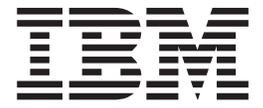


2 U Universal Tape Autoloader



User's Guide

2 U Universal Tape Autoloader



User's Guide

Note: Before using this information and the product it supports, read the information in Appendix D, "IBM Statement of Limited Warranty Z125-4753-10 08/2008," on page 41 and Appendix E, "Notices," on page 61.

Second Edition (October 2010)

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Safety

Before installing this product, read the Safety Information.

مج، يجب قراءة دات السلامة

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

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

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si prečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

安裝本產品之前，請先閱讀「安全資訊」。

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 15:



CAUTION:

Make sure that the rack is secured properly to avoid tipping when the unit is extended.

Statement 23:



CAUTION:

Do not place any object weighing more than 50 kg (110 lb) on top of rack-mounted devices.



>50 kg (110 lb)

Chapter 1. Introduction

The IBM® Universal Tape Autoloader is an automated tape storage and retrieval device for xSeries® and System x servers. The autoloader supports one tape drive and can store up to 23 LTO3 tape cartridges in two magazines.

The Universal Tape Autoloader comes with a limited warranty. For more information, see Appendix D, “IBM Statement of Limited Warranty Z125-4753-10 08/2008,” on page 41.

Note: The terms *library* and *autoloader* are used interchangeably in this document.

Contact your place of purchase if an item is missing or damaged. Be sure to retain your proof of purchase. It might be required for you to receive warranty service.

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.
- **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 could 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 a situation 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.

Components

The following illustrations show the components on the front and back of the autoloader.

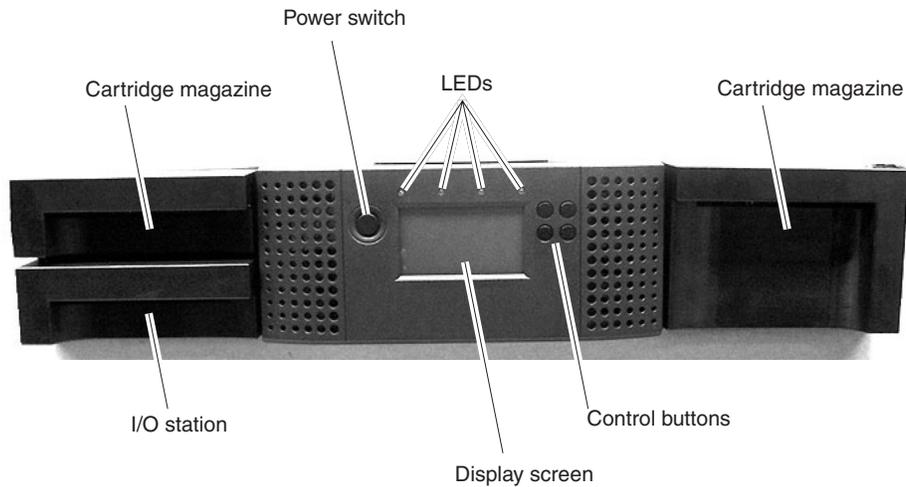


Figure 1. Front panel components

Note: The following illustration shows a SCSI tape drive. Fibre Channel tape drives are similar.

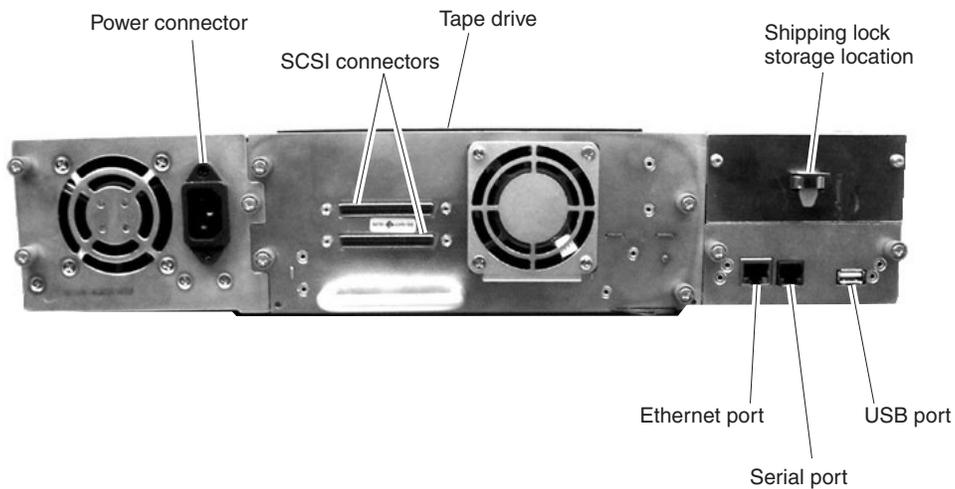


Figure 2. Back panel components

Operator control panel LEDs

The operator control panel consists of the display screen, the control buttons, and the LEDs.

Table 1 describes the LEDs on the operator panel.

Table 1. LED function

LED	Description
Activity	When this LED is lit, it indicates that the autoloader is turned on. It flashes when the autoloader is active.
Clean drive	When this LED is lit, it indicates that the tape drive needs to be cleaned. The LED turns off when the tape drive has been cleaned.

Table 1. LED function (continued)

LED	Description
Media attention	When this LED is lit, it indicates that a cartridge is not usable. The LED turns off when the cartridge is replaced.
Error	When this LED is lit, it indicates that there is an error condition. A message about the error is also displayed on the display screen. The LED turns off when the error is corrected.

The following illustration shows the locations of the LEDs.

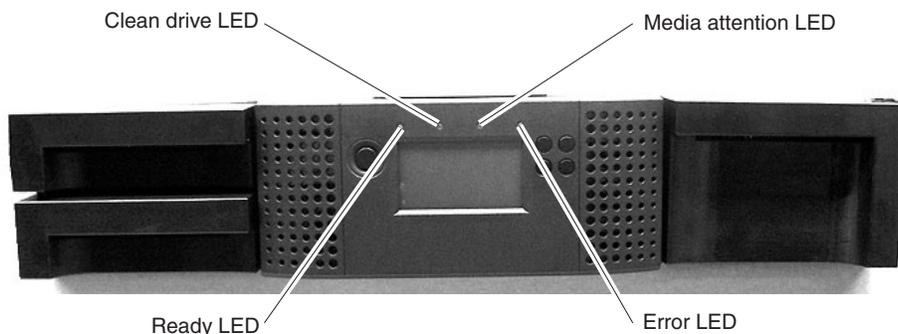


Figure 3. LED locations

SCSI host bus adapter

To get optimum performance from your autoloader, use a SCSI bus that can transfer data at a rate that supports the maximum data transfer rate of the autoloader. See Appendix A, "Specifications," on page 29 for more information.

If necessary, install a SCSI host adapter, software, and compatible device drivers. See the documentation for the host server and the SCSI host bus adapter for detailed information. Use a SCSI-3 LVDS host bus adapter with the autoloader. To ensure optimum performance, use an Ultra320 host bus adapter for the autoloader.

A single-ended (SE) SCSI host bus adapter will severely degrade performance and limit cable length. Also, if any SE devices are on the same SCSI bus, the entire SCSI bus will run at the single-end speed, severely degrading performance.

LUN scanning

The autoloader uses a single SCSI or loop ID per drive and dual logical unit numbers (LUNs) to control the tape drive (LUN 0) and autoloader accessor (LUN 1). The autoloader requires a host bus adapter that supports LUN scanning. If LUN scanning is not enabled, the host server will not scan beyond LUN 0, and it will fail to discover the autoloader; it will discover only the tape drive.

Chapter 2. Using the autoloader menus

Use the operator control panel to navigate the menus. The autoloader menus are organized in a tree structure that consists of four main menus with submenus and selections. Table 2 provides a description of the operator control panel buttons.

Table 2. Operator control panel buttons

Button	Description
Enter	Use this button to select menu items and values.
Next	Use this button to navigate forward through the menus.
Previous	Use this button to navigate backward through the menus.
Cancel	Use this button to cancel an action and return to the last menu that was displayed.

The following illustration shows the locations of the operator control panel buttons.

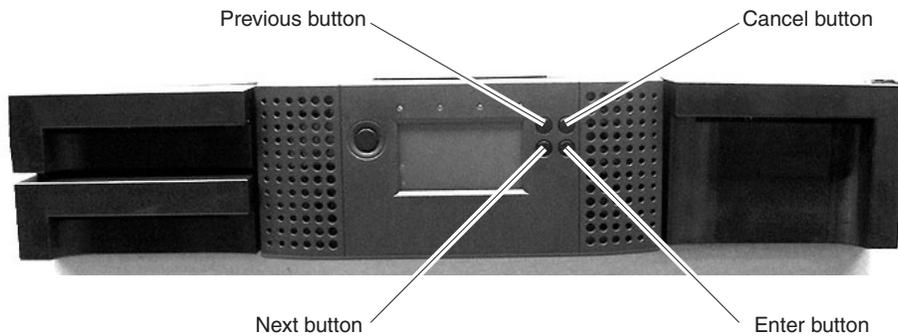


Figure 4. Control panel buttons

Table 3 describes the types of values that can be selected and how to select them.

Table 3. Operator control panel values

Value	Description	Procedure
Predefined	Some menus provide predefined values to choose from.	To select a predefined value, use the Next or Previous button to select the value, and press the Enter button.
Toggle	Toggle values are used to switch between two different values, for example, on and off.	To select a toggle value, use the Next or Previous button to change the value, and press the Enter button.

Table 3. Operator control panel values (continued)

Value	Description	Procedure
Numerical	Numerical values are used for network addresses, password entries, and other configuration entries.	To select a numerical value, complete the following steps: <ol style="list-style-type: none"> 1. Use the Next or Previous button to display the value that you want to specify, and press Enter. The cursor moves to the next digit. 2. Repeat step 1 until all values are specified. 3. Press Enter after the last digit is specified to apply the new value.

The following flow chart shows the menu structure.

