LTO Autoloader

IBM

User's Guide

LTO Autoloader

User's Guide

IBM

Note: Before using this information and the product it supports, read the information under Appendix B, "Product warranties and notices" on page B-1.

Contents

Safety

Before installing this product, read the Safety Information.

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

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

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje 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」。

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Chapter 1. Installation and user's guide

The IBM® LTO autoloader is an automated storage and retrieval system that comes with a preinstalled LTO tape drive, three fixed-cartridge slots, and a removable magazine that can hold six additional tape cartridges. You can connect the autoloader to a server externally, or you can install the autoloader in a server rack on a fixed shelf.

The autoloader complies with the ANSI standard for the SCSI-3 LVD (low-voltage differential) interface and has industry-standard, 68-pin, external SCSI cable connectors. The tape media format follows ECMA-approved and ANSI-proposed standards.

Autoloader features

In addition to this book, the option kit includes:
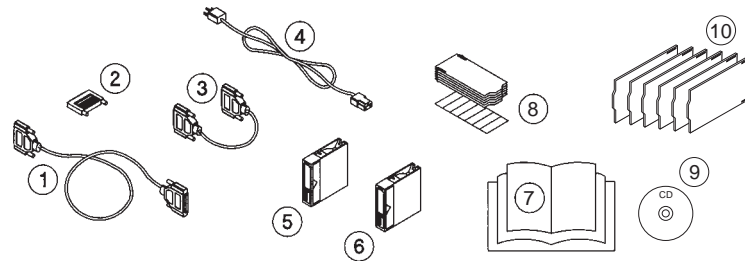
1 SCSI external cable
2 SCSI terminator
3 SCSI jumper cable
4 AC power cord
5 Data cartridge
6 Cleaning cartridge
7 Quick install guide booklet
8 Barcode kit
9 Trial software CDs
10 Information tabs

Before you begin

The autoloader requires the following environmental conditions:
- AC power voltage: autoswitching 100-127 V or 200-240 V. Line frequency: 50-60 Hz.
- Moderate room temperate between 10-35° C (50-95° F).
- Humidity ranging from 20-80%.
- Standalone configuration includes the base enclosure and feet, and requires the following clearances:
  - Back: 56 cm (22 in.) for cooling and service
  - Front: 86 cm (34 in.) for operator access

- A clean, level surface on which to place the autoloader. The weight of the autoloader is approximately 22.7 kg (50 lbs.). Be sure that the surface can support the weight of the autoloader.

Autoloader Views

The following illustrations and descriptions review the front and back panel views of the autoloader.

Front panel view
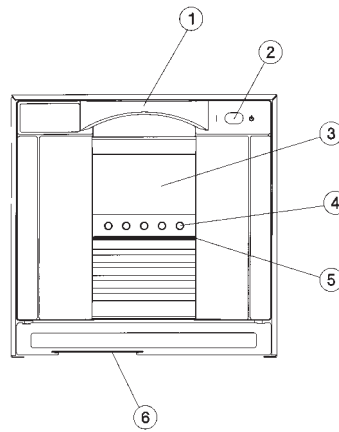
The components shown in the previous illustration include the following.

1 Door handle
2 Power (standby) switch
3 Front panel display
4 Soft-button keys
5 LED status bar
6 Slot for pull-out information tab

Back panel view
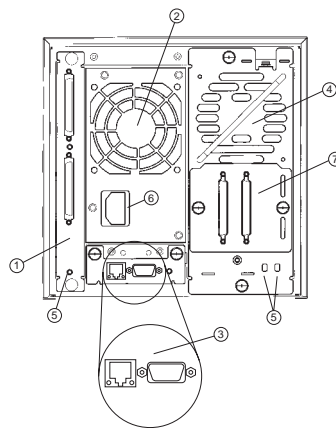
The components shown in the previous illustration include the following.

1 autoloader controller card
2 Power supply
3 Future upgrade
4 Drive module
5 Status LEDs

6 Power cord receptacle
7 SCSI connectors

Internal view
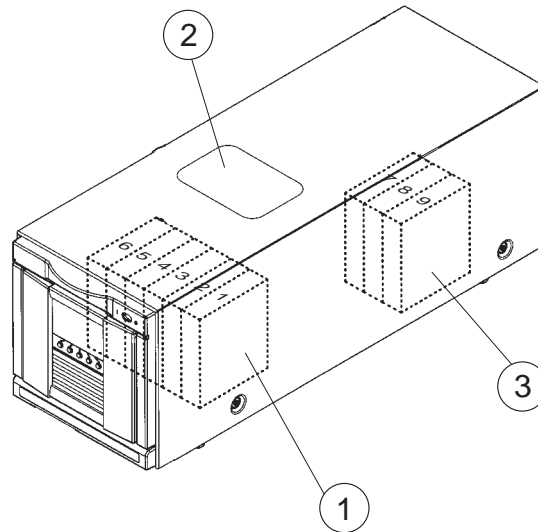
The internal components shown in the previous illustration include the following.

1. Removable magazine with slots numbered 1-6
2. Viewing window on the top of the autoloader
3. Internal back storage slots with slots numbered 7-9

Product features

The autoloader provides the following features:

- Automatic tape operations
- Autoloader status display using the operator control panel (OCP), including:
  - Tape drive status and activity
  - Tape drive error status
  - Magazine slot status
  - Loaded tape-cartridge conditions
- Mode control features:
  - Automatic random access to all tape cartridges
  - Sequential access to tape cartridges in a single cycle
  - Sequential access to tape cartridges in circular cycles
  - An optional autoclean mode that automatically cleans the drive when necessary
- Manual selection of cartridges to be loaded into the tape drive
- SCSI ID selection using the OCP
- Autoloader and tape drive microcode updates using the SCSI bus
- Display of device microcode and hardware revision numbers
- Embedded diagnostic software that displays status for head cleaning, autoloader, and tape drive operation and provides test functions to help isolate problems.

Unpacking the autoloader

Before taking the autoloader out of its packaging, inspect the carton for damage that might have occurred during shipment. If you received the autoloader on a pallet, inspect the pallet for damage. Report any damage to the shipper immediately. When you unpack the autoloader, place the unit as close to the installation location as possible.

To prepare the autoloader for installation, remove the internal packaging from the autoloader and install the pull-out information tabs.

Remove the autoloader and its internal packaging

To unpack the autoloader, follow these steps.

1. If you received the autoloader on a pallet, cut the straps that secure the shipping carton to the pallet, and then move the carton off of the pallet.
2. Open the top of the shipping carton by carefully cutting the packing tape.
3. Remove the accessories box from the carton.
4. Remove the packing foam from the top of the autoloader.
   - Statement 4

22.7 kg (50 lbs)
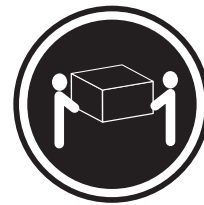
5. With two people lifting the autoloader, remove it from the shipping carton.
6. Remove the autoloader from the shipping bag.
7. Place the autoloader in the installation location.
8. Remove the internal packaging by opening the autoloader front door and pulling the foam packaging out from around the magazine.

   Note: Do not turn on the autoloader before removing the internal packaging or a hard error will result.

Installing the pull-out information tab

Select the tab in the language that you prefer, (for reference see **10** on page 1) and insert it into the slot on the front of the autoloader, as shown in the following illustration. The tab snaps into place when you push it to the back of the slot. This tab contains information on basic autoloader operations.

Note: You might need to forcefully push the tab all the way to the back of the slot in order for it to click completely into place.
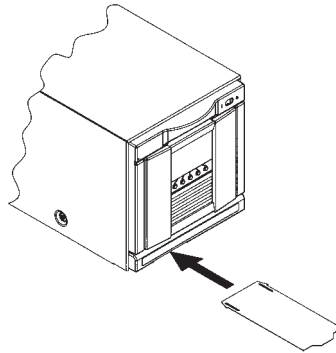
Preparing for installation

Before installing the autoloader, read the following safety statements.

- 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:	To disconnect:
1. Turn everything OFF.	1. Turn everything OFF.
2. First attach all cables to devices.	2. First, remove power cords from outlet.
3. Attach signal cables to connectors.	3. Remove signal cables from connectors.
4. Attach power cords to outlet.	4. Remove all cables from devices.
5. Turn device ON.	

Additional preparation

Do the following to prepare the autoloader for installation.

1. Use proper procedures to prevent electrostatic discharge (ESD). Use wrist-grounding straps and anti-static mats when removing internal components.

2. If your server does not already have an external SCSI connector, you will have to install a SCSI host adapter and compatible software and drivers. Refer to the user manual and installation instructions that came with the SCSI host adaptor.

3. Locate the autoloader in a convenient place or on a fixed rack shelf.

4. Do not connect the autoloader drive to the same SCSI bus as the hard drive, because it will degrade the autoloader performance.

5. Check for available SCSI IDs if you are installing the autoloader onto the same SCSI bus as other devices. You might need to use the front-panel buttons to change the SCSI ID, if you think there will be an ID conflict with other devices.

6. If you have removed the internal packaging and installed the pull-out information tabs as shown in the section "Installing the pull-out information tab" on page 5, then the autoloader is ready for installation.

Installing the autoloader

To connect the autoloader, do the following:

Note: Refer to the following illustration.

1. If the host computer is connected to a network, check with the system administrator before turning off power.
2. Properly turn off all attached devices connected to the host computer.
3. Turn off the host computer.

   Note: When installing cables, use care in handling the SCSI pins. These pins are easily damaged.
4. Install the SCSI jumper cable **3** from the bottom connector on the autoloader controller card to the left connector on the drive module.
5. Install the SCSI terminator **1** to the top connector of the controller card.
6. Install the SCSI cable **4** from the SCSI adapter on the host to the remaining connector on the tape drive module.
7. Connect the power cord, **2**, from the back of the power supply module to a properly grounded outlet. See .

