The tape drive will do the following:

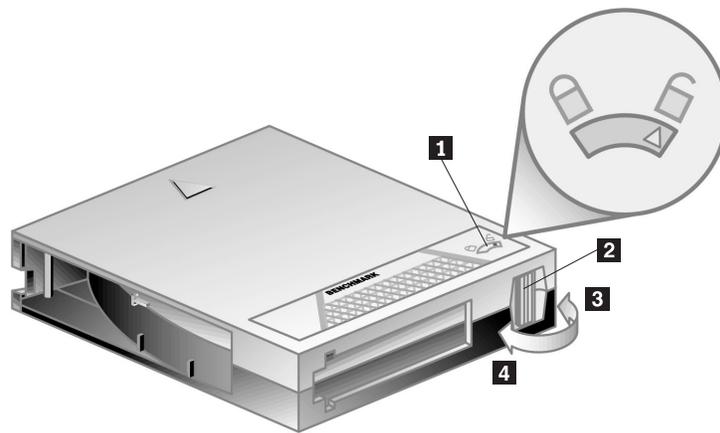
1. Loads the cleaning cartridge into the tape drive.
2. Cleans the drive by moving the cleaning tape forward for approximately 30 seconds.
3. Unloads the cleaning cartridge when the cleaning operation is complete.
4. Indicates a successful cleaning operation by turning off the Cleaning LED (if the **Cleaning** LED was on prior to the cleaning process).
5. If the cleaning operation completes but the Cleaning LED remains on, repeat the cleaning procedure with a new cleaning cartridge. If the LED still remains on, go to Chapter 2, "Maintenance and troubleshooting," on page 2-1.

To determine how many times a cleaning cartridge may be used, check the information printed on the cartridge. If you attempt to use a depleted cleaning cartridge, the tape drive automatically detects the error and ejects the cartridge, without turning off the cleaning LED, if already on.

Setting write protection on the cartridge

The front of the cartridge has a write-protect switch to prevent accidental erasure. Slide the write-protect switch to the left to enable write protection or slide the

switch to the right to enable writing.



1 Indicator
3 Write protected

2 Write Protect Switch
4 Write Enabled

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.

Chapter 2. Maintenance and troubleshooting

This chapter contains information on maintaining and troubleshooting the 80/160 GB VS160 Tape Drive.

Maintenance

You need to perform regular maintenance on your 80/160 GB VS160 Tape Drive. This section explains how to care for the tape cartridges and how to clean the drive head.

Upgrading firmware

IBM periodically releases new drive firmware to fix new problems or add enhancements to improve operation. Upgrading to this new firmware is a customer responsibility. To upgrade firmware, please do the following:

1. Go to <http://www-1.ibm.com/support>
2. Search for MIGR-39400.
3. Download the file.
4. Follow the instructions to upgrade to the latest supported firmware.

Failure to do so may result in drive problems and customer dissatisfaction, and may result in billable service charges.

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

Attention: You must use proper cleaning cartridges with this tape drive, 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 or once a week, whichever occurs first. Insert the cleaning cartridge and the drive carries out its cleaning cycle and ejects the cartridge on completion (which can take up to 5 minutes). Please follow the cleaning instructions on page 1-8 to clean the drive.

Tape handling

This section describes how to properly handle your tape cartridges to reduce wear on the 80/160 GB VS160 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.

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, it reintroduces 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.

Troubleshooting

The first step in problem solving is establishing if 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 go to Appendix B, "Service and Support," on page B-1.

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

Symptom	Problem	Action
None of the drive's LEDs illuminate.	The drive is not receiving power.	Check the drive's power cable. If a tabletop drive, check the power cable connections. Plug the power cable into a different power outlet.
Media LED: Slow blink	Unsupported format, unsupported cartridge type, or damaged cartridge.	Loading an unsupported cartridge, such as a DLTtapeIII, an SDLT cartridge, or an incompatible cleaning cartridge, damaged blank or was written using an unsupported format such as DLT4000, DLT7000 or DLT8000, or an unsuccessful buckle operation causes this condition. The drive ejects the cartridge. Inspect cartridge and confirm format, type, and integrity. If repeatable with a known good cartridge, go to Appendix B, "Service and Support," on page B-1..
Media LED: Illuminated	A DLT1 (VS80) format DLTape IV cartridge is loaded.	Your DLT VS160 drive can read, but not write, this cartridge. If attempting to read, no action is required. Because this cartridge cannot be written, if you attempt a write operation, your backup application should return a "Write Protected" message.
Clean LED: Slow blink	Calibration error or permanent write/read error.	The drive cannot read the calibration tracks on the tape or has encountered a permanent write or read error. If the failure is the result of a calibration error, the drive ejects the cartridge. If the failure is the result of a permanent read/write error, the drive does not eject the cartridge. Try a known-good cartridge. If condition persists with a particular cartridge, discard or degauss that cartridge. If repeatable with a known-good cartridge, try cleaning the drive. If cleaning does not help, go to Appendix B, "Service and Support," on page B-1..
Clean LED: Illuminated	Cleaning required. 250 tape motion hours exceeded since last cleaning.	Drive continues to function, although increased soft error rates may be encountered. Clean the drive at your earliest convenience. LED indication remains until drive is cleaned.
Fault LED: Slow blink	User initiated write/read diagnostic failed.	Eject tape, power cycle or reset drive. Try diagnostic again with a different, known-good tape. Note: This feature overwrites any data currently on the cartridge. Confirm that the selected cartridge does not contain important data. If this condition persists with a known-good cartridge, go to Appendix B, "Service and Support," on page B-1.
Fault LED: Fast blink	Servo or mechanical error.	Power cycle or reset the drive. Try the operation again with a known-good cartridge. If condition persists, go to Appendix B, "Service and Support," on page B-1.
Fault LED: Illuminated	Internal firmware error.	Power cycle or reset the drive. Try the operation again with a known-good cartridge. If condition persists, go to Appendix B, "Service and Support," on page B-1.
Other LED Indications	Unspecified.	If you encounter any LED indications that are not covered in this manual, go to Appendix B, "Service and Support," on page B-1.