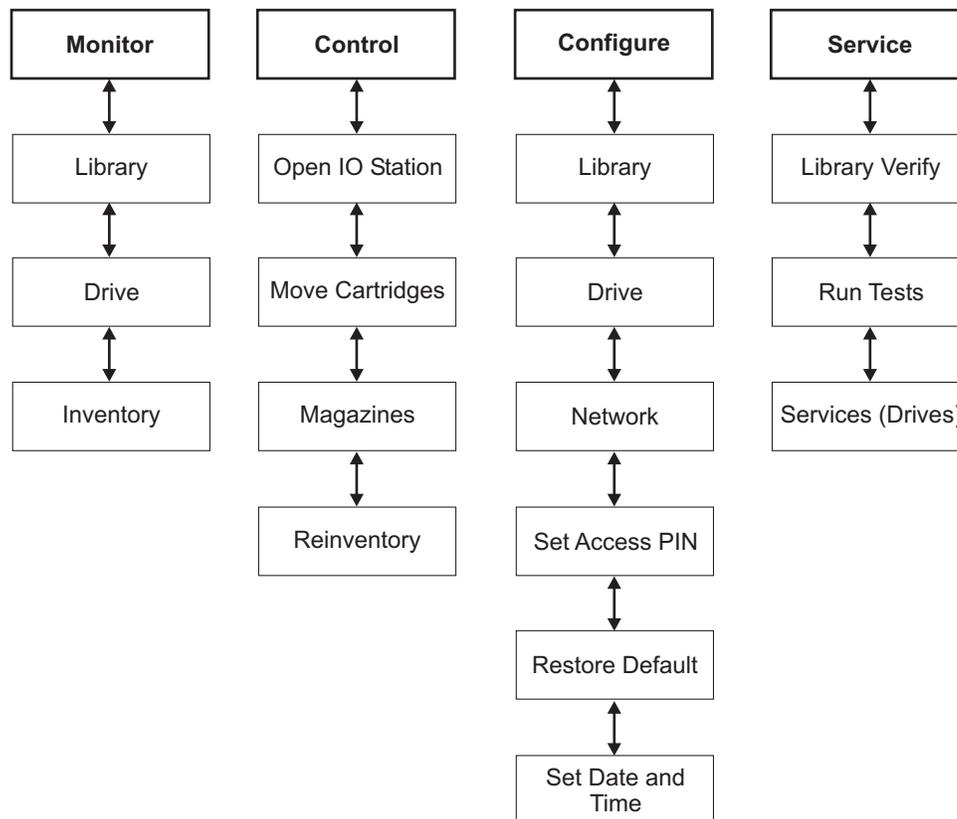


Figure 5.

Monitor menus

To access the Monitor menu choices, complete the following steps:

1. From the home screen, press the Enter button. The main menu is displayed.
2. From the main menu, press the Next button to select **Monitor**, and press the Enter button. The **Monitor** menu is displayed.
3. Press the Next button to select one of the **Monitor** menu choices, and press the Enter button.

The **Monitor** menu choices are described in the following sections.

Library

From the **Library** menu, press the Next button to select one of the **Library** menu choices, and press the Enter button. The **Library** menu choices are described in the following sections.

Status

The Status screen displays the following information:

- Library status
- Cartridges installed
- Cartridge delivery status
- Number of empty slots.
- Temperature
- Cycles
- I/O station (open or closed)
- Date and time

Identity

The Identity screen displays the following information:

- The serial number of the library
- The firmware version
- The vendor ID
- The product ID
- IP address
- Library mode
- Reserved slots
- WWNN or SCSI ID

Error log

The Error Log screen displays the library error log information.

Network

The Network screen displays the following network information:

- DHCP (enabled or disabled)
- IP address
- Network mask
- Gateway

Drive

From the **Drive** menu, press the Next button to select one of the **Drive** menu choices, and press the Enter button. The **Drive** menu choices are described in the following sections.

Status

The Drive Status screen displays the following information:

- Status
- Activity
- Source
- Temperature
- Cooling
- Link A status
- Link A speed

- Link B status
- Link B speed

Identity

The drive Identity screen displays the following information:

- Firmware level
- Vendor ID
- Product ID
- Serial number
- The SCSI loop ID if a SCSI tape drive is installed
- The world wide network node (WWNN) if a Fibre Channel tape drive is installed

Inventory

From the **Inventory** menu, press the Next button to select one of the **Inventory** menu choices, and press the Enter button. The **Inventory** menu choices are described in the following sections.

Magazine

The Magazine screen displays the magazine tape cartridge inventory.

Drive

The Drive screen displays information about the tape cartridge that is loaded in the tape drive.

Control menus

To access the Control menu choices, complete the following steps:

1. From the home screen, press the Enter button. The main menu is displayed.
2. Press the Next button to select **Control**, and press the Enter button. The **Control** menu is displayed.
3. Press the Next button to select one of the **Control** menu choices, and press the Enter button.

Open I/O Station

Select this choice to load a cartridge.

From the **Control** menu, press the Next button to select **Open I/O Station**, and press the Enter button.

Move Cartridges

Select this choice to move a tape cartridge from one location to another in the autoloader.

In the **Move Cartridges** screen, specify the following information:

- Source type
- Source
- Volume serial number
- Destination type
- Destination

Press the Next button to select **Move**, and press the Enter button.

Magazines

Select this choice to unlock a magazine.

From the **Magazine** menu, press the Next button to select the magazine that you want to unlock, and press the Enter button.

Re-Inventory

Select this choice to inventory the tape cartridges that are installed in the autoloader.

From the **Control** menu, press the Next button to select **Re-Inventory**, and press the Enter button.

Configure menus

To access the **Configure** menu choices, complete the following steps:

1. From the home screen, press the Enter button. The main menu is displayed.
2. From the main menu, press the Next button to select **Configure**, and press the Enter button. The **Configure** menu is displayed.
3. Press the Next button to select one of the **Configure** menu choices, and press the Enter button.

Library

In the Library screen, specify the following information:

- Mode:
 - Random: The host application software randomly selects which tape cartridge to load.
 - Sequential: The autoloader firmware predefines which cartridge to load. After the autoloader initializes, the first available tape cartridge is loaded.
- Autoload: When the autoloader is started, the first available cartridge is loaded. Sequential mode must be selected for Autoload to be enabled.
- Loop: When the tape in the slot with the highest numerical position is loaded, the tape cartridge in the slot with the lowest numerical position will be loaded next. Sequential mode must be selected for Loop to be enabled.
- Reserved slots: The slots that are designated as reserved cannot be used.

Press the Next button to select **Save**, and press the Enter button.

Drive

From the **Drive** menu, press the Next button to select one of the **Drive** menu choices, and press the Enter button.

Drive Power

Select this choice to turn on and turn off the tape drive.

From the **Drive Power** menu, select a choice, and press the Enter button.

Drive Interface

Select this choice to specify the tape drive interface information:

- SCSI tape drive: specify the SCSI ID.
- Fiber Channel tape drive: specify the speed, type, address mode, and loop ID.

From the **Drive Interface** menu, press the Next button to select **Drive 1**, and press the Enter button. Specify the tape drive interface information, and press the Enter button. Press the Next button to select **Save**, and press the Enter button.

Network

In the Network screen, specify the following information:

- DHCP (on or off)
- IP address
- Network mask
- Gateway

Press the Next button to select **Save**, and press the Enter button.

Set Access PIN

In the **Set Access PIN** menu, specify the following information:

- New access PIN
- Access PIN mode (enabled or disabled)

Specify the new access PIN or access PIN mode and press the Enter button. Press the Next button to select **Save**, and press the Enter button.

Restore Defaults

Select this choice to restore the autoloader configuration values to their original values.

When the prompt Are you sure? is displayed, press the Next button to select **Proceed**, and press the Enter button.

Set Date and Time

Select this choice to set the date and time in the autoloader.

Specify the date and press the Next button. Specify the time and press the Next button. Press the Next button to select **Save**, and press the Enter button.

Service menus

To access the **Service** menus, complete the following steps:

1. From the home screen, press the Enter button. The main menu is displayed.
2. Press the Next button to select **Service**, and press the Enter button. The **Service** menu is displayed.
3. Press the Next button to select one of the **Service** menu choices, and press the Enter button.

Library Verify

Select this choice to run the autoloader verification test, which exercises all autoloader components.

Specify the number of times that you want the verification test to run. Press the Next button to select **Run**, and press the Enter button.

Run Tests

Select this choice to run the following tests:

- Slot to Slot Test: Move each tape cartridge from its slot to the tape drive and then back to the slot.
- System Tests: Exercise the autoloader components.

Press the Next button to select the test that you want to run, and press the Enter button. Press the Next button to select the number of times you want the test to run, and press the Enter button. Press the Next button to select **Run**, and press the Enter button.

Service (Drives)

From the **Service (Drives)** menu, press the Next button to select one of the **Service (Drives)** menu choices, and press the Enter button.

Clean Drive

Select this choice to clean the tape drive.

Press the Next button to select **Drive 1**, and press the Enter button.

Drive FW Upgrade

Select this choice to upgrade the tape drive firmware.

Press the Next button to select **Drive 1**, and press the Enter button.

Note: The latest firmware can be found at <http://www-947.ibm.com/support/entry/portal/docdisplay?brand=5000008&lnodocid=TAPE-FILES>

Drive Tests

Select this choice to test the tape drive.

Press the Next button to select **Drive 1**, and press the Enter button. Press the Next button to select **Run**, and press the Enter button.

Chapter 3. Using the Remote Management utility

Use the Remote Management utility to manage the autoloader remotely.

To run the Remote Management utility, complete the following steps:

1. Make sure that the autoloader is connected to an Ethernet network.
2. Make sure that the autoloader is turned on.
3. Open a web browser and enter the IP address of the autoloader in the following format: `http://ipaddress`.
4. Type the password and click **OK**. The Remote Management utility home page is displayed.

Note: User IDs are static and cannot be changed. The default password for the User ID is `usr001` and the default password for the administration ID is `adm001`.

To change the password, complete the following steps:

1. From the home page, click **Configure Library** → **User Access**. The User Access page is displayed.
2. Specify one of the following access levels:
 - 1 (Guest)
 - 2 (Administration)
 - 3 (Service)
3. Type the password.
4. Type the confirmation password.
5. Click **Submit**. The password is changed.

Table 4. Monitor library

Page	Description	Access procedure
Library Identity	This page provides the following information about the autoloader: <ul style="list-style-type: none">• Serial number• Product ID• Firmware level installed• Boot code firmware revision• IP address• Library mode• Worldwide node name (Fibre Channel tape drives only)	This page is displayed when you log on to the Remote Management utility.

