

IBM Tape Storage Products



# Problem Determination and Service Guide



IBM Tape Storage Products



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**Note:**

Before using this information and the products it supports, read the general information in Appendix B, "Notices," on page 31.

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## Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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)。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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 ασφαλείας (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.

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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

---

## Guidelines for trained service technicians

This section contains information for trained service technicians.

### Inspecting for unsafe conditions

Use the information in this section to help you identify potential unsafe conditions in an IBM product that you are working on. Each IBM product, as it was designed and manufactured, has required safety items to protect users and service technicians from injury. The information in this section addresses only those items. Use good judgment to identify potential unsafe conditions that might be caused by non-IBM alterations or attachment of non-IBM features or options that are not addressed in this section. If you identify an unsafe condition, you must determine how serious the hazard is and whether you must correct the problem before you work on the product.

Consider the following conditions and the safety hazards that they present:

- Electrical hazards, especially primary power. Primary voltage on the frame can cause serious or fatal electrical shock.
- Explosive hazards, such as a damaged CRT face or a bulging capacitor.
- Mechanical hazards, such as loose or missing hardware.

To inspect the product for potential unsafe conditions, complete the following steps:

1. Make sure that the power is off and the power cords are disconnected.
2. Make sure that the exterior cover is not damaged, loose, or broken, and observe any sharp edges.
3. Check the power cords:
  - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
  - Make sure that the power cords are the correct type.
  - Make sure that the insulation is not frayed or worn.
4. Remove the cover.
5. Check for any obvious non-IBM alterations. Use good judgment as to the safety of any non-IBM alterations.
6. Check inside the computer for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

### Guidelines for servicing electrical equipment

Observe the following guidelines when you service electrical equipment:

- Check the area for electrical hazards such as moist floors, nongrounded power extension cords, and missing safety grounds.
- Use only approved tools and test equipment. Some hand tools have handles that are covered with a soft material that does not provide insulation from live electrical current.
- Regularly inspect and maintain your electrical hand tools for safe operational condition. Do not use worn or broken tools or testers.



- Do not touch the reflective surface of a dental mirror to a live electrical circuit. The surface is conductive and can cause personal injury or equipment damage if it touches a live electrical circuit.
- Some rubber floor mats contain small conductive fibers to decrease electrostatic discharge. Do not use this type of mat to protect yourself from electrical shock.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Locate the emergency power-off (EPO) switch, disconnecting switch, or electrical outlet so that you can turn off the power quickly in the event of an electrical accident.
- Disconnect all power before you perform a mechanical inspection, work near power supplies, or remove or install main units.
- Before you work on the equipment, disconnect the power cord. If you cannot disconnect the power cord, have the customer power-off the wall box that supplies power to the equipment and lock the wall box in the off position.
- Never assume that power has been disconnected from a circuit. Check it to make sure that it has been disconnected.
- If you have to work on equipment that has exposed electrical circuits, observe the following precautions:
  - Make sure that another person who is familiar with the power-off controls is near you and is available to turn off the power if necessary.
  - When you are working with powered-on electrical equipment, use only one hand. Keep the other hand in your pocket or behind your back to avoid creating a complete circuit that could cause an electrical shock.
  - When you use a tester, set the controls correctly and use the approved probe leads and accessories for that tester.
  - Stand on a suitable rubber mat to insulate you from grounds such as metal floor strips and equipment frames.
- Use extreme care when you measure high voltages.
- To ensure proper grounding of components such as power supplies, pumps, blowers, fans, and motor generators, do not service these components outside of their normal operating locations.
- If an electrical accident occurs, use caution, turn off the power, and send another person to get medical aid.

---

## Safety statements

### Important:

Each caution and danger statement in this documentation is labeled with a number. This number is used to cross reference an English-language caution or danger statement with translated versions of the caution or danger statement in the *Safety Information* document.

For example, if a caution statement is labeled "Statement 1," translations for that caution statement are in the *Safety Information* document under "Statement 1."

Be sure to read all caution and danger statements in this documentation before you perform the procedures. Read any additional safety information that comes with your computer or optional device before you install the device.

### Statement 1:



## DANGER

Electrical current from power, telephone, and communication cables is hazardous.

### To avoid a shock hazard:

- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- Connect all power cords to a properly wired and grounded electrical outlet.
- Connect to properly wired outlets any equipment that will be attached to this product.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.

### To Connect:

1. Turn everything OFF.
2. First, attach all cables to devices.
3. Attach signal cables to connectors.
4. Attach power cords to outlet.
5. Turn device ON.

### To Disconnect:

1. Turn everything OFF.
2. First, remove power cords from outlet.
3. Remove signal cables from connectors.
4. Remove all cables from devices.

**Statement 2:**



**CAUTION:**

When replacing the lithium battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

*Do not:*

- Throw or immerse into water
- Heat to more than 100°C (212°F)
- Repair or disassemble

Dispose of the battery as required by local ordinances or regulations.

**Statement 3:**



**CAUTION:**

When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:

- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.



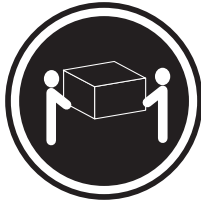
**DANGER**

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

Class 1 Laser Product  
Laser Klasse 1  
Laser Klass 1  
Luokan 1 Laserlaite  
Appareil À Laser de Classe 1

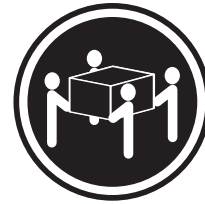
**Statement 4:**



≥ 18 kg (39.7 lb)



≥ 32 kg (70.5 lb)



≥ 55 kg (121.2 lb)

**CAUTION:**

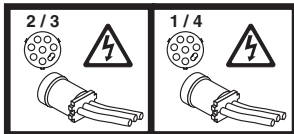
Use safe practices when lifting.

**Statement 5:**



**CAUTION:**

The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



**Statement 8:**



**CAUTION:**

Never remove the cover on a power supply or any part that has the following label attached.



Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

**Statement 12:**



**CAUTION:**

The following label indicates a hot surface nearby.



**Statement 13:**



**DANGER**

Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your device for electrical specifications.

**Statement 20:**



**CAUTION:**

To avoid personal injury, before lifting the unit, remove all the blades to reduce the weight.

**Statement 21:**



**CAUTION:**

Hazardous energy is present when the blade is connected to the power source. Always replace the blade cover before installing the blade.

---

## Chapter 1. Introduction

This *Problem Determination and Service Guide* contains information to help you solve problems that might occur with your IBM® tape drive and tape media. Service personnel and customers can use the information in this document to diagnose problems and solve most common errors and faults. This document is not intended as a comprehensive list of all potential issues. For technical information about specific tape drive and tape media products, see the IBM online resources.

Replaceable components are of three types:

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.
- **Tier 2 customer replaceable unit:** You can install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your computer.
- **Field replacement unit (FRU):** FRUs must be installed only by trained service technicians.

For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document on the IBM *Documentation* CD that comes with your tape storage product.

---

## Finding tape drive hardware information

The *Tape drive support matrix - Servers and IntelliStation* Web page on the IBM Web site displays information about every IBM tape drive, library, and autoloader. The Web page includes the following information:

- Tape drive description
- Tape drive marketing part number
- Tape drive replacement part number
- Alternative tape drive name
- Media cartridge part number
- Cleaning cartridge part number

To view the *Tape drive support matrix - Servers and IntelliStation* online document, go to <http://www-304.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=MIGR-4DRM86&brandind=5000008>, or complete the following steps.

**Note:** Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to <http://www.ibm.com/systems/support/>.
2. Under **Product support**, click **System x**.
3. Under **Support & downloads**, click **Search**.
4. In the **Search for:** field, type tape drive support matrix and click the search icon.
5. In the list of search results, click **Tape drive support matrix - Servers and IntelliStation**.