Use the following table to help you troubleshoot other drive and connectivity problems.

Symptom	Problem	Solution
The host server or workstation does not recognize your DLT VS160 drive.	The drive's SCSI ID might not be unique.	Regardless of the number of SCSI devices attached to the server or workstation that is to be the host for your DLT VS160 drive, each must have a unique SCSI ID. Check the SCSI IDs on all other SCSI devices on the selected server, including the SCSI host adapter, and select an unused SCSI ID for your DLT VS160 drive. Note: If you attach the drive to a narrow (50-pin) bus, you can only use SCSI IDs 0 through 7.
	The SCSI host adapter might be incorrectly configured.	Check the SCSI host adapter configuration. Refer to the SCSI host adapter manuals for instructions.
	The SCSI cable might be loose.	Check both ends of the SCSI cable, both for the external and internal drives.
	The SCSI terminator might be loose or missing.	<ol style="list-style-type: none"> 1. Make sure an active Low-Voltage Differential/Single-Ended (LVD/SE) terminator is properly seated on the open SCSI connector on the rear panel of the external drive or on the last device on the SCSI bus. 2. Make sure an active LVD/SE terminator is in place on the SCSI ribbon cable for the internal drive.
	The SCSI bus might be improperly terminated.	<ol style="list-style-type: none"> 1. If your DLT VS160 drive is the last or only device on the SCSI bus, make sure the drive is properly terminated. 2. If your DLT VS160 drive is not the last or only device on the SCSI bus, check all SCSI cable connections and make sure the last device on the SCSI bus is terminated. 3. Make sure termination is set properly on the SCSI host adapter. 4. If you attach the drive to a narrow (50-pin) SCSI bus, you must use a customer supplied 68-pin to 50-pin adapter that terminates the unused 18 pins. These adapters are sometimes labeled "high-byte termination." 5. Regardless of which device is used to terminate the SCSI bus, it must have power applied and be turned on for proper termination to occur.
	The SCSI terminator might not be at the end of the SCSI bus or more than two terminators might be present on the SCSI bus.	Make sure the terminators are placed only at each end of the SCSI bus — normally one at the host adapter and one on the last device on the bus. However, if both internal and external devices are attached to the same SCSI host adapter, the adapter may be positioned in the middle of the SCSI bus and should not be terminated. In that case, the SCSI devices on each end of the bus must be terminated.
	The SCSI host adapter might be in a defective expansion slot.	Move the SCSI host adapter to a different expansion slot.
	The SCSI bus might be too long.	Make sure the total length of the SCSI bus does not exceed the ANSI SCSI standard of 19 feet (6 meters) for a Single-Ended (SE) bus, 40 feet (12 meters) for a Low-Voltage Differential (LVD) SCSI bus with multiple devices, or 82 feet (25 meters) for an LVD SCSI bus with a single device. If you attach the drive to an SE bus or if there are any SE devices attached to the bus, the bus is limited to the maximum cable lengths of an SE bus.
There are fatal or nonfatal errors for which you cannot find the cause.	The SCSI bus might be improperly terminated.	<ol style="list-style-type: none"> 1. If your DLT VS160 drive is the last or only device on the SCSI bus, make sure the drive is properly terminated. Make sure only the last device is terminated. 2. If your DLT VS160 drive is not the last or only device on the SCSI bus, check all SCSI cable connections and make sure the last device on the SCSI bus is terminated. 3. Make sure termination is set properly on the SCSI host adapter. 4. If you attach the drive to a narrow (50-pin) SCSI bus, you must use a customer supplied 68-pin to 50-pin adapter that terminates the unused 18 pins. These adapters are sometimes labeled "high-byte termination." 5. Regardless of which device is used to terminate the SCSI bus, it must have power applied and be turned on for proper termination to occur.
	The AC power source may not be properly grounded (DLT VS160 External Drive only).	<ol style="list-style-type: none"> 1. Plug your DLT VS160 External Drive's power cable into a power outlet on the same circuit as the host server. 2. Plug your DLT VS160 External Drive's power cable into a different power outlet.
The backup application does not recognize the drive.	Application not compatible or improper device drivers installed.	If the operating system recognizes the drive, but not the backup application, confirm that you are using a compatible backup application. Also confirm that you have the proper device drivers, if necessary, installed. See the your supplier's support website to obtain the latest operating system drivers and/or firmware upgrades.