   Note: Remember to remove the internal packaging before turning on the autoloader.
8. Go to the front of the autoloader, and turn it on by pressing the power (standby) switch in the top right corner. After the power-up test completes, you will see the default Home screen on the front panel display (see "Front panel view" on page 2).
9. Set the SCSI IDs for the autoloader and drive if there will be a conflict with the default SCSI IDs.
10. Turn on other devices and then turn on the host.
11. After turning on the autoloader, the following will happen:
    * LED bar (**5** on page 2) flashes solid amber for a few seconds.
    * LED bar flashes green during self-test
    * LED bar flashes green during calibration.
    * LED bar flashes green during inventory of cartridges.
    * LED bar is solid green with Home screen displayed on LCD.
12. Verify that the autoloader is installed correctly by looking for the autoloader and drive devices after turning on the host computer.
    * If you are using Microsoft® Windows NT®, you can see if the autoloader is recognized by clicking **Settings-->Control Panel-->SCSI Adapter** and expanding the device tree to view the autoloader SCSI adapter.
    * Or, during the boot sequence, you can press **Cntrl a** during the SCSI adapter configuration. Select **SCSI Select Utilities** and then select **SCSI Disk Utilitie**s to have the computer retrieve the SCSI bus and display all of the attached SCSI devices.
13. If you do not already have backup/restore software installed, you can install the complementary trial software of your choice by inserting the CD into your

computer CD-ROM drive and following the onscreen instructions.
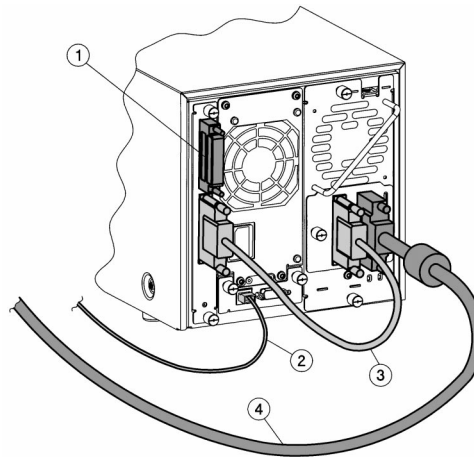
1 Terminator

2 Power cord

3 SCSI jumper cable

4 SCSI interface cable to host

Getting started with the autoloader

After you install the autoloader, perform the following to begin using the autoloader.

- Select the operating mode. From the **Change Configuration** menu, select **Operating Mode**. Select one of the following operating modes: stacker, random, or autodetect.
- Enable the password.
- Set the date and time.

Selecting the operation mode

To select the operation mode, do the following:

- Select **Main-->Administration-->Change Configuration-->Operating Mode**.
- When you enter the Operating Mode menu, the front panel indicates the mode currently selected. To change the operating mode, select one of the following:
  - **Stacker Mode:** Stacker mode enables you to use the autoloader like a standalone drive, without using special automation software and without accessing the autoloader with host SCSI commands. The autoloader automatically unloads and loads tapes from the drive until it unloads the last tape. With this operating mode, you must also select the following:
    - **Circular Mode On/Off:** If the circular mode option has been selected, the autoloader will reload the first tape cartridge after unloading the last tape cartridge. If circular mode is disabled and the last tape cartridge has been unloaded, the autoloader stops operating until the user loads additional tape cartridges.
    - **Autoload On/Off:** If the autoload option is selected, the first available tape loads into the drive at power up. When the host issues a SCSI Unload

command to the drive, the autoloader automatically removes the tape cartridges from the drive and inserts the next available tape.

If the autoloader encounters a cleaning cartridge during the cycle, it will be loaded into the drive as normal, but will be automatically unloaded after the cleaning cycle.

– **Random Mode:** Random mode provides full autoloader functionality with special automation software in the host computer. Tapes can only be loaded to the drive from the front panel, host SCSI commands, or the optional remote management card. The autoloader will not automatically load tapes as it will in stacker mode.

– **Autodetect Mode (Factory Default):** In autodetect mode, the autoloader starts in Stacker mode until it receives a SCSI "changer" command. The autoloader then runs in random mode. The "changer" commands include the following: INITIALIZE ELEMENT STATUS, READ ELEMENT STATUS, POSITION TO ELEMENT, MOVE MEDIA, and EXCHANGE MEDIA.

With this operating mode, you must also select **Circular Mode On/Off**. If the circular mode option is **ON**, the autoloader will reload the first tape cartridge after unloading the last tape cartridge. If circular mode is **OFF** and the last tape cartridge has been unloaded, the autoloader stops operating until the user loads additional tape cartridges.

Note: You must set autoload to **OFF** when in autodetect mode.

Enabling and changing the password

When the autoloader is first installed, the password is inactive. Set a password to protect the system from unauthorized access.

1. To enable and change the password, select **Main Menu--> Administration--> Change Configuration-->Password**.

2. Enter the **Password** menu. A status screen will indicate if a password is enabled.

   • If the password is turned off, select **Set New Password** to enter the new password.

   • If the password is enabled, select **Change Password** to enter the new password.

   • If the password is enabled, select **Turn Password Off** to clear the password.

   Note: The password must be exactly eight digits. If you enter more than eight digits, the ninth digit becomes the first digit of the new password.

3. Select **OK** to save your changes and exit or **Back** to exit without saving your changes.

   Attention: If you forget the password, only a service representative can restore it to the default settings.

Setting the date and time

When the autoloader is initially set up, you must set the date and time. If the autoloader has been unplugged for an extended period and the autoloader displays a partial availability message, you must reset the date and time. To set the date and time, enter the Administration menu, and then do the following steps:

1. Select **Main menu-->Administration-->More-->Set Date and Time**.

2. Enter the Set Date & Time menu.

3. Use the [-] or [+] keys to select the year, month, and day. Use the --> to scroll to the next entry when complete.

4. Set the hour and minutes (00:00:00) using [-] or [+] keys. Use the --> key to scroll over to the next selection. The seconds are automatically set at 00.

5. Use the [-] or [+] keys to substract or add hours for your time zone. (For more information, see the following table.) "UTC" stands for Coordinated Universal Time.

6. Press **OK** to save your changes. Press **Quit** to exit this menu without saving your changes.

   Note: The time does not automatically adjust for time changes, such as daylight savings time.

Code	Time Zone
UTC -12	Eniwetok, Kwajalein
UTC -11	Midway Island, Samoa
UTC -10	Hawaii
UTC -9	Alaska
UTC -8	Pacific Time (US and Canada), Tijuana
UTC -7	Mountain Time (US and Canada), Arizona
UTC -6	Central Time (US and Canada), Saskatchewan, Mexico City, Tegucigalpa
UTC -5	Eastern Time (US and Canada), Bogota, Lima
UTC -4	Atlantic Time (Canada), Caracas, La Paz
UTC -3	Brasilia, Buenos Aires, Georgetown
UTC -2	Mid-Atlantic
UTC -1	Atlantic Ocean
UTC	Great Britain, Lisbon, Monrovia, Casablanca
UTC +1	Berlin, Stockholm, Rome, Bern, Brussels, Vienna, Paris, Madrid, Amsterdam, Prague, Warsaw, Budapest
UTC +2	Athens, Helsinki, Istanbul, Cairo, Eastern Europe, Harare, Pretoria, Israel
UTC +3	Baghdad, Kuwait, Nairobi, Riyadh, Moscow, St. Petersburg, Kazan, Volgograd
UTC +3:30	Tehran
UTC +4	Abu Dhabi, Muscat, Tbilisi
UTC +4:30	Kabul
UTC +5	Islamabad, Karachi, Ekaterinburg, Tashkent
UTC +5:30	Bombay, Calcutta, Madras, New Delhi, Colombo
UTC +6	Almaty, Dhaka
UTC +7	Bangkok, Jakarta, Hanoi
UTC +8	Beijing, Chongqing, Urumqi, Hong Kong, Perth, Singapore, Taipei
UTC +9	Tokyo, Osaka, Sapporo, Seoul, Yakutsk
UTC +9:30	Adelaide, Darwin
UTC +10	Brisbane, Melbourne, Sydney, Guam, Port Moresby, Vladivostock, Hobart
UTC +11	Magadan, Solomon Is., New Caledonia
UTC +12	Fiji, Kamchatka, Marshall Is., Auckland, Wellington

Chapter 2. Autoloader operation

This chapter describes operations of the autoloader.This section describes the operational processes of the following autoloader components:
- Front panel
- Main menu structure
- Tape and drive operations

Using the front panel
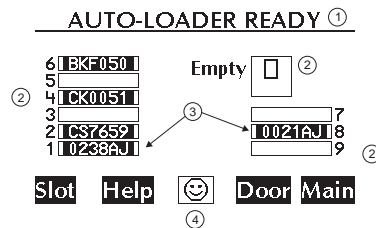
This section describes how to use or the purpose of the following autoloader components:

This LCD display on the control panel provides a drive and autoloader status line at the top, up to five lines of text, and five buttons under the display. The function of the buttons varies between screens.

The display automatically displays to the Home screen. The previous figure shows a typical view of the Home screen. The Home screen shows the following:
- Statement indicating the general condition of the autoloader **1**
- Drive and tape status **2**
- Tape bar codes (if applicable) **3**
- **Slot** to display slot status, bar-code information, and tape locations
- **Help** to display the icons with a description
- An icon, **4** , that indicates the general status of the autoloader. Press the corresponding button to obtain more information about the autoloader status
- **Door** to open the door
- **Main** to go to the **Information**, **Operations**, and **Administration** menus

Panel icon messages

The following illustration shows an example of the LCD display. The following table shows the available icons that display in the LCD.

	Power is off		Online
	Failed, offline		Full and idle
	Needs to be cleaned		Unloading a tape
	Offline		Seeking data on a tape
	Failed, online		Writing data to a tape
	Tape is cleaning a drive		Rewinding a tape
	Tape is write protected		Reading a tape
	Empty		Erasing a tape
	Loading a tape		

	Library status - failed		Library status - partially available
	Library status - healthy		

Menu Commands and structures

This section describes the structure of menu commands.

Menu Command Nesting

Each level of the password-protected menus (**Administration** and **Service**) includes all options available in the subordinate menu. For example, all options available in the **Administration Menu** are also included in the **Service Menu**. This functionality reduces the need to return to the **Main Menu** or re-enter the password. The following figure displays the top level menu items and their corresponding nested submenus.

Note: The front panel display returns to the Home screen if a button is not pressed for 3 minutes.

Understanding the menu structure

The following graphic shows the front panel menu structure.
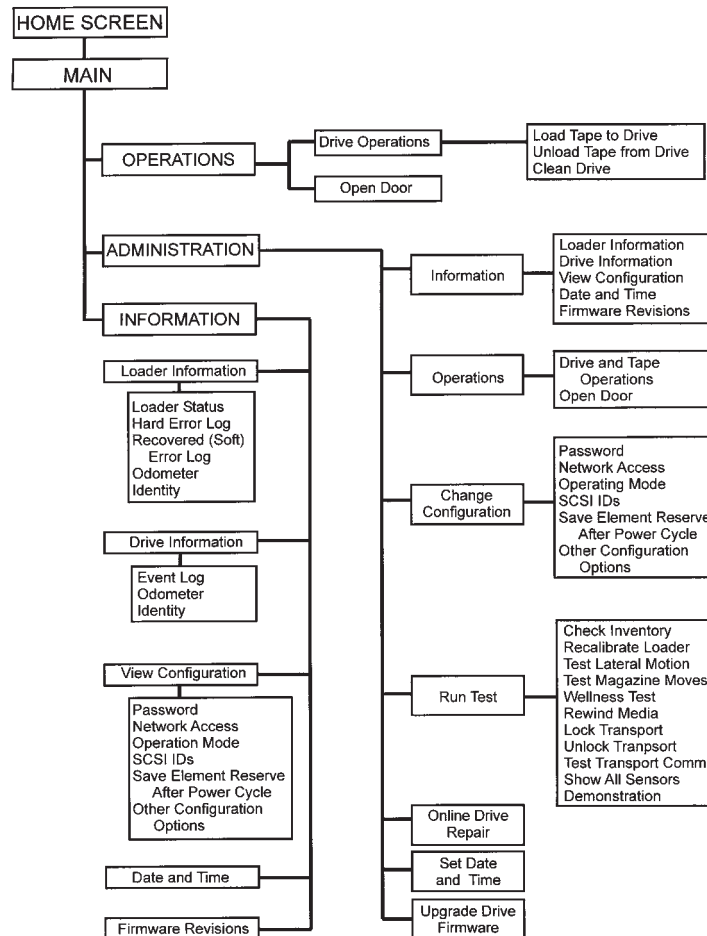
Tape and drive operations

The following sections describe how to access tapes within the autoloader.