---

## Finding tape drive firmware information

The *Tape files index - Software for tape drives and libraries* online document displays an index of firmware and device drivers, organized by tape drive. To view the tape files index, go to <https://www-304.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=TAPE-FILES&brandind=5000019>, or complete the following steps.

**Note:** Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to <http://www.ibm.com/systems/support/>.
2. Under **Product support**, click **System x**.
3. Under **Support & downloads**, click **Search**.
4. In the **Search for:** field, type *tape files index* and click the search icon.
5. In the list of search results, click **Tape Files (index) - Software for tape drives and libraries**.

---

## Finding tape backup software name, version, and revision number

To find the name, version, and revision number of most backup software applications, click **Help > About** in the application. See the documentation that comes with the backup software for more information.

---

## Finding troubleshooting information about the tape drive

The *Troubleshooting Tape drive issues* Web page on the IBM Web site displays troubleshooting process for IBM tape drives. To view the *Troubleshooting Tape drive issues* Web page, go to <http://www-304.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=MIGR-50646&brandind=5000008>, or complete the following steps.

**Note:** Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to <http://www.ibm.com/systems/support/>.
2. Under **Product support**, click **System x**.
3. Under **Support & downloads**, click **Search**.
4. In the **Search for:** field, type *troubleshooting tape drive issues* and click the search icon.
5. In the list of search results, click **Troubleshooting Tape drive issues**.

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## Related documentation

In addition to this document, the following related documentation is provided on the IBM Web site.

- *Tape drive customer responsibilities*

Tape drives are mechanical devices that need periodic maintenance and care. Specific actions by you are necessary to ensure reliable tape drive operation. This Web page supplements your tape drive user's guide and is provided as a list to help you obtain the most reliable backups of your data. To view the *Tape drive customer responsibilities* online, go to <http://www-304.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=MIGR-52989&brandind=5000008>, or complete the following steps.



**Note:** Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to <http://www.ibm.com/systems/support/>.
  2. Under **Product support**, click **System x**.
  3. Under **Support & downloads**, click **Search**.
  4. In the **Search for:** field, type *responsibilities* and click the search icon.
  5. In the list of search results, click **Tape drive customer responsibilities - IBM System x**.
- *Recommended tape drive media list*

This document contains a list of the compatible tape media and corresponding part numbers for each IBM tape drive. To view the recommended tape drive media list, go to <http://www-304.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=MIGR-5074910&brandind=5000008>, or complete the following steps.

**Note:** Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to <http://www.ibm.com/systems/support/>.
2. Under **Product support**, click **System x**.
3. Under **Support & downloads**, click **Search**.
4. In the **Search for:** field, type *tape drive* and click the search icon.
5. In the list of search results, click **Recommended tape drive media list - IBM System x**.

For information about IBM system management and tape drive management tools, see the following Web sites.

- *IBM UpdateXpress matrix - Servers*

IBM UpdateXpress can help reduce your cost of computing by providing an effective and simple way to update device drivers, server firmware, and firmware of supported optional devices on most of your System x and BladeCenter products. If you have purchased an IBM server, UpdateXpress is available for download at no additional charge. An UpdateXpress System Pack (UXSP) is a compressed file that contains an integration-tested bundle of online firmware and device drivers for supported System x and BladeCenter servers. To view the Update Xpress matrix online, go to <http://www-304.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=SERV-XPRESS&brandind=5000008>, or complete the following steps.

**Note:** Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to <http://www.ibm.com/systems/support/>.
  2. Under **Product support**, click **System x**.
  3. Under **Support & downloads**, click **Search**.
  4. In the **Search for:** field, type *updatexpress matrix* and click the search icon.
  5. In the list of search results, click **IBM UpdateXpress matrix - Servers**.
- *IBM Dynamic System Analysis (DSA)*
- IBM Dynamic System Analysis (DSA) collects and analyzes system information to aid in diagnosing system problems. To download DSA for your server, go to <http://www-304.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=SERV-DSA&brandind=5000008>, or complete the following steps.

**Note:** Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to <http://www.ibm.com/systems/support/>.
2. Under **Product support**, click **System x**.
3. Under **Support & downloads**, click **Search**.
4. In the **Search for:** field, type software download matrix dsa and click the search icon.
5. In the list of search results, click **Software download matrix - IBM Dynamic System Analysis (DSA)**.

For information about safety and warranty and support, see the following documentation:

- *Safety Information*

This document contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the Safety Information document.

- *Warranty and Support Information*

This document contains information about the terms of the warranty and getting service and assistance.

Additional documentation might be included on the IBM *Documentation* CD that comes with your tape drive product.

Your IBM tape storage product might have features that are not described in the documentation that came with the product. The documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in the tape drive or tape media documentation. These updates are available on the IBM Web site. To check for updated documentation and technical updates, go to <http://www.ibm.com/support/>.

---

## Notices and statements in this document

The caution and danger statements in this document are also in the multilingual *Safety Information* document, which is on the IBM *Documentation* CD. Each statement is numbered for reference to the corresponding statement in your language in the *Safety Information* document.

The following notices and statements are used in this document:

- **Note:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage might occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.

- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.



---

## Chapter 2. Maintenance

Most tape drive problems are caused by improper maintenance. The following conditions are the most common causes of tape drive failures:

- Outdated firmware or device drivers
- Outdated operating system or backup application software
- Dirty tape drive mechanism due to poor maintenance or a dirty environment
- Defective, expired, or mishandled tape media

This chapter describes maintenance activities that will help prevent tape drive failures. If you cannot locate and correct a problem by using the information in this chapter, see Appendix A, “Getting help and technical assistance,” on page 29 for more information.

---

### Preventing tape drive media problems

Defective, expired, or mishandled tape media is a common cause of tape drive problems. Frequent read/write errors are often caused by tape media that needs to be replaced. Do not exceed the expiration date of tape media. Use only high-quality tape media that is compatible with the tape drive. For a list of recommended media, see the *Recommended tape drive media list* online document (for instructions for locating the document, see “Related documentation” on page 2).

Use care when you handle tape media. For more information about handling and storing tape media, see the documentation that comes with the tape media.

---

### Cleaning the tape drive with a cleaning cartridge

Tape drives require frequent cleaning because debris and dust accumulate naturally on the tape mechanism during operation. As dirt and dust accumulate on the tape mechanism over time, the tape drive generates more read/write errors and slower backup performance. Failure to clean the tape drive can cause damage to the tape media or the internal mechanism of the tape drive, and might void the warranty. To find an explanation of customer responsibilities, see the *Tape drive customer responsibilities* online document (for instructions for locating the document, see “Related documentation” on page 2).

Cleaning cartridges have a limited number of uses before they are depleted and must be replaced. When the cleaning cartridge has expired or has been depleted through normal use, it no longer functions. Track the usage of the cleaning cartridge by marking the cartridge or cartridge container each time it is used. When the cleaning cartridge is depleted, replace it with a new one. To purchase additional tape drive cleaning cartridges, order them from the IBM Web site or contact an authorized reseller or marketing representative. For a list of tape media suppliers in your area, go to <http://www.storage.ibm.com/media/distributors/index.html>.

To clean a tape drive by using a cleaning cartridge, complete the following steps:

1. Make sure that you have the correct type of tape cleaning cartridge for the tape drive.
2. Make sure that the cartridge has not expired and is not depleted.
3. Insert the cleaning cartridge in the tape drive.

**Note:** If the cleaning cartridge has expired, is depleted, or is the wrong type for the tape drive, the tape drive immediately ejects the cartridge. After insertion, the cleaning process should begin automatically. The process is complete when the tape drive cleaning cartridge is ejected.

4. If the tape drive has not been cleaned recently or is in a dirty, dusty, or smoky environment, repeat the cleaning process three or more times.

**Note:** For information about how often your tape drive should be cleaned, see “Cleaning frequency and maximum cleaning cartridge usage.”

If you clean the tape drive three or more times and the performance is not improved, additional troubleshooting steps might be required. See “Evaluating the cleanliness of a tape drive environment” on page 9 for more information.