Symptom	Problem	Solution
The drive cannot write data to or read data from a cartridge.	Cartridge or drive problem.	<ol style="list-style-type: none"> 1. Make sure that the cartridge is write enabled. Move the write-protect switch to the write-enabled position. 2. If you are attempting to write data, make sure you are using a DLTtape VS1 Media cartridge. 3. Make sure that the cartridge has not been exposed to harsh environmental or electrical conditions and is not physically damaged in any way. 4. Many backup applications do not read or write to cartridges that were created using a different backup application. In this case, you may have to perform an erase, format, or label operation on the cartridge using your backup application. 5. Make sure you understand any data protection or overwrite protection schemes that your backup application may be using, any of which could prevent you from writing to a given cartridge. 6. Retry the operation with a different, known good cartridge. 7. Clean the tape drive.
The drive is not backing up data efficiently.	Network, cartridge, SCSI bus, backup data set, or backup application problem.	<ol style="list-style-type: none"> 1. Check the network bandwidth from the host server. If you are backing up data over a network, compare to a local-only backup for relative backup speed indication. 2. Make sure that the drive is on its own SCSI bus and not daisy-chained to another tape drive or to the hard drive being backed up. 3. Clean the tape drive. 4. Try a new cartridge. A marginal cartridge can cause performance problems due to bad spots on the tape requiring retries. 5. Make sure that the data is being compressed. See your backup application user documentation for details. 6. Check the size of the files in the backup set. Small file size can impact performance. 7. Confirm that the backup application is using block sizes of at least 32KB, and preferably 64KB. See your backup application user documentation for details.
The drive does not eject a cartridge.	Timing or drive problem.	Allow sufficient time for the drive to complete any operations, such as POST, reset, load, unload, rewind, etc. Worst case is when powering up or resetting the drive with the tape positioned at the physical end of the media. Recovery from this state could take several minutes. Allow sufficient time for the backup application to release any hold it may have on the drive. Worst case could be several minutes. Confirm that the backup application is not set to prevent media removal. Try a software eject, using your backup application, allowing sufficient time for the command to execute. If the drive still does not eject the cartridge, power down the drive and remove all connectors except power from the rear of the tape drive. Apply power to the drive and allow it to complete POST. Press the Unload/Eject button, allowing sufficient time for the command to execute. See If the Drive Becomes Unresponsive for instructions on performing an emergency reset to eject the cartridge. If the drive still does not eject the cartridge, contact your supplier's technical support department.
The drive repeatedly rejects a cartridge.	Cartridge or drive problem.	The DLT VS160 Tape Drive rejects any unsupported cartridge, such as a DLTtape III, an SDLT cartridge, an incompatible cleaning cartridge, damaged media, a DLTtape IV cartridge that is either blank or was written using an unsupported format such as DLT4000, DLT7000 or DLT8000, as well as any cartridge that causes an unsuccessful buckle operation. Inspect the cartridge and confirm format, type, and integrity. If repeatable with a known-good cartridge, try cleaning the drive. If cleaning does not help, replace the drive or contact your supplier's technical support department.

General Fault diagnosis

If all else fails, try the following three steps before replacing the drive.

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

- Clean the tape drive.
- Replace the data cartridge.
- Go to the IBM support Web site at <http://www.ibm.com/pc/support> and look for hints or tips on the 59P6719 VS160 tape drive.

Appendix A. Product specifications

This appendix includes the product specifications and requirements.

<i>Physical specifications</i>	
Height (with bezel)	43.82 mm (1.625 in)
Width (with bezel)	148 mm (5.8 in)
Length (with bezel)	221 mm (8.7 in)
Weight	1.3 Kg. (2.9 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 +40°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 B. Service and Support

The following information describes the technical support that is available for your product, during the warranty period or throughout the life of the product. Refer to your IBM Statement of Limited Warranty for a full explanation of IBM warranty terms.

Online technical support

Online technical support is available during the life of your product through the Personal Computing Support Web site at www-3.ibm.com/pc/support/site.wss/.

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

Phone numbers are subject to change without notice. For the latest phone number list, go to www-3.ibm.com/pc/support/site.wss/ and click **Support Phone List**.

Country or Region	Telephone Number	Country or Region	Telephone Number
Argentina	0800-666-0011	Malaysia	03-7727-7800
Australia	1300-130-426	Mexico	001-866-434-2080
Austria	01-24592-5901	Netherlands	020-514-5770

Country or Region	Telephone Number	Country or Region	Telephone Number
Belgium	Dutch 02-210-9820	New Zealand	0800-446-149
	French 02-210-9800		
Bolivia	0800-0189	Norway	66 81 11 00
Brazil	55-11-3889-8986	Peru	0-800-50-866
Canada	1-800-565-3344	Philippines	632-995-2225
	Toronto 416-383-3344		
Chile	800-224-488	Portugal	21-791 51 47
China (PRC)	800-810-1818	Russia	095-940-2000
China (Hong Kong S.A.R.)	852-2825-7799	Singapore	1800-840-9911
Columbia	980-912-3021	Spain	91-662 49 16
Denmark	45 20 82 00	Sweden	08-477 4420
Ecuador	1-800-426911 (option #4)	Switzerland	058-333-09-00
Finland	09-459 69 60	Taiwan	886-2-2725-9799
France	02 38 55 74 50	Thailand	66-2-273-4000
Germany	07032-1549 201	Turkey	00-800-446-32-041
Indonesia	021-523-8535	United Kingdom	0-1475-555 055
Ireland	01-815-9202	United States	1-800-426-7378
Italy	02-7031-6101	Uruguay	000-411-005-6649
Japan	Consumer customers 0120-887-870	Venezuela	0-800-100-2011
	Business customers 0120-887-874		
Luxembourg	298-977 5063	Vietnam	848-8295-160

Appendix C. IBM Statement of Limited Warranty - Z125-4753-07 - 11/2002

Part 1 - General Terms

This Statement of Limited Warranty includes Part 1 - General Terms, Part 2 - Country-unique Terms, and Part 3 - Warranty Information. 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. 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. Nothing in this Statement of Limited Warranty affects any statutory rights of consumers that cannot be waived or limited by contract.

