

20/40GB 4MM Internal Tape Drive

# Installation and Using Guide

**Note**

Before you install this product and use this information, be sure to read the product warranties and notices information included with the system unit into which you are installing the product.

**Second Edition (April 2001)**

Before using this information and the product it supports, read the information in "Safety Information" on page v and "Appendix B. Notices" on page 29.

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## Safety Information

### DANGER

An electrical outlet that is not correctly wired could place hazardous voltage on metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.

Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.

When adding or removing any additional devices to or from the system, ensure that the power cables for those devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.

Use one hand, when possible, to connect or disconnect signal cables to prevent a possible shock from touching two surfaces with different electrical potentials.

During an electrical storm, do not connect cables for display stations, printers, telephones, or station protectors for communication lines.



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## Handling Static-Sensitive Devices

**Attention:** Static electricity can damage the device and your system unit. To avoid damage, keep this device in its anti-static protective bag until you are ready to install it. To reduce the possibility of electrostatic discharge, follow the precautions listed below:

- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed printed circuitry.
- Do not leave the device where others can handle and possibly damage the device.
- While the tape drive is still in its anti-static package, touch it to an unpainted metal part of the system unit for at least two seconds. (This drains static electricity from the package and from your body.)
- Remove the device from its package and install it directly into your system unit without setting it down. If it is necessary to set the device down, place it on its static-protective package. (If your device is an adapter, place it component-side up.) Do not place the device on your system unit cover or on a metal table.
- Take additional care when handling devices during cold weather, as heating reduces indoor humidity and increases static electricity.



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## About This Book

This book provides information about the 20/40GB 4MM Internal Tape Drive, and how to plan your SCSI device layout, set the SCSI address, install the tape drive, and use the tape drive. Use this book along with your specific system unit and operating system documentation.

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## ISO 9000

ISO 9000 registered quality systems were used in the development and manufacturing of this product.

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## Related Publications

The following publications contain related information:

- System unit documentation for information specific to your hardware configuration
- AIX operating system documentation for information specific to your software configuration

The AIX documentation library is available at the following Web address:

<http://www-1.ibm.com/servers/aix/library/>. Select **Technical Publications**. AIX documentation is also contained on the AIX Documentation CD which was shipped with your AIX operating system. The documentation is made accessible by loading the documentation CD onto the hard disk or by mounting the CD into a CD-ROM compatible drive.

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## Trademarks

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- AIX

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## Chapter 1. Overview

The 20/40GB 4MM Internal Tape Drive is an internal streaming tape drive that provides medium to high-capacity backup and archival capability, as well as a high data-transfer rate. The 20/40GB 4MM Internal Tape Drive uses wide bus (16-bit) architecture. Communications on the SCSI bus can be either asynchronous or synchronous. The 20/40GB 4MM Internal Tape Drive is compatible with existing 4.0GB, and 12.0GB 4mm tape cartridges. The 20/40GB 4MM Internal Tape Drive can be used as a boot device.

The tape drive is used primarily for:

- Saving and restoring system data files
- Archiving important records
- Distributing operating system software upgrades

The drive conforms to the American National Standards Institute (ANSI) SCSI-2 standard. You can attach the drive to any system that uses a single-ended interface/LVD that meets SCSI-2 Standard ANSI X3.131-1994.Rev 10h.

The 20/40GB 4MM Internal Tape Drive features include:

- Use of 20/40GB 4mm data cartridges
- Data rate of 3.0MB/second
- Capacity of 20GB
- Compression capability, which effectively doubles the native capacity of 20GB and the effective data rate. The actual capacity per cartridge varies depending on the application and the type of data cartridge being used. The default is compressed. Use SMIT to change the default.

**Note:** The factory default setting is *Activated*. Data compression is usually controlled by the application software.

- A half-high 5.25-inch form-factor
- Status lights that indicate:
  - When it is time to clean the tape drive
  - When the tape is in motion
  - When the drive is ready to accept tape motion commands

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## Tape Drive Environment and Use

Tape drives require specific maintenance and environmental conditions to operate well over time. Using high quality, data grade media, handling and storing this media properly, operating the tape drive in a clean environment and keeping the tape drive properly cleaned can help you to avoid problems with your tape drive.

### Media Grades

There are two different grades of media that could be used with your 20/40GB 4MM Internal Tape Drive:

- Tape containing Program Transmittal Fixes (PTF) - PTFs are tapes designed to be written to only once and read from a few times. PTF tapes are not designed to be used as a backup medium.
- Storage tapes - Storage tapes are designed to be used for backing up files which may be reused numerous times and also for long term storage.

**Note:** Your system supplier may only support the media they sell. If the representative's analysis indicates that your problem is caused by inferior media usage, it is your (the customer's) responsibility to replace the inferior media.

### Tape Handling and Storage

Most tape is supplied in a sealed cartridge. It is provided this way so that the tape will remain in a clean environment. Opening the cartridge allows dirt and airborne particles to enter and then become a source of contamination. The cartridge should only be opened by the tape drive and not an operator. The tape also is held under proper tension inside the cartridge. If the cartridge is dropped, this tension will be relaxed. Inserting a dropped cartridge into a tape drive can cause incorrect loading and result in a jam. This will ruin the tape and can cause physical damage if the cartridge is not removed properly.

When the tapes are stored, they must be replaced in their protective containers and stored on their end. The storage area must be clean, dry, normal room temperature and away from any magnetic fields.