Accessing tapes in the autoloader

Tapes in the autoloader can be accessed from the front magazine or the internal back slots. To open the door, do the following:

- Select **Main-->Operations-->Open Door**.
- Pull the door handle down.
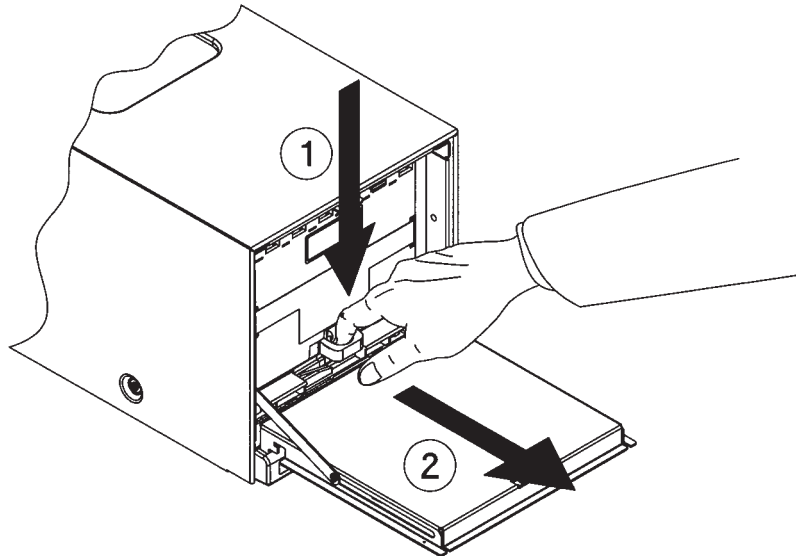
Accessing tapes from the front magazine

Refer to the previous illustration. To access tape cartridges from the front magazine, do the following.

1. Pull the unlocked door down to access the magazine and tapes.
2. Remove the magazine by fully depressing the release button on the bottom of the magazine while pulling the magazine out with the tab.
3. Use the magazine carrying handle to lift it out from the autoloader.
4. To remove a tape, grasp the top and bottom corners of the tape, and pull the tape straight out of the magazine. *Do not* hold the magazine handle down when you are removing tapes. When the handle is depressed, the tapes are locked in place.
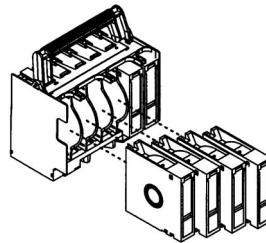
5. To insert a tape, slide the cartridge directly into a slot, ensuring the write-protect switch faces out and at the bottom of the magazine. Push the tape into the slot until it "clicks" into place.
6. Using the magazine tab, guide the magazine into the back of the autoloader by sliding it across the inside of the door until it aligns with the guide tracks and clicks into place. Close the door. The autoloader runs an inventory check.
7. If the tape is not positioned correctly inside the slot, try pushing the tape in again until it clicks into place.

Accessing tapes from the internal back slots

Refer to the following illustration. To access tape cartridges from the internal back slots, do the following.

1. Unplug the power cord from the back of the autoloader.

2. Follow the steps on the previous page to open the door and remove the front magazine. *If you are loading tapes for the first time, ensure you turn the autoloader on, wait until the autoloader is ready and then turn it off before loading any tapes. This procedure moves the transport away from the back slots.*

3. Unload tapes from the internal slots by pressing the tape in until it clicks and releases. Remove the tape after it partially ejects.

   Note: Always remove back tapes by first pushing them in until they click and release. Do not remove back tapes by pulling them straight out.
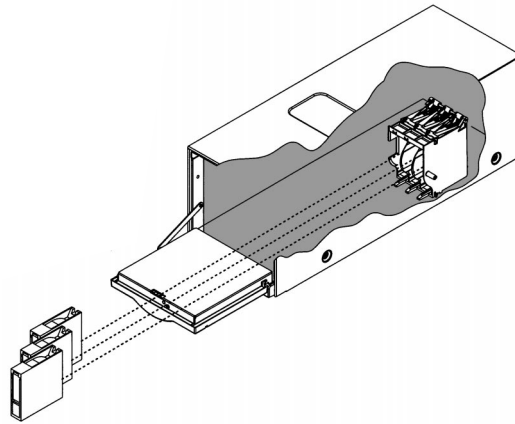

4. With the write-protect switch facing out of the autoloader and at the bottom, load the internal slots by pushing the tape in until it clicks into place.

Drive and tape operations

This section contains information about loading and unloading tapes, cleaning the drive, and moving tapes between slots.

Loading a tape into a drive: To load a tape into a drive, do the following:

1. Select **Main-->Operations-->Drive operations--->Load Tape to Drive**.
2. Use the [-] or [+] key to select any full slot and then select **OK**.
3. Select **Load** to move the tape from a slot to the drive. The drive makes a clicking noise as the tape is being loaded. A status screen indicates that the tape is being loaded.

   Note: To view the slot numbering scheme on the Home screen see "Using the front panel" on page 13.

Unloading a tape from the drive: To unload a tape from the drive, do the following:

1. Select **Main-->Operations-->Drive operations--->Unload Tape from Drive** to move the tape from the drive to the original tape location (the location it occupied before being loaded into the drive). If that slot is occupied, you are prompted to select another slot location.

   The tape automatically rewinds before it is unloaded. A status screen displays autoloader progress as the tape is relocated.

2. From the Drive and Tape Operations menu, select **Menu** to return to the Operations menu.

Cleaning a drive: To clean a drive, do the following:

Note: As an alternative, you can load a cleaning cartridge into one of the fixed slots at the back of the autoloader and let the backup software clean the drive automatically. Refer to the backup software instruction for information on this automatic cleaning process.

1. Install a cleaning cartridge into any vacant slot, and note the location. See "Accessing tapes in the autoloader" on page 15 for more information.
2. Select **Main-->Operations-->Drive Operations-->Clean Drive**.
3. From Choose Cleaning Slot, use the [-] or [+] key to select the slot location of the cleaning tape. Refer to page 1-6, the label inside the autoloader door, or the Home screen for a list of slot numbers.
4. Select **OK**.
5. When the cleaning process is complete, the cleaning tape will be returned to the original slot location. The screen will display the appropriate status information.

Moving tapes between slots

To move tapes between slots, do the following:

1. Select **Main-->Operations-->Move Tape Slot-to-Slot**.
2. Select the slot from which you want to move the tape using the [-] or [+] keys, and press **OK**.
3. Select the slot to which you want to move the tape using the [-] or [+] keys, and then press **OK**. A message displays if the destination slot chosen is reserved or is the original "home" slot for a tape in the drive.
4. A status screen indicates the tape is being moved.

Handling tape cartridges

When using tapes in the autoloader, you need to ensure that the tape media is compatible with the drive. You can damage drives if you try to load incompatible media.

For best results, use IBM brand data and clean cartridges. You can order additional IBM clean and data cartridges by calling 1-800-IBM-MEDIA.

Note: Although you can use other IBM approved data cartridges, use of non-IBM brand clean cartridges is not supported and will cause unsupported clean cartridges to be ejected.

Write-protecting tape cartridges

The use of the write protect switch ensures data safety for files that have been previously written to tape by preventing additional files from being written to that tape.

Labeling tape cartridges

Make it a practice to use bar code labels on your tape cartridges. Your host software might need to keep track of the following information and the associated bar code:

- Date of format or initialization
- Cartridge owner (such as group or department)
- Storage purpose

A complementary set of barcode labels is provided with your purchase. The following illustration shows the proper placement of the barcode label.

24P1913

Maintaining tape cartridges

When maintaining tape cartridges, use the following guidelines.

Do not:

- Expose tape cartridges to magnetic fields.
- Leave cartridges in the drive when autoloader is turned off.
- Expose cartridges to extreme temperatures or humidity. Refer to the documentation with your tape media for appropriate operating and storage temperatures.
- Expose cartridges to moisture or direct sunlight.
- Drop the tape cartridges or subject the cartridges to any physical shock.
- Open the tape cartridge lid and expose the tape to possible contamination or physical damage.
- Touch the tape surface.
- Take the tape cartridges apart.
- Use graphite pencils, water soluble felt pens, or other debris-producing writing instruments to label tape cartridges.
- Erase a label; replace it instead.

Do:

- Remove dust on the outside of tape cartridges with a damp cloth.
- Store cartridges vertically, not horizontally.
- Store tape cartridges in their plastic containers and in the environmental conditions recommended in your tape media documentation.
- Use bar code labels.

Chapter 3. Autoloader configuration

This chapter describes how to configure the autoloader.

Note: After configuring the autoloader, you might need to turn on and off the host computer for it to recognize the new configurations. This process causes the configurations to be saved to permanent memory, which enables the settings to be recovered if the unit is turned off for more than 8 days.

To change the autoloader's configuration, select **Main -->Administration-->Change Configuration**.

Retrieving autoloader information

The following information is available from the Information and Administration front panel menus:

- Autoloader information
- Drive information
- Configuration information
- Date and time
- Firmware revisions

Autoloader information

To view information about the autoloader, select **Main -->Information-->Loader Information**. Then select one of the options in the following table:

Menu Option	Information
Loader Status	Displays information about the overall status of the autoloader and any partial availability flags.
Hard Error Log	Displays a history of unrecoverable errors. Returns a message indicating that there are no hard errors or provides an error entry. Use the **Older** or **Newer** buttons to select an entry.
Recovered (Soft) Error Log	Displays a history of recovered errors. Returns a message indicating that there are no soft entries or supplies an error entry. Use the **Older** or **Newer** buttons to select an entry.
Odometer	Displays the number of times tapes have been moved.
Identity	Displays the autoloader serial number.