What this Warranty Covers

IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications ("Specifications") which are available on request. The warranty period for the Machine starts on the original Date of Installation and is specified in Part 3 - Warranty Information. The date on your invoice or sales receipt is the Date of Installation unless IBM or your reseller informs you otherwise. 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. Unless IBM specifies otherwise, these warranties apply only in the country or region in which you purchased the Machine.

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. SOME STATES OR JURISDICTIONS DO NOT ALLOW THE EXCLUSION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU. IN THAT EVENT, SUCH WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD. SOME STATES OR JURISDICTIONS DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

What this Warranty Does not Cover

This warranty does not cover the following:

- any software programs, whether pre-loaded or shipped with the Machine, or installed subsequently;
- failure resulting from misuse (including but not limited to use of any Machine capacity or capability, other than that authorized by IBM in writing), accident, modification, unsuitable physical or operating environment, or improper maintenance by you;
- failure caused by a product for which IBM is not responsible; and

- any non-IBM products, including those that IBM may procure and provide with or integrate into an IBM Machine at your request.

The warranty is voided by removal or alteration of identification labels on the Machine or its parts.

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, is provided **WITHOUT WARRANTIES OF ANY KIND**.

How to Obtain Warranty Service

If the Machine does not function as warranted during the warranty period, contact IBM or your reseller to obtain warranty service. If you do not register the Machine with IBM, you may be required to present proof of purchase as evidence of your entitlement to warranty service.

What IBM Will Do to Correct Problems

When you call for service, you must follow the problem determination and resolution procedures that IBM specifies. A technician will attempt to make an initial diagnosis of your problem and help you resolve it over the telephone.

The type of warranty service applicable to your Machine is specified in Part 3 - Warranty Information.

You are responsible for downloading and installing designated Machine Code (microcode, basic input/output system code (called "BIOS"), utility programs, device drivers, and diagnostics delivered with an IBM Machine) and other software updates from an IBM Internet Web site or from other electronic media, and following the instructions that IBM provides.

If your problem can be resolved with a Customer Replaceable Unit ("CRU") (e.g., keyboard, mouse, speaker, memory, hard disk drive and other easily replaceable parts), IBM will ship these parts to you for replacement by you.

If the Machine does not function as warranted during the warranty period and your problem cannot be resolved over the telephone, through your application of Machine Code or software updates, or with a CRU, IBM or your reseller, if approved by IBM to provide warranty service, will either, at its discretion, 1) repair it to make it function as warranted, or 2) replace it with one that is at least functionally equivalent. If IBM is unable to do either, you may return the Machine to your place of purchase and your money will be refunded.

IBM or your reseller will also manage and install selected engineering changes that apply to the Machine.

Exchange of a Machine or Part

When the 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.

Your Additional Responsibilities

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 service request procedures that IBM or your reseller provides;
 - b. backup or secure all programs, data, and funds contained in the Machine;
 - c. IBM or your reseller with sufficient, free, and safe access to your facilities to permit IBM to fulfill its obligations; and
 - d. inform IBM or your reseller of changes in the Machine's location.
4. (a) ensure all information about identified or identifiable individuals (Personal Data) is deleted from the Machine (to the extent technically possible), (b) allow IBM, your reseller or an IBM supplier to process on your behalf any remaining Personal Data as IBM or your reseller considers necessary to fulfill its obligations under this Statement of Limited Warranty (which may include shipping the Machine for such processing to other IBM service locations around the world), and (c) ensure that such processing complies with any laws applicable to such Personal Data.

Limitation of Liability

IBM is responsible for loss of, or damage to, your Machine only 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 are responsible for any of your confidential, proprietary or personal information contained in a Machine which you return to IBM for any reason. You should remove all such information from the Machine prior to its return.

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 ("LIC").

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, ITS SUPPLIERS OR RESELLERS LIABLE FOR ANY OF THE FOLLOWING EVEN IF INFORMED OF THEIR POSSIBILITY: 1) THIRD PARTY CLAIMS AGAINST YOU FOR DAMAGES (OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE); 2) LOSS OF, OR DAMAGE TO, DATA; 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; OR 4) LOST PROFITS, BUSINESS REVENUE, GOODWILL OR ANTICIPATED SAVINGS. SOME STATES OR JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU. SOME STATES OR JURISDICTIONS DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION 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 Statement of Limited Warranty, without regard to conflict of law principles.

THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE OR JURISDICTION TO JURISDICTION.

Jurisdiction

All of our rights, duties, and obligations are subject to the courts of the country in which you acquired the Machine.

Part 2 - Country-unique Terms

AMERICAS

ARGENTINA

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

Any litigation arising from this Statement of Limited Warranty will be settled exclusively by the Ordinary Commercial Court of the city of Buenos Aires.

BRAZIL

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

Any litigation arising from this Statement of Limited Warranty will be settled exclusively by the court of Rio de Janeiro, RJ.

Peru

Limitation of Liability: *The following is added at the end of this section:*

In accordance with Article 1328 of the Peruvian Civil Code the limitations and exclusions specified in this section will not apply to damages caused by IBM's willful misconduct ("dolo") or gross negligence ("culpa inexcusable").

NORTH AMERICA

How to Obtain 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

Limitation of Liability: *The following replaces item 1 of this section:*

1. damages for bodily injury (including death) or physical harm to real property and tangible personal property caused by IBM's negligence; and

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

What this Warranty Covers: *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, United States of America.