---

## Cleaning frequency and maximum cleaning cartridge usage

Clean your tape drive regularly to minimize errors that are caused by environmental contaminants such as dust, carpet fibers, and airborne debris. If excessive dust or debris from the tape media accumulates on one or more of the tape heads, the drive might not be able to read from or write to tape media. When you use a new data cartridge, clean the drive every 4 hours of tape movement until the tape has been used from beginning to end.

*Table 1. Tape drive cleaning frequency and maximum cleaning cartridge usage*

<b>Tape drive</b>	<b>Cleaning frequency</b>	<b>Maximum cleaning cartridge usage</b>
DDS-1, DDS-2, or DDS-3	Clean every 25 hours of operation	30 cleanings
DDS-4, DDS Gen 5 (DAT72)	Clean when the cleaning LED is lit	30 cleanings
Travan 40 (TR7), NS20 (TR5)	Clean every week if the tape drive operates for more than three hours a day	30 cleanings
20/40 GB DLT	Clean when you are prompted by the tape drive	20 cleanings
20/40 GB Mammoth	Clean every 30 hours of operation, or once a month	18 cleanings
35/70 GB DLT	Clean when you are prompted by the tape drive	20 cleanings
40/80 GB DLT	Clean when you are prompted by the tape drive	20 cleanings
40/80 GB DLTVS80	Clean when you are prompted by the tape drive	20 cleanings
60/120 GB Mammoth 2	Clean every 100 hours and when you exceed soft-error thresholds	18 cleanings
60/120 GB VXA-2	Clean when the cleaning LED is lit	80 cleanings
80/160 GB DLTVS160	Clean when the cleaning LED is lit	20 cleanings
100/200 GB HH LTO	Clean when the cleaning LED is lit	50 cleanings

Table 1. Tape drive cleaning frequency and maximum cleaning cartridge usage (continued)

Tape drive	Cleaning frequency	Maximum cleaning cartridge usage
100/200 GB FH LTO	Clean once a week if the tape drive is used daily	50 cleanings
110/220 GB SDLT	Clean when you are prompted by the tape drive	20 cleanings
160/320 GB SDLT	Clean when you are prompted by the tape drive	20 cleanings
200/400 GB FH LTO	Clean when you are prompted by the tape drive	50 cleanings
3502 DLT autoloader	Clean when you are prompted by the tape drive	20 cleanings
3600 LTO autoloader or library	Clean when you are prompted by the tape drive	20 cleanings
3607-16X SDLT autoloader	Clean when you are prompted by the tape drive	20 cleanings
3607-26X LTO autoloader	Clean when you are prompted by the tape drive	50 cleanings
3623-2SX SDLT autoloader	Clean when you are prompted by the tape drive	20 cleanings
3623-2LX LTO autoloader	Clean when you are prompted by the tape drive	50 cleanings
4560 SDLT tape library	Clean when you are prompted by the tape drive	20 cleanings
4560 LTO tape library	Clean when you are prompted by the tape drive	50 cleanings
3361 4U Universal LTO tape library	Clean when you are prompted by the tape drive	50 cleanings
3362 2U Universal LTO tape autoloader	Clean when you are prompted by the tape drive	50 cleanings

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## Evaluating the cleanliness of a tape drive environment

Tape drives are sensitive to dirty, dusty, and smoky environmental conditions. A tape drive in an environment with substantial particulate matter in the air has more performance problems. If one or more of the conditions in the following list describe your tape drive, the tape drive environment might be too dirty:

- The tape drive requires cleaning more frequently than the suggested cleaning schedule.
- The tape drive is on or near the floor. A tape drive on or near the floor is more likely to accumulate dust and debris. If the tape drive is on the floor, move it to a table-top level.
- The tape drive is near a photocopier, printer, or paper shredder. Toner dust and paper fibers can contaminate the tape drive. If the tape drive is near one of these devices, move the tape drive to a better location. If moving the tape drive or device is impractical, you must clean the tape drive more frequently to maintain optimal performance.

- The tape drive bezel is damaged or missing. If the bezel on the front of the tape drive is not intact, the tape drive internal components accumulate more dust and debris. If the bezel is damaged or missing, contact an IBM technical-support representative for a replacement bezel.

If the tape drive location is dirty, dusty, or smoky, move the tape drive to a cleaner environment. For more information about cleaning a tape drive, see “Cleaning the tape drive with a cleaning cartridge” on page 7.

**Note:** Damage to the tape drive that is caused by a dirty operating environment is not covered by the tape drive or server warranty. The tape drive will not be replaced if the device has been in a dirty environment.

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## Updating the tape drive firmware and device drivers

It is important to make sure that the tape drive has the most current levels of firmware and device drivers. Establishing maintenance windows, system architecture, and change methodologies that are suitable to a chosen availability level are essential to system planning and administration. Current firmware and device drivers optimize the availability of the tape drive. You can solve many tape drive problems by updating the firmware and the device drivers.

**Attention:** Remove any tape media from the tape drive before you update the firmware or device drivers. Do not disconnect the power while you update the firmware or device drivers. The loss of power before the update process is finished might disrupt the update process or damage the tape drive.

**Note:** You must have Internet access to download firmware and device driver updates.

Update the firmware or device drivers by using IBM UpdateXpress or by downloading the files from the IBM Web site. For more information about UpdateXpress, see the *IBM UpdateXpress matrix* online document (for instructions for locating the document, see “Related documentation” on page 2). To download firmware or device drivers from the IBM Web site, complete the following steps.

**Note:** Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to <https://www-304.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=TAPE-FILES&brandind=5000019>, or complete the following steps:
  - a. Go to <http://www.ibm.com/systems/support/>.
  - b. Under **Product support**, click **System x**.
  - c. Under **Support & downloads**, click **Search**.
  - d. In the **Search for:** field, type `tape files index` and click the search icon.
  - e. In the list of search results, click **Tape files (index) - Software for tape drives and libraries**.
2. Find the applicable tape drive and operating system in the table, and download the firmware or device drivers.
3. Follow the installation instructions that are provided with the files and install the firmware or device drivers.



**Note:** If you have an external tape drive, you might have to restart the server after you update the firmware or device drivers. Failure to restart the server might result in backup software application errors.

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## Replacing a tape drive

If the tape drive is damaged or becomes defective, it must be replaced. Before you replace the tape drive, complete the following steps to make sure that the problem is not related to basic maintenance:

1. Make sure that the tape drive firmware and device drivers are current.
2. Make sure that the operating system and backup application software are current.
3. Complete the tape drive cleaning process three times.
4. Make sure that the tape drive media is of good quality and is compatible with the tape drive.
5. Run the tape drive internal diagnostic test and check for errors.
6. If the problem remains with the tape drive, contact an IBM technical-support representative.



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## Chapter 3. Diagnostics

This chapter describes the diagnostic tools that are available to help you solve problems that might occur with the tape drive or tape media. If you cannot locate and correct a problem by using the information in this chapter, see Appendix A, “Getting help and technical assistance,” on page 29 for more information.

The following conditions are the most common causes of tape drive failures:

- Outdated firmware or device drivers
- Outdated operating system or backup application software
- Dirty tape drive mechanism due to poor maintenance or a dirty environment
- Defective, expired, or mishandled tape media

To achieve the optimal data backup process, follow these general guidelines:

- Make sure that your tape drive is installed correctly in the cleanest possible environment.
- Use high-quality media and cleaning cartridges.
- Clean the tape drive on a regular basis.
- Store and handle your media properly.

To perform a basic diagnostic evaluation of the tape drive, complete the following steps:

1. Make sure that the firmware on the tape drive is at the current level (for more information, see the documentation that comes with the tape drive).
2. Try new tape media. The old tape media might be damaged or expired.
3. See whether the cleaning LED is lit. If it is lit, clean the tape drive with a cleaning cartridge at least three times.
4. Make sure that the backup software application is installed and configured correctly (for more information, see the documentation that comes with the backup software application).