Drive Information

To display drive information, select **Main -->Information-->Drive Information**. Then select one of the options in the following table:

Menu Option	Information
Event Log	Displays significant drive events, including drive errors, online and offline transitions, and drive cleaning. This log is even available after removing the drive.
Odometer	Displays a count of cumulative power-on hours, number of times tapes have been loaded into the drive, and power-on cycles.
Identity	Displays drive type, serial number, and firmware revision.

Configuration Information

To view configuration information select **Main -->Information-->View Configuration**. You can then view current information about the drive:

- Password enabled status
- Network access configuration
- Operating mode
- SCSI ID assignments
- Element (drive or slot) reservations
- Other configuration options (prevent media access, restore factory defaults, report recovered error logs, and diagnostic configurations for service only).

Date and time

To view the date and time, select **Main -->Information-->More-->Date and Time**. Access this menu to view the autoloader settings for the date, time, and time zone. Use the **Powered** button to display the date and time when the autoloader was last turned on. See "Setting the date and time" on page 10 for world date and times.

Firmware revisions

To view this menu, select **Main menu-->Information-->Firmware Revisions**. From the Firmware Revisions menu, you can view information about the following:

- Autoloader
- Tape drive

Running autoloader diagnostics tests

Use the following procedure to run internal tests of autoloader functions. The following table describes these tests.

1. Select **Main-->Administration-->More-->Run Test** .
2. From Run Test, use the [-] or [+] key to view available tests.
3. Select **OK** to select the test.
4. Select the number of times this test will run (if more than one cycle is available and desired).
5. Select **Run** to start the test cycle. The test results will display at the conclusion of the test cycle.

   Note: Select **Stop** to halt a running test. The current test cycle completes and the test stops. Stopping the test might take a few minutes.

Test	Description
Check Inventory	Physically scans the entire autoloader to determine the location, status, and barcode information of tapes.
Recalibrate Loader	Performs the power-up self-tests. Each test runs one time per test loop. This test recalibrates the mechanics and clears hard errors, but not the hard error log.
Test Lateral Motion	Moves the transport assembly to a random slot. No tape is required.
Test Magazine Moves	Moves a tape from a random slot to an empty, random slot, and then returns it to the original location.
Wellness Test	Moves a tape from a random slot to an empty drive and back to its original location.
Rewind Media	**Attention:** Do not run this test if the drive contains a tape that is receiving data from the host. Rewinds the tape in the drive.
Lock Transport	Locks the transport assembly in place to enable shipping the autoloader. **Note:** The only way to unlock the transport after you run this test is to run the Unlock Transport test or turn the autoloader off and then on.
Unlock Transport	Unlocks the transport assembly if you want to unlock the transport without turning the autoloader off and on. The transport must have already been locked to use this test.
Test Transport Comm	Exercises the internal infrared communications path between the autoloader controller and the transport microcontroller. Reports the health of this link. If the test passes, the infrared communication link is good.
Show All Sensors	Dynamically displays the state of the door sensor. To toggle the door sensor, open and close the door
Demonstration	**Attention:** Run an inventory check from the host backup application after performing this test because the tapes will be in a different order. Selects a random full storage slot and moves the tape to the drive. The test locates a full slot, a full drive, an empty slot, and then performs an exchange.
Additional Tests Available for Service Personnel	
Empty Drive	Unloads a tape from the drive and returns it to its original location.
Fill Transport	**Attention:** Unload the tape from the transport, and runan inventory check from the backup software after performing this test. Moves a tape from a random storage slot into the transport.
Empty Transport	**Attention:** Run an inventory check from the backup software after performing this test. Moves the tape in the transport back to the original slot, or a different slot if the original position is full. The test passes if the transport is successfully emptied.
Clear Soft Log	Clears all historical data from the Soft Error (recoverable error) Log.
Clear Hard Log	Clears all historical data from the Hard Error (unrecoverable error) Log. This test clears any "Hard Error" indicators on the front panel.
Find Plunge Home	Moves the transport plunge mechanism to the back of the transport assembly.
Clear Hard Log	Clears all historical data from the Hard Error (unrecoverable error) Log. This test clears any "Hard Error" indicators on the front panel.
Find Plunge Home	Moves the transport plunge mechanism to the back of the transport assembly.
Find Lateral Home	Moves the transport to the extreme front right side of the autoloader and then locates slot 2.
Test Lateral Encoder	Moves the transport to the extreme front right side of the autoloader and then to the extreme back right to check the distance and verify the mechanics are moving consistently.

Chapter 4. Autoloader maintenance

This appendix contains information on how to remove and replace different components and parts of the autoloader.

Attention: This autoloader contains very sensitive electronic components. It is important to prevent electrostatic discharge (ESD). Use wrist grounding straps and anti-static mats when removing and replacing cards and internal assemblies.

Removing and replacing parts

Removing and replacing the controller card

Attention: This autoloader contains very sensitive electronic components. It is important to prevent electrostatic discharge (ESD). Use wrist grounding straps and anti-static mats when removing and replacing cards and internal assemblies.

To remove the controller card, do the following:

1. Note the front panel configuration settings so that after you download firmware, you can reset the autoloader configuration settings (see "Chapter 3. Autoloader configuration" on page 21.)
2. Note how the autoloader is connected, and remove all external cables attached to the controller card.
3. Loosen the two thumbscrews at the top of the card with a screwdriver or by hand.
4. Remove the card by gently pulling it straight out from the autoloader.

To replace the controller card, do the following:

1. Align the top and bottom edges of the card with the recessed slots on the left side of the autoloader.
2. Gently slide the controller to the back slot, ensuring that the card aligns with the internal guide tracks.
3. Ensure that the front of the card is flush with the autoloader, and tighten the thumbscrews.
4. Turn on the autoloader.
5. Download new firmware.
6. Configure the autoloader.

Removing and replacing drive modules

This sections explains how to replace a drive module.

Removing the LTO drive module

This section explains how to remove the LTO drive module.

Note: To preserve SCSI communications, do not loosen or remove the SCSI cable connected to the outside of the drive module. The connection to be removed is located inside the drive module.

When the drive module has been successfully taken offline, the LED on the back of the drive will be flashing yellow. To remove the drive module, do the following steps.

1. Verify that the external SCSI cable is securely fastened to the connector plate.

2. Loosen the thumbscrews on each side of the connector plate located in the middle of the drive module. See the following illustration. If this is your fist time loosening the thumbscrews, you may want to use a screwdriver.

3. Gently remove the connector plate and keep the SCSI cable connected.

   CAUTION:
   Use standard precautions for electro-static discharge (ESD) protection.

4. Grasp the ribbon cable that is plugged into the drive module. Remove the cable by pulling the connector to the left. See the following illustration.
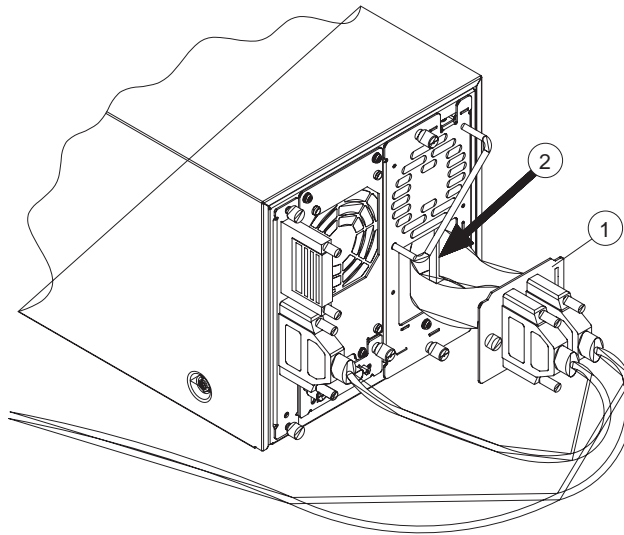
5. Lay the connector assembly to the side, allowing the external cables to hang from the connector. Do not disconnect external cables from the connector plate.

6. Loosen the top and bottom thumbscrews on the drive module. See the following illustration.

7. Using the handle that is mounted on the back of the drive module, pull the drive module straight out with one hand while supporting the bottom of the drive module with the other hand.

   CAUTION:
   As the drive module is pulled out. support the bottom of the drive module to avoid dropping or damaging it.
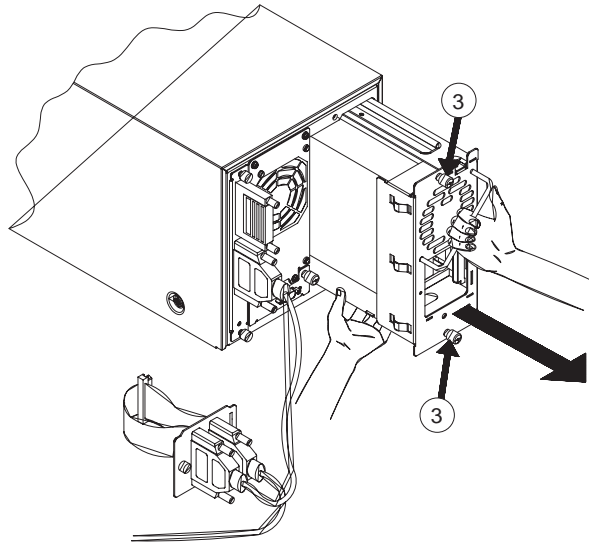
Unloading a tape from a drive

Before replacing a drive, unload any tape from the drive. Do the following steps:

1. Select **Main-->Operations-->Drive and tape operation--> Unload tape from Drive.**

2. The tape is automatically rewound before it is unloaded.

Installing a drive module

To install a drive module, do the following:

1. Hold the drive module with one hand on the drive module handle while the other hand supports the drive.

2. Install the drive by inserting the rail at the top of the drive module into the slot at the top of the drive module opening. There is some resistance as the drive connector engages with the connector on the autoloader.