### Environmental Issues

Tape drives are designed to operate in a clean environment. Problem factors are dirt, dust, fibers and airborne particles. Airborne particles are the most difficult to address. When a tape is installed into the tape drive, the clearance between the heads and the tape is measured in microns. Particles can damage the tape or the head if they come in contact with either. Your service representative offers a tape drive filter enclosure for some systems to solve this problem. The enclosure draws air in through a filter and supplies the tape drive with clean air. Customers are responsible to provide a clean operating environment for the tape drive and system.

## Tape Drive Cleaning

No matter how clean the environment, debris may build up on the heads of any tape drive. Every time tape motion occurs, some of the media surface comes off on the heads. Over time, this builds up and causes errors in reading and writing. Customers are responsible to clean the tape drive in accordance with the cleaning information provided with the tape drive.

**Note:** Your system supplier may only support the use of their own cleaning cartridges. Contact your system supplier for quality cleaning cartridges that are specifically designed for the 20/40GB 4MM Internal Tape Drive.

Cleaning cartridges can be used a limited number of times. Once a cleaning cartridge has been used to its maximum number of times, the cartridge is considered expired. When cartridges expire, they must be replaced. Never reuse an expired cleaning cartridge. Doing so allows previously removed dirt to be reintroduced to the tape drive. Place a mark on the cleaning cartridge after each use, to best determine when your cleaning cartridge has expired.

## SCSI Hardware Issues

SCSI bus cables and terminators may affect tape drive performance. Use cables and terminators that are designed specifically to keep the SCSI bus as free of noise as possible. Generic cables or terminators may adversely affect the SCSI bus performance. If your service representative's analysis indicates a problem with inferior cables, it may be necessary for the customer to replace them.

## Microcode Updates

Your system supplier constantly works to provide the best possible tape drive products. To make certain that the tape drives work their very best, your system supplier may release changed microcode for the tape drives. When a microcode change is developed, your system supplier makes the change available to you through its service organization or by electronic delivery.

Microcode changes are available from service web sites. For more information about supporting web sites, contact your local service representative.

Microcode can be installed by your service representative or your system administrator.

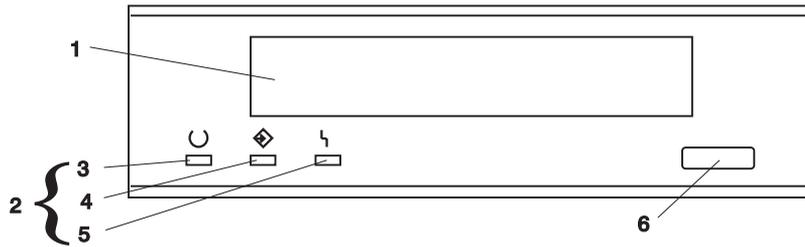
## Summary

Your tape drive must be installed in the cleanest possible environment. Your 20/40GB 4MM Internal Tape Drive requires high quality, data grade tapes and cleaning on a regular basis. Media must also be stored and handled properly. Improper use, storage or handling of tape drives or media may void your warranty or service agreement.

If a tape drive stops functioning due to a component failure during the tape drive warranty or maintenance time, the service provider will replace the tape drive unit. The service provider will replace any defective tape drive under the terms and conditions of its warranty or service agreement. It is the service provider's objective to work with you to identify the cause of any tape drive problem and provide a solution.

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## Front View of the 20/40GB 4MM Internal Tape Drive



- 1 Tape Drive Door
- 2 Status lights
- 3 Ready (green)
- 4 Tape Motion (green)
- 5 Disturbance (amber)
- 6 Unload/Reset button

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## Cleaning the Tape Drive

No matter how clean the environment, debris can build up on the heads of any tape drive. Every time tape motion occurs, some of the media surface comes off on the heads. Over time, residue builds up and causes errors in reading and writing. Customers are responsible for cleaning the tape drive in accordance with the cleaning information provided with the tape drive.

**Note:** Refer to “Ordering Tape Cartridges” on page 23 to identify the only media supported on this tape drive.

Cleaning cartridges can be used a limited number of times. After a cleaning cartridge has been used to its maximum number of times, the cartridge is considered expired. When cartridges expire, they must be replaced. Never reuse an expired cleaning cartridge. Doing so allows previously removed dirt to be reintroduced to the tape drive. When you have cleaned the tape drive, mark the usage on the cartridge in order to best determine when your cleaning cartridge has expired.

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## SCSI Hardware Issues

SCSI bus cables and terminators may affect tape drive performance. The cables and terminators supplied with your system are designed specifically to keep the SCSI bus as free of noise as possible. Use of nonsupported cables or terminators may adversely affect the SCSI bus performance. If service personnel analysis indicates a problem with nonsupported cables, it may be necessary for the customer to replace them with the appropriate supported cables. Contact your customer service representative if your system’s cables or terminators need to be replaced.

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## Chapter 2. Preparing to Install the 20/40GB 4MM Internal Tape Drive

This chapter covers all the things you need to do before you install your 20/40GB 4MM Internal Tape Drive. Preparing to install the tape drive involves the following tasks:

- Verifying your software requirements
- Making sure your package is complete
- Gathering tools and documentation
- Planning your SCSI device layout
- Determining your SCSI address.

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### Verifying Your Software Requirements

The 20/40GB 4MM Internal Tape Drive is supported on AIX 4.3.0 or later.

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### Checking Prerequisites

Check that your package contains the following items:

- The 20/40GB 4MM Internal Tape Drive
- Media kit containing:
  - 1 data cartridge
  - 1 cleaning cartridge
  - 1 test tape
  - jumpers (located in a plastic bag)
- Specific hardware for attaching the tape drive to your specific system, as detailed on the parts listing that comes with your 20/40GB 4MM Internal Tape Drive

### Needed Tools and Documentation

The following tools and documentation are needed to complete the installation:

- A flat-bladed screwdriver
- Your system unit documentation, including any service documentation
- Your operating system documentation

Contact the place of purchase if an item is missing or damaged.