CAMBODIA, INDONESIA, LAOS, AND VIETNAM

Arbitration: The following is added under this heading:

Disputes arising out of or in connection with this Statement of Limited Warranty shall be finally settled by arbitration which shall be held in Singapore in accordance with the Arbitration Rules of Singapore International Arbitration Center ("SIAC Rules") then in effect. The arbitration award shall be final and binding for the parties without appeal and shall be in writing and set forth the findings of fact and the conclusions of law.

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 who shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the SIAC. 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.

All proceedings shall be conducted, including all documents presented in such proceedings, in the English language. The English language version of this Statement of Limited Warranty prevails over any other language version.

HONG KONG S.A.R. OF CHINA AND MACAU S.A.R. OF CHINA

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 of China.

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; and
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, the charge paid by you for the individual Machine that is the subject of the claim. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code ("LIC").

Arbitration: *The following is added under this heading:*

Disputes arising out of or in connection with this Statement of Limited Warranty shall be finally settled by arbitration which shall be held in Bangalore, India in accordance with the laws of India then in effect. The arbitration award shall be final and binding for the parties without appeal and shall be in writing and set forth the findings of fact and the conclusions of law.

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 who shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the Bar Council of India. 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.

All proceedings shall be conducted, including all documents presented in such proceedings, in the English language. The English language version of this Statement of Limited Warranty prevails over any other language version.

JAPAN

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

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

MALAYSIA

Limitation of Liability: *The word "SPECIAL" in item 3 of the fifth paragraph is deleted.*

NEW ZEALAND

What this Warranty Covers: *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 "laws of the country in which you acquired the Machine" in the first sentence:*

laws of the State of New York, United States of America (except when local law requires otherwise).

PHILIPPINES

Limitation of Liability: *Item 3 in the fifth paragraph is replaced by the following:*

SPECIAL (INCLUDING NOMINAL AND EXEMPLARY DAMAGES), MORAL, INCIDENTAL, OR INDIRECT DAMAGES FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; OR

Arbitration: The following is added under this heading

Disputes arising out of or in connection with this Statement of Limited Warranty shall be finally settled by arbitration which shall be held in Metro Manila, Philippines in accordance with the laws of the Philippines then in effect. The

arbitration award shall be final and binding for the parties without appeal and shall be in writing and set forth the findings of fact and the conclusions of law.

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 who shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the Philippine Dispute Resolution Center, Inc. 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.

All proceedings shall be conducted, including all documents presented in such proceedings, in the English language. The English language version of this Statement of Limited Warranty prevails over any other language version.

SINGAPORE

Limitation of Liability: The words "SPECIAL" and "ECONOMIC" in item 3 in the fifth paragraph are deleted.

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.

Hot to Obtain Warranty Service: If you purchase a Machine in Austria, Belgium, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, Norway, Portugal, Spain, San Marino, Sweden, Switzerland, United Kingdom or Vatican State, 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, provided the Machine has been announced and made available by IBM in the country in which you wish to obtain service. If you purchased a Personal Computer Machine in Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Hungary, Kazakhstan, Kyrgyzstan, 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 a 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 approved service provider. You are responsible for transportation costs for Machines located outside 50 kilometers of an IBM approved service provider.

*Add the following paragraph in **Western Europe** (Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Monaco, Netherlands, Norway, Portugal, Spain, San Marino, Sweden, Switzerland, United Kingdom, Vatican State):*

The warranty for Machines acquired in Western Europe shall be valid and applicable in all Western Europe countries provided the Machines have been announced and made available in such countries.

Governing Law:

The phrase "the laws of the country in which you acquired the Machine" is replaced by:

1) "the laws of Austria" in **Albania, Armenia, Azerbaijan, Belarus, Bosnia-Herzegovina, Bulgaria, Croatia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, FYR Macedonia, Moldova, Poland, Romania, Russia, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, and FR Yugoslavia;** 2) "the laws of France" in **Algeria, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo Republic, Djibouti, Democratic Republic of Congo, Equatorial Guinea, French Guiana, French Polynesia, Gabon, Gambia, Guinea, Guinea-Bissau, Ivory Coast, Lebanon, Madagascar, Mali, Mauritania, Mauritius, Mayotte, Morocco, New Caledonia, Niger, Reunion, Senegal, Seychelles, Togo, Tunisia, Vanuatu, and Wallis & Futuna;** 3) "the laws of Finland" in **Estonia, Latvia, and Lithuania;** 4) "the laws of England" in **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, the United Kingdom, West Bank/Gaza, Yemen, Zambia, and Zimbabwe;** and 5) "the laws of South Africa" in **South Africa, Namibia, Lesotho and Swaziland.**

Jurisdiction: *The following exceptions are added to this section:*

1) In **Austria** the choice of jurisdiction for all disputes arising out of this Statement of Limited Warranty and relating thereto, including its existence, will be the competent court of law in Vienna, Austria (Inner-City); 2) in **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, West Bank/Gaza, Yemen, Zambia, and Zimbabwe** all disputes arising out of this Statement of Limited Warranty or related to its execution, including summary proceedings, will be submitted to the exclusive jurisdiction of the English courts; 3) in **Belgium and Luxembourg**, all disputes arising out of this Statement of Limited Warranty or related to its interpretation or its execution, the law, and the courts of the capital city, of the country of your registered office and/or commercial site location only are competent; 4) in **France, Algeria, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo Republic, Djibouti, Democratic Republic of Congo, Equatorial Guinea, French Guiana, French Polynesia, Gabon, Gambia, Guinea, Guinea-Bissau, Ivory Coast, Lebanon, Madagascar, Mali, Mauritania, Mauritius, Mayotte, Morocco, New Caledonia, Niger, Reunion, Senegal, Seychelles, Togo, Tunisia, Vanuatu, and Wallis & Futuna** all disputes arising out of this Statement of Limited Warranty or related to its violation or execution, including summary proceedings, will be settled exclusively by the Commercial Court of Paris; 5) in **Russia**, all disputes arising out of or in relation to the interpretation, the violation, the termination, the