Table 4. Monitor library (continued)

Page	Description	Access procedure
Drives Identity	<p>This page provides the following information about the drive:</p> <ul style="list-style-type: none"> • Vendor ID • Product ID • Serial number • Firmware revision • SCSI ID (for SCSI tape drives only) • Physical drive number • SCSI element address (for SCSI tape drives only) • Interface type • Port name (for Fibre Channel tape drives only) • Topology (for Fibre Channel tape drives only) • FC-AL loop ID (for Fibre Channel tape drives only) • Speed (for Fibre Channel tape drives only) 	Click Monitor Library → Drives Identity .
Library Status	<p>This page provides the following information about the autoloader:</p> <ul style="list-style-type: none"> • Status • Cartridge in transport • Number of moves • Total power-on time • Robotic status • Left magazine • Right magazine 	Click Monitor Library → Library Status .
Drives status	<p>This page displays the following information about the tape drives:</p> <ul style="list-style-type: none"> • Status • Cartridge in drive • Drive error code • Drive temperature • Cooling fan active • Drive activity 	Click Monitor Library → Drives Status .
Inventory	<p>This page provides summary information about the cartridges. Click the > symbol to display more information.</p>	Click Monitor Library → Inventory .

Table 5. Configure library

Page	Description	Access procedure
General	<p>Use this page to display and change the following configuration values:</p> <ul style="list-style-type: none"> • Library name • Library mode • Active slots 	Click Configure Library → General .

Table 5. Configure library (continued)

Page	Description	Access procedure
Drives	<p>Use this page to display and change the tape drive configuration information:</p> <p>For SCSI tape drives:</p> <ul style="list-style-type: none"> • Drive SCSI ID • Power on or off <p>For Fibre Channel tape drives:</p> <ul style="list-style-type: none"> • Speed • Port type • Loop ID 	Click Configure Library → Drives .
Network	<p>Use this page to display and change the following network information:</p> <ul style="list-style-type: none"> • DHCP • IP address • Network mask • Gateway address 	Click Configure Library → Network .
User access	<p>Use this page to view or change the following information:</p> <ul style="list-style-type: none"> • User access • Access level • Access level name • New password • Repeat password • Operator control panel PIN enabled • Operator control panel PIN code • Support name • Support phone • Support e-mail 	Click Configure Library → User Access .
Date and time	Use this page to set the date and time.	Click Configure Library → Date & Time .
Logs and Traces	<p>Use this page to control the error log:</p> <ul style="list-style-type: none"> • Error log mode • Trace level • Trace filter 	Click Configure Library → Logs and Traces .
Event notification	<p>Use this page to configure the following information:</p> <ul style="list-style-type: none"> • Notification errors • Notification warnings • To e-mail address • SMTP server address 	Click Configure Library → Event Notification .
Restore defaults	<p>Use this page to perform the following tasks:</p> <ul style="list-style-type: none"> • Restore factory defaults • Restore vital product data • Save vital product data 	Click Configure Library → Restore Defaults .

Table 6. Manage library

Page	Description	Access procedure
Move media	Use this page to move cartridges within the autoloader.	Click Manage Library → Move Media .
Perform Inventory	Use this page to inventory the tape cartridges.	Click Manage Library → Perform Inventory .
Release Magazines	Use this page to release a magazine so that it can be removed from the autoloader.	Click Manage Library → Release Magazine .

Table 7. Service library

Page	Description	Access procedure
Clean drive	Use this page to clean the tape drive.	Click Service Library → Clean Drive .
Advanced diagnostics	Use this page to run diagnostics on the tape drive.	Click Service Library → Advanced Diagnostics .
View logs	Use this page to view the logs.	Click Service Library → View Logs .
Perform diagnostics	Use this page to run diagnostics.	Click Service Library → Perform Diagnostics .
Upgrade firmware	Use this page to upgrade the library and tape drive firmware. Note: The latest firmware can be found at http://www-947.ibm.com/support/entry/portal/docdisplay?brand=5000008&lnocid=TAPE-FILES	Click Service Library → Upgrade Firmware .
Reboot	Use this page to reboot the library.	Click Service Library → Reboot .

Chapter 4. Solving problems

Table 8 lists problems and potential solutions that might occur with the autoloader.

Table 8. Problems and solutions

Problem	Solution
The autoloader does not turn on.	<ol style="list-style-type: none">1. Check all power cord connections.2. Make sure that the power switch is turned on.3. Make sure that there is power to the electrical outlet. If necessary, try another working outlet.4. Replace the power cord.
No messages are displayed.	<ol style="list-style-type: none">1. Make sure that the power cord is connected.2. Make sure that the power switch is turned on.3. Power cycle the autoloader.4. Download the latest autoloader firmware.
A cartridge will not eject from the tape drive.	<ol style="list-style-type: none">1. Power cycle the autoloader. Allow it to complete initialization, which in rare cases can take as long as 10 minutes; then, try to unload the cartridge, using the autoloader operator control panel.2. Allow the drive to complete all operations. This might take as long as 10 minutes if you reset or cycle power on the autoloader while the cartridge is positioned at the physical end of the media.3. Make sure that the backup software is not reserving the slot or preventing the drive from ejecting the cartridge. Temporarily disconnect the autoloader from the host server and power cycle the host server to eliminate it as the source of the problem.
A cartridge cannot be removed from a storage slot.	Make sure that a defective cartridge is not lodged in the storage slot. Remove a defective cartridge and replace it with a new cartridge.
A magazine cannot be removed from the autoloader.	If the magazine cannot be removed after you complete the procedure in "Removing a magazine" on page 24, see "Removing a magazine manually" on page 25.
A cleaning or data cartridge is incompatible with the tape drive.	Make sure that you are using tape and cleaning cartridges that are compatible with the tape drive and autoloader. The autoloader automatically unloads incompatible cartridges, and the media attention LED flashes for the indicated slot number. Export the cartridge to correct the problem.

Table 8. Problems and solutions (continued)

Problem	Solution
<p>The tape drive cannot write to or read from a tape cartridge.</p>	<ol style="list-style-type: none"> 1. Make sure that the tape cartridge write-protect switch is in the write-enabled position. 2. Make sure that you are using the appropriate data cartridge for your autoloader model. 3. If you are using an Ultrium cartridge, make sure that it has not been degaussed. Do not degauss Ultrium cartridges. 4. Make sure that the tape cartridge has not been exposed to harsh environmental or electrical conditions and is not physically damaged in any way. 5. Make sure that the cartridge is compatible with the backup application that you are using. Many backup applications do not read or write to cartridges that were created using a different backup application. In this case, you might have to perform an erase, reformat, or label replacement operation on the cartridge. 6. Make sure that you understand any data protection or overwrite protection schemes that your backup application might be using, which might prevent you from writing to a cartridge. 7. Try the operation with a different, known good cartridge. 8. Clean the tape drive.
<p>The autoloader cannot load the cleaning cartridge.</p>	<p>Make sure that you are using an Ultrium universal cleaning cartridge.</p>
<p>There is an error code on the operator control panel display screen.</p>	<p>Look up the error code, correct the failure, and power cycle the autoloader.</p>
<p>The tape drive SCSI ID was changed, but the host server does not recognize the new SCSI ID.</p>	<ol style="list-style-type: none"> 1. Make sure that all SCSI devices on the same bus have unique ID numbers. 2. If the SCSI bus is narrow (50-pin), only SCSI IDs 0 through 7 are available. 3. Make sure that you cycle power on the autoloader after you change the SCSI ID. 4. Restart the host server.

Table 8. Problems and solutions (continued)

Problem	Solution
The autoloader is not efficiently backing up data.	<ol style="list-style-type: none"> 1. Check the network bandwidth from the host server. If you are backing up data over a network, consider comparing it to a local-only backup. 2. Make sure that the autoloader and tape drive are on their own SCSI bus and not daisy-chained to another tape drive or to the hard disk drive that is being backed up. 3. Make sure that the autoloader is connected to an LVD SCSI bus and there are no single-ended (SE) devices on the same bus, because this will cause the entire bus to negotiate down to SE speed. 4. Use an Ultra320 SCSI bus and high-quality cabling with the autoloader. 5. Do not connect the autoloader to a narrow SCSI bus. 6. Try a new cartridge. A marginal cartridge can cause performance problems, because bad spots on the tape cause repeated attempts to read or write. 7. Observe whether the data is compressed. Backing up data that compresses poorly or is already compressed will lower performance. 8. Check the size of the files. Small file size can affect performance. 9. Confirm that the backup application is using block sizes of at least 32 KB, preferably 64 KB. See the backup application documentation for more information. 10. Make sure that the backup server has enough memory to handle the bandwidth of the backup or restore function. 11. Clean the tape drive.
The autoloader is contaminated by loose debris.	Avoid contamination by making sure that the autoloader is installed in a clean, contamination-free environment. Store cartridges vertically in their plastic cases. Continue cleaning the tape drive as needed.
A tape cartridge is incompatible with the autoloader.	Make sure that you are using an Ultrium universal cleaning cartridge.
The media attention LED is lit immediately after a tape cartridge problem has been corrected.	<p>If the media attention LED turns off and on immediately (although the drive has been cleaned) each time a particular cartridge is reloaded, the cartridge is defective.</p> <ol style="list-style-type: none"> 1. Export the cartridge and load a known good cartridge. In some cases, a cartridge can be worn, have a defective cartridge memory, or have been formatted as a firmware upgrade cartridge. 2. Do not use any cartridge that is suspected of being defective or contaminated.

Chapter 5. Replacing autoloader components

Replaceable parts are of two 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 (CRU): You may 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 product.

For more information about the terms of the warranty and getting service and assistance, see Appendix D, “IBM Statement of Limited Warranty Z125-4753-10 08/2008,” on page 41.

If you are instructed to return a component, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Table 9 lists the replaceable components.

Table 9. CRU list

CRU part number	Description	Tier
23R7162	SCSI tape drive	1
42D8778	Fibre Channel tape drive	1
42C3936	Chassis	2
23R6452	Right magazine	1
23R6471	Left magazine	1
23R3594	Long SCSI cable	2
23R5841	SCSI terminator	1
42C3930	Controller card	2
23R6447	Power supply	1
42C3954	Rack rails	1
39M5081	US power cord	1
39M5377	PDU power cord	1

Removing the autoloader chassis from a rack

To remove the autoloader chassis from a rack, complete the following steps:

1. Read the safety information that begins on page v and the installation guidelines in the *2 U Universal Tape Autoloader Installation Guide*.
2. Turn off the autoloader and disconnect the power cord.
3. Disconnect the Ethernet cable.
4. Remove the magazines. See “Removing a magazine” on page 24.
5. Remove the tape drive. See “Removing a tape drive” on page 25.
6. Remove the screws that secure the autoloader chassis to the rack.