3. Tighten the top and bottom thumbscrews by hand, securing the drive module into the autoloader.

4. Connect the ribbon connector to the back of the drive module.

5. Gently fold the ribbon cable (attached to the plate and SCSI cable) into the back of the drive module.

6. Holding the connector plate in place, tighten the thumbscrews by hand.
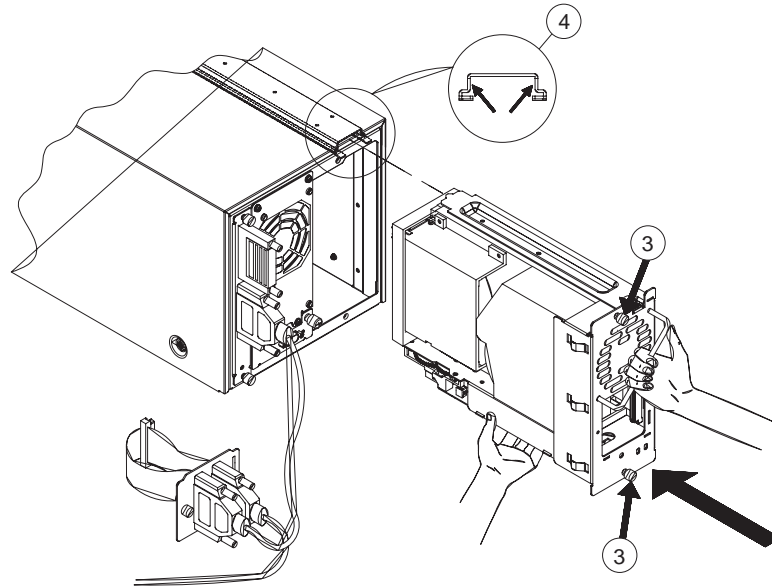
Upgrading Firmware

This section details the processes for upgrading autoloader and drive firmware.
Some of the processes used for upgrading autoloader firmware are different from
those used to upgrade drive firmware. Use the following steps:

Step1. Checking the Firmware revision

To check your current firmware revisions before downloading new firmware, do
the following:

1. Ensure the autoloader is powered on.

2. Use the **Main-->Information-->Firmware Revisions** menus on the front panel.

Step 2. Download the new Firmware

To download the new Firmware, do the following:

1. Go to **www.ibm.com/pc/support**.

2. Select **Options**.

3. Select **Tape Backup**.

4. Select **Tape Library 3600**.

5. Select your model.

6. Select **Download Files.**

7. Download the latest Firmware file and follow the README installation
   instructions.

Moving or shipping the autoloader

To move or ship the autoloader, do the following:

1. Verify that the drive is empty.

2. If the drive contains a tape, unload it. Refer to the backup software
   documentation, or use the front panel menu (see "Unloading a tape from the
   drive" on page 17).

3. Remove all tapes from the autoloader.

4. When shipping, lock the transport by running the Lock Transport front panel
   test to prevent damage.

Attention: Do not turn off the autoloader until the interface is inactive. Removing power from a SCSI peripheral when the bus is active can result in data loss and indeterminate bus states. If your computer is connected to a LAN, be sure to check with your system administrator before turning off the device.

5. Turn off the autoloader. The power "standby" switch is recessed to avoid accidental power cycles. Disconnect the power cable.
6. To ship the autoloader, remove all external cords, cables, and terminators. For an internal move, only disconnect the power cable, remote management card cable, and SCSI cable to the host.

   Note: You do not need to remove the SCSI cable that connects the controller to the drive module unless the autoloader is being shipped.

7. Re-install the internal packaging to secure the magazine inside the autoloader (see"Remove the autoloader and its internal packaging" on page 5).
8. Place the autoloader into the original packaging box. If you no longer have the original packaging, contact your service representative to purchase the packaging kit.

Chapter 5. Error messages, troubleshooting, and problem solving

This chapter includes information on types of and codes for error messages, troubleshooting techniques, and solutions for problems you might encounter.

Understanding error states

This section describes the differences between the following types of errors:

- Soft (recovered) errors
- Errors that result in partial availability
- Hard (unrecoverable) errors
- Host software and media errors

Soft (recovered) errors

Soft errors are hardware errors that the autoloader recovered from by retrying the operation. Although soft errors are often transparent to a user, they are logged in the soft-error log. To access the error log, select **Main menu-->Information-->Loader Information-->Soft (recovered) errors**.

Periodically review the soft error log to monitor and track errors before they become serious. If you see that a component has many soft errors, it might indicate an autoloader component that is likely to fail. If the autoloader has a hard error (see "Hard (unrecoverable) errors" on page 33) and you are unsure what caused it, you can review the soft error log to help identify problem areas.

You can also use soft errors to identify the reason for backup software timeouts. The backup software on the host computer allows for only a designated time for each operation. If the autoloader takes longer than the backup software allows, it might be due to the autoloader retrying a failed operation.

Note: The date and time stamp will help you identify errors.

Monitor and track components that might fall.

Review the soft error log to:

See error history to determine why other errors have occurred.

Identify the reason for backup software timeouts.
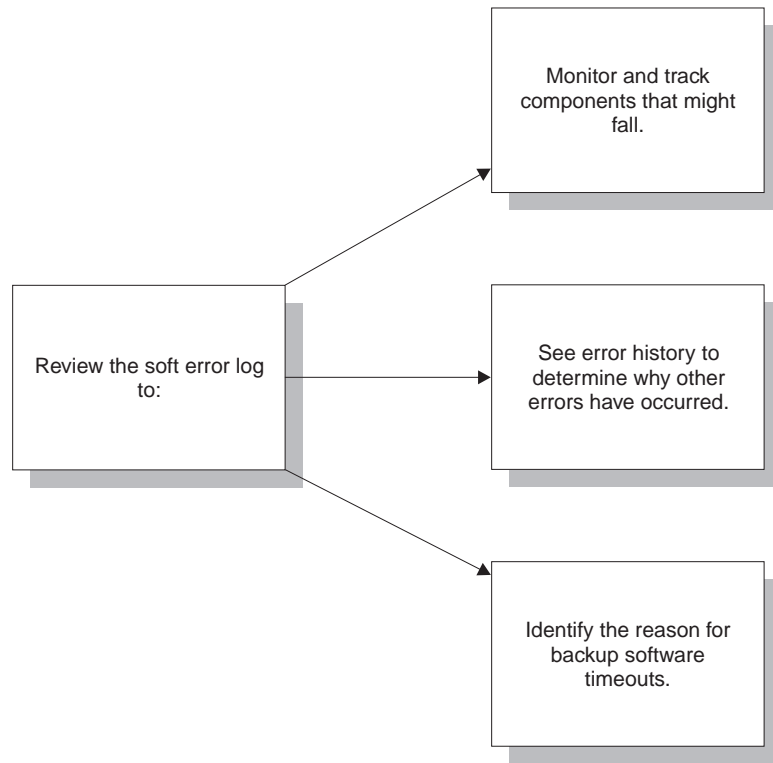
Partial availability state

When the autoloader is in the partial availability state, it is still functional, but has a condition that needs attention (see "Partial availability conditions"). Partial availability does not indicate a hardware error. With partial availability, the LED under the display is solid amber until you correct the problem. A partial availability state from the default home screen will look similar to the following example. The front panel uses the term **Partly Available** because of display size limitations.

The middle icon button on the Home screen is a shortcut to the Loader Status menu and partial availability information. To view more information about the partial availability error, you can also access the log by selecting **Main menu-->Information-->Loader Information-->Loader Status**.

Partial availability conditions
The partial availability state is caused by one of the errors described in the following table.

| Displayed error message	Causes	Recovery actions
Drive not present	Autoloader could not detect the drive module.	Chek that the drive is correctly installed and online. See "Drive and tape operations" on page 17.

Displayed error message	Causes	Recovery actions
Drive offline	The drive was taken offline because of the following: • User took drive offline using front-panel controls • Host computer took drive offline • Drive failed power-on test • Drive failed serial communication with autoloader • Drive failed to load or unload tape	Turn the autoloader off and then on. Ensure that the drive is correctly installed and online. Put drive back online from the front panel. Check the error log from the front panel or remote management card.
Drive online pending	Drive is turned on but has outdated firmware.	Download new drive firmware. See "Firmware revisions" on page 22.
Drive needs cleaning	Drive needs cleaning.	Clean the drive. See "Cleaning a drive" on page 17.
Drive critical error	Critical error occurred on the drive.	Check the drive error logs. See "Accessing error log files" on page 37.
Firmware update needed	Autoloader component has incompatible firmware with the rest of the autoloader.	Download new loader firmware. See "Firmware revisions" on page 22.
Incompatible magazine	The magazine is incompatible with the drive type.	Use the correct magazine for the autoloader drive.
Fan failure	Fan has failed.	Turn the autoloader off and then on.
Magazine missing	Autoloader could not detect the magazine.	Ensure that the magazine is present and correctly installed.
Door open	Front door is open.	Close the door.
Remote management card not present	Autoloader could not detect the remote management card.	Check that the remote management card is correctly installed.
Front panel not present	Autoloader could not detect the front panel display.	Turn the autoloader off and then on.
Remote management card failed	Remote management card failed power-up test.	Check that the remote management card is correctly installed.
Front panel failed	Front panel display failed on power-up test.	Turn the autoloader off and then on.
Date and time not set	The date and time are not set on the front panel.	Set the date and time. See "Setting the date and time" on page 10.

Hard (unrecoverable) errors

Note: The hard error codes are described on the front panel and in this appendix.

When a hard error occurs, the front panel will display Hard Error and the LED bar will flash amber. The front panel will automatically display information about the error, shown in the following illustrations. You cannot operate the autoloader until this error is resolved.
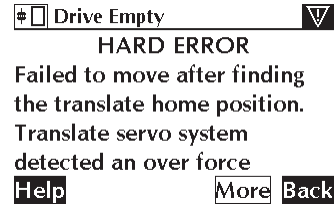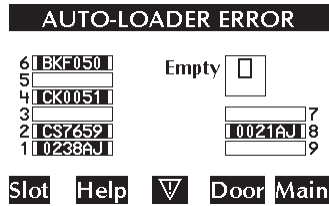
Error information includes the following:

- Time stamp of error event
- Error code number
- Autoloader component that might have caused the problem
- Error code description
- Recovery actions
- Error code qualifier that provides more information on the type of error
- Sequence numbers, which are used for factory diagnostics

View the hard error log to see the sequence of error events and more information on resolving the error condition. To view this log, select **Main menu-->Information-->Loader Information-->Hard Error Log** or press the middle (shortcut) button.

Note: When you are reviewing the error log, select **Older** to view error history and **Newer** to see more recent errors.

Also, the date and time stamp will help you identify errors.

To retrieve more information about an error, follow these steps:

1. From the screen with the initial error message or from the **Hard Error Log** screen, select **More** to retrieve more information about that error, which might include the following:
2. Record all information from this screen for later reference.
3. Select **More**. Record the list of recommendations on this and any subsequent screens. To retrieve the same information after you exit, view the latest entry in the hard error log.
4. Perform the recovery actions in the order presented. Continue with each successive action until the problem is isolated.

   The front panel might display recovery actions such as the following:

   - Turn the autoloader off and then on.
   - Remove a tape from the drive.
   - Check the autoloader or host configuration.
   - Check the cable connections (data or power).
   - Run front-panel diagnostic tests. Diagnostic tests are run to help identify and clear the error condition.
   - Reposition a tape or magazine.
   - Upgrade firmware.
5. If the problem persists after implementing all of the actions presented on the front panel display, contact your service representative.

Host software and media errors

The autoloader depends on several other components to operate correctly. Many errors that appear to be caused by the autoloader are often a result of errors on the host, the network, or with the backup software.