If the tape drive stops functioning because of a component failure within the covered warranty or maintenance time period, IBM will replace the tape drive. IBM will replace any defective tape drive that meets the terms and conditions of the IBM warranty or service agreement. If a problem with the tape drive is not solved by following the guidelines in this document, an IBM technical-support representative will work with you to identify the cause and solution of the problem. If the source of the tape problem is identified as customer misuse, IBM might charge you for the service time and materials.

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### Diagnostic tools

The following tools are available to help you diagnose and solve tape drive problems:

- **Troubleshooting tables**

These tables list problem symptoms and actions to correct the problems. See “Troubleshooting tables” on page 15 for more information. The following troubleshooting tables are included in this section:

- “Tape media problems” on page 15
- “Tape drive problems” on page 17
- “Host bus adapter problems” on page 20

- “Windows Event IDs” on page 23
- “Backup software application problems” on page 24
- “Operating-system problems” on page 25
- **IBM Dynamic System Analysis (DSA)**

IBM DSA is a software application that collects and analyzes information about the server, tape drive, operating system, and software to aid in diagnosing problems.
- **Internal and external tape drive tests**

Most IBM tape drives can run other diagnostic tests. The internal and external diagnostic tests are described in these two sections:

  - “Running an internal tape drive test” on page 26
  - “Running an external tape drive test” on page 27

## Troubleshooting tables

Use the troubleshooting tables to find solutions to problems that have identifiable symptoms. If you cannot find a problem in these tables, see the documentation that comes with your tape drive or System x server.

If you have just added a new tape drive and either the tape drive or server is not working, complete the following steps before you use the troubleshooting tables:

1. Remove the tape drive that you just added.
2. Restart the server to determine whether the server is working correctly.
3. Reinstall the new tape drive.

## Tape media problems


Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.	
Symptom	Action
The tape media in the tape drive is stuck.	<ol style="list-style-type: none"> <li>1. Press the eject button on the tape drive. <b>Note:</b> Some tape drives need more than a few seconds to eject tape media. Most tape drives have an LED display that indicates tape drive activity. If the LED is lit or flashing, the tape drive is responding. Allow adequate time for the drive to eject the media before you assume that the media is stuck or that the drive is malfunctioning.</li> <li>2. If the tape media will not eject and it appears to be stuck in the drive, see the documentation that comes with the tape drive for information about manual tape media ejection. <b>Note:</b> Some tape devices do not have a manual-ejection function. If the tape drive does not have this function, contact your IBM technical-support representative for further assistance.</li> <li>3. If the tape media will not eject after you perform the manual-ejection procedure, contact your IBM technical-support representative for further assistance.</li> </ol>
The tape drive cannot read/write to the tape media.	<p>Read/write errors are usually caused by expired tape media, incorrect tape media for the tape drive, damaged tape media, or mishandled tape media.</p> <ol style="list-style-type: none"> <li>1. Get a new tape media cartridge, verify that it is the correct type for the tape drive, and try to use the new tape cartridge.</li> <li>2. Make sure that the tape media is not write-protected by checking the position of the write-protect tab. If the tape media is write-protected, deactivate write protection and try to use the new tape cartridge. <b>Note:</b> If the tape media is an LTO Generation 3 or higher cartridge, make sure that it is not WORM (write once read many) media. WORM media can be written only once. If the tape is full, you must get new tape media.</li> <li>3. If the write-protect tab is not activated, the problem might be related to the backup software application. Make sure that the backup application has not been configured to secure the media. See the documentation that comes with the backup application or contact the backup application manufacturer for more information. <b>Note:</b> If you contact the backup application manufacturer for support, keep the manufacturer's case number for the problem. The case number might be useful if the case is returned to IBM for further support.</li> <li>4. If the backup application has not been configured to secure the media, make sure that the tape drive firmware and device drivers are current. For more information about updating firmware and device drivers, see "Updating the tape drive firmware and device drivers" on page 10.</li> </ol>

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.

Symptom	Action
<p>The tape drive has an unrecognized media error.</p>	<p><b>Attention:</b> Erasing and reformatting tape media will destroy any data that is currently on the tape media.</p> <ol style="list-style-type: none"> <li>1. An unrecognized media error usually indicates that the media is unformatted or was formatted by a different backup application than the one that is currently being used. Erase the media and reformat it with the current backup application. IBM is not responsible for troubleshooting backup application software errors. For assistance with a backup application, contact the backup application manufacturer. See the documentation that comes with your backup application or contact the backup application manufacturer for more information. <b>Note:</b> If you contact the backup application manufacturer for support, keep the manufacturer's case number for the problem. The case number might be useful if the case is returned to IBM for further support.</li> <li>2. Make sure that the tape media is the correct type for the tape drive. If the tape media is the incorrect type, get the correct type and try again.</li> <li>3. If the tape media is the correct type, it might be expired or damaged. Get new tape media and try again.</li> <li>4. If the problem remains with the new tape media, make sure that the tape drive firmware and device drivers are current. For more information about updating firmware and device drivers, see "Updating the tape drive firmware and device drivers" on page 10.</li> <li>5. If the problem remains with the current firmware and device drivers, run an internal diagnostic test. See "Running an internal tape drive test" on page 26 for more information.</li> </ol>

## Tape drive problems

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.

Symptom	Action
<p>The tape drive power does not turn on.</p>	<p><b>Statement 5:</b></p>  <p><b>CAUTION:</b> The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.</p> <p>Troubleshooting actions differ for external and internal tape drives. If the tape drive is an external drive, complete the following steps:</p> <ol style="list-style-type: none"> <li>1. If the tape drive has a power button, make sure that the tape drive is turned on. See the documentation that comes with the tape drive for more information.</li> <li>2. Make sure that the power cable and data cable are connected to both the enclosure and the server.</li> <li>3. Make sure that the server power is turned on.</li> <li>4. If the power cable and data cables are connected and the tape device power does not turn on, try another electrical outlet.</li> <li>5. If the tape drive power still does not turn on after you try another electrical outlet, try a different power cable.</li> <li>6. If the tape drive continues not to power on, contact your IBM technical-support representative for further assistance.</li> </ol> <p>If the tape drive is an internal drive, complete the following steps:</p> <ol style="list-style-type: none"> <li>1. If the tape drive has a power button, make sure that the tape drive is turned on. See the documentation that comes with the tape drive for more information.</li> <li>2. Remove the server cover and make sure that the data and power cables are attached to both the tape drive and the host bus adapter. See the documentation that comes with your server for more information about working inside the server.</li> <li>3. Contact an IBM technical-support representative for further assistance.</li> </ol>

**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**

Symptom	Action
<p>The tape drive is not communicating with the host server through the Ethernet connection.</p>	<ol style="list-style-type: none"> <li>1. Make sure that the Ethernet cable is connected to the tape drive.</li> <li>2. Check the Ethernet configuration. To check the Ethernet configuration by using the tape drive front panel, complete the following steps:               <ol style="list-style-type: none"> <li>a. If there is a Dynamic Host Configuration Protocol (DHCP) server, make sure that the tape drive is set to DHCP. If it is not set to DHCP, you must configure the tape drive with a unique IP address and subnet mask.</li> <li>b. Check the IP address, subnet mask, and gateway IP to make sure that they are correct.</li> <li>c. Turn off the power and restart the server.                   <p><b>Note:</b> IBM is not responsible for network troubleshooting. Contact your network administrator for further assistance with Ethernet configuration.</p> </li> </ol> </li> <li>3. Try connecting the Ethernet cable to a different Ethernet port.</li> <li>4. Replace the Ethernet cable.</li> <li>5. Make sure that the Ethernet adapter LED on the tape drive is lit and indicates activity. For more information about the Ethernet adapter, see the documentation that comes with the adapter.</li> <li>6. If the problem remains, contact your IBM technical-support representative for further assistance.</li> </ol>
<p>The tape drive operator control panel (OCP) is blank.</p>	<ol style="list-style-type: none"> <li>1. Make sure that the tape drive power cord is connected.</li> <li>2. If the tape drive has a power button, make sure that the power button is turned on.               <p><b>Note:</b> Some tape drives require touch activation to turn on the power. For example, the front panel of the IBM 4560 tape library is a touch-sensitive screen. To turn on the IBM 4560 tape library power, the power switch should be in the On position and you must touch the front panel touch-sensitive screen.</p> </li> <li>3. Turn off the server power and restart the server.</li> <li>4. Update the tape drive device drivers. See “Updating the tape drive firmware and device drivers” on page 10 for more information.</li> <li>5. Update the tape drive firmware. See “Updating the tape drive firmware and device drivers” on page 10 for more information.               <p><b>Note:</b> You must have Internet access to download the current device drivers and firmware.</p> </li> </ol>



**Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.**



Symptom	Action
<p>The tape autoloader or tape library gripper cannot move the tape media. The tape autoloader or tape library displays an error when the gripper moves the tape media.</p>	<p>The gripper is the robotic mechanism in a tape library or autoloader that moves the tape media.</p> <p><b>Attention:</b> Some tape libraries and autoloaders are packaged with a shipping key that protects the device from damage during shipping. The shipping key must be removed before the library or autoloader power is turned on, or damage might occur to the robotics.</p> <ol style="list-style-type: none"> <li>1. Make sure that the shipping key has been removed.</li> <li>2. Make sure that all other internal shipping material has been removed from the tape library or autoloader.</li> <li>3. Make sure that nothing is blocking the gripper and preventing it from moving the tape media.</li> <li>4. Look for a fallen piece of tape media that is blocking the path of the gripper. This might occur when the tape library or autoloader has been moved with tape media in the tape magazines. If you find a piece of tape media, remove it.</li> <li>5. Make sure that the tape library or autoloader is level and has been installed correctly in the rack (if applicable). A tape library or autoloader that has been installed incorrectly or is tilted might prevent the tape media from being seated in the magazine. This might obstruct the motion of the gripper.</li> <li>6. If the tape media has bar code labels, make sure that nothing is blocking the bar code reader.</li> <li>7. Make sure that no debris is blocking the sensors or clogging the gripper track. Debris can cause a tape media movement error. For more information about how to clean the sensors and the gripper track, see the documentation that comes with the tape library or autoloader.</li> <li>8. If the problem remains, contact an IBM technical-support representative for further assistance.</li> </ol>
<p>When you try to clean the tape drive, it ejects the cleaning cartridge, but the cleaning LED remains lit.</p>	<p>Try cleaning the tape drive again with a new, unused cleaning cartridge.</p>
<p>The fault LED is flashing.</p>	<ol style="list-style-type: none"> <li>1. Update the tape drive with the latest firmware (see “Updating the tape drive firmware and device drivers” on page 10 for more information).</li> <li>2. Turn the tape drive power off. Turn the tape drive power back on and try to operate the tape drive.</li> <li>3. Try to operate the tape drive with a new, unused data cartridge.</li> <li>4. Clean the tape drive twice (see “Cleaning the tape drive with a cleaning cartridge” on page 7 for more information), and try to operate the tape drive.</li> <li>5. Call IBM support.</li> </ol>

## Host bus adapter problems


A host bus adapter (HBA) uses a SCSI, SAS/SATA, or USB connection to connect a host server to the tape drive. The following procedures describe how to troubleshoot SCSI bus configuration, SCSI HBA hardware problems, and SAS/SATA bus problems.

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.	
Symptom	Action
The source code of a Windows Event ID indicates a SCSI HBA error, or the SCSI tape drive is not recognized by server.	<p>Many SCSI tape device errors are caused by SCSI hardware settings that are configured incorrectly.</p> <ol style="list-style-type: none"><li>1. Make sure that each device on the SCSI bus has been assigned a unique SCSI ID. <b>Note:</b> If the SCSI tape drive is in an external tape enclosure, make sure that the SCSI ID is not set on both the tape drive and the enclosure. The SCSI ID must be set on either the tape drive or the tape enclosure, but not on both.</li><li>2. If the SCSI ID is unique and the problems remains, check the parameters of the SCSI controller. The SCSI controller must be set to use the default settings. <b>Note:</b> The default setting for multiple logical unit number (LUN) support is disabled. If the SCSI tape drive is a tape library or autoloader, it might require that multiple LUN support be enabled. Check and make a note of the tape library or autoloader multiple LUN support status. You will need this information if the SCSI HBA must be reset. If the tape library or autoloader requires LUN support and the SCSI HBA is reset to the default parameters, you must enable multiple LUN support again.</li><li>3. Update the SCSI HBA with the current device drivers. See “Updating the tape drive firmware and device drivers” on page 10 for more information.</li><li>4. Update the HBA firmware. See “Updating the tape drive firmware and device drivers” on page 10 for more information. <b>Note:</b> You must have Internet access to download the current HBA device drivers and firmware.</li></ol>

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.

Symptom	Action
<p>The SCSI hardware settings are correct, but the SCSI tape drive is not recognized by server.</p>	<p><b>Statement 5:</b></p>   <p><b>CAUTION:</b> The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.</p> <p>The following procedure requires you to remove the server cover and work inside the server. For more information about the server, see the documentation that comes with the server.</p> <ol style="list-style-type: none"> <li>1. Make sure that the SCSI HBA is seated correctly in the server.</li> </ol> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>a. If the SCSI controller has a hot-swap connector, make sure that the latch is closed so that power is supplied to the PCI slot.</li> <li>b. A SCSI tape drive must be on a dedicated SCSI HBA channel with no other SCSI devices.</li> </ol> <ol style="list-style-type: none"> <li>2. Make sure that the SCSI cable is connected correctly and that the SCSI HBA is connected to the beginning of the cable and not at the middle or the end.</li> <li>3. Make sure that the SCSI HBA has been terminated correctly.</li> <li>4. Check the SCSI cable length and make sure that the number of SCSI devices on the bus does not exceed the limits of the SCSI HBA. <b>Note:</b> A SCSI tape drive must be on a dedicated SCSI HBA channel with no other SCSI devices.</li> <li>5. Move the SCSI HBA to another PCI slot.</li> <li>6. Make sure that the SCSI cable part number is the correct type for the SCSI HBA. If it is not, replace the SCSI cable and restart the server.</li> </ol> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>a. All IBM SCSI tape drives use low voltage differential (LVD) SCSI cables. LVD SCSI cables have termination capability. Some older servers might have SCSI cables that are not LVD-compatible and are not supported by LVD tape drives. LVD SCSI cables have a termination mechanism in the cable that performs the termination function at the end of the SCSI bus, and the SCSI HBA performs the termination function at the beginning of the bus.</li> <li>b. Many SCSI tape devices have a termination power jumper. It does not perform the termination on the SCSI bus; it provides power for the termination. It is for single-ended (SE) SCSI busses. If you use the termination power jumper on an LVD SCSI bus, the bus performance is degraded. Most current SCSI controllers provide termination power, but if there are more than four SCSI devices on an SE SCSI bus, a power jumper might be required on the last device on the SCSI bus.</li> </ol>

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.