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### Planning Your SCSI Device Layout

SCSI devices are attached in a daisy-chain configuration to a SCSI adapter inside your system unit. SCSI devices can be installed inside your system unit or connected externally. When you connect more than one SCSI device, it is important that you plan the layout of your SCSI chain. Each device in the chain has a unique SCSI address (also called a *SCSI ID*). A terminator is required at each end of the SCSI chain.

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## Determining Your SCSI Address

Before you install the 20/40GB 4MM Internal Tape Drive, you must set the SCSI address on the drive. First, determine which SCSI addresses are available to use. Then you choose an address and install jumpers on the drive to set the selected address. The 20/40GB 4MM Internal Tape Drive supports addresses 6 through 0 and 8 through 15. You can use any available SCSI address as long as no two SCSI devices on the same chain use the same address. Usually, no device can use address 7, which is reserved for the SCSI adapter.

SCSI addresses are in sequential order from highest to lowest priority. Refer to Table 1 on page 7 for the priority associated with each address. All SCSI devices can use SCSI addresses 6 through 0. If your system unit and adapter support the wide (16-data bit, 68-conductor cable) SCSI interface, you may see addresses in the range of 0 through 15.

To determine what SCSI adapters are in your system, type the following at the system prompt:

- `lsdev -C | grep scsi`

Press enter. All SCSI adapters in the system are displayed in the following format:

```
scsi0      Available 00-00-0S      Standard SCSI I/O Controller
scsi1      Available 00-01          SCSI I/O Controller
```

To determine the SCSI address for the adapter you will attach to, type the following at the system prompt:

- `lsattr -El scsi0 | grep id`

Where *scsi0* is the adapter that the tape drive is to be attached. Press enter. The SCSI ID is displayed in the following format:

```
id      7          Adapter card SCSI I          True
```

To find an available SCSI address, do the following:

1. To identify the SCSI addresses used by all other devices, type

```
lsdev -Cs scsi
```

and press Enter. A list of devices appears in the following format.

```
hdisk0     Available 00-00-0S-0,0  2.0GB SCSI Disk Drive
hdisk1     Available 00-02-01-2,0  4.5GB 16 Bit SCSI Disk Drive
hdisk2     Available 00-02-01-3,0  SCSI Disk Drive
rmt0       Available 00-02-01-4,0  SCSI 8mm Tape Drive
```

In the fourth position of the third column, locate all instances of the port that you chose in step 1. (The list may contain multiple instances of a port. In the following example, for port 2 (identified in step 1) there are three instances.) The addresses of the other SCSI devices appear in the seventh position (highlighted in the example.)

For the port chosen in step 1 on page 6, note the addresses of the other SCSI devices attached to your system (in this case, for port 2, the addresses are 2, 3, and 4).

2. Select the highest-priority unused SCSI address for your 20/40GB 4MM Internal Tape Drive. Use Table 1 to record the address you chose for your 20/40GB 4MM Internal Tape Drive and the names and addresses of any other installed SCSI devices. Save this information for future reference.

*Table 1. Data Access Priorities for SCSI Addresses*

<b>Priority</b>	<b>SCSI Address</b>	<b>SCSI Device Name</b>
Highest Priority	7 (Default)	Adapter
↓	6	
↓	5	
↓	4	
↓	3	
↓	2	
↓	1	
↓	0	
↓	15	
↓	14	
↓	13	
↓	12	
↓	11	
↓	10	
↓	9	
Lowest Priority	8	



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## Chapter 3. Installing the 20/40GB 4MM Internal Tape Drive

This chapter takes you through the steps of installing your 20/40GB 4MM Internal Tape Drive, which involves the following tasks:

- Handling Recommendations
- Setting the SCSI address
- Installing the tape drive in your system unit
- Connecting the tape drive
- Configuring the tape drive
- Verifying the installation

**Note:** Refer to your system unit documentation for safety information before you install and connect your 20/40GB 4MM Internal Tape Drive.

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### Handling Recommendations

**Attention:** Be sure to read “Handling Static-Sensitive Devices” on page vii before you remove the 20/40GB 4MM Internal Tape Drive from its anti-static bag or any time you handle it.

For optimum performance, always follow the recommendations listed below:

- Handle the drive carefully and by its external metal chassis. Keep your hands away from the printed circuit boards, components, and printed circuit (flex) cables.
- If possible, work on a cushioned surface, and do not drop the tape drive onto the work surface.
- If you move tape drive to an environment that is colder or warmer than its previous environment, keep the drive in its package and allow the package to reach the current room temperature. This prevents potential data loss or damage to the tape drive. Allow one hour of acclimation for each 10 degrees C (18 degrees F) difference between the ship or storage temperature and the room temperature.

---

### Setting the SCSI Address

The 20/40GB 4MM Internal Tape Drive is shipped with jumpers packaged in a small plastic bag. After you choose an available SCSI address, you can install the jumpers on the tape drive to match the selected address. Refer to “Determining Your SCSI Address” on page 6 if you need instructions for selecting the SCSI address.

To set a SCSI address, insert jumpers onto pin positions reserved on the jumper block specifically for setting the address. To set a position to On, insert a jumper onto both the top and bottom pins. To set a position to Off, either insert a jumper onto the top pin only or remove the jumper from the jumper block.

