



CERTANCE

## Online User's Guide



 DAT 72/DDS-4 6-Slot Autoloader



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# Warnings

All safety and operating instructions should be read before this product is operated, and should be retained for future reference. This unit has been engineered and manufactured to assure your personal safety. Improper use can result in potential electrical shock or fire hazards. In order not to defeat the safeguards, observe the following basic rules for installation, use and servicing.

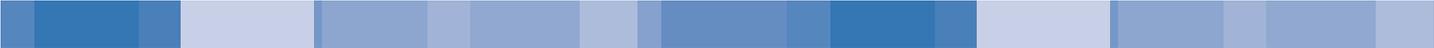


**CAUTION:** This symbol should alert the user to the presence of “dangerous voltage” inside the product that might cause harm or electric shock.

Caution! Risk of electric shock! Do not open!

To reduce the risk of electric shock, do not remove the cover (or back). No user-serviceable parts are inside. Refer servicing to qualified service personnel.

- Heed warnings — All warnings on the product and in the operating instructions should be adhered to.
- Follow instructions — All operating and use instructions should be followed.
- Ventilation — The product should be situated so that its location or position does not interfere with proper ventilation.
- Heat — The product should be situated away from heat sources such as radiators, heat registers, furnaces, or other heat producing appliances.
- Power sources — The product should be connected to a power source only of the type directed in this document or as marked on the product.
- Power cord protection — The power cord should be routed so that it is not likely to be walked on or pinched by items placed upon or against it, paying particular attention to the cord at the wall receptacle, and the point where the cord exits from the product.
- To complete the disconnection of the electricity, please remove the power (electric) cord and the SCSI cable from their connections in the back of the product. The plugs should be placed near the product for easy access.
- Object and liquid entry — Care should be taken to insure that objects do not fall and liquids are not spilled into the product's enclosure through openings.
- Servicing — The user should not attempt to service the product beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.



# Precautions

- Do not use oil, solvents, gasoline, paint thinners, or insecticides on the unit.
- Do not expose the unit to moisture or to temperatures higher than 104 °F (40 °C) or lower than -40 °F (-40°C).
- Keep the unit away from direct sunlight, strong magnetic fields, excessive dust, humidity, and electronic/ electrical equipment, which generate electrical noise.
- Hold the power cord by the head when removing it from the AC outlet; pulling the cord can damage the internal wires.
- Use the unit on a firm level surface free from vibration, and do not place anything on top of the unit.

# FCC Notice

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

- Reorient the receiving antenna.
- Relocate the computer with respect to the receiver.
- Move the computer into a different outlet so that the computer and receiver are on different branch circuits.

If necessary, you should consult the dealer or an experienced radio/television technician for additional suggestions. You may find the booklet, *How to Identify and Resolve Radio-TV Interference Problems*, prepared by the Federal Communications Commission, helpful. This booklet (Stock No. 004-000-00345-4) is available from the U.S. Government Printing Office, Washington, DC 20402.



**WARNING:** Changes or modifications made to this equipment, which have not been expressly approved by Certance, may cause radio and television interference problems that could void the user's authority to operate the equipment.

Further, this equipment complies with the limits for a Class B digital apparatus in accordance with Canadian Radio Interference Regulations.

The desktop device drive described in this manual requires shielded interface cables to comply with FCC emission limits.



**WARNING:** To prevent fire or electrical shock hazard, do not expose the unit to rain or moisture.

To avoid electrical shock, do not open the cabinet.  
Refer servicing to qualified personnel.

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# 1. Introduction

The Certance DAT 72 and DDS-4 tape autoloaders are fully integrated, intelligent, multi-cartridge tape systems that support the (Digital Data Storage) DDS-2 (DDS-4 autoloader only), DDS-3, DDS-4, and DAT 72 (DAT 72 autoloader only) 4mm tape formats. They include a magazine that can accommodate up to six (6) data cartridges.

These autoloaders are an internal or standalone desktop subsystem that connects to a host system using an LVD 2 68-pin shielded SCSI cable.