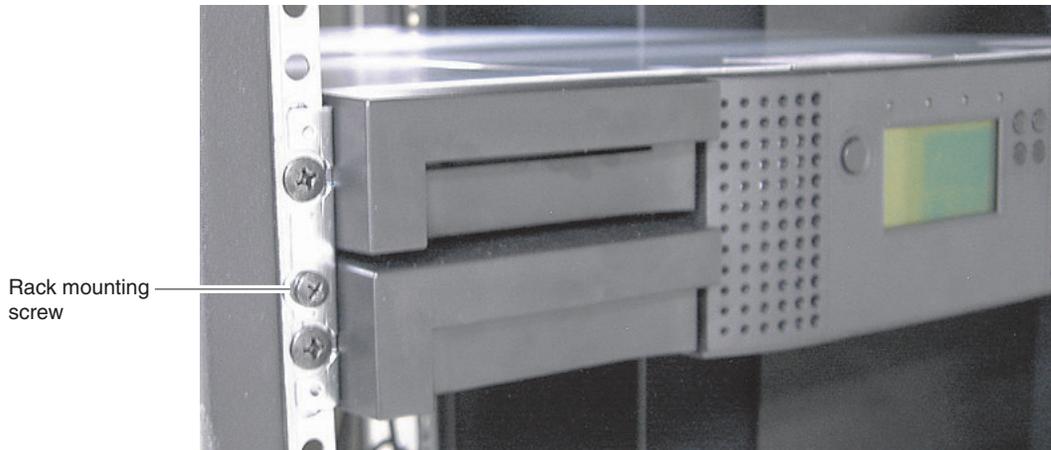


Figure 6. Removing the chassis

7. Remove the chassis from the rack.
8. Remove the mounting brackets and anchors from the autoloader.

Installing the autoloader chassis in a rack

To install the chassis in a rack, complete the following steps:

1. Read the safety information that begins on page v and the installation guidelines in the *2 U Universal Tape Autoloader Installation Guide*.
2. Attach the mounting brackets and anchors to the autoloader.
3. Place the autoloader chassis in the rack.
4. Install the screws that secure the autoloader chassis to the rack.
5. Connect the Ethernet cable.
6. Install the tape drive. See “Installing a tape drive” on page 26 for more information.
7. Install the power supply. See “Installing a power supply” on page 24 for more information.
8. Install the magazines. See “Installing a magazine” on page 24 for more information.

Removing the controller card

To remove the controller card, complete the following steps:

1. Read the safety information that begins on page v and the installation guidelines in the *2 U Universal Tape Autoloader Installation Guide*.
2. Turn off the autoloader and disconnect the power cord.
3. Disconnect the Ethernet cable.
4. Loosen the two captive screws.
5. Pull the controller card out of the autoloader chassis as shown in Figure 7 on page 23.

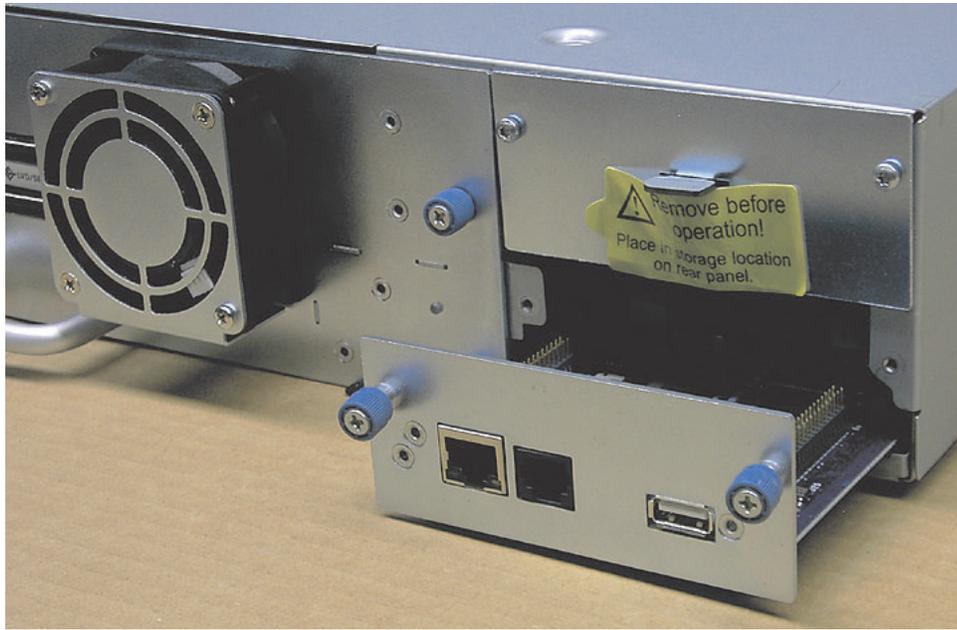


Figure 7. Removing the controller card

Installing the controller card

To install the controller card, complete the following steps:

1. Read the safety information that begins on page v and the installation guidelines in the *2 U Universal Tape Autoloader Installation Guide*.
2. Make sure that the autoloader is turned off, and disconnect the power cord.
3. Insert the controller card into the autoloader chassis.
4. Tighten the captive screws.
5. Connect the Ethernet cable.
6. Connect the power cord.

Removing a power supply

To remove a power supply, complete the following steps:

1. Read the safety information that begins on page v and the installation guidelines in the *2 U Universal Tape Autoloader Installation Guide*.
2. Turn off the autoloader and disconnect the power cord.
3. Loosen the captive screws.
4. Pull the power supply out of the autoloader chassis as shown in Figure 8 on page 24.

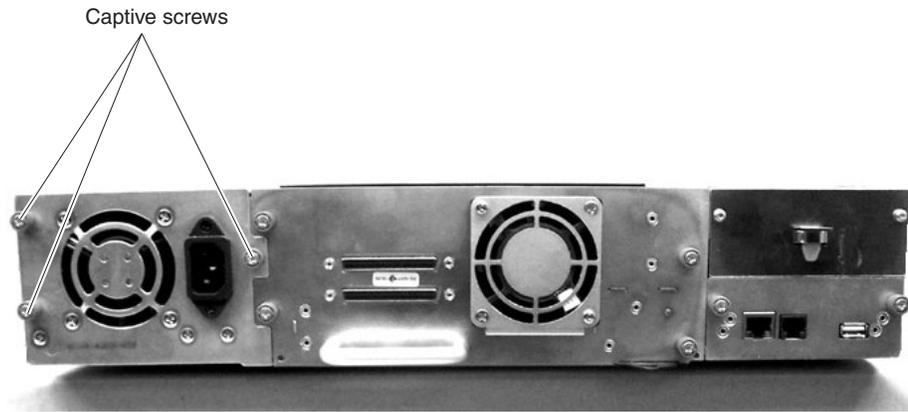


Figure 8. Removing the power supply

Installing a power supply

To install a power supply, complete the following steps:

1. Read the safety information that begins on page v and the installation guidelines in the *2 U Universal Tape Autoloader Installation Guide*.
2. Slide the power supply into the autoloader chassis.
3. Tighten the captive screws.
4. Connect the power cord.

Removing a magazine

To remove a magazine, complete the following steps:

1. From the home screen, press the Enter button. The main menu is displayed.
2. From the main menu, press the Next button to select **Control**, and press the Enter button. The **Control** menu is displayed.
3. From the **Control** menu, press the Next button to select the magazine that you want to remove (if it is not already selected), and press the Enter button. The magazine is unlocked.
4. Remove the magazine from the autoloader.
5. Remove the tapes from the magazine.

Important: If the magazine cannot be removed after you complete the preceding procedure, see “Removing a magazine manually” on page 25.

Installing a magazine

To install a magazine, complete the following steps:

1. Install the tape cartridges in the magazine.
2. Slide the magazine into the autoloader chassis. The tape cartridges are automatically inventoried.

Removing a magazine manually

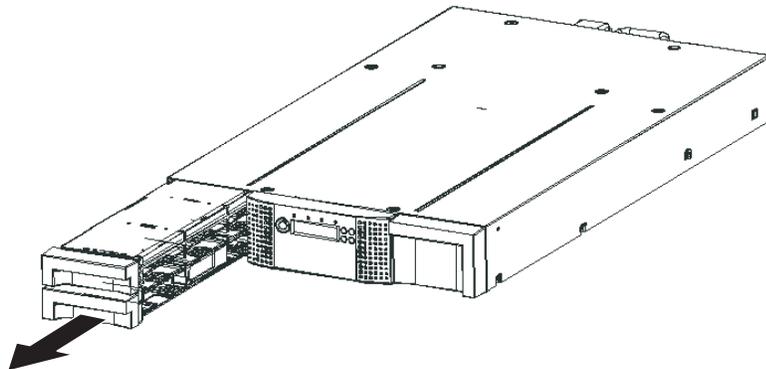
Under certain circumstances, you might have to remove one or both magazines manually. The following procedure requires two people, and you need a straightened paper clip (or similar tool) to release the magazine from its bay.

To remove a magazine manually, complete the following steps:

1. Turn off the power to the autoloader and unplug the power cord.
2. Locate the access holes for manual magazine release on the back of the autoloader, shown in the following image.



3. Push the end of a straightened paper clip (or a similar tool) into the access hole for the magazine that you want to remove.
4. With the straightened paper clip pressed into the access hole, have another person pull the magazine out of the autoloader from the front, as shown in the following illustration.



5. If necessary, repeat the procedure for the other magazine.

If tapes remain in the library, or if you were unable to manually remove the magazines and drive, contact IBM support for further assistance

Removing a tape drive

To remove a tape drive, complete the following steps:

1. Read the safety information that begins on page v and the installation guidelines in the *2 U Universal Tape Autoloader Installation Guide*.
2. Turn off the tape drive:
 - a. From the home screen, press the Enter button. The main menu is displayed.
 - b. From the main menu, press the Next button to select **Configure**, and press the Enter button. The **Configure** menu is displayed.

- c. From the **Configure** menu, press the Next button to select **Drive**, and press the Enter button. The **Drive** menu is displayed.
 - d. From the **Drive** menu, press the Next button to select **Drive Power** (if it is not already selected), and press the Enter button. The **Drive Power** menu is displayed.
 - e. From the **Drive Power** menu, press the Next button to select **Drive 1** (if it is not already selected), and press the Enter button. The **Drive Power** menu is displayed.
 - f. From the **Drive Power** menu, press the Next button to select **Proceed** (if it is not already selected), and press the Enter button. The drive is turned off.
3. Remove the host interface cable and the terminator.
 4. Loosen the captive screws that secure the tape drive.
 5. Pull on the tape drive handle to remove the tape drive.