When troubleshooting the autoloader, begin by ruling out these other components. Here are some troubleshooting procedures to help determine if an error is caused by the autoloader hardware, host, or backup software.

Verify the autoloader hardware is correctly operating.	→	Ensure the LED on the front panel is not flashing amber. Flashing amber indicates a hardware error. Check the hard and soft error logs.
	→	Run a Wellness Test from the autoloader front panel.
Verify the software is supported and correctly configured.	→	Ensure the backup software has the Loader Module or Changer option to communicate with the autoloader robotics or use the Stacker operating mode from the autoloader front panel
	→	Check the software configuration. Ensure the SCSI ID's are correct on the backup software application.
	→	Use a different backup software application (if available) and see if similar errors occurs.
Look for connection errors with the host and network.	→	Ensure the host can identify the autoloader and drive.
	→	Check all cable connections. Ensure the SCSI bus is properly terminated.
	→	Ensure the SCSI host bus adaptor card and the drives are compatible and correctly installed.

The table that follows describes error code qualifiers.

Error code Qualifiers	Hex error	Description	Recovery procedure
0	00H	Qualifier code is unknown.	Check the error code.
0	0AH	Plunge motion system detected an over voltage.	Check the error code. Clear the transport path.
11	0BH	Plunge motion system detected an over force.	Turn off the unit. Clear the transport path. Turn on the unit.
12	0CH	Plunge motion system detected an error.	Turn the unit off and then on. Clear the transport path.
13	0DH	Plunge motion system timed out.	Turn the unit off and then on.
19	13H	Translate motion system detected an unknown error.	Check the error code. Clear the transport path.
20	14H	Translate motion system detected an over voltage.	Clear the transport path.
21	15H	Translate motion system detected an over force.	Turn off the unit. Clear the transport path.
22	16H	Translate motion system detected an error.	Turn the unit off and then on. Clear the transport path.
26	1AH	Translate motion system failed to detect a hardstop or the edge of the frame.	Run Recalibrate Loader test. Run Test Lateral Encoder test.
29	1DH	The translate motion system attempted a move when it was not ready.	Run Recalibrate Loader from panel test.
33	21H	Failed to detect a cartridge in the drive.	Run Recalibrate Loader test, followed by Check Inventory test. Turn the unit off and then on.
36	24H	Drive module failed to eject a tape.	Take the drive off- and online. Turn the unit off and then on.
37	25H	Failed to detect the drive hardstop while loading a tape.	Run Recalibrate Loader test, followed by Check Inventory test. Turn the unit off and then on.
42	2AH	Drive module is missing or not communicating.	Check that the drive is installed and online.
47	2FH	Drive module fan is not working properly.	Check for obstructions in the drive fan. Try bringing the drive back online. Replace the drive.
48	30H	Failed to detect that the transport has loaded a tape.	Run Test Lateral Loader test, Recalibrate Loader test, followed by Check Inventory.
50	32H	Failed to detect the magazine hardstop while loading a tape.	Run Test Lateral Loader test, Recalibrate Loader test, followed by Check Inventory.
54	36H	Failed to detect the magazine hardstop while removing a tape.	Run Recalibrate Loader test, followed by Check Inventory test. Turn the unit off and then on.
56	38H	Failed to empty the transport during an inventory check.	Ensure there is a vacant slot. Run Recalibrate Loader test, followed by Check Inventory test.
60	3CH	Internal communication on I2C bus has failed.	Run Recalibrate Loader test, followed by Check Inventory test. Turn the unit off and then on.
83	53H	Failed during a diagnostic test.	Run Recalibrate Loader test, followed by Check Inventory test. Run diagnostic again.
86	56H	Timed out on a command sent to the transport controller.	Verify that the transport LEDs are on and green. Clear any obstructions from the transport path.
87	57H	A command to the transport controller was corrupted.	Turn the unit off and then on.
88	58H	Attempted to overlap commands to the transport controller.	Run Recalibrate Loader test. Clear the transport path. Turn the unit off and then on.

Finding and identifying error information

The following sections describe information on accessing log files and using LEDs to determine status.

Accessing error log files

You can access error log files for the types of errors listed as follows.

- **Soft (recovered) errors**: Contains a log of minor errors, which is helpful in identifying errors that might indicate an underlying problem or lead to major errors. (See "Soft (recovered) errors" on page 31.)
- **Partial availability errors**: Indicates a current condition that needs attention, but enables you to still fully operate the autoloader. (See "Partial availability state" on page 32.)
- **Hard (unrecoverable) errors**: Contains a log of major errors that needed to be resolved. (See "Hard (unrecoverable) errors" on page 33.)
- **Drive event log**: Contains a log of drive errors and events.

Menu paths

Soft (recovered) error log
> Main menu-->Information-->Loader Information-->Soft (recovered) error log

Partial availability
> Main menu-->Information-->Loader Information-->Loader Status

Hard (unrecoverable) error log
> Main menu-->Information-->Loader Information-->Hard Error Log
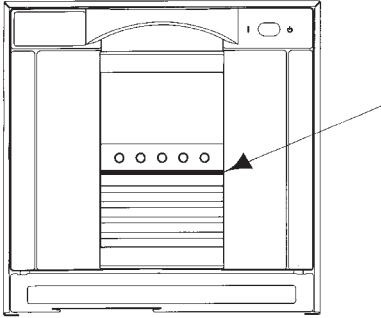
Drive event log
> Main menu-->Information-->Drive Information-->Event Log

Using LEDs to determine status

LEDs communicate status and errors as they are occurring. Use the following LED conditions for more information on how the autoloader is functioning.

Front panel LEDs
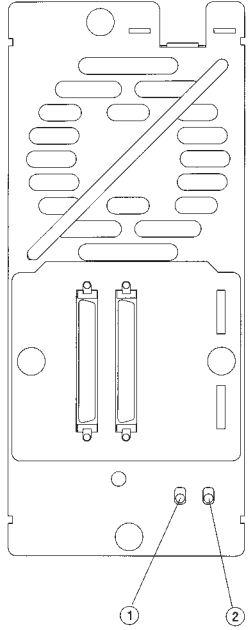
Color	Description	
Green	The autoloader is ready.	
Flashing green	The autoloader is active and in the process of performing a function.	
Solid amber	The autoloader is partially available (the autoloader is not fully functional, but can still be used).	
Flashing amber	A hard error has occurred. You cannot operate the autoloader until resolving the error.	

LVDS library controller card LED

1) Controller LED		
Color	Description	
Flashing green	Controller needs boot code.	
Yellow	In the process of powering up.	
Yellow *n* flashes	Controller failed power-on test.	
Pause	n=1; ROM error	
Yellow *n* flashes	n=3; microprocessor error	
	n=4; controlled RAM error	
	n=5; non-volatile RAM error	
	n=6; volatile RAM error	
Green	Controller passed power-on test.	
2) SCSI LED		
Color	Description	
Green	No bus connected or low voltage differential SCSI bus connected.	
Flashing green	Single-ended SCSI bus attached. SCSI performance may be reduced. SCSI cable length restrictions apply.	
Yellow	Incorrect SCSI bus type. Single-ended, low-voltage terminator attached.	
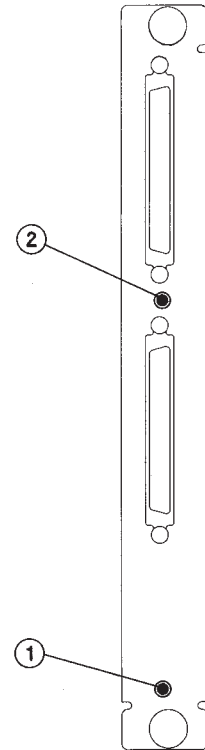
Drive module LEDs

1) Yellow	2) Green	Description	
Off	On	Drive is online and available.	
Flashing	Off	Drive is offline and can be replaced without turning off the autoloader.	
On	Flashing	Drive is being brought online.	
Flashing	On	Drive is offline. Internal communication to the controller has been lost.	
On	On	Drive module controller is in reset.	
On	Off	Power-on test in progress.	
Note: Depending on your autoloader drive type, the back of the drive module might look different from the previous illustration.			

Troubleshooting common problems

The following table describes how to troubleshoot autoloader problems. For problems that might be related to the host or application software, refer to the host system documentation or the application software instructions.

Attention: Consult the system administrator before turning the autoloader off and then on. Never do this procedure when active devices are connected to the SCSI bus. Turning the autoloader off and then on when the SCSI bus is active can cause data loss or cause the host system to stop responding.

Problem	Recovery actions
Power	
Autoloader will not turn on	Check the power cord connection. Make sure the power (standby) switch is on. Make sure there is power to the outlet. Try another working outlet. Replace the power cord. Check that the LEDs on the back of the autoloader are on and the fans are turning to ensure the autoloader is receiving power.
Power-on test failed. An error message on the front panel is displayed.	Verify that all tapes are fully inserted in the magazine and that athe magazine is fully installed inside the autoloader. Check that the internal packaging has been removed. Make sure the door is closed. If the power-on test fails again, look at the error code and refer to "Understanding error states" on page 31 for more information.
The autoloader power failed while a tape was in the drive and did not return to the ready state after the power came on.	Check that the LEDs on the back of the autoloader are on and the fans are turning. Turn the autoloader off and then on.
Tape Movement	
An error message is displayed after inserting the magazine or loading tapes.	Verify that the tapes are inserted correctly in the magazine. (See "Accessing tapes in the autoloader" on page 15.)
Tape stuck in drive.	Turn the unit off and then on and retry unloading the tape from the autoloader front panel. Ensure the backup host software is not reserving the slot. The backup software needs to cancel the reservation.
Tape stuck in transport.	Run the Recalibrate Loader test. Open the door. Remove the magazine and then gently ease the tape out of the transport. Do not grasp the back of the transport assembly. Call your service representative.
Tape stuck in back storage slot.	Using the front panel display, open the door. Pull the door down, and remove the magazine. Push the tape into the back slot until it clicks into the slot. Push the tape in again until it clicks and releases.
Transport will not load or unload a tape.	Run the Recalibrate Loader test. Ensure you are using the correct tape type and magazine for your autoloader drive configurations.
Media	
Tapes or cleaning cartridge incompatible with drive.	Ensure you are using media and a cleaning cartridge that is compatible with the drive.
Connections	
Host does not detect the autoloader.	Check that the autoloader is terminated and properly cabled. Ensure the terminator and host bus adapter card are compatible with the autoloader and SCSI bus type (HVDS or LVDS). Check that the autoloader is recognized by the operating system. Check that the SCSI host bus adapter card and backup software are compatible with the autoloader.
Backup software application on the host does not detect the autoloader.	If the backup software detects the drive, but not the autoloader, check that the Autoloader Module or Changer Option is included with the backup software. Most software packages require an addtiional module to communicate with the autoloader robotics. If the backup software detects the autoloader and not the drive check that you have installed the correct backup software driver and that there are no conflicting drivers installed.
Changed drive SCSI ID, but the new ID is not recognized by the host computer.	Check that all SCSI devices on the same bus have different ID numbers. Restart the host. If the drive remains at SCSI ID 5, regardless of how it is set, then the drive is not communicating with the autoloader. Call your service representative.
Host responds slowly or stops responding after connecting to the autoloader.	Check the SCSI IDs of all devices on the host to ensure there are no conflicts. Check that the backup software does not require SCSI IDs to be in a certain order.
Network Monitoring and Operations	

The remote management card interface is slow in updating the Web pages or does not display clearing.	Check your computer display settings. For est results, make sure the display resolution is set to 800 x 600 and the color palette is set to 65535 colors or higher. To speed up the display of pages, be sure to bypass

Appendix A. Help and service information

This section contains information on how to obtain online and telephone technical support.