The autoloader combines established DDS technology, high-density recording and hardware data compression capability to provide unmatched reliability and performance.



**NOTE:** These autoloaders will not work in a SCSI-1 environment.

## Features

The following list summarizes the key features of the DDS-4 and DAT 72 autoloader drives.

- Compatibility
  - DDS-4: Supports DDS-2, DDS-3, and DDS-4 recording formats.
  - DAT 72: Supports DDS-3, DDS-4, and DAT 72 recording formats.
- Support for various native data-storage capacities
- High-speed transfer rates for fast backups
- Advanced onboard DDS-DC hardware using Lempel-Ziv (DCLZ) data-compression, doubling the drive's uncompressed capacity (e.g., a 20 GB uncompressed drive can be 40 GB with compression)
- High-performance SCSI burst transfer rates
- Three levels of error-correction code (ECC) and four-head design for read-after-write (RAW) error detection and correction (uncorrectable error rate of less than 1 in  $10^{15}$  bits)
- "Flying" preamplifier for greater signal-to-noise ratio
- Flash memory to store setup parameters and enable field firmware upgrades
- Automatic Power On Self Test
- State-of-the-art sealed drive mechanism and tape handling components for improved immunity to airborne contaminants and extended media life.

# Capacity and Transfer Rates

The Certance DAT 72 and DDS-4 autoloaders provide the following capacities and sustained data transfer rates, depending upon the type and length of tape media used. These capacities and transfer rates are based on an assumed 2:1 data compression rate. Uncompressed (native) capacities are one-half these values.

**Table 1. DDS-4 and DAT 72 Autoloader Capacity and Transfer Rates**

Tape format	DDS-2*	DDS-3	DDS-4	DAT-72
<i>Tape Length (meters)</i>	120	125	150	170
<i>Single-Cartridge Capacity (Gbytes)</i>	8	24	40	72
<i>Six-Cartridge Magazine Capacity (Gbytes)</i>	48	144	240	432
<i>Sustained Data Transfer Rate (Mbytes/sec)</i>	2.2	5.5	5.5	7.0

\* Applies to DDS-4 drives only



**NOTE:** 60-meter DDS data cartridges cannot be used with these autoloaders. The use of 90-meter DDS data cartridges is not recommended for these products. The DAT 432 autoloader will reject 90-meter tapes if they are inserted.

## Applications

The Certance DAT 72 and DDS-4 autoloaders are ideal for server and network/enterprise applications, including:

- Backup of high-capacity hard drives or disk arrays
- Automated storage management
- On-line, unattended data collection
- Near-line secondary storage for text, graphics or multimedia data of all types
- Archival storage.

## Using This Guide

This User's Guide describes how to install, configure, and care for the DDS-4 and DAT 72 autoloader tape drives. Please read the appropriate chapters and appendixes carefully, and keep this Guide handy for future reference.

- **Chapter 2** provides quick-start instructions for getting the drives up and running in the shortest possible time.
- **Chapter 3** describes how to install the DDS-4 and DAT 72 autoloader drives.
- **Chapter 4** describes how to operate the drives.
- **Chapter 5** describes the autoloader LEDs.
- **Chapter 6** describes the configuration for Novell and UNIX operating systems.
- **Chapter 7** provides troubleshooting procedures you can follow in the unlikely event you encounter a problem with your drive.
- **Appendix A** describes how to upgrade firmware for your tape drive.

## 2. Quick Start Installation

This chapter provides quick-start instructions for getting the autoloader tape drives up and running in the shortest possible time.