Note: A SCSI tape drive is shown. Fibre Channel tape drives are similar.



Figure 9. Removing the tape drive

Installing a tape drive

To install a tape drive, complete the following steps:

1. Read the safety information that begins on page v and the installation guidelines in the *2 U Universal Tape Autoloader Installation Guide*.

Attention: The connector pins might be damaged if you do not support the bottom of the tape drive while you are installing it.

2. While you support the bottom of the tape drive, slowly insert the tape drive into the autoloader chassis until the connectors are fully seated.
3. Tighten the captive screws.
4. Connect the host interface cable and the terminator.

5. Turn on the tape drive power:
 - a. From the home screen, press the Enter button. The main menu is displayed.
 - b. From the main menu, press the Next button to select **Configure**, and press the Enter button. The **Configure** menu is displayed.
 - c. From the **Configure** menu, press the Next button to select **Drive**, and press the Enter button. The **Drive** menu is displayed.
 - d. From the **Drive** menu, press the Next button to select **Drive Power** (if it is not already selected), and press the Enter button. The **Drive Power** menu is displayed.
 - e. From the **Drive Power** menu, press the Next button to select **Drive 1** (if it is not already selected), and press the Enter button. The **Drive Power** menu is displayed.
 - f. From the **Drive Power** menu, press the Next button to select **Proceed** (if it is not already selected), and press the Enter button. The tape drive is turned on.

Appendix A. Specifications

The following tables provide a summary of the autoloader specifications.

Table 10. Physical specifications

Specification	Value
Height	87.6 mm (3.4 in.)
Width	447.5 mm (17.6 in.)
Depth	740 mm (29.1 in.)
Weight without tape cartridges	15.59 kg (34.37 lb)
Weight with tape cartridges	20.67 kg (45.57 lb)
AC power voltage	100 - 127 V ac; 200 - 240 V ac
Line frequency	50 - 60 Hz

Table 11. Operational specifications

Specification	Value
Maximum storage capacity (23 data cartridges)	Native: 8.8 TB Compressed: 17.6 TB (2:1 compression)
Maximum data transfer rate	Native: 80 MBps (288 GB per hour) Compressed: 160 MBps (576 GB per hour [2:1 compression])
Drive type	Ultrium 3 SCSI drive or Fibre Channel drive
Number of slots	23 (including I/O station)
Interface	Ultra160 SCSI or Fibre Channel

Table 12. Environmental specifications

Specification	Value
Temperature	
Operating	10° to 35°C (50° to 95°F)
Non-operating	-30° to 60°C (-22° to 140°F)
Temperature shock immunity - maximum rate of change	10°C (18°F) per hour
Miscellaneous	
Dust concentration	Less than 200 microgram per cubic meter
Altitude (operating)	4200 meters (13 000 ft) at 25°C ambient
Humidity	
Operating	20% to 80% noncondensing
Non-operating	10% to 90% noncondensing

Appendix B. Error codes

Error Code	Description	User Action
80	Bar code reader error: cannot initialize bar code reader	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
81	Bar code reader error: no response from bar code reader	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
82	EEPROM (electrically erasable programmable read-only memory) error: no response from EEPROM	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
83	Accessor controller generic problem	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
84	Setting of gripper motor parameters failed	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
85	Setting of slider motor parameters failed	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
86	Setting of elevator motor parameters failed	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
87	Setting of rotation motor parameters failed	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
88	Setting of sled motor parameters failed	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
89	Gripper blocked	<ol style="list-style-type: none"> 1. Remove the left and right cartridge magazines. 2. Look inside the autoloader and remove any obvious obstruction that might be preventing the accessor from functioning correctly. 3. Cycle the autoloader power and try the operation again. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.

Error Code	Description	User Action
8A	Slider blocked	<ol style="list-style-type: none"> 1. Remove the left and right cartridge magazines. 2. Look inside the autoloader and remove any obvious obstruction that might be preventing the accessor from functioning correctly. 3. Cycle autoloader power and try the operation again. If the error recurs, replace the autoloader chassis. See “Removing the autoloader chassis from a rack” on page 21 for more information.
8B	Elevator blocked	<ol style="list-style-type: none"> 1. Remove the left and right cartridge magazines. 2. Look inside the autoloader and remove any obvious obstruction that might be preventing the accessor from functioning correctly. 3. Cycle autoloader power and try the operation again. If the error recurs, replace the autoloader chassis. See “Removing the autoloader chassis from a rack” on page 21 for more information.
8C	Rotation blocked	<ol style="list-style-type: none"> 1. Remove the left and right cartridge magazines. 2. Look inside the autoloader and remove any obvious obstruction that might be preventing the accessor from functioning correctly. 3. Cycle autoloader power and try the operation again. If the error recurs, replace the autoloader chassis. See “Removing the autoloader chassis from a rack” on page 21 for more information.
8D	Sled blocked	<ol style="list-style-type: none"> 1. Remove the left and right cartridge magazines. 2. Look inside the autoloader and remove any obvious obstruction that might be preventing the accessor from functioning correctly. 3. Cycle the autoloader power and try the operation again. If the error recurs, replace the autoloader chassis. See “Removing the autoloader chassis from a rack” on page 21 for more information.
8E	Cannot find gripper block within the expected range	Run the Library Verify test; then, retry the operation. If the error recurs, replace the autoloader chassis. See “Removing the autoloader chassis from a rack” on page 21 for more information.
8F	Cannot find slider block within the expected range	Run the Library Verify test; then, retry the operation. If the error recurs, replace the autoloader chassis. See “Removing the autoloader chassis from a rack” on page 21 for more information.
90	Cannot find elevator block within the expected range	Run the Library Verify test; then, retry the operation. If the error recurs, replace the autoloader chassis. See “Removing the autoloader chassis from a rack” on page 21 for more information.
91	Cannot find rotation block within the expected range	Run the Library Verify test; then, retry the operation. If the error recurs, replace the autoloader chassis. See “Removing the autoloader chassis from a rack” on page 21 for more information.
92	Cannot find sled block within the expected range	Run the Library Verify test; then, retry the operation. If the error recurs, replace the autoloader chassis. See “Removing the autoloader chassis from a rack” on page 21 for more information.

Error Code	Description	User Action
93	Gripper outside range	Run the Library Verify test; then, retry the operation. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
94	Slider outside range	Run the Library Verify test; then, retry the operation. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
95	Elevator outside range	Run the Library Verify test; then, retry the operation. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
96	Rotation outside range	Run the Library Verify test; then, retry the operation. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
97	Sled outside range	Run the Library Verify test; then, retry the operation. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
98	Cartridge present sensor not found	Run the Library Verify test; then, retry the operation. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
99	Slider home sensor not found	Run the Library Verify test; then, then retry the operation. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
9A	Rotation home sensor not found	Run the Library Verify test; then, retry the operation. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
9B	Sled position sensor not found	Run the Library Verify test; then, retry the operation. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
9C	Gripper range out of specification	Run the Library Verify test; then, retry the operation. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
9D	Slider range out of specification	Run the Library Verify test; then, retry the operation. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
9E	Elevator range out of specification	Run the Library Verify test; then, retry the operation. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
9F	Rotation range out of specification	Run the Library Verify test; then, retry the operation. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.

Error Code	Description	User Action
A0	Sled range out of specification	Run the Library Verify test; then, retry the operation. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
A1	Open I/O station failed	Replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
B0	Robotic controller response timeout	Replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
B1	NACK (not acknowledged) received from robotic controller	Replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
B2	Accessor controller communication failed	Replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
B3	Accessor controller urgent stop because of a released magazine	Make sure that the left and right magazines are completely inserted; then try the operation again. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
B4	The cartridge did not transport completely. The gripper could not pick the cartridge, and the CP sensor was not present.	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
B5	Accessor controller does not respond on command	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
C0	Network initialization failed	Check the network cable and the network configuration; then, retry the operation. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
C1	Telnet Interface initialization failed	Check the network cable and the network configuration; then, try the operation again. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
C2	Web server initialization failed	Check network cable and network configuration, then try the operation again. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
C6	Ping command did not reach target	Check network cable and network configuration, then try the operation again. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
C7	Cannot upgrade from USB	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.

Error Code	Description	User Action
D0	ROM error: ROM checksum incorrect	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the controller card. See "Removing the controller card" on page 22 for more information.
D1	RAM error: Power-on self test (POST) has failed	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the controller card. See "Removing the controller card" on page 22 for more information.
D2	NVRAM (nonvolatile random access memory) error	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the controller card. See "Removing the controller card" on page 22 for more information.
D3	CTC (Channel to Channel) error	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the controller card. See "Removing the controller card" on page 22 for more information.
D4	UART (universal asynchronous receiver transmitter) error	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the controller card. See "Removing the controller card" on page 22 for more information.
D5	Display error	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the controller card. See "Removing the controller card" on page 22 for more information.
D6	Memory error: stack and heap overflow	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the controller card. See "Removing the controller card" on page 22 for more information.
D7	System error	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the controller card. See "Removing the controller card" on page 22 for more information.
D8	Data base error	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the controller card. See "Removing the controller card" on page 22 for more information.
D9	No SCSI IC detected	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the controller card. See "Removing the controller card" on page 22 for more information.
DA	While the autoloader Verify test was running, the bar code reader read different bar code data for the same tape cartridge label.	<ol style="list-style-type: none"> 1. Check the barcode label on the tape cartridge; then, run the autoloader Verify test again. 2. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
DB	External cooling fan error (fan motion has stopped). The subcode indicates which drive sled fan is affected. Subcode 00: drive sled 1	Make sure that the indicated fan is working and not obstructed. Check the network cable and network configuration; then, try the operation again. If the error recurs, replace the tape drive. See "Removing a tape drive" on page 25 for more information.

Error Code	Description	User Action
DC	I ² C bus failure	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the autoloader chassis. See "Removing the autoloader chassis from a rack" on page 21 for more information.
F0	Drive over temperature condition	Check the ambient temperature conditions, and check all fans. If the error recurs, replace the tape drive. See "Removing a tape drive" on page 25 for more information.
F1	Drive communication error, autoloader controller has lost communication to drive	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the tape drive. See "Removing a tape drive" on page 25 for more information.
F2	Drive sled not present	Make sure that the drive sled is correctly installed in the autoloader and that all associated cables are properly connected, then retry the operation. If the error recurs, replace the tape drive. See "Removing a tape drive" on page 25 for more information.
F3	Drive hardware error	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the tape drive. See "Removing a tape drive" on page 25 for more information.
F4	Drive load timeout	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the tape drive. See "Removing a tape drive" on page 25 for more information.
F5	Drive unload timeout	Cycle the server and autoloader power and try the operation again. If the error recurs, replace the tape drive. See "Removing a tape drive" on page 25 for more information.