Symptom	Action
<p>The SAS/SATA HBA does not recognize the tape drive.</p>	<ol style="list-style-type: none"> <li>1. Check the tape drive LED or operator control panel (OCP) for an error message. If there is an LED or OCP error, see the documentation that comes with the server for more information. If there is no LED or OCP error, turn off the server power and restart the server.</li> <li>2. Scan the bus for devices. To scan the bus for devices, complete the following steps:               <ol style="list-style-type: none"> <li>a. During the server POST boot sequence, follow the instructions to open the HBA BIOS utility.</li> <li>b. Use the HBA BIOS utility to scan the bus for devices.</li> </ol> </li> <li>3. Download the current device drivers for the HBA. To update the HBA device drivers, complete the following steps:               <ol style="list-style-type: none"> <li>a. Download the current device drivers from the IBM Web site. See “Updating the tape drive firmware and device drivers” on page 10 for more information.</li> <li>b. Use the HBA BIOS utility to scan the bus for devices.</li> </ol> </li> <li>4. Download the current firmware for the HBA. To update the HBA firmware, complete the following steps:               <ol style="list-style-type: none"> <li>a. Download current firmware from the IBM Web site. See “Updating the tape drive firmware and device drivers” on page 10 for more information.</li> <li>b. Use the HBA BIOS utility to scan the bus for devices.</li> </ol> </li> </ol> <p><b>Statement 5:</b></p> <div style="text-align: center;">  </div> <p><b>CAUTION:</b>  <b>The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.</b></p> <ol style="list-style-type: none"> <li>5. The following procedure requires you to remove the server cover and work inside the server. For more information about the server, see the documentation that comes with your server.               <ol style="list-style-type: none"> <li>a. Remove the server cover.</li> <li>b. Make sure that the SAS/SATA HBA is seated correctly in the server.</li> <li>c. Make sure that the SAS/SATA cable is connected correctly.</li> </ol> </li> <li>6. If the problem remains, contact an IBM technical-support representative for further assistance.</li> </ol>

## Windows Event IDs

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.	
Symptom	Action
Windows Event ID 5	<p>Windows Event ID 5 indicates a data parity error that is caused by either the SCSI tape drive or the SCSI HBA bus. To determine the source of the error, complete the following steps:</p> <ol style="list-style-type: none"> <li>1. Determine whether the source code for the Windows Event ID 5 comes from the SCSI controller device driver or from the backup application device driver.</li> <li>2. If the source of the error is the backup application device driver, update the tape drive firmware. See “Updating the tape drive firmware and device drivers” on page 10 for more information. <b>Note:</b> You must have Internet access to download the current HBA firmware.</li> <li>3. If the source of the error is the SCSI HBA drive, see the SCSI bus and SCSI hardware procedures in “Host bus adapter problems” on page 20.</li> <li>4. If the problem remains, see “Running an internal tape drive test” on page 26.</li> </ol>
Windows Event ID 7	<p>Windows Event ID 7 indicates bad data blocks. These errors have several possible causes:</p> <ol style="list-style-type: none"> <li>1. Host connectivity failure</li> <li>2. A faulty device driver</li> <li>3. Outdated firmware</li> <li>4. Dirty read/write heads on the tape drive</li> <li>5. Faulty media</li> </ol> <p>To determine the source of the error, complete the following steps:</p> <ol style="list-style-type: none"> <li>1. Determine whether the source code for the Windows Event ID 7 comes from the SCSI controller device driver or from the backup application device driver.</li> <li>2. If the source of the error is the backup application device driver, update the tape drive firmware. See “Updating the tape drive firmware and device drivers” on page 10 for more information. <b>Note:</b> You must have Internet access to download the current HBA firmware.</li> <li>3. If the source of the error is the SCSI HBA drive, see the SCSI bus and SCSI hardware procedures in “Host bus adapter problems” on page 20.</li> <li>4. If the problem remains, see “Running an internal tape drive test” on page 26.</li> </ol>
Windows Event ID 9	<p>Windows Event ID 9 indicates that a device did not respond within the time-out period.</p> <ol style="list-style-type: none"> <li>1. Make sure that the SCSI controller has the latest driver installed.</li> <li>2. Make sure that the tape drive has the latest firmware and driver installed (see “Updating the tape drive firmware and device drivers” on page 10 for more information).</li> <li>3. Check the cable and the terminator. Unplug the cable and make sure the pins are not bent. Reconnect the cable.</li> </ol>

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.	
Symptom	Action
Windows Event ID 11	<p>Windows Event ID 11 indicates SCSI HBA errors. To determine the source of the error, complete the following steps:</p> <ol style="list-style-type: none"> <li>1. Determine whether the source code for the Windows Event ID 11 comes from the SCSI controller device driver or from the backup application device driver.</li> <li>2. If the source of the error is the backup application device driver, update the tape drive firmware. See “Updating the tape drive firmware and device drivers” on page 10 for more information. <b>Note:</b> You must have Internet access to download the current HBA firmware.</li> <li>3. If the source of the error is the SCSI HBA drive, see the SCSI bus and SCSI hardware procedures in “Host bus adapter problems” on page 20.</li> <li>4. If the problem remains, see “Running an internal tape drive test” on page 26.</li> </ol>
Windows Event ID 15	<p>Windows Event ID 15 indicates that a device is not ready. To determine the source of the error, complete the following steps:</p> <ol style="list-style-type: none"> <li>1. Determine whether the source code for the Windows Event ID 15 comes from the SCSI controller device driver or from the backup application device driver.</li> <li>2. If the source of the error is the backup application device driver, update the tape drive firmware. See “Updating the tape drive firmware and device drivers” on page 10 for more information. <b>Note:</b> You must have Internet access to download the current HBA firmware.</li> <li>3. If the source of the error is the SCSI HBA drive, see the SCSI bus and SCSI hardware procedures in “Host bus adapter problems” on page 20.</li> <li>4. If the problem remains, see “Running an internal tape drive test” on page 26.</li> </ol>

## Backup software application problems

**Note:** IBM does not support backup software applications that are manufactured by independent software vendors.

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.	
Symptom	Action
<p>The backup application does not recognize the tape drive.</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. Some backup applications do not support a tape drive that is attached to a RAID controller. For best performance, use one dedicated HBA for the tape drive.</li> <li>2. IBM tape libraries and autoloaders do not support connection to a RAID HBA.</li> </ol>	<ol style="list-style-type: none"> <li>1. Make sure that the tape drive and any HBAs that are connected to the drive have current firmware and device drivers. For more information about current firmware and device drivers, see “Updating the tape drive firmware and device drivers” on page 10.</li> <li>2. Make sure that the backup application is compatible with the tape drive. See the documentation that comes with the backup application for more information.</li> <li>3. After you confirm that the backup application is compatible with the tape drive, check the application manufacturer Web site for service packs that might have to be installed.</li> <li>4. If the problem remains, contact the software manufacturer for assistance.</li> </ol>

<b>Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</b>	
<b>Symptom</b>	<b>Action</b>
<p>The backup application does not show that the tape media is loaded.</p> <p><b>Note:</b> IBM does not support backup software applications that are manufactured by independent software vendors.</p>	<p>Either the backup application has not sent commands to the tape drive to determine its status, or the backup application display has not been updated.</p> <ol style="list-style-type: none"> <li>1. To verify that the problem is not related to the tape drive hardware, run the read/write test as a part of the internal diagnostic test (see “Running an internal tape drive test” on page 26). If no problem is identified, the problem is not related to the hardware. If a hardware problem is identified, see the applicable section in this document.</li> <li>2. If the problem remains, contact the software manufacturer for assistance.</li> </ol>

## Operating-system problems

<b>Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.</b>	
<b>Symptom</b>	<b>Action</b>
<p>The operating system does not recognize the tape drive.</p>	<ol style="list-style-type: none"> <li>1. Check the tape drive LED or operator control panel (OCP) for an error message. If there is an LED or OCP error, see the documentation that comes with the server for more information.</li> <li>2. If there is no LED or OCP error, update the tape drive firmware and device drivers from the IBM Web site. See “Updating the tape drive firmware and device drivers” on page 10 for more information.</li> <li>3. Use the operating-system device manager to scan for devices.</li> <li>4. If the operating-system device manager does not recognize the tape drive, the problem might be related to the hardware. Run the tape drive internal diagnostic test. See “Running an internal tape drive test” on page 26 for more information.</li> <li>5. If the internal diagnostic test does not identify the problem, run the external tape drive diagnostic test. See “Running an external tape drive test” on page 27 for more information.</li> <li>6. If the problem remains, contact your IBM technical-support representative for further assistance.</li> </ol>