Online technical support

Online technical support is available during the life of your product. Online assistance can be obtained through the Personal Computing Support Web site and the IBM Automated Fax System.

Online technical support	
IBM Personal Computing Support Web site	http://www.ibm.com/pc/support
IBM Automated Fax System	1-800-426-3395 (U.S. and Canada)

During the warranty period, assistance for replacement or exchange of defective components is available. In addition, if your IBM option is installed in an IBM computer, you might be entitled to service at your location. Your technical support representative can help you determine the best alternative.

Telephone technical support

Installation and configuration support through the HelpCenter will be withdrawn or made available for a fee, at IBM's discretion, 90 days after the option has been withdrawn from marketing. Additional support offerings, including step-by-step installation assistance, are available for a nominal fee.

To assist the technical support representative, have available as much of the following information as possible:
* Option name
* Option number
* Proof of purchase
* Computer manufacturer, model, serial number (if IBM), and manual
* Exact wording of the error message (if any)
* Description of the problem
* Hardware and software configuration information for your system

If possible, be at your computer. Your technical support representative might want to walk you through the problem during the call.

For the support telephone number and support hours by country, refer to the following table or to the enclosed technical support insert. Support phone numbers are also available by clicking **HelpCenter phone list** on the IBM support Web page at

http://www.ibm.com/pc/support

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

Support 24 hours a day, 7 days a week	
Canada (Toronto only)	416-383-3344
Canada (all other)	1-800-565-3344
U.S.A. and Puerto Rico	1-800-772-2227

Appendix B. Product warranties and notices

Warranty Statements

The warranty statements consist of two parts: Part 1 and Part 2. Part 1 varies by country. Part 2 is the same for both statements. Be sure to read both the Part 1 that applies to your country and Part 2.

- **United States, Puerto Rico, and Canada (Z125-4753-05 11/97)** (see "IBM Statement of Limited Warranty for United States, Puerto Rico, and Canada (Part 1 - General Terms)")
- **Worldwide except Canada, Puerto Rico, Turkey, and United States (Z125-5697-01 11/97)** (see "IBM Statement of Warranty Worldwide except Canada, Puerto Rico, Turkey, United States (Part 1 - General Terms)" on page 48)
- **Worldwide Country-Unique Terms** (see "Part 2 - Worldwide Country-Unique Terms" on page 51)

IBM Statement of Limited Warranty for United States, Puerto Rico, and Canada (Part 1 - General Terms)

This Statement of Warranty includes Part 1 - General Terms and Part 2 - Country-unique Terms. **The terms of Part 2 may replace or modify those of Part 1.** *The warranties provided by IBM in this Statement of Warranty apply only to Machines you purchase for your use, and not for resale, from IBM or your reseller. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. The term "Machine" does not include any software programs, whether pre-loaded with the Machine, installed subsequently or otherwise. Unless IBM specifies otherwise, the following warranties apply only in the country where you acquire the Machine. Nothing in this Statement of Warranty affects any statutory rights of consumers that cannot be waived or limited by contract. If you have any questions, contact IBM or your reseller.*

Machine - LTO Autoloader

Warranty period* - One (1) year

* Contact your place of purchase for warranty service information. Some IBM Machines are eligible for on-site warranty service depending on the country where service is performed.

The IBM Warranty for Machines

IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications. The warranty period for a Machine is a specified, fixed period commencing on its Date of Installation. The date on your sales receipt is the Date of Installation, unless IBM or your reseller informs you otherwise.

During the warranty period IBM or your reseller, if approved by IBM to provide warranty service, will provide repair and exchange service for the Machine, without charge, under the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine.

If a Machine does not function as warranted during the warranty period, and IBM or your reseller are unable to either 1) make it do so or 2) replace it with one that

is at least functionally equivalent, you may return it to your place of purchase and your money will be refunded. The replacement may not be new, but will be in good working order.

Extent of Warranty

The warranty does not cover the repair or exchange of a Machine resulting from misuse, accident, modification, unsuitable physical or operating environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible. The warranty is voided by removal or alteration of Machine or parts identification labels.

THESE WARRANTIES ARE YOUR EXCLUSIVE WARRANTIES AND REPLACE ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU. IN THAT EVENT, SUCH WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD.

Items Not Covered by Warranty

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

Unless specified otherwise, IBM provides non-IBM machines **WITHOUT WARRANTIES OF ANY KIND.**

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

Warranty Service

To obtain warranty service for the Machine, contact your reseller or IBM. In the United States, call IBM at 1-800-772-2227. In Canada, call IBM at 1-800-565-3344. (In Toronto, call 416-383-3344.) You may be required to present proof of purchase.

IBM or your reseller provides certain types of repair and exchange service, either at your location or at a service center, to keep Machines in, or restore them to, conformance with their Specifications. IBM or your reseller will inform you of the available types of service for a Machine based on its country of installation. IBM may repair the failing Machine or exchange it at its discretion.

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

Any feature, conversion, or upgrade IBM or your reseller services must be installed on a Machine which is 1) for certain Machines, the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade. Many features, conversions, or upgrades involve the removal of parts and their return to IBM. A part that replaces a removed part will assume the warranty service status of the removed part.

Before IBM or your reseller exchanges a Machine or part, you agree to remove all features, parts, options, alterations, and attachments not under warranty service.

You also agree to
1. ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange;
2. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and
3. where applicable, before service is provided
   a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provides,
   b. secure all programs, data, and funds contained in a Machine,
   c. provide IBM or your reseller with sufficient, free, and safe access to your facilities to permit them to fulfill their obligations, and
   d. inform IBM or your reseller of changes in a Machine's location.

IBM is responsible for loss of, or damage to, your Machine while it is 1) in IBM's possession or 2) in transit in those cases where IBM is responsible for the transportation charges.

Neither IBM nor your reseller is responsible for any of your confidential, proprietary or personal information contained in a Machine which you return to IBM or your reseller for any reason. You should remove all such information from the Machine prior to its return.

Production Status

Each IBM Machine is manufactured from new parts, or new and used parts. In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine's production status, IBM's appropriate warranty terms apply.

Limitation of Liability

Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), IBM is liable for no more than

1. damages for bodily injury (including death) and damage to real property and tangible personal property; and

2. the amount of any other actual direct damages, up to the greater of U.S. $100,000 (or equivalent in local currency) or the charges (if recurring, 12 months' charges apply) for the Machine that is the subject of the claim.

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

UNDER NO CIRCUMSTANCES IS IBM LIABLE FOR ANY OF THE
FOLLOWING: 1) THIRD-PARTY CLAIMS AGAINST YOU FOR DAMAGES
(OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE); 2) LOSS
OF, OR DAMAGE TO, YOUR RECORDS OR DATA; OR 3) SPECIAL,
INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC
CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS OR SAVINGS),
EVEN IF IBM, ITS SUPPLIERS OR YOUR RESELLER IS INFORMED OF
THEIR POSSIBILITY. SOME JURISDICTIONS DO NOT ALLOW THE
EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL
DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY
TO YOU.

IBM Statement of Warranty Worldwide except Canada, Puerto Rico, Turkey, United States (Part 1 - General Terms)

This Statement of Warranty includes Part 1 - General Terms and Part 2 - Country-unique Terms. **The terms of Part 2 may replace or modify those of Part 1.** *The warranties provided by IBM in this Statement of Warranty apply only to Machines you purchase for your use, and not for resale, from IBM or your reseller. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. The term "Machine" does not include any software programs, whether pre-loaded with the Machine, installed subsequently or otherwise. Unless IBM specifies otherwise, the following warranties apply only in the country where you acquire the Machine. Nothing in this Statement of Warranty affects any statutory rights of consumers that cannot be waived or limited by contract. If you have any questions, contact IBM or your reseller.*

Machine - LTO Autoloader

Warranty period* - One (1) year

* Contact your place of purchase for warranty service information. Some IBM Machines are eligible for on-site warranty service depending on the country where service is performed.

The IBM Warranty for Machines

IBM warrants that each Machine 1) is free from defects in materials and
workmanship and 2) conforms to IBM's Official Published Specifications. The
warranty period for a Machine is a specified, fixed period commencing on its Date
of Installation. The date on your sales receipt is the Date of Installation, unless IBM
or your reseller informs you otherwise.

During the warranty period IBM or your reseller, if approved by IBM to provide
warranty service, will provide repair and exchange service for the Machine,
without charge, under the type of service designated for the Machine and will
manage and install engineering changes that apply to the Machine.

If a Machine does not function as warranted during the warranty period, and IBM
or your reseller are unable to either 1) make it do so or 2) replace it with one that
is at least functionally equivalent, you may return it to your place of purchase and
your money will be refunded. The replacement may not be new, but will be in
good working order.

Extent of Warranty

The warranty does not cover the repair or exchange of a Machine resulting from
misuse, accident, modification, unsuitable physical or operating environment,

improper maintenance by you, or failure caused by a product for which IBM is not responsible. The warranty is voided by removal or alteration of Machine or parts identification labels.

THESE WARRANTIES ARE YOUR EXCLUSIVE WARRANTIES AND REPLACE ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU. IN THAT EVENT, SUCH WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD.

Items Not Covered by Warranty

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

Unless specified otherwise, IBM provides non-IBM machines **WITHOUT WARRANTIES OF ANY KIND.**

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

Warranty Service

To obtain warranty service for the Machine, contact your reseller or IBM. You may be required to present proof of purchase.

IBM or your reseller provides certain types of repair and exchange service, either at your location or at a service center, to keep Machines in, or restore them to, conformance with their Specifications. IBM or your reseller will inform you of the available types of service for a Machine based on its country of installation. IBM may repair the failing Machine or exchange it at its discretion.

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

Any feature, conversion, or upgrade IBM or your reseller services must be installed on a Machine which is 1) for certain Machines, the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade. Many features, conversions, or upgrades involve the removal of parts and their return to IBM. A part that replaces a removed part will assume the warranty service status of the removed part.