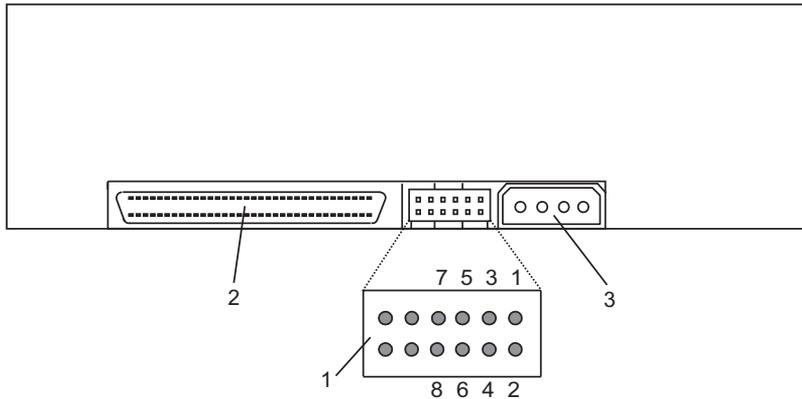
Refer to the figure on page 10 and to Table 2 on page 10 as you go through the following steps to set the SCSI address on your 20/40GB 4MM Internal Tape Drive:

**Attention:** Be sure to read the handling instructions in “Handling Static-Sensitive Devices” on page vii before you begin.

1. Remove the tape drive from its anti-static bag.
2. Find pin positions **1-2**, **3-4**, **5-6**, and **7-8** located on the jumper block on the back of the tape drive. These positions are always used to set the SCSI address on the 20/40GB 4MM Internal Tape Drive.
3. Refer to Table 2 to determine in which positions you install the jumpers to correctly set the SCSI address you chose in step 2 on page 7.

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## Jumper Pin Positions on the 20/40GB 4MM Internal Tape Drive



- 1 SCSI Address Block
- 2 68-pin SCSI Connector
- 3 Power Connector

**Note:** The 20/40GB 4MM Internal Tape Drive is shipped with six jumpers, each set to the “off” position (SCSI address 0).

*Table 2. SCSI Address Settings*

Address	Jumper 7-8	Jumper 5-6	Jumper 3-4	Jumper 1-2
0	Off	Off	Off	Off
1	Off	Off	Off	On
2	Off	Off	On	Off
3	Off	Off	On	On
4	Off	On	Off	Off
5	Off	On	Off	On
6	Off	On	On	Off
7*	Off	On	On	On
8	On	Off	Off	Off

Table 2. SCSI Address Settings (continued)

Address	Jumper 7-8	Jumper 5-6	Jumper 3-4	Jumper 1-2
9	On	Off	Off	On
10	On	Off	On	Off
11	On	Off	On	On
12	On	On	Off	Off
13	On	On	Off	On
14	On	On	On	Off
15	On	On	On	On

**Note:** \* = Address 7 is reserved for the adapter.

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## Installing and Connecting the Tape Drive

After you set the SCSI address on your drive, you can install the tape drive into your system unit. Follow the instructions provided in your system unit documentation for shutting down your system and for installing an internal device into your system unit.

To install and connect the 20/40GB 4MM Internal Tape Drive, do the following:

1. Remove the covers to your system unit, following the instructions provided in your system unit documentation.
2. Install the tape drive, following the instructions provided in your system unit documentation for installing devices.
3. Attach the 68-pin SCSI cable connector to the tape drive.
4. Attach the 5/12V power plug to the drive.
5. Ensure there is a SCSI terminator on the end of the cable or that a terminator is supplied by the last physical SCSI device on the internal chain.
6. After the tape drive is installed, reinstall your system unit covers. Follow the instructions provided in your system unit documentation.

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## Configuring the 20/40GB 4MM Internal Tape Drive

To configure the tape drive after installation, boot your system unit. Device drivers are provided in the AIX operating system and other operating systems that support the 20/40GB 4MM Internal Tape Drive. Your operating system recognizes the drive and automatically updates your system unit configuration.

---

## Verifying the Installation

To verify the successful installation of the 20/40GB 4MM Internal Tape Drive, see the instructions provided in your operating system documentation. To verify the installation on an AIX system, type:

```
lsdev -Cs scsi
```

Press Enter. A list of SCSI devices displays. An *Available* status indicates that the drive is installed and ready to use.

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## Updating Microcode Levels

This device contains microcode that you can update. Contact your service representative for instructions on how to get the latest microcode levels for your device. To install the microcode, follow the instructions in the README file included with the update.

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## Chapter 4. Using the 20/40GB 4MM Internal Tape Drive

This chapter describes the operator controls and indicator lights on the 20/40GB 4MM Internal Tape Drive. It also gives instructions for loading and unloading a tape cartridge, and tells how to clean the tape drive.

Figure 1 shows the front view of the 20/40GB 4MM Internal Tape Drive.

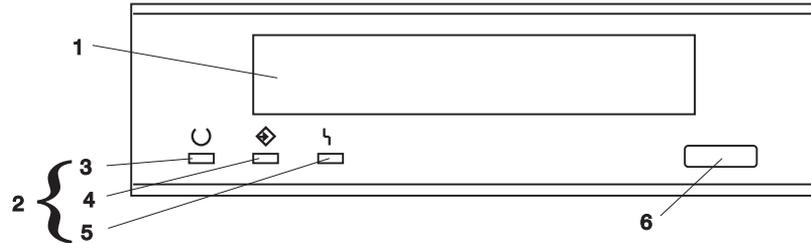


Figure 1. Front View of the 20/40GB 4MM Internal Tape Drive

- |   |                     |
|---|---------------------|
| 1 | Tape Drive Door     |
| 2 | Status lights       |
| 3 | Ready (green)       |
| 4 | Tape Motion (green) |
| 5 | Disturbance (amber) |
| 6 | Unload/Reset button |

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### Operator Controls

The 20/40GB 4MM Internal Tape Drive has the following operator controls.