nullity of the execution of this Statement of Limited Warranty shall be settled by Arbitration Court of Moscow; 6) **in South Africa, Namibia, Lesotho and Swaziland**, both of us agree to submit all disputes relating to this Statement of Limited Warranty to the jurisdiction of the High Court in Johannesburg; 7) **in Turkey** all disputes arising out of or in connection with this Statement of Limited Warranty shall be resolved by the Istanbul Central (Sultanahmet) Courts and Execution Directorates of Istanbul, the Republic of Turkey; 8) in each of the following specified countries, any legal claim arising out of this Statement of Limited Warranty will be brought before, and settled exclusively by, the competent court of a) Athens for **Greece**, b) Tel Aviv-Jaffa for **Israel**, c) Milan for **Italy**, d) Lisbon for **Portugal**, and e) Madrid for **Spain**; and 9) **in the United Kingdom**, both of us agree to submit all disputes relating to this Statement of Limited Warranty to the jurisdiction of the English courts.

Arbitration: *The following is added under this heading:*

In Albania, Armenia, Azerbaijan, Belarus, Bosnia-Herzegovina, Bulgaria, Croatia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, FYR Macedonia, Moldova, Poland, Romania, Russia, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, and FR Yugoslavia all disputes arising out of this Statement of Limited Warranty or related to its violation, termination or nullity will be finally settled under the Rules of Arbitration and Conciliation of the International Arbitral Center of the Federal Economic Chamber in Vienna (Vienna Rules) by three arbitrators appointed in accordance with these rules. The arbitration will be held in Vienna, Austria, and the official language of the proceedings will be English. The decision of the arbitrators will be final and binding upon both parties. Therefore, pursuant to paragraph 598 (2) of the Austrian Code of Civil Procedure, the parties expressly waive the application of paragraph 595 (1) figure 7 of the Code. IBM may, however, institute proceedings in a competent court in the country of installation.

In Estonia, Latvia and Lithuania all disputes arising in connection with this Statement of Limited Warranty will be finally settled in arbitration that will be held in Helsinki, Finland in accordance with the arbitration laws of Finland then in effect. Each party will appoint one arbitrator. The arbitrators will then jointly appoint the chairman. If arbitrators cannot agree on the chairman, then the Central Chamber of Commerce in Helsinki will appoint the chairman.

EUROPEAN UNION (EU)

THE FOLLOWING TERMS APPLY TO ALL EU COUNTRIES:

Consumers have legal rights under applicable national legislation governing the sale of consumer goods. Such rights are not affected by the warranties provided in this Statement of Limited Warranty.

How to Obtain Warranty Service: *The following is added to this section:*

To obtain warranty service from IBM in EU countries, see the telephone listing in Part 3 - Warranty Information.

You may contact IBM at the following address:

IBM Warranty & Service Quality Dept.

PO Box 30

Spango Valley

Greenock

Scotland PA 16 OAH

**AUSTRIA, DENMARK, FINLAND, GREECE, ITALY, NETHERLANDS,
PORTUGAL, SPAIN, SWEDEN AND SWITZERLAND**

Limitation of Liability: *The following replaces the terms of this section in its entirety:*

Except as otherwise provided by mandatory law:

1. IBM's liability for any damages and losses that may arise as a consequence of the fulfillment of its obligations under or in connection with this Statement of Limited Warranty or due to any other cause related to this Statement of Limited Warranty is limited to the compensation of only those damages and losses proved and actually arising as an immediate and direct consequence of the non-fulfillment of such obligations (if IBM is at fault) or of such cause, for a maximum amount equal to the charges you paid for the Machine. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code ("LIC").

The above limitation shall not apply to damages for bodily injuries (including death) and damages to real property and tangible personal property for which IBM is legally liable.

2. **UNDER NO CIRCUMSTANCES IS IBM, ITS SUPPLIERS OR RESELLERS LIABLE FOR ANY OF THE FOLLOWING, EVEN IF INFORMED OF THEIR POSSIBILITY: 1) LOSS OF, OR DAMAGE TO, DATA; 2) INCIDENTAL OR INDIRECT DAMAGES, OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; 3) LOST PROFITS, EVEN IF THEY ARISE AS AN IMMEDIATE CONSEQUENCE OF THE EVENT THAT GENERATED THE DAMAGES; OR 4) LOSS OF BUSINESS, REVENUE, GOODWILL, OR ANTICIPATED SAVINGS.**

FRANCE AND BELGIUM

Limitation of Liability: *The following replaces the terms of this section in its entirety:*

Except as otherwise provided by mandatory law:

1. IBM's liability for any damages and losses that may arise as a consequence of the fulfillment of its obligations under or in connection with this Statement of Limited Warranty is limited to the compensation of only those damages and losses proved and actually arising as an immediate and direct consequence of the non-fulfillment of such obligations (if IBM is at fault), for a maximum amount equal to the charges you paid for the Machine that has caused the damages. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code ("LIC").

The above limitation shall not apply to damages for bodily injuries (including death) and damages to real property and tangible personal property for which IBM is legally liable.