Table 13. Robotics suberror codes

Suberror code	Description
01	Mechanical initialization failure
02	Connection to slave robotic failed
03	Error motor initialization
04	Error during gripper close
05	Error slider home positioning
06	Error elevator home movement
07	Error during sled movement to rotation position
08	Error during rotation initialization, get range failed
09	Error elevator init
0A	Error during rotation to far position
0B	Error first sled init, move to sensor failed
0C	Error during sled movement to rotation position
0D	Error during rotation to drive position
0E	Error slider init, get range failed
0F	Error during slider forward movement
10	Error gripper init, get range failed

Table 13. Robotics suberror codes (continued)

Suberror code	Description
11	Error during slider home movement
12	Error during rotation to FAR position
13	Error sled init, move to sensor failed
20	Error Inventory scan
21	Error during gripper close
22	Error slider home movement
23	Error during move gripper to scan position
24	Error reading barcode label
28	Error Extra inventory scan
29	Error during closing gripper
2A	Error slider preposition movement
2B	Error during opening gripper
2C	Error during sled movement up to sensor
2D	Error slider preposition backwards movement
30	Error slot preposition
31	Error during sled movement in FLMoveRotation function
32	Command sending to robotic failed
33	Error during elevator movement in FLMoveRotation function
34	Error during rotation in FLMoveRotation function
35	Error during elevator movement in FLMoveSled function
36	Error during sled movement in FLMoveSled function
37	Error during sled positioning to sensor in FLMoveSled function
38	Error during sled positioning to mail slot in FLMoveSled function
39	Error during sled positioning without sensor
40	Movement to/from slot failed
41	Error during first slider movement
42	Error during first gripper movement
43	Error during second slider movement
44	Error during second gripper movement: get range failed
45	Error during third slider movement: move home failed
50	Preposition to drive failed
51	Elevator movement to home sensor failed
52	Sled movement to home sensor failed
53	Error during sled movement to drive position
54	Error during rotation to drive position
55	Error during elevator movement to drive position
56	Error during sled movement to rotation position
57	Error during rotation to end position
60	Move to or from drive failed
61	Error during first slider movement

Table 13. Robotics suberror codes (continued)

Suberror code	Description
62	Error during first gripper movement
63	Error during second slider movement
64	Error during second gripper movement: get range failed
65	Error during third slider movement: move home failed
70	Release magazine failed
71	Error during sled movement to rotation position
72	Error during rotation to unlock position
73	Error during move sled to block
80	Open I/O slot failed
81	Error during movement to I/O slot open position
82	Error during move back: sensor was found
90	Movement to home position failed
91	Elevator movement to home position failed
92	Error during sled movement to rotation position
93	Error during rotation to home or far position
94	Sled movement to home sensor position failed
95	Sled movement to transport position failed
A0	Movement of I/O slot failed
A1	Sled movement to sensor failed
A2	Sled movement to rotation position failed
A3	Elevator movement to home position failed
A4	Error during rotation to far position
A5	Sled movement to I/O slot position failed

Table 14. Library suberror codes

Suberror code	Description
81	Drive wake up failed
88	Error accessing slot status
90	Accessor load did not reach Cartridge Present sensor
91	No activity after Load command
92	Timeout while loading tape
93	No activity after load command
94	Timeout drive Unload
95	Drive terminated unsuccessfully
96	Tape not ejected at robot unload
97	Slot not free at robot unload

Appendix C. 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.

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 website 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.

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/>.

Getting help and information from the World Wide Web

On the World Wide Web, the IBM website 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/>.

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).

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 Business Partners** 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.

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

Appendix D. IBM Statement of Limited Warranty Z125-4753-10 08/2008

Part 1 - General Terms

This Statement of Limited Warranty includes Part 1 - General Terms, Part 2 - Country-unique Terms, and Part 3 - Warranty Information. The terms of Part 2 replace or modify those of Part 1. For purposes of this Statement of Limited Warranty, "IBM" means the IBM entity that provided your Machine to you or to your reseller—for example, International Business Machines Corporation in the U.S. or IBM World Trade Corporation or the local IBM entity in your country.

The warranties provided by IBM in this Statement of Limited Warranty apply only to Machines you purchase for your use, and not for resale. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. The term "Machine" does not include any software programs, whether pre-loaded with the Machine, installed subsequently, or otherwise. **NOTHING IN THIS STATEMENT OF LIMITED WARRANTY AFFECTS ANY STATUTORY RIGHTS OF CONSUMERS THAT CANNOT BE WAIVED OR LIMITED BY CONTRACT.**

This Statement of Limited Warranty is available, in multiple languages, at the following IBM Internet website: http://www.ibm.com/systems/support/machine_warranties/.

What this Warranty Covers

IBM warrants that each Machine is free from defects in materials and workmanship and conforms to its Specifications. "Specifications" is information specific to a Machine in a document entitled "Official Published Specifications", which is available upon request.

During the warranty period, IBM provides repair and exchange service for the Machine under the type of warranty service IBM designates for the Machine. The warranty period for the Machine is a fixed period starting on its original Date of Installation. The date on your purchase invoice or sales receipt is the Date of Installation unless IBM or your reseller informs you otherwise. The warranty period, type of warranty, and service level that apply to your Machine are designated in Part 3.

Many features, conversions, or upgrades involve the removal of parts and their return to IBM. An IBM part that replaces a removed part will assume the warranty service status of the removed part. An IBM part that is added to a Machine without replacing a previously-installed part is subject to warranty effective on its Date of Installation. Unless IBM specifies otherwise, the warranty period, type of warranty, and service level of such part is the same as the Machine on which it is installed.

Unless IBM specifies otherwise, these warranties apply only in the country or region in which you purchased the Machine.

THESE WARRANTIES ARE YOUR EXCLUSIVE WARRANTIES AND REPLACE ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED,

INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND ANY WARRANTY OF TITLE OR NON-INFRINGEMENT. SOME STATES OR JURISDICTIONS DO NOT ALLOW THE EXCLUSION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU. IN THAT EVENT, SUCH WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD. SOME STATES OR JURISDICTIONS DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

What this Warranty Does not Cover

This warranty does not cover the following:

- a. failure or damage resulting from misuse (including, but not limited to, use of any Machine capacity or capability, other than that authorized by IBM in writing), accident, modification, unsuitable physical or operating environment, operation in other than the specified operating environment or improper maintenance by you or a third party;
- b. failure due to events beyond IBM's control;
- c. failure caused by a product for which IBM is not responsible;
- d. any non-IBM products, including those provided with, or installed on, an IBM Machine at your request;
- e. accessories, supply items and consumables (e.g. batteries and printer cartridges), and structural parts (e.g. frames and covers);
- f. service of Machine alterations; and
- g. service of a Machine on which you are using capacity or capability, other than that authorized by IBM in writing.

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

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

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

How to Obtain Warranty Service

If the Machine does not function as warranted during the warranty period, refer to the service documentation that shipped with your Machine for support assistance and problem determination procedures. A copy of the service documentation for your Machine can also be found at the following IBM website:
<http://www.ibm.com> under "Support and downloads".

If you are unable to resolve your problem with the service documentation, contact IBM or your reseller to obtain warranty service. Contact information for IBM is provided in Part 3. If you do not register the Machine with IBM, you may be required to present proof of purchase as evidence of your entitlement to warranty service.

What IBM Will Do to Correct Problems

IBM will attempt to diagnose and resolve your problem over the telephone or electronically by access to an IBM Internet website. Certain Machines contain remote support capabilities for direct problem reporting, remote problem determination, and resolution with IBM. When you contact IBM for service, you must follow the problem determination and resolution procedures that IBM specifies. Following problem determination, if IBM determines on-site service is required, a service technician will be scheduled for service at your location.

You are responsible for downloading or obtaining from IBM, and installing designated Machine Code (microcode, basic input/output system code (called "BIOS"), utility programs, device drivers, and diagnostics delivered with an IBM Machine) and other software updates in a timely manner from an IBM Internet website or from other electronic media, and following the instructions that IBM provides. You may request IBM to install Machine Code changes, however, you may be charged for that service.

Some parts of IBM Machines are designated as Customer Replaceable Units ("CRUs"). If your problem can be resolved with a CRU (e.g. keyboard, memory, hard disk drive), IBM will ship the CRU to you for you to install.

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

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

Exchange of a Machine or Part

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

Your Additional Responsibilities

You agree:

- a. before IBM or its subcontractor or the reseller exchanges a Machine or part, to remove all features, parts, options, alterations, and attachments not under warranty service and ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange;
- b. to obtain authorization from the owner to have IBM or its subcontractor or the reseller service a Machine that you do not own;

- c. where applicable, before service is provided:
 1. follow the service request procedures that IBM or its subcontractor or its reseller provides;
 2. backup and secure all programs, data, and funds contained in the Machine; and
 3. inform IBM or its subcontractor or the reseller of changes in the Machine's location;
- d. to provide IBM or its subcontractor or the reseller with sufficient and safe access to your facilities to permit IBM to fulfill its obligations;
- e. to allow IBM or its subcontractor or the reseller to install mandatory engineering changes, such as those required for safety;
- f. when the type of warranty service requires that you deliver a failing Machine to IBM, you agree to ship it suitably packaged, as IBM specifies, to a location IBM designates. After the Machine has been repaired or exchanged, IBM will return the repaired Machine or provide a replacement Machine to you at its expense, unless IBM specifies otherwise. IBM is responsible for loss of, or damage to, your Machine only while it is 1) in IBM's possession; or 2) in transit in those cases where IBM is responsible for the transportation charges; and
- g. to securely erase from any Machine you return to IBM for any reason all programs not provided by IBM with the Machine, and data, including without limitation the following: 1) information about identified or identifiable individuals or legal entities ("Personal Data"); and 2) your confidential or proprietary information and other data. If removing or deleting Personal Data is not possible, you agree to transform such information (e.g., by making it anonymous or encrypting it) so that it no longer qualifies as Personal Data under applicable law. You also agree to remove all funds from Machines returned to IBM. IBM is not responsible for any funds, programs not provided by IBM with the Machine, or data contained in a Machine that you return to IBM. You acknowledge that, to perform its responsibilities under this Statement of Limited Warranty, IBM may ship all or part of the Machine or its software to other IBM or third party locations around the world, and you authorize IBM to do so.