#### Unload Button

The unload button **6** enables the tape cartridge to be ejected. The unload button operates only when the 20/40GB 4MM Internal Tape Drive's power is on. To remove a cartridge, press and hold the unload button for about one second.

## Indicator Lights

The 20/40GB 4MM Internal Tape Drive has the following indicator lights.

## Status Lights

Three status lights ( **2** in Figure 1 on page 13) and their ISO symbols appear on the 20/40GB 4MM Internal Tape Drive as follows:

○ **Ready** (green)

◊ **Activity** (green)

⌋ **Fault** (amber)

The combinations of the lights and their definitions are shown in the following table.

Table 3. Definition of Status Light Combinations

Ready	Activity	Fault	Definition
○ <b>Ready</b> (green)	◊ <b>Activity</b> (green)	⌋ <b>Fault</b> (amber)	
Flashing	Off	Off	The Power-On Self Test (POST) is running or the test cartridge is running.
Off or On	Off or Flashing	On	<p><b>The tape drive requires cleaning.</b> See “Cleaning the Tape Drive” on page 17.</p> <ul style="list-style-type: none"> <li>• If the Ready light is on, a tape cartridge is in the drive. If the light is off, a cartridge is not in the drive.</li> <li>• If the Activity light flashes, a tape cartridge is in the drive and tape movement is occurring. If the light is off, no tape movement is occurring.</li> </ul>
Off	Off	Off or On	<p>One of the conditions exists:</p> <ul style="list-style-type: none"> <li>• The power is off (Fault light is off).</li> <li>• The POST completed successfully, but no tape cartridge has been inserted.</li> <li>• If the Fault light is on, <b>cleaning is required.</b> See “Cleaning the Tape Drive” on page 17.</li> </ul>

Table 3. Definition of Status Light Combinations (continued)

Ready	Activity	Fault	Definition
○ Ready (green)	↻ Activity (green)	⌋ Fault (amber)	
On	Off or Flashing	Off or On	<p>A data cartridge has been inserted.</p> <ul style="list-style-type: none"> <li>The 20/40GB 4MM Internal Tape Drive is ready to receive commands from the system (whether the Fault light is on or off).</li> <li>If the Fault light is on, <b>cleaning is required</b>. See “Cleaning the Tape Drive” on page 17.</li> <li>If the Activity light flashes, a tape cartridge is in the drive and tape movement is occurring. If the light is off, no tape movement is occurring.</li> </ul>
On	Flashing	Off or On	<p>The tape is in motion, and the 20/40GB 4MM Internal Tape Drive is running an operation or is cleaning.</p>
Off	Off	Flashing	<p>The 20/40GB 4MM Internal Tape Drive detected an internal fault that requires corrective action.</p> <ul style="list-style-type: none"> <li>Reset the error by turning the power off to the 20/40GB 4MM Internal Tape Drive, then turning it back on, or by holding down the unload button for 8 seconds.</li> <li>If the Fault light still flashes after the reset, contact your service representative.</li> </ul>

**Notes:**

1. The 20/40GB 4MM Internal Tape Drive needs cleaning when the tape drive turns on the Fault status light (solid amber). The light turns on when The 20/40GB 4MM Internal Tape Drive exceeds a preset operating limit.
2. The recommended preventative maintenance cleaning frequency is approximately 50 tape motion hours. Tape motion hours are defined as the time the tape drive is moving tape.
3. When the Fault light turns on (solid amber), the 20/40GB 4MM Internal Tape Drive causes AIX to log an information error (TAPE\_ERR6) in the AIX log, indicating that the tape drive needs to be cleaned.
4. Use only quality media and cleaning cartridges.
5. The 20/40GB 4MM Internal Tape Drive is designed to operate in normal office environments. Dirty environments or other poor environments may damage the tape drive. It is the customer's responsibility to provide the proper operating environment.
6. When the tape drive indicates that the drive needs to be cleaned, it is the customer's responsibility to clean the tape drive with the recommended cleaning cartridge.

7. If a DDS-2 diagnostic cartridge (P/N 8191146) is used in the 20/40GB 4MM Internal Tape Drive, that cartridge will do automatic diagnostics.
8. If a tape cartridge that is not DDS-2, DDS-3, or DDS-4 format is used, that cartridge will be immediately ejected as an incorrect cartridge type.

---

## Loading and Unloading a Tape Cartridge

Use the following instructions to load and unload a tape cartridge. For information about the type of media to use, refer to “Chapter 5. Using the Media” on page 19.

**Note:** To avoid problems with loading and unloading, use only one label on a cartridge. Multiple or poorly placed labels can clog the drive load mechanism.

### Loading a Tape Cartridge

To load a tape cartridge:

1. Make sure that the 20/40GB 4MM Internal Tape Drive power is on.
2. Grasp the cartridge by the outer edges, with the window side up and the write-protect switch facing you.

**Note:** See “Setting the Write-Protect Switch” on page 22 to make sure that the write-protect switch is properly set.

3. Lift the door on the front of the 20/40GB 4MM Internal Tape Drive and slide the cartridge into the opening until the loading mechanism pulls the cartridge into the drive and the drive door closes.