Before IBM or your reseller exchanges a Machine or part, you agree to remove all features, parts, options, alterations, and attachments not under warranty service.

You also agree to
1. ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange;
2. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and
3. where applicable, before service is provided
    a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provides,
    b. secure all programs, data, and funds contained in a Machine,
    c. provide IBM or your reseller with sufficient, free, and safe access to your facilities to permit them to fulfill their obligations, and
    d. inform IBM or your reseller of changes in a Machine's location.

IBM is responsible for loss of, or damage to, your Machine while it is 1) in IBM's possession or 2) in transit in those cases where IBM is responsible for the transportation charges.

Neither IBM nor your reseller is responsible for any of your confidential, proprietary or personal information contained in a Machine which you return to IBM or your reseller for any reason. You should remove all such information from the Machine prior to its return.

Production Status

Each IBM Machine is manufactured from new parts, or new and used parts. In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine's production status, IBM's appropriate warranty terms apply.

Limitation of Liability

Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), IBM is liable for no more than

1. damages for bodily injury (including death) and damage to real property and tangible personal property; and
2. the amount of any other actual direct damages, up to the greater of U.S. $100,000 (or equivalent in local currency) or the charges (if recurring, 12 months' charges apply) for the Machine that is the subject of the claim.

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

UNDER NO CIRCUMSTANCES IS IBM LIABLE FOR ANY OF THE FOLLOWING: 1) THIRD-PARTY CLAIMS AGAINST YOU FOR DAMAGES (OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE); 2) LOSS OF, OR DAMAGE TO, YOUR RECORDS OR DATA; OR 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS OR SAVINGS), EVEN IF IBM, ITS SUPPLIERS OR YOUR RESELLER IS INFORMED OF THEIR POSSIBILITY. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

Part 2 - Worldwide Country-Unique Terms

<u>ASIA PACIFIC</u>

AUSTRALIA: The IBM Warranty for Machines: The following paragraph is added to this Section:
The warranties specified in this Section are in addition to any rights you may have under the Trade Practices Act 1974 or other legislation and are only limited to the extent permitted by the applicable legislation.

Extent of Warranty: The following replaces the first and second sentences of this Section:
The warranty does not cover the repair or exchange of a Machine resulting from misuse, accident, modification, unsuitable physical or operating environment, operation in other than the Specified Operating Environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible.

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

PEOPLE'S REPUBLIC OF CHINA: Governing Law: The following is added to this Statement:
The laws of the State of New York govern this Statement.

INDIA: Limitation of Liability: The following replaces items 1 and 2 of this Section:
1. liability for bodily injury (including death) or damage to real property and tangible personal property will be limited to that caused by IBM's negligence;
2. as to any other actual damage arising in any situation involving nonperformance by IBM pursuant to, or in any way related to the subject of this Statement of Warranty, IBM's liability will be limited to the charge paid by you for the individual Machine that is the subject of the claim.

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

Limitation of Liability: The following is added to this Section:
Where Machines are not acquired for the purposes of a business as defined in the Consumer Guarantees Act 1993, the limitations in this Section are subject to the limitations in that Act.

<u>EUROPE, MIDDLE EAST, AFRICA (EMEA)</u>

The following terms apply to all EMEA countries.

The terms of this Statement of Warranty apply to Machines purchased from an IBM reseller. If you purchased this Machine from IBM, the terms and conditions of the applicable IBM agreement prevail over this warranty statement.

Warranty Service

If you purchased an IBM Machine in Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland or United Kingdom, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM.

If you purchased an IBM Personal Computer Machine in Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Hungary, Kazakhstan, Kirghizia, Federal Republic of Yugoslavia, Former Yugoslav Republic of Macedonia (FYROM), Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, or Ukraine, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM.

The applicable laws, Country-unique terms and competent court for this Statement are those of the country in which the warranty service is being provided. However, the laws of Austria govern this Statement if the warranty service is provided in Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Federal Republic of Yugoslavia, Georgia, Hungary, Kazakhstan, Kirghizia, Former Yugoslav Republic of Macedonia (FYROM), Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, and Ukraine.

The following terms apply to the country specified:

EGYPT: Limitation of Liability: The following replaces item 2 in this Section:
2. as to any other actual direct damages, IBM's liability will be limited to the total amount you paid for the Machine that is the subject of the claim.

Applicability of suppliers and resellers (unchanged).

FRANCE: Limitation of Liability: The following replaces the second sentence of the first paragraph of this Section:
In such instances, regardless of the basis on which you are entitled to claim damages from IBM, IBM is liable for no more than: (items 1 and 2 unchanged).

GERMANY: The IBM Warranty for Machines: The following replaces the first sentence of the first paragraph of this Section:
The warranty for an IBM Machine covers the functionality of the Machine for its normal use and the Machine's conformity to its Specifications.

The following paragraphs are added to this Section:
The minimum warranty period for Machines is six months.

In case IBM or your reseller are unable to repair an IBM Machine, you can alternatively ask for a partial refund as far as justified by the reduced value of the unrepaired Machine or ask for a cancellation of the respective agreement for such Machine and get your money refunded.

Extent of Warranty: The second paragraph does not apply.

Warranty Service: The following is added to this Section:
During the warranty period, transportation for delivery of the failing Machine to IBM will be at IBM's expense.

Production Status: The following paragraph replaces this Section:
Each Machine is newly manufactured. It may incorporate in addition to new parts, re-used parts as well.

Limitation of Liability: The following is added to this Section:
The limitations and exclusions specified in the Statement of Warranty will not apply to damages caused by IBM with fraud or gross negligence and for express warranty.

In item 2, replace "U.S. $100,000" with "1.000.000 DEM."

The following sentence is added to the end of the first paragraph of item 2:
IBM's liability under this item is limited to the violation of essential contractual terms in cases of ordinary negligence.

IRELAND: Extent of Warranty: The following is added to this Section:
Except as expressly provided in these terms and conditions, all statutory conditions, including all warranties implied, but without prejudice to the generality of the foregoing all warranties implied by the Sale of Goods Act 1893 or the Sale of Goods and Supply of Services Act 1980 are hereby excluded.

Limitation of Liability: The following replaces items one and two of the first paragraph of this Section:
1. death or personal injury or physical damage to your real property solely caused by IBM's negligence; and 2. the amount of any other actual direct damages, up to the greater of Irish Pounds 75,000 or 125 percent of the charges (if recurring, the 12 months' charges apply) for the Machine that is the subject of the claim or which otherwise gives rise to the claim.

Applicability of suppliers and resellers (unchanged).

The following paragraph is added at the end of this Section:
IBM's entire liability and your sole remedy, whether in contract or in tort, in respect of any default shall be limited to damages.

ITALY: Limitation of Liability: The following replaces the second sentence in the first paragraph:
In each such instance unless otherwise provided by mandatory law, IBM is liable for no more than: (item 1 unchanged) 2) as to any other actual damage arising in all situations involving non-performance by IBM pursuant to, or in any way related to the subject matter of this Statement of Warranty, IBM's liability, will be limited to the total amount you paid for the Machine that is the subject of the claim.

Applicability of suppliers and resellers (unchanged).

The following replaces the second paragraph of this Section:
Unless otherwise provided by mandatory law, IBM and your reseller are not liable for any of the following: (items 1 and 2 unchanged) 3) indirect damages, even if IBM or your reseller is informed of their possibility.

SOUTH AFRICA, NAMIBIA, BOTSWANA, LESOTHO AND SWAZILAND:
Limitation of Liability: The following is added to this Section:
IBM's entire liability to you for actual damages arising in all situations involving nonperformance by IBM in respect of the subject matter of this Statement of Warranty will be limited to the charge paid by you for the individual Machine that is the subject of your claim from IBM.

TURKIYE: Production Status: The following replaces this Section:
IBM fulfills customer orders for IBM Machines as newly manufactured in accordance with IBM's production standards.

UNITED KINGDOM: Limitation of Liability: The following replaces items 1 and 2 of the first paragraph of this Section:
1. death or personal injury or physical damage to your real property solely caused by IBM's negligence;
2. the amount of any other actual direct damages or loss, up to the greater of Pounds Sterling 150,000 or 125 percent of the charges (if recurring, the 12 months' charges apply) for the Machine that is the subject of the claim or which otherwise gives rise to the claim.

The following item is added to this paragraph:
3. breach of IBM's obligations implied by Section 12 of the Sale of Goods Act 1979 or Section 2 of the Supply of Goods and Services Act 1982.

Applicability of suppliers and resellers (unchanged).

The following is added to the end of this Section:
IBM's entire liability and your sole remedy, whether in contract or in tort, in respect of any default will be limited to damages.

<u>**NORTH AMERICA**</u>

CANADA: Warranty Service: The following is added to this section:
To obtain warranty service from IBM, call **1-800-565-3344**. In Toronto, call **416-383-3344**.

UNITED STATES OF AMERICA: Warranty Service: The following is added to this section:
To obtain warranty service from IBM, call **1-800-772-2227**.

Notices

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

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Taiwan Class A warning statement

警告使用者：
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Federal Communications Commission (FCC) statement

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

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

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

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

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

<div align="center">

FC   Tested To Comply
        With FCC Standards
FOR HOME OR OFFICE USE

</div>

Industry Canada Class B emission compliance statement

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

Avis de conformite a la reglementation d'Industrie Canada

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

Deutsche EMV-Direktive (electromagnetische Verträglichkeit)

Dieses Gerät ist berechtigt in Übereinstimmung mit dem deutschen EMVG vom 9.Nov.92 das EG-Konformitätszeichen zu führen.

Der Aussteller der Konformitätserklärung ist die IBM UK, Greenock.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse B.

European Union - emission directive

This product is in conformity with the protection requirements of EU Council Directive 89/366/ECC on the approximation of the laws of the Member States relating to electromagnetic compatibility.

IBM can not accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

This product has been tested and found to comply with the limits for Class B Information Technology Equipment according to CISPR 22/European Standard EN 55022. The limits for Class B equipment were derived for typical residential environments to provide reasonable protection against interference with licensed communication devices.

Union Européenne - Directive Conformité électromagnétique

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Este producto ha sido probado y satisface los límites para Equipos Informáticos Clase B de conformidad con el Estándar CISPR22 y el Estándar Europeo EN 55022. Los límites para los equipos de Clase B se han establecido para entornos residenciales típicos a fin de proporcionar una protección razonable contra las interferencias con dispositivos de comunicación licenciados.

Union Europea - Normativa EMC

Questo prodotto è conforme alle normative di protezione ai sensi della Direttiva del Consiglio dell'Unione Europea 89/336/CEE sull'armonizzazione legislativa degli stati membri in materia di compatibilità elettromagnetica.

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Korean B급 규격 증명서

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