Limitation of Liability

Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. Regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), except for any liability that cannot be waived or limited by applicable laws, IBM's entire liability for all claims in the aggregate arising from or related to each Product will not exceed:

- a. damages for bodily injury (including death) and damage to real property and tangible personal property; and
- b. the amount of any other actual direct damages, up to the charges (if recurring, 12 months' charges apply) for the Machine that is subject of the claim. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code ("LIC").

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

**UNDER NO CIRCUMSTANCES IS IBM OR ITS SUPPLIERS,
SUBCONTRACTORS, OR RESELLERS LIABLE FOR ANY OF THE**

FOLLOWING EVEN IF INFORMED OF THEIR POSSIBILITY: 1) THIRD PARTY CLAIMS AGAINST YOU FOR DAMAGES (OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE); 2) LOSS OF, OR DAMAGE TO, DATA; 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; OR 4) LOST PROFITS, BUSINESS, REVENUE, GOODWILL OR ANTICIPATED SAVINGS. SOME STATES OR JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

Governing Law

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

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

Jurisdiction

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

Part 2 - Country-unique Terms

AMERICAS

Jurisdiction:

The following sentence is added to this section as it applies to countries in bold print below:

Any litigation arising from this Statement of Limited Warranty will be settled exclusively by 1) in **Argentina**; the Ordinary Commercial Court of the city of Buenos Aires; 2) in **Bolivia**; the courts of the city of La Paz; 3) in **Brazil**; court of Rio de Janeiro, RJ; 4) in **Chile**; the Civil Courts of Justice of Santiago; 5) in **Colombia**; the Judges of the Republic of Colombia; 6) in **Ecuador**; the civil judges of Quito for executory or summary proceedings (as applicable); 7) in **Mexico**; the courts located in Mexico City, Federal District; 8) in **Paraguay**; the courts of the city of Asuncion; 9) in **Peru**; the judges and tribunals of the judicial district of Lima, Cercado; 10) in **Uruguay**; the courts of the city of Montevideo; 11) in **Venezuela**; the courts of the metropolitan area of the city of Caracas.

BRAZIL

Exchange of a Machine or Part:

Delete the last sentence:

The replacement assumes the warranty service status of the replaced item.

CANADA

What this Warranty Covers:

The following replaces the 2nd paragraph to this section:

During the warranty period, IBM provides repair and exchange service for the Machine under the type of warranty service IBM designates for the Machine. The warranty period for the Machine is a fixed period starting on its original Date of Installation. The date on your purchase invoice or sales receipt is the Date of Installation unless IBM informs you otherwise. The warranty period, type of warranty, and service level that apply to your Machine are designated in Part 3.

Limitation of Liability:

The following replaces item a and item b of this section:

- a. damages for bodily injury (including death) or physical harm to real property and tangible personal property caused by IBM's negligence; and
- b. the amount of any other actual direct damages, up to the greater of \$100,000.00 or the charges (if recurring, 12 months' charges apply) for the Machine that is subject of the claim. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code ("LIC").

Governing Law:

The following replaces "laws of the country in which you acquired the Machine" in the first sentence:

laws in the Province of Ontario.

PERU**Limitation of Liability:**

The following is added at the end of this section:

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

UNITED STATES**Governing Law:**

The following replaces "laws of the country in which you acquired the Machine" in the first sentence:

laws of the State of New York

ASIA PACIFIC**AUSTRALIA****What this Warranty Covers:**

The following paragraph is added to this section:

The warranties specified in this Section are in addition to any rights you may have under the Trade Practices Act 1974 or other similar legislation and are only limited to the extent permitted by the applicable legislation.

Limitation of Liability:

The following is added to this section:

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

Governing Law:

The following replaces "laws of the country in which you acquired the Machine" in the first sentence:

laws of the State or Territory

CAMBODIA AND LAOS

Governing Law:

The following replaces "laws of the country in which you acquired the Machine" in the first sentence:

laws of the State of New York, United States of America

CAMBODIA, INDONESIA AND LAOS

Arbitration:

The following is added under this heading:

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

The number of arbitrators shall be three, with each side to the dispute being entitled to appoint one arbitrator. The two arbitrators appointed by the parties shall appoint a third arbitrator who shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the SIAC. Other vacancies shall be filled by the respective nominating party. Proceedings shall continue from the stage they were at when the vacancy occurred.

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

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

HONG KONG S.A.R.

As applies to transactions initiated and performed in Hong Kong S.A.R., phrases throughout this Agreement containing the word “country” (for example, “country of purchase” and “country of Installation”) are replaced with “Hong Kong S.A.R.”

INDIA

Limitation of Liability:

The following replaces item a and item b of this section:

- a. liability for bodily injury (including death) or damage to real property and tangible personal property will be limited to that caused by IBM's negligence; and
- b. as to any other actual damage arising in any situation involving nonperformance by IBM pursuant to, or in any way related to the subject of this Statement of Limited Warranty, the charge paid by you for the individual Machine that is the subject of the claim. For purposes of this item, the term “Machine” includes Machine Code and Licensed Internal Code (“LIC”).

Arbitration:

The following is added under this heading:

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

The number of arbitrators shall be three, with each side to the dispute being entitled to appoint one arbitrator. The two arbitrators appointed by the parties shall appoint a third arbitrator who shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the Bar Council of India. Other vacancies shall be filled by the respective nominating party. Proceedings shall continue from the stage they were at when the vacancy occurred.

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

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

JAPAN

Governing Law:

The following sentence is added to this section:

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

MACAU S.A.R.

As applies to transactions initiated and performed in Macau S.A.R., phrases throughout this Agreement containing the word “country” (for example, “country of purchase” and “country of Installation”) are replaced with “Macau S.A.R.”

MALAYSIA

Limitation of Liability:

The word “SPECIAL” in item 3 of the last paragraph is deleted.

NEW ZEALAND

What this Warranty Covers:

The following paragraph is added to this section:

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

Limitation of Liability:

The following is added to this section:

Where Machines are not acquired for the purposes of a business as defined in the Consumer Guarantees Act 1993, the limitations in this Section are subject to the limitations in that Act.

PEOPLE'S REPUBLIC OF CHINA (PRC)

Governing Law:

The following replaces “laws of the country in which you acquired the Machine” in the first sentence:

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

PHILIPPINES

Limitation of Liability:

Item 3 in the last paragraph is replaced by the following:

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

Arbitration:

The following is added under this heading:

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

The number of arbitrators shall be three, with each side to the dispute being entitled to appoint one arbitrator. The two arbitrators appointed by the parties shall appoint a third arbitrator who shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the Philippine Dispute Resolution Center, Inc. Other vacancies shall be filled by the respective nominating party. Proceedings shall continue from the stage they were at when the vacancy occurred.

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

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

SINGAPORE**Limitation of Liability:**

The words "SPECIAL" and "ECONOMIC" in item 3 in the last paragraph are deleted.

EUROPE, MIDDLE EAST, AFRICA (EMEA)**THE FOLLOWING TERMS APPLY TO ALL EMEA COUNTRIES:**

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

How to Obtain Warranty Service:

*Add the following paragraphs in **Western Europe** (Andorra, Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Netherlands, Norway, Poland, Portugal, Romania, San Marino, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom, Vatican State, and any country subsequently added to the European Union, as from the date of accession):*

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

If you purchase a Machine in one of the Western European countries, as defined above, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from

IBM, provided the Machine has been announced and made available by IBM in the country in which you wish to obtain service.

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

Governing Law:

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

1) "the laws of Austria" in **Albania, Armenia, Azerbaijan, Belarus, Bosnia-Herzegovina, Bulgaria, Croatia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, FYR Macedonia, Moldova, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan;** 2) "the laws of France" in **Algeria, Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Comoros, Congo Republic, Djibouti, Democratic Republic of Congo, Equatorial Guinea, French Guiana, French Polynesia, Gabon, Gambia, Guinea, Guinea-Bissau, Ivory Coast, Lebanon, Libya, Madagascar, Mali, Mauritania, Mauritius, Mayotte, Morocco, New Caledonia, Niger, Reunion, Senegal, Seychelles, Togo, Tunisia, Vanuatu, and Wallis & Futuna;** 3) "the laws of Finland" in **Estonia, Latvia, and Lithuania;** 4) "the laws of England" in **Angola, Bahrain, Botswana, Burundi, Egypt, Eritrea, Ethiopia, Ghana, Jordan, Kenya, Kuwait, Liberia, Malawi, Malta, Mozambique, Nigeria, Oman, Pakistan, Qatar, Rwanda, Sao Tome, Saudi Arabia, Sierra Leone, Somalia, Tanzania, Uganda, United Arab Emirates, the United Kingdom, West Bank/Gaza, Yemen, Zambia, and Zimbabwe;** 5) "the laws of South Africa" in **South Africa, Namibia, Lesotho and Swaziland;** 6) "the laws of Switzerland" in **Liechtenstein;** and 7) "the laws of Czech republic" in **Czech republic.**

Jurisdiction:

The following exceptions are added to this section:

1) In **Austria;** the choice of jurisdiction for all disputes arising out of this Statement of Limited Warranty and relating thereto, including its existence, will be the competent court of law in Vienna, Austria (Inner-City); 2) in **Angola, Bahrain, Botswana, Burundi, Egypt, Eritrea, Ethiopia, Ghana, Jordan, Kenya, Kuwait, Liberia, Malawi, Malta, Mozambique, Nigeria, Oman, Pakistan, Qatar, Rwanda, Sao Tome, Saudi Arabia, Sierra Leone, Somalia, Tanzania, Uganda, United Arab Emirates, United Kingdom, West Bank/Gaza, Yemen, Zambia, and Zimbabwe;** all disputes arising out of this Statement of Limited Warranty or related to its execution, including summary proceedings, will be submitted to the exclusive jurisdiction of the English courts; 3) in **Belgium and Luxembourg;** all disputes arising out of this Statement of Limited Warranty or related to its interpretation or its execution, the law, and the courts of the capital city, of the country of your registered office and/or commercial site location only are competent; 4) in **France, Algeria, Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Comoros, Congo Republic, Djibouti, Democratic Republic of Congo, Equatorial Guinea, French Guiana, French Polynesia, Gabon, Gambia, Guinea, Guinea-Bissau, Ivory Coast, Lebanon, Libya, Madagascar, Mali, Mauritania, Mauritius, Mayotte, Morocco, New Caledonia, Niger, Reunion, Senegal,**

Seychelles, Togo, Tunisia, Vanuatu, and Wallis & Futuna; all disputes arising out of this Statement of Limited Warranty or related to its violation or execution, including summary proceedings, will be settled exclusively by the Commercial Court of Paris; 5) in **South Africa, Namibia, Lesotho and Swaziland**; both of us agree to submit all disputes relating to this Statement of Limited Warranty to the jurisdiction of the High Court in Johannesburg; 6) in **Turkey**; all disputes arising out of or in connection with this Statement of Limited Warranty shall be resolved by the Istanbul Central (Sultanahmet) Courts and Execution Directorates of Istanbul, the Republic of Turkey; 7) in each of the following specified countries, any legal claim arising out of this Statement of Limited Warranty will be brought before, and settled exclusively by, the competent court of a) Athens for **Greece**, b) Tel Aviv-Jaffa for **Israel**, c) Milan for **Italy**, d) Lisbon for **Portugal**, and e) Madrid for **Spain**; 8) in **the United Kingdom**; both of us agree to submit all disputes relating to this Statement of Limited Warranty to the exclusive jurisdiction of the English courts; 9) in **Liechtenstein**; all of our rights, duties, and obligations are settled exclusively by the competent court of Zurich; and 10) "to the competent courts of Czech republic".