To indicate that the load operation was successful, the Ready status light comes on about 10 seconds after the load.

### Unloading a Tape Cartridge

To unload a tape cartridge:

1. Make sure that the tape drive power is on.
2. Press the unload button.

The 20/40GB 4MM Internal Tape Drive rewinds, unloads, and ejects the tape cartridge. The process may take from 15 seconds to several minutes, depending on the position of the tape and the amount of data written. The status lights respond as follows:

- The Ready light turns off.
- The Activity light flashes during the unload operation.
- The Activity light turns off when the cartridge is ejected from the tape drive.

## Emergency Eject Feature

**Attention:** This procedure may result in loss of data.

The 20/40GB 4MM Internal Tape Drive includes an emergency eject and reset feature that releases the tape cartridge and resets the drive. Use the feature if the cartridge does not move properly or if the unload process fails.

To perform an emergency eject of the tape cartridge or a reset of the drive, press and hold the unload button for at least 5 seconds. If a cartridge is in the drive, it automatically ejects without rewinding the tape.

---

## Cleaning the Tape Drive

Clean the 20/40GB 4MM Internal Tape Drive whenever the Fault status light comes on or a system I/O error related to the device occurs.

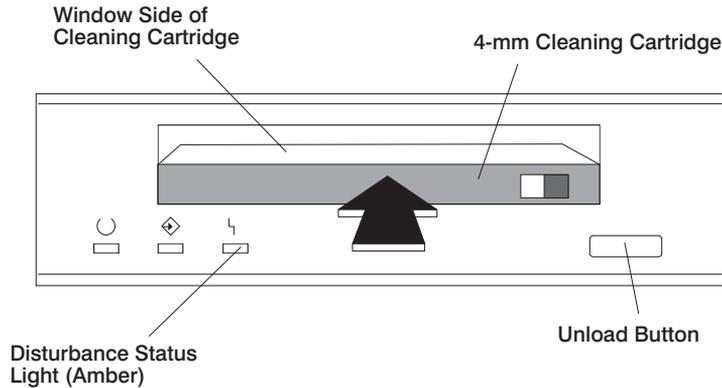
**Attention:** Use only the recommended cleaning cartridge to clean the tape drive. Use of other than recommended cleaning cartridges can damage your drive and may void the warranty.

To clean the 20/40GB 4MM Internal Tape Drive:

1. Make sure that the power is on to the 20/40GB 4MM Internal Tape Drive.
2. If a tape cartridge is in the 20/40GB 4MM Internal Tape Drive, eject and remove the cartridge.

**Note:** Some quality cleaning cartridges have 50 white dots on the window side that are designed to be used to log the use of the cartridge. Each time the cartridge is used, mark one of the dots on the cartridge with a pen or marker. When all of the dots have been marked, discard the cleaning cartridge.

3. Grasp the cleaning cartridge ( **1** in Figure 2 on page 18) by the outer edges, with the window side up and the write-protect switch **2** facing you.
4. Lift the door on the front of the 20/40GB 4MM Internal Tape Drive and slide the cartridge into the opening until the loading mechanism pulls the cartridge into the drive and the drive door closes.



*Figure 2. Loading the Cleaning Cartridge*

After the cleaning cartridge has been inserted, the remainder of the cleaning process is automatic. The 20/40GB 4MM Internal Tape Drive:

1. Loads the cleaning cartridge into the tape drive
2. Cleans the drive by moving the cleaning tape forward for approximately 30 seconds
3. Unloads the cleaning cartridge when the cleaning operation is complete
4. Indicates a successful cleaning operation by turning off the Fault status light (if the Fault light was on prior to the cleaning process. Otherwise, the Fault light remains solid to indicate that the cleaning cartridge is no longer usable. Obtain a new cleaning cartridge and repeat the process.)

**Note:** If the cleaning operation completes but the Fault light remains on, repeat the cleaning procedure with a new cleaning cartridge. If the light still remain on, contact your authorized service representative.

To determine how many times a cleaning cartridge may be used, check the information printed on the cartridge. If you attempt to use a depleted cleaning cartridge, the 20/40GB 4MM Internal Tape Drive automatically detects the error and ejects the cartridge. If the Fault status light was on prior to the cleaning process, it stays on; if the Fault light was off, the depleted cartridge causes the light to come on.

If a system error occurs, clean the drive and retry the operation. If the operation fails, replace the data cartridge, clean the drive again, then retry the operation.

---

## Chapter 5. Using the Media

The 20/40GB 4MM Internal Tape Drive uses 4mm data cartridges for saving and restoring system data. It is designed to use only DDS (Digital Data Storage) data cartridges. The cartridges are identified by one of the following DDS symbols:



The 20/40GB 4MM Internal Tape Drive only reads and writes data to tape cartridges that are DDS-2, 3, or 4 format.

**Note:** The 20/40GB 4MM Internal Tape Drive only supports DDS-2, 3, and 4 tape cartridges. If any other cartridge is inserted in the drive, it will be ejected.

The 20/40GB 4MM Internal Tape Drive has been designed to operate with DDS media that meet the following standards of the European Computer Manufacturers Association (ECMA):

- ECMA-198 DDS-2 format
- ECMA-236 DDS-3 format
- ECMA-288 DDS-4 format

**Note:** Your system supplier may only support the media they sell. If the representative's analysis indicates that your problem is caused by inferior media usage, it is your (the customer's) responsibility to replace the inferior media.

---

### Types of Tape Cartridges

The 20/40GB 4MM Internal Tape Drive is shipped with the following media cartridges.