Follow the suggested actions in the order in which they are listed in the Action column until the problem is solved.	
Symptom	Action
When you view the tape drive in Device Manager in Windows 2000 Server Explorer or Windows Server 2003 Explorer, it is not accessible, and the tape drive icon has a red X.	<p>There are four possible reasons for the problem. To troubleshoot the tape drive accessibility, complete the following steps:</p> <ol style="list-style-type: none"> <li>1. The installed device driver is not a Microsoft-compatible device driver. To check the tape drive properties and solve the problem, complete the following steps:               <ol style="list-style-type: none"> <li>a. In Windows Explorer, right-click the <b>My Computer</b> icon and select <b>Manage</b>.</li> <li>b. Click <b>Device Manager</b>.</li> <li>c. Click <b>Tape Drives</b>.</li> <li>d. Right-click the applicable tape drive icon and click <b>Properties</b>.</li> <li>e. Click the <b>Driver</b> tab and verify that the device driver is a Microsoft driver. If it is a Microsoft device driver, skip to step 2.</li> <li>f. If the device driver is not a Microsoft device driver, install the current Windows Server tape device driver from the Windows device driver column on the <i>Tape files index - Software for tape drives and libraries</i> Web page (see "Finding tape drive firmware information" on page 2 for more information).</li> </ol> </li> <li>2. The operating-system options are not configured correctly.               <ul style="list-style-type: none"> <li>• In Windows 2000 Server, right-click the tape drive under <b>Physical Locations</b>. Make sure that the <b>Enable Library</b> check box is selected. If it is selected, go to step 3.</li> <li>• In Windows Server 2003, right-click the tape drive under <b>Libraries</b>. Make sure that the <b>Enable Drive</b> check box is selected.</li> </ul> </li> <li>3. The tape drive is no longer installed in the server. If the tape drive appears to be installed and you do want to use it, go to step 4. If the tape drive is not installed and you do not want to use it, right-click the drive icon and click <b>Delete</b>.</li> <li>4. A new tape drive is installed that has a different drive serial number, but the old tape drive was not deleted. To remove the old tape drive icon, right-click the icon and click <b>Delete</b>.</li> </ol>

---

## Running IBM Dynamic System Analysis

IBM Dynamic System Analysis (DSA) is a software application that collects and analyzes information about the server, tape drive, operating system and software, to aid in diagnosing problems. DSA logs provide server and tape drive information that includes the BIOS level, the tape drive firmware levels, driver levels, installed applications, event error logs, and operating system version. This information is useful because it describes the current status of server and tape drive components. For more information about using DSA, see the documentation that comes with DSA or the *Software download matrix - IBM Dynamic System Analysis (DSA)* online documentation (for instructions for locating the document, see "Related documentation" on page 2).

---

## Running an internal tape drive test

Most tape drives are equipped to perform an internal diagnostic test. The internal test can determine whether an error or fault is caused by the tape drive hardware. See the documentation that comes with your tape drive for instructions for running an internal test. If the internal test indicates a hardware failure, contact your IBM technical-support representative for further assistance.



**Note:** Not every tape drive supports internal diagnostic tests. Internal test capabilities might have been added to some tape drives in the form of a firmware update. See the documentation that comes with your tape drive for more information.

If the tape-drive internal test fails, make sure that the tape drive firmware and device drivers are current. To download current firmware or device drivers, see “Updating the tape drive firmware and device drivers” on page 10.

---

## Running an external tape drive test

External tape drive diagnostic applications provide basic problem determination and help narrow the scope of a problem. Diagnostic results can be used to determine the next step in problem determination. Not all tape drives support external diagnostic applications. If there is a compatible application for your tape drive, it is available for download on the IBM Web site.

**Note:** You must have Internet access to download firmware and device driver updates.

To download a diagnostic application for your tape drive, go to <https://www-304.ibm.com/systems/support/supportsite.wss/docdisplay?Indocid=TAPE-FILES&brandind=5000019>, or complete the following steps.

**Note:** Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.

1. Go to <http://www.ibm.com/systems/support/>.
2. Under **Product support**, click **System x**.
3. Under **Support & downloads**, click **Search**.
4. In the **Search for:** field, type `tape files index` and click the search icon.
5. In the list of search results, click **Tape files (index) - Software for tape drives and libraries**.

---

## Problem determination tips

Because of the variety of hardware and software combinations that you can encounter, use the following information to assist you in problem determination. If possible, have this information available when you request assistance from IBM:

- Tape drive name and model
- Server machine type and model
- Failure symptoms
  - Does the tape drive fail the diagnostic programs? If so, what are the error codes?
  - What occurred? When? Where? Did it occur on a single or multiple tape drives? Did it occur on a single or multiple tape servers?
  - Is the failure repeatable?
  - Has the current tape drive and server configuration ever worked?
  - What changes, if any, were made before it failed?
  - Is this the original reported failure, or has this failure been reported before?
- Diagnostic program type and version level
- Hardware configuration (print the screen with the server summary information)
- BIOS code level
- Operating-system type and version level

You can solve some problems by comparing the configuration and software setups between working and nonworking tape drives and servers. When you compare server and tape drive configurations to each other for diagnostic purposes, consider them identical only if all the following factors are exactly the same in all the tape drives and servers:

- Tape drive name and model
- Machine type and model
- BIOS code level
- Adapters and attachments, in the same locations
- Address jumpers, terminators, and cabling
- Software versions and release levels
- Diagnostic programs type and version level
- Configuration option settings
- Operating-system control-file setup

See Appendix A, “Getting help and technical assistance,” on page 29 for information about calling IBM for service.

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## Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This section contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your system, and whom to call for service, if it is necessary.

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### Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Problem Determination and Service Guide* on the *IBM Documentation CD* that comes with your system.
- Go to the IBM support Web site at <http://www.ibm.com/systems/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the documentation that is provided with your IBM product. The documentation that comes with IBM systems also describes the diagnostic tests that you can perform. Most systems, operating systems, and programs come with documentation that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

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### Using the documentation

Information about your IBM system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to <http://www.ibm.com/systems/support/> and follow the instructions. Also, some documents are available through the IBM Publications Center at <http://www.ibm.com/shop/publications/order/>.

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### Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM systems, optional devices, services, and support. The address for IBM System x™ and xSeries® information is <http://www.ibm.com/systems/x/>. The address for IBM BladeCenter® information is <http://www.ibm.com/systems/bladecenter/>. The address for IBM IntelliStation® information is <http://www.ibm.com/intellistation/>.

You can find service information for IBM systems and optional devices at <http://www.ibm.com/systems/support/>.

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## Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with System x and xSeries servers, BladeCenter products, IntelliStation workstations, and appliances. For information about which products are supported by Support Line in your country or region, see <http://www.ibm.com/services/sl/products/>.

For more information about Support Line and other IBM services, see <http://www.ibm.com/services/>, or see <http://www.ibm.com/planetwide/> for support telephone numbers. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

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## Hardware service and support

You can receive hardware service through your IBM reseller or IBM Services. To locate a reseller authorized by IBM to provide warranty service, go to <http://www.ibm.com/partnerworld/> and click **Find a Business Partner** on the right side of the page. For IBM support telephone numbers, see <http://www.ibm.com/planetwide/>. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.

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## IBM Taiwan product service

台灣 IBM 產品服務聯絡方式：  
台灣國際商業機器股份有限公司  
台北市松仁路7號3樓  
電話：0800-016-888

IBM Taiwan product service contact information:  
IBM Taiwan Corporation  
3F, No 7, Song Ren Rd.  
Taipei, Taiwan  
Telephone: 0800-016-888

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## Appendix B. Notices

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UNIX is a registered trademark of The Open Group in the United States and other countries.