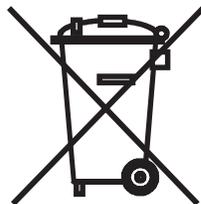
Arbitration:

The following is added under this heading:

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

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

EUROPEAN UNION (EU) BATTERY DIRECTIVE



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.

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.

The retail price of batteries, accumulators and power cells includes the cost of the environmental management of their waste. For proper collection and treatment, contact your local IBM representative.

THE FOLLOWING TERMS APPLY TO ALL EU COUNTRIES:

The warranty for Machines acquired in EU countries is valid and applicable in all EU countries provided the Machines have been announced and made available in such countries.

DENMARK, FINLAND, GREECE, ITALY, LIECHTENSTEIN, NETHERLANDS, NORWAY, PORTUGAL, SPAIN, SWEDEN AND SWITZERLAND

Limitation of Liability:

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

Except as otherwise provided by mandatory law:

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

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

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

FRANCE AND BELGIUM

Limitation of Liability:

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

Except as otherwise provided by mandatory law:

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

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

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

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

THE FOLLOWING TERMS APPLY TO THE COUNTRY SPECIFIED:

AUSTRIA AND GERMANY

What this Warranty Covers:

The following replaces the first sentence of the first paragraph of this section:

The warranty for an IBM Machine covers the functionality of the Machine for its normal use and the Machine's conformity to its Specifications.

The following paragraph is added to this section:

The minimum warranty period for Machines is 12 months. In case IBM or your reseller is unable to repair an IBM Machine, you can alternatively ask for a price

reduction as far as justified by the reduced value of the unrepaired Machine or ask for a cancellation of the respective agreement for such Machine and get your money refunded.

The second paragraph does not apply.

What IBM Will Do to Correct Problems:

The following is added to this section:

During the warranty period, transportation for the delivery of the failing Machine to IBM will be at IBM's expense.

Limitation of Liability:

The following paragraph is added to this section:

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

The following sentence is added to the end of item "b":

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

IRELAND

What this Warranty Covers:

The following is added to this section:

Except as expressly provided in these terms and conditions or Section 12 of the Sale of Goods Act 1893 as amended by the Sale of Goods and Supply of Services Act, 1980 ("the 1980 Act"), all conditions or warranties (express or implied, statutory or otherwise) are hereby excluded including, without limitation, any warranties implied by the Sale of Goods Act 1893 as amended by the 1980 Act (including, for the avoidance of doubt, section 39 of the 1980 Act).

Limitation of Liability:

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

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

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

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

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

Items for Which IBM is Not Liable

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

- a. loss of, or damage to, data;
- b. special, indirect, or consequential loss; or
- c. loss of profits, business, revenue, goodwill, or anticipated savings.

SOUTH AFRICA, NAMIBIA, BOTSWANA, LESOTHO AND SWAZILAND

Limitation of Liability:

The following is added to this section:

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

TURKEY

What this Warranty Covers:

The following is added to this section:

The minimum warranty period for Machines is 2 years.

UNITED KINGDOM

Limitation of Liability:

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

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

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

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

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

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

Items for Which IBM is Not Liable

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

- a. loss of, or damage to, data;
- b. special, indirect, or consequential loss;
- c. loss of profits, business, revenue, goodwill, or anticipated savings; or
- d. third party claims against you for damages.

Part 3 - Warranty Information

Country of Purchase	Warranty Period	Type of Warranty Service*
Worldwide	3 years	5
* See "Types of Warranty Service" for an explanation of warranty-service types.		

Scheduling of a warranty service will depend upon the following: 1) the time your request for service is received, 2) Machine technology and redundancy, and 3) availability of parts. Contact your local IBM representative or the subcontractor or reseller performing services on behalf of IBM for country and location specific information.

Types of Warranty Service

Type 1 - Customer Replaceable Unit ("CRU") Service

IBM provides replacement CRUs to you for you to install. CRU information and replacement instructions are shipped with your Machine and are available from IBM at any time on your request. CRUs are designated as being either a Tier 1 (mandatory) or a Tier 2 (optional) CRU. Installation of a Tier 1 CRU is your responsibility. If IBM installs a Tier 1

CRU at your request, you will be charged for the installation. You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service designated for your Machine. IBM specifies in the materials shipped with a replacement CRU whether a defective CRU must be returned to IBM. When return is required, 1) return instructions and a container are shipped with the replacement CRU, and 2) you may be charged for the replacement CRU if IBM does not receive the defective CRU within 15 days of your receipt of the replacement.

Type 5 - CRU and On-site Service

At IBM's discretion you will receive CRU service or IBM or your reseller will repair the failing Machine at your location and verify its operation. You must provide suitable working area to allow disassembly and reassembly of the IBM Machine. The area must be clean, well lit and suitable for the purpose.

Type 6 - CRU and Courier or Depot Service

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

Type 7 - CRU and Customer Carry-In or Mail-In Service

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

Type 8 - CRU and Machine Exchange Service

At IBM's discretion you will receive specified CRU service or IBM will initiate shipment of a replacement Machine to your location. You must pack the failing Machine into the shipping container that contained the replacement Machine and return the failing Machine to IBM. Transportation charges, both ways, are paid by IBM. You may be charged for the replacement Machine if IBM does not receive the failing Machine within 15 days of your receipt of the replacement Machine. You are responsible for its installation and verification of operation.

Service Levels

Service levels specified below are response-time objectives only and are not guarantees. The specified service level may not be available in all worldwide locations. Charges may apply outside IBM's normal service area. Response times are based on local standard business days and working hours. Unless otherwise specified, all responses are measured from the time the customer contacts IBM for problem determination until IBM has resolved the problem remotely or scheduled service to be performed. Same Business Day Warranty Service (SBD) is based on local standard business days and working hours. Next Business Day Warranty Service (NBD) is based on commercially reasonable effort.

IBM encourages you to use available remote support technologies. Failure to install and use available remote connectivity tools and equipment for direct problem

reporting, remote problem determination and resolution may result in an increased service level response-time due to resource requirements.

1. Next Business Day (NBD), 9X5
2. Same Business Day (SBD), 9X5
3. Same Day (SD), 24X7

IBM Contact Information

For IBM in Canada or the United States, call 1-800-IBM-SERV (or 1-800-426-7378). For IBM in the European Union (EU), Asia Pacific, and Latin America countries, contact IBM in that country or visit the IBM Directory of Worldwide Contacts at the following IBM Internet website: <http://www.ibm.com/planetwide/>.

Appendix E. Notices

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

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

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.

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.

IBM makes no representation or warranties regarding non-IBM products and services that are ServerProven[®], including but not limited to the implied warranties of merchantability and fitness for a particular purpose. These products are offered and warranted solely by third parties.

IBM makes no representations or warranties with respect to non-IBM products. Support (if any) for the non-IBM products is provided by the third party, not IBM.

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

Particulate contamination

Attention: Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the tape autoloader that is described in this document. Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the tape autoloader to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If IBM determines that the levels of particulates or gases in your environment have caused damage to the tape autoloader, IBM may condition provision of repair or replacement of tape autoloader or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

Table 15. Limits for particulates and gases

Contaminant	Limits
Particulate	<ul style="list-style-type: none"> • The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2¹. • Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282. • The deliquescent relative humidity of the particulate contamination must be more than 60%². • The room must be free of conductive contamination such as zinc whiskers.
Gaseous	<ul style="list-style-type: none"> • Copper: Class G1 as per ANSI/ISA 71.04-1985³ • Silver: Corrosion rate of less than 300 Å in 30 days

¹ ASHRAE 52.2-2008 - *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

² The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.

³ ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants*. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.

Documentation format

The publications for this product are in Adobe Portable Document Format (PDF) and should be compliant with accessibility standards. If you experience difficulties when you use the PDF files and want to request a web-based format or accessible PDF document for a publication, direct your mail to the following address:

*Information Development
IBM Corporation
205/A015
3039 E. Cornwallis Road
P.O. Box 12195
Research Triangle Park, North Carolina 27709-2195
U.S.A.*

In the request, be sure to include the publication part number and title.

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Electronic emission notices

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.

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.

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.

Attention: This is an EN 55022 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.

Responsible manufacturer:

International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
914-499-1900

European Community contact:

IBM Technical Regulations, Department M456
IBM-Allee 1, 71137 Ehningen, Germany
Telephone: +49 7032 15-2937
E-mail: tjahn@de.ibm.com

Germany Class A statement

Deutschsprachiger EU Hinweis:

Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der IBM empfohlene Kabel angeschlossen werden. IBM übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der IBM gesteckt/eingebaut werden.

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden: "Warnung: Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen."

Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse A

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:

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Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

Japan VCCI Class A statement

この装置は、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。 VCCI-A

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

Korea Communications Commission (KCC) statement

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

Please note that this equipment has obtained EMC registration for commercial use. In the event that it has been mistakenly sold or purchased, please exchange it for equipment certified for home use.

Russia Electromagnetic Interference (EMI) Class A statement

ВНИМАНИЕ! Настоящее изделие относится к классу А.
В жилых помещениях оно может создавать радиопомехи, для
снижения которых необходимы дополнительные меры

People's Republic of China Class A electronic emission statement

中华人民共和国“A类”警告声明

声 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。

Taiwan Class A compliance 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。

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