**Data Cartridge** Use the 4mm data cartridge to save or restore programs or data.

**Test Cartridge** Use the specially labeled 4mm test cartridge to run the AIX system diagnostics (for information about running diagnostics, refer to your AIX manuals). The test cartridge should not be used to save or restore customer programs or data.

#### **Cleaning Cartridge**

Use the specially labeled cleaning cartridge (part number 21F8763) to clean the 20/40GB 4MM Internal Tape Drive. For instructions about how to clean the 20/40GB 4MM Internal Tape Drive, see "Cleaning the Tape Drive" on page 17).

**Attention:** Use of other than a quality 4mm cleaning cartridge can damage your 20/40GB 4MM Internal Tape Drive and may void your warranty.

To order additional cartridges, refer to "Ordering Tape Cartridges" on page 23.

---

## Recommendations for Data Cartridge Usage

The following list describes recommended guidelines that will help to protect your data and prolong the life of your tape cartridges and the 20/40GB 4MM Internal Tape Drive:

- Use only 4mm DDS-2, DDS-3, or DDS-4 cartridges. (DDS-4 media is recommended whenever possible as it best optimizes overall drive advantages).
- Remove the tape cartridge from the drive when the drive is not in use.
- Back up and then discard any tape cartridge that repeatedly produces error messages (the error information is in the System Error Log).
- On the data cartridge, do not open the door that covers the tape. The door protects the tape from dirt, dust, and damage.
- Do not touch the tape. Any substance transferred to the tape by touching could cause loss of data.
- To avoid problems with loading and unloading, use only one label on a cartridge. Multiple or poorly placed labels can clog the drive load mechanism.
- Do not use poor-quality tape cartridges. They can cause excessive read or write errors, and may damage the tape drive.
- Discard any tape cartridges that are dropped, as the impact may damage the tape's internal mechanism.
- Make sure the environment is kept clean and constant. Do not operate in a dusty environment and always maintain a constant environment. A consistent storage and operating environment reduces media exposure to climatic stress.
- The 20/40GB 4MM Internal Tape Drive does automatic cartridge recognition for both write and read. The density settings, as shown with the AIX **SMIT** command, should not be manually changed by the user. The tape drive controls the format of the data written to the tape cartridge through automatic media recognition.

**Attention:** Use only the recommended cleaning cartridge to clean the tape drive. Use of other than recommended cleaning cartridges can damage your drive and may void the warranty.

- Printers and copiers can produce paper and toner dust. Locate the tape unit away from these items. High traffic areas near hallways and doors can also produce excess dust and dirt.
- All important information should be recorded on the tape label. Information, such as the model and number of the system or tape drive, the date, the density, any error statistics, and a log number should be included. The operating environment and compression mode should also be noted.

---

## Prolonging Head Life

The new technology in the 20/40GB 4MM Internal Tape Drive is read and write compatible with DDS-2, DDS-3, and DDS-4 media. Due to media characteristics, extended use of DDS-2 and DDS-3 tape cartridges may increase head wear on the drive. An indication of this head wear is an increase in soft (recoverable) errors. Using a quality DDS-4 tape reduces drive head wear and maximizes the overall advantages of the 20/40GB 4MM Internal Tape Drive.

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## Data Cartridge Erasure

Most bulk eraser devices do not have the capability to erase the 4mm data cartridge. To properly erase a 4mm data cartridge with a bulk eraser device, the erasure coercivity rating must be a minimum of 3900 Oersted.

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## Storage and Shipping Environments

Before using a tape cartridge, let it acclimate to the operating environment by placing the cartridge in the operating environment for as long as it has been away from the environment or for 24 hours, whichever is less. (To determine the appropriate operating environment, see “Tape Drive Environment and Use” on page 2.)

Acclimation is necessary for any data cartridge exposed to a different humidity environment or to temperature changes of 11°C (20°F) or more.

Retrieval of archived data should be performed on a tape unit that is clean and fully operational. Try to make the recovery environment the same as the operating environment. Allow tapes at least 24 hours to acclimate to environment of the tape unit.

The recommended environment for storage and shipment of 4mm data cartridges is shown in Table 4.

*Table 4. Recommended Environment for 4mm Data Cartridges*

<b>Environmental Factor</b>	<b>Storage</b>	<b>Shipping</b>
Temperature	5°C to 32°C (41° to 90°F)	-40 to 52°C (-40 to 125°F)
Relative Humidity (noncondensing)	20 to 60%	5 to 80%
Maximum Wet Bulb	26°C (79°F)	26°C (79°F)

## Tape Cartridge Storage

Tape drives record data using densities similar to hard disk drives. Because most computer systems are not located in a dust-free, climate-controlled environment, you must exercise special care when dealing with tape cartridges and tape drives. They need to be treated as a valuable asset used to protect your business data.

Use the following guidelines for storing your tape cartridges:

- Temperature and humidity should be kept constant at a level comfortable for you.
- Tape cartridges should always be stored in their protective cases. The storage case helps prevent damage from dust and physical misuse. When the tape cartridges are not in use or being stored, they should be in their storage cases and stood on edge

in a designated storage location. Do not stack cartridges on the flat side or stack other items on top of the tape cartridges. Handle your tape cartridges with care to reduce archival problems.

- Tape cartridge protective cases should be kept closed except when inserting or removing a cartridge. Contamination can build up and be transferred to the tape cartridge if the protective case is left open.
- Stored tapes should be exercised at least once every 12 months. Run the tape from Beginning of Data (BOD) to End of Data (EOD) and back to BOD at normal operating speeds. Tapes stored in a warmer environment should be exercised more frequently.
- Sunlight can damage the tape and the cartridge shell. Store tape cartridges out of the direct sunlight

**Attention:** Operation outside of the recommended environment can result in possible loss of data or failure of the drive.