2. **UNDER NO CIRCUMSTANCES IS IBM, ITS SUPPLIERS OR RESELLERS LIABLE FOR ANY OF THE FOLLOWING, EVEN IF INFORMED OF THEIR POSSIBILITY: 1) LOSS OF, OR DAMAGE TO, DATA; 2) INCIDENTAL OR INDIRECT DAMAGES, OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; 3) LOST PROFITS, EVEN IF THEY ARISE AS AN IMMEDIATE**

CONSEQUENCE OF THE EVENT THAT GENERATED THE DAMAGES;
OR 4) LOSS OF BUSINESS, REVENUE, GOODWILL, OR ANTICIPATED
SAVINGS.

THE FOLLOWING TERMS APPLY TO THE COUNTRY SPECIFIED:

AUSTRIA

What this Warranty Covers: *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 12 months from the date of delivery. The limitation period for consumers in action for breach of warranty is the statutory period as a minimum. 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.

The second paragraph does not apply.

What IBM Will Do to Correct Problems: *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 (LIC).

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

What this Warranty Covers: *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 twelve 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.

The second paragraph does not apply.

What IBM Will Do to Correct Problems: *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.

HUNGARY

Limitation of Liability: *The following is added at the end of this section:*

The limitation and exclusion specified herein shall not apply to liability for a breach of contract damaging life, physical well-being, or health that has been caused intentionally, by gross negligence, or by a criminal act.

The parties accept the limitations of liability as valid provisions and state that the Section 314.(2) of the Hungarian Civil Code applies as the acquisition price as well as other advantages arising out of the present Statement of Limited Warranty balance this limitation of liability.

IRELAND

What this Warranty Covers: *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 the terms of this section in its entirety:*

For the purposes of this section, a "Default" means any act, statement, omission, or negligence on the part of IBM in connection with, or in relation to, the subject matter of this Statement of Limited Warranty in respect of which IBM is legally liable to you, whether in contract or tort. A number of Defaults which together result in, or contribute to, substantially the same loss or damage will be treated as one Default occurring on the date of occurrence of the last such Default.

Circumstances may arise where, because of a Default, you are entitled to recover damages from IBM.

This section sets out the extent of IBM's liability and your sole remedy.

1. IBM will accept unlimited liability for death or personal injury caused by the negligence of IBM.
2. Subject always to the Items for Which IBM is Not Liable below, IBM will accept unlimited liability for physical damage to your tangible property resulting from the negligence of IBM.
3. Except as provided in items 1 and 2 above, IBM's entire liability for actual damages for any one Default will not in any event exceed the greater of 1) EUR 125,000, or 2) 125% of the amount you paid for the Machine directly relating to the Default.

Items for Which IBM is Not Liable

Save with respect to any liability referred to in item 1 above, under no circumstances is IBM, its suppliers or resellers liable for any of the following, even if IBM or they were informed of the possibility of such losses:

1. loss of, or damage to, data;
2. special, indirect, or consequential loss; or
3. loss of profits, business, revenue, goodwill, or anticipated savings.

SLOVAKIA

Limitation of Liability: *The following is added to the end of the last paragraph:*

The limitations apply to the extent they are not prohibited under §§ 373-386 of the Slovak Commercial Code.

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 the terms of this section in its entirety:*

For the purposes of this section, a "Default" means any act, statement, omission, or negligence on the part of IBM in connection with, or in relation to, the subject matter of this Statement of Limited Warranty in respect of which IBM is legally

liable to you, whether in contract or tort. A number of Defaults which together result in, or contribute to, substantially the same loss or damage will be treated as one Default.

Circumstances may arise where, because of a Default, you are entitled to recover damages from IBM.

This section sets out the extent of IBM's liability and your sole remedy.

1. IBM will accept unlimited liability for:
 - a. death or personal injury caused by the negligence of IBM; and
 - b. any breach of its obligations implied by Section 12 of the Sale of Goods Act 1979 or Section 2 of the Supply of Goods and Services Act 1982, or any statutory modification or re-enactment of either such Section.
2. IBM will accept unlimited liability, subject always to the Items for Which IBM is Not Liable below, for physical damage to your tangible property resulting from the negligence of IBM.
3. IBM's entire liability for actual damages for any one Default will not in any event, except as provided in items 1 and 2 above, exceed the greater of 1) Pounds Sterling 75,000, or 2) 125% of the total purchase price payable or the charges for the Machine directly relating to the Default.

These limits also apply to IBM's suppliers and resellers. They state the maximum for which IBM and such suppliers and resellers are collectively responsible.

Items for Which IBM is Not Liable

Save with respect to any liability referred to in item 1 above, under no circumstances is IBM or any of its suppliers or resellers liable for any of the following, even if IBM or they were informed of the possibility of such losses:

1. loss of, or damage to, data;
2. special, indirect, or consequential loss; or
3. loss of profits, business, revenue, goodwill, or anticipated savings.

Part 3 - Warranty Information

This Part 3 provides information regarding the warranty applicable to your Machine, including the warranty period and type of warranty service IBM provides.

Warranty Period

The warranty period may vary by country or region and is specified in the table below. NOTE: "Region" means either Hong Kong or Macau Special Administrative Region of China.

80/160 GB VS160 Internal Tape Drive

Country or Region of Purchase	Warranty Period	Type of Warranty Service
Worldwide	3 years	1

A warranty period of 3 year on parts and 3 year on labor means that IBM provides warranty service without charge for parts and labor during the 3 year warranty period.

Types of Warranty Service

If required, IBM provides repair or exchange service depending on the type of warranty service specified for your Machine in the above table and as described below. Warranty service may be provided by your reseller if approved by IBM to perform warranty service. Scheduling of service will depend upon the time of your call and is subject to parts availability. Service levels are response time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations, additional charges may apply outside IBM's normal service area, contact your local IBM representative or your reseller for country and location specific information.