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





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## Appendix D. Important notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard disk drive bays with the largest currently supported drives that are available from IBM.

Maximum memory might require replacement of the standard memory with an optional memory module.

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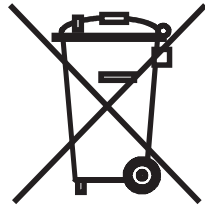
Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.



## Appendix E. Product recycling and disposal

This unit must be recycled or discarded according to applicable local and national regulations. IBM encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. IBM offers a variety of product return programs and services in several countries to assist equipment owners in recycling their IT products. Information on IBM product recycling offerings can be found on IBM's Internet sites at <http://www.ibm.com/ibm/recycle/us/index.shtml> and <http://www.ibm.com/ibm/environment/products/index.shtml>.

Esta unidad debe reciclarse o desecharse de acuerdo con lo establecido en la normativa nacional o local aplicable. IBM recomienda a los propietarios de equipos de tecnología de la información (TI) que reciclen responsablemente sus equipos cuando éstos ya no les sean útiles. IBM dispone de una serie de programas y servicios de devolución de productos en varios países, a fin de ayudar a los propietarios de equipos a reciclar sus productos de TI. Se puede encontrar información sobre las ofertas de reciclado de productos de IBM en el sitio web de IBM <http://www.ibm.com/ibm/recycle/us/index.shtml> y <http://www.ibm.com/ibm/environment/products/index.shtml>.



**Notice:** This mark applies only to countries within the European Union (EU) and Norway.

This appliance is labeled in accordance with European Directive 2002/96/EC concerning waste electrical and electronic equipment (WEEE). The Directive determines the framework for the return and recycling of used appliances as applicable throughout the European Union. This label is applied to various products to indicate that the product is not to be thrown away, but rather reclaimed upon end of life per this Directive.

注意: このマークは EU 諸国およびノルウェーにおいてのみ適用されます。

この機器には、EU 諸国に対する廃電気電子機器指令 2002/96/EC(WEEE) のラベルが貼られています。この指令は、EU 諸国に適用する使用済み機器の回収とリサイクルの骨子を定めています。このラベルは、使用済みになった時に指令に従って適正な処理をする必要があることを知らせるために種々の製品に貼られています。

**Remarque :** Cette marque s'applique uniquement aux pays de l'Union Européenne et à la Norvège.

L'étiquette du système respecte la Directive européenne 2002/96/EC en matière de Déchets des Equipements Electriques et Electroniques (DEEE), qui détermine les dispositions de retour et de recyclage applicables aux systèmes utilisés à travers

l'Union européenne. Conformément à la directive, ladite étiquette précise que le produit sur lequel elle est apposée ne doit pas être jeté mais être récupéré en fin de vie.

In accordance with the European WEEE Directive, electrical and electronic equipment (EEE) is to be collected separately and to be reused, recycled, or recovered at end of life. Users of EEE with the WEEE marking per Annex IV of the WEEE Directive, as shown above, must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and recovery of WEEE. Customer participation is important to minimize any potential effects of EEE on the environment and human health due to the potential presence of hazardous substances in EEE. For proper collection and treatment, contact your local IBM representative.

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## Appendix F. Battery return program

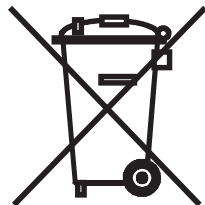
This product may contain a sealed lead acid, nickel cadmium, nickel metal hydride, lithium, or lithium ion battery. Consult your user manual or service manual for specific battery information. The battery must be recycled or disposed of properly. Recycling facilities may not be available in your area. For information on disposal of batteries outside the United States, go to <http://www.ibm.com/ibm/environment/products/index.shtml> or contact your local waste disposal facility.

In the United States, IBM has established a return process for reuse, recycling, or proper disposal of used IBM sealed lead acid, nickel cadmium, nickel metal hydride, and battery packs from IBM equipment. For information on proper disposal of these batteries, contact IBM at 1-800-426-4333. Have the IBM part number listed on the battery available prior to your call.

**For Taiwan:** Please recycle batteries.



**For the European Union:**



**Notice:** This mark applies only to countries within the European Union (EU).

Batteries or packaging for batteries are labeled in accordance with European Directive 2006/66/EC concerning batteries and accumulators and waste batteries and accumulators. The Directive determines the framework for the return and recycling of used batteries and accumulators as applicable throughout the European Union. This label is applied to various batteries to indicate that the battery is not to be thrown away, but rather reclaimed upon end of life per this Directive.

Les batteries ou emballages pour batteries sont étiquetés conformément aux directives européennes 2006/66/EC, norme relative aux batteries et accumulateurs en usage et aux batteries et accumulateurs usés. Les directives déterminent la marche à suivre en vigueur dans l'Union Européenne pour le retour et le recyclage des batteries et accumulateurs usés. Cette étiquette est appliquée sur diverses batteries pour indiquer que la batterie ne doit pas être mise au rebut mais plutôt récupérée en fin de cycle de vie selon cette norme.

バッテリーあるいはバッテリー用のパッケージには、EU 諸国に対する廃電気電子機器指令 2006/66/EC のラベルが貼られています。この指令は、バッテリーと蓄電池、および廃棄バッテリーと蓄電池に関するものです。この指令は、使用済みバッテリーと蓄電池の回収とリサイクルの骨子を定めているもので、EU 諸国にわたって適用されます。このラベルは、使用済みになったときに指令に従って適正な処理をする必要があることを知らせるために種々のバッテリーに貼られています。

In accordance with the European Directive 2006/66/EC, batteries and accumulators are labeled to indicate that they are to be collected separately and recycled at end of life. The label on the battery may also include a chemical symbol for the metal concerned in the battery (Pb for lead, Hg for mercury, and Cd for cadmium). Users of batteries and accumulators must not dispose of batteries and accumulators as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and treatment of batteries and accumulators. Customer participation is important to minimize any potential effects of batteries and accumulators on the environment and human health due to the potential presence of hazardous substances. For proper collection and treatment, contact your local IBM representative.

This notice is provided in accordance with Royal Decree 106/2008 of Spain: The retail price of batteries, accumulators, and power cells includes the cost of the environmental management of their waste.

**For California:**

Perchlorate material – special handling may apply. See <http://www.dtsc.ca.gov/hazardouswaste/perchlorate/>.

The foregoing notice is provided in accordance with California Code of Regulations Title 22, Division 4.5 Chapter 33. Best Management Practices for Perchlorate Materials. This product/part may include a lithium manganese dioxide battery which contains a perchlorate substance.

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## Appendix G. Electronic emission notices

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### Federal Communications Commission (FCC) statement

**Note:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. 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.

---

### Industry Canada Class A emission compliance statement

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

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### Avis de conformité à la réglementation d'Industrie Canada

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

---

### Australia and New Zealand Class A statement

**Attention:** This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

---

### United Kingdom telecommunications safety requirement

#### Notice to Customers

This apparatus is approved under approval number NS/G/1234/J/100003 for indirect connection to public telecommunication systems in the United Kingdom.

---

### European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended 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 A Information Technology Equipment according to CISPR 22/European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

**Attention:** This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

European Community contact:  
IBM Technical Regulations  
Pascalstr. 100, Stuttgart, Germany 70569  
Telephone: 0049 (0)711 785 1176  
Fax: 0049 (0)711 785 1283  
E-mail: tjahn@de.ibm.com

---

## Taiwanese Class A warning statement

警告使用者:  
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

---

## Chinese Class A warning statement

聲 明  
此为 A 级产品。在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

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## Japanese Voluntary Control Council for Interference (VCCI) statement

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。



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## Korean Class A warning statement

이 기기는 업무용으로 전자파 적합등록을 받은 기기 이오니, 판매자 또는 사용자는 이점을 주의하시기 바라며, 만약 잘못 구입하셨을 때에는 구입한 곳에서 비업무용으로 교환하시기 바랍니다.



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