---

## Operating in Harsh Environments

Do not use as an archival tape any tape that has been used outside of the operating ranges specified in “Storage and Shipping Environments” on page 21 for an extended period of time. The magnetic and physical strength of the tape will have deteriorated as a result of its exposure to the environment. Do not store important data on such a tape; transfer the data to a newer tape for reliable archiving.

**Attention:** Do not operate the 20/40GB 4MM Internal Tape Drive in a poor air-quality environment. If your environment contains an excessive amount of particulates, contact your service representative for more information.

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## Setting the Write-Protect Switch

The position of the write-protect switch on the 4mm tape cartridge determines when you can write to the tape (see Figure 3 on page 23).

- When the switch is set to the right **1**, data can be written to and read from the tape.
- When the switch is set to the left **2**, data can only be read.

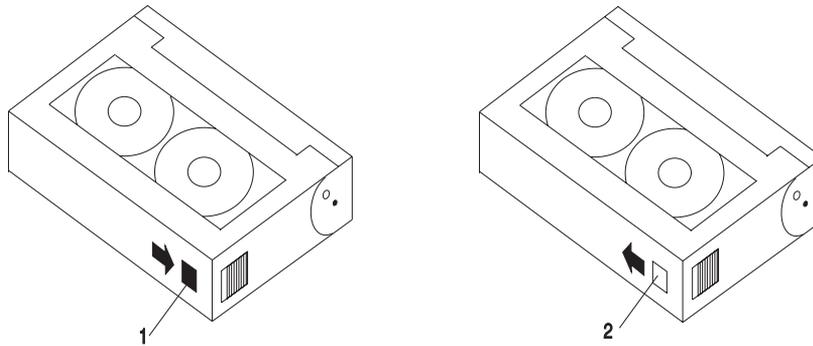


Figure 3. Setting the Write-Protect Switch

## Ordering Tape Cartridges

All tape cartridges are not alike. The tape composition and length, and the construction of the cartridge itself can all affect the quality and capacity of the recording and the performance of your tape drive. A poor quality tape cartridge may appear to work adequately in your system, yet it can leave contamination in the tape path or impede the speed of the recording.

The length and composition of the tape, and the size, shape, and construction of the cartridge shell must all be considered when selecting the tape cartridge to be used with your system. Data grade tape media is the only type of tape media that should be used for backup and data processing. Saving money by using generic media for data purposes will do little to save your business if your data is destroyed and your backup tapes fail because of inferior media.

Table 5 lists quality tape cartridges that you can order for the 20/40GB 4MM Internal Tape Drive. To order cartridges contact your local provider of storage products. The following table provides you with two part numbers of quality tape cartridges that can be purchased from your local provider.

Table 5. Tape Cartridges for the 20/40GB 4MM Internal Tape Drive

Part Number	Type of Cartridge	Length
59H4458	4mm Data Cartridge	150 m (492 ft)
21F8763	4mm Cleaning Cartridge	--



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## Appendix A. Communications Statements

The following statement applies to this product. The statement for other products intended for use with this product appears in their accompanying documentation.

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### Federal Communications Commission (FCC) Statement

**Note:** The 4mm Tape Drive 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 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 authorized dealers. Neither the provider nor the manufacturer are 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, New York 10504
- Telephone: (919) 543-2193



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## European Union (EU) Statement

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. The manufacturer cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of option cards supplied by third parties. Consult with your dealer or sales representative for details on your specific hardware.

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.

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## International Electrotechnical Commission (IEC) Statement

This product has been designed and built to comply with IEC Standard 950.

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## United Kingdom Telecommunications Safety Requirements

This equipment is manufactured to the International Safety Standard EN60950 and as such is approved in the UK under the General Approval Number NS/G/1234/J/100003 for indirect connection to the public telecommunication network.

The network adapter interfaces housed within this equipment are approved separately, each one having its own independent approval number. These interface adapters, supplied by the manufacturer, do not use or contain excessive voltages. An excessive voltage is one which exceeds 70.7 V peak ac or 120 V dc. They interface with this equipment using Safe Extra Low Voltages only. In order to maintain the separate (independent) approval of the manufacturer's adapters, it is essential that other optional cards, not supplied by the manufacturer, do not use main voltages or any other excessive voltages. Seek advice from a competent engineer before installing other adapters not supplied by the manufacturer.

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## Avis de conformité aux normes du ministère des Communications du Canada

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

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## Canadian Department of Communications Compliance Statement

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

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## VCCI Statement

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。  
取扱説明書に従って正しい取り扱いをして下さい。

The following is a summary of the VCCI Japanese statement in the box above.

This product is a Class B Information Technology Equipment and conforms to the standards set by the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). This product is aimed to be used in a domestic environment. When used near a radio or TV receiver, it may become the cause of radio interference. Read the instructions for correct handling.

---

## Radio Protection for Germany

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 Germany.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse B.



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## Appendix B. Notices

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

The manufacturer may not offer the products, services, or features discussed in this document in other countries. Consult the manufacturer's representative for information on the products and services currently available in your area. Any reference to the manufacturer's product, program, or service is not intended to state or imply that only that product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any intellectual property right of the manufacturer may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any product, program, or service.

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## Reader's Comments — We'd Like to Hear From You

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Order Number: SA23-1233-01

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	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
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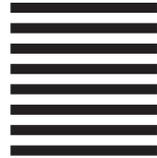
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