1. Customer Replaceable Unit ("CRU") Service

IBM will ship CRU parts to you for your replacement. If IBM instructs you to return the replaced CRU, you are responsible for returning it to IBM in accordance with IBM's instructions. If you do not return the defective CRU, if IBM so instructs, within 30 days of your receipt of the replacement CRU, IBM may charge you for the replacement.

2. On-site Service

IBM or your reseller will either repair or exchange the failing Machine at your location and verify its operation. You must provide suitable working area to allow disassembly and reassembly of the IBM Machine. The area must be clean, well lit and suitable for the purpose. **For some Machines, certain repairs may require sending the Machine to an IBM service center.**

3. Courier or Depot Service¹

You will disconnect the failing Machine for collection arranged by IBM. IBM will provide you with a shipping container for you to return your Machine to a designated service center. A courier will pick up your Machine and deliver it to the designated service center. Following its repair or exchange, IBM will arrange the return delivery of the Machine to your location. You are responsible for its installation and verification.

4. Customer Carry-In or Mail-In Service

You will deliver or mail as IBM specifies (prepaid unless IBM specifies otherwise) the failing Machine suitably packaged to a location IBM designates. After IBM has repaired or exchanged the Machine, IBM will make it available for your collection or, for Mail-in Service, IBM will return it to you at IBM's expense, unless IBM specifies otherwise. You are responsible for the subsequent installation and verification of the Machine.

The IBM Machine Warranty worldwide web site at http://www.ibm.com/servers/support/machine_warranties/ provides a worldwide overview of IBM's Limited Warranty for Machines, a Glossary of IBM

1. This type of service is called ThinkPad® EasyServ or EasyServ in some countries.

definitions, Frequently Asked Questions (FAQs) and Support by Product (Machine) with links to Product Support pages. **The IBM Statement of Limited Warranty is also available on this site in 29 languages.**

To obtain warranty service contact IBM or your IBM reseller. In Canada or the United States, call 1-800-IBM-SERV (426-7378). For other countries, see the telephone numbers below.

Phone numbers are subject to change without notice. For the latest phone number list, go to www-3.ibm.com/pc/support/site.wss/ and click **Support Phone List**.

Country or Region	Telephone Number	Country or Region	Telephone Number
Argentina	0800-666-0011	Malaysia	03-7727-7800
Australia	1300-130-426	Mexico	001-866-434-2080
Austria	01-24592-5901	Netherlands	020-514-5770
Belgium	Dutch 02-210-9820 French 02-210-9800	New Zealand	0800-446-149
Bolivia	0800-0189	Norway	66 81 11 00
Brazil	55-11-3889-8986	Peru	0-800-50-866
Canada	1-800-565-3344 Toronto 416-383-3344	Philippines	632-995-2225
Chile	800-224-488	Portugal	21-791 51 47
China (PRC)	800-810-1818	Russia	095-940-2000
China (Hong Kong S.A.R.)	852-2825-7799	Singapore	1800-840-9911
Columbia	980-912-3021	Spain	91-662 49 16
Denmark	45 20 82 00	Sweden	08-477 4420
Ecuador	1-800-426911 (option #4)	Switzerland	058-333-09-00
Finland	09-459 69 60	Taiwan	886-2-2725-9799
France	02 38 55 74 50	Thailand	66-2-273-4000
Germany	07032-1549 201	Turkey	00-800-446-32-041
Indonesia	021-523-8535	United Kingdom	0-1475-555 055
Ireland	01-815-9202	United States	1-800-426-7378
Italy	02-7031-6101	Uruguay	000-411-005-6649
Japan	Consumer customers 0120-887-870 Business customers 0120-887-874	Venezuela	0-800-100-2011
Luxembourg	298-977 5063	Vietnam	848-8295-160

Appendix D. Notices

IBM may not offer the products, services, or features discussed in this document in all 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.

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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.

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ThinkPad
xSeries

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

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

Electronic emission notices

80/160 GB VS160 Internal Tape Drive

Federal Communications Commission (FCC) statement

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

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

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

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

 Tested To Comply
With FCC Standards
FOR HOME OR OFFICE USE

Industry Canada Class B emission compliance statement

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

Avis de conformite a la reglementation d'Industrie Canada

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

Deutsche EMV-Direktive (electromagnetische Verträglichkeit)

Zulassungbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) vom 30. August 1995 (bzw. der EMC EG Richtlinie 89/336):

Dieses Gerät ist berechtigt in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen. Verantwortlich für die Konformitätserklärung nach Paragraph 5 des EMVG ist die:

IBM Deutschland Informationssysteme GmbH, 70548 Stuttgart.

Informationen in Hinsicht EMVG Paragraph 3 Abs. (2) 2:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024:1998 und EN 55022:1998 Klasse B.
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EN 55022 Hinweis:

“Wird dieses Gerät in einer industriellen Umgebung betrieben (wie in EN 55022:B festgelegt), dann kann es dabei eventuell gestört werden. In solch einem FA11 ist der Abstand bzw. die Abschirmung zu der industriellen Störquelle zu vergrößern.”

Anmerkung:

Um die Einhaltung des EMVG sicherzustellen sind die Geräte, wie in den IBM Handbüchern angegeben, zu installieren und zu betreiben.

European Union - emission directive

This product is in conformity with the protection requirements of EU Council Directive 89/336/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 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 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 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 della 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.

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Part Number: 71P9128

Printed in USA

(1P) P/N: 71P9128