Topics in this chapter are:

- “Before you begin” on page 13
- “Autoloader Components” on page 14
- “Installing a Desktop Autoloader” on page 14
- “Installing an Internal Autoloader” on page 15



**NOTE:** If you prefer more detailed instructions, see Chapter 3 for drive installation instructions.

### Before you begin

#### Precautions

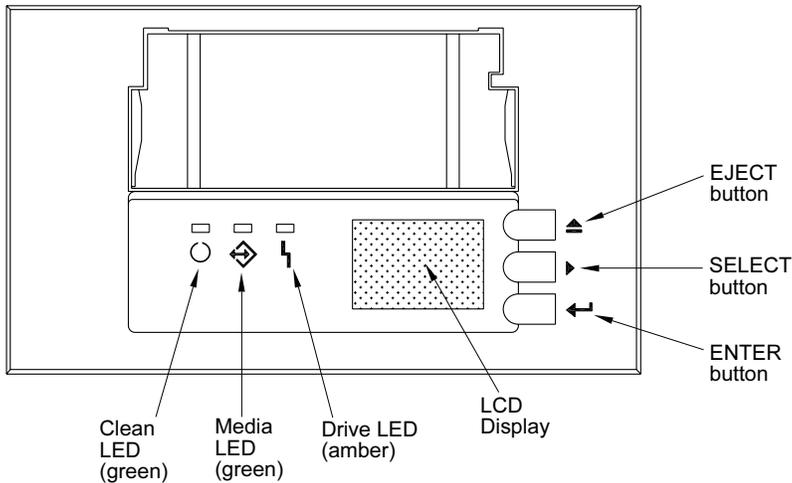


**CAUTION:** Observe the following precautions to avoid electrostatic damage to the internal autoloader.

- Do not remove the drive from the antistatic bag until you are ready to install it.
- Before you remove the drive from the antistatic bag, touch a grounded metal surface to discharge any static electricity buildup from your body.
- Hold the drive only by its edges and avoid direct contact with any electronic components.
- If you need to put down the drive, lay it on top of the antistatic bag or place it inside the bag.

# Autoloader Components

The following describes the major components of the autoloader.



**Figure 1. Front Panel Components**

For more information on LEDs and their meaning, see “Front Panel LEDs” on page 37.

## Installing a Desktop Autoloader

Use the following procedure to install a desktop autoloader. Print this page and check each step as you complete it. If you need more information about a step, turn to the section referenced in the step.

- 1.** *Unpack the contents of your drive package, and check for missing or damaged items. See “Unpacking and Inspection” on page 16.*
- 2.** *Review the drive’s default settings and change them if necessary:*
  - *SCSI ID: 6*
  - *Parity Checking: Enabled*
  - *Terminator Power: Disabled*
  - *Data Compression: Enabled*
  - *Media Recognition (DDS-4 drives only): Enabled*
  - *Power On Self Test (POST): Enabled*
  - *Host Operating System: Windows 98 SE/ME/XP/NT/2000/Windows Server 2003*
  - *SCSI Interface Compatibility: Ultra 2 Wide SCSI for DDS-4 and DAT 72 autoloader*
  - *Vendor ID: SEAGATE DAT**See “Configuring the Desktop Autoloader” on page 17.*
- 3.** *Connect a SCSI interface cable to the drive. See “Connecting the SCSI Interface Cable” on page 18.*
- 4.** *Be sure the tape drive is not the last device on the SCSI bus (the drive does not provide SCSI termination). See “Installing SCSI Termination” on page 19.*
- 5.** *Connect a power cable to the drive. See “Connecting the Power Cord” on page 19.*

## Installing an Internal Autoloader

Use the following procedure to install an internal autoloader. Print this page and check each step as you complete it. If you need more information about a step, turn to the section referenced in the step.

- 1.** *Unpack the contents of your drive package, and check for missing or damaged items. See "Unpacking and Inspection" on page 16.*
- 2.** *Review the drive's default settings and change them if necessary:*
  - *SCSI ID: 6*
  - *Parity Checking: Enabled*
  - *Terminator Power: Disabled*
  - *Data Compression: Enabled*
  - *Media Recognition: Enabled*
  - *Power On Self Test (POST): Enabled*
  - *Host Operating System: Windows 98 SE/ME/XP/NT/2000/Windows Server 2003*
  - *SCSI Interface Compatibility: Ultra 2 Wide SCSI for DDS-4 and DAT 72 autoloader*
  - *Vendor ID: SEAGATE DAT**See "Configuring the Internal Autoloader" on page 20.*
- 3.** *Mount the drive horizontally in a 5.25-inch, full-height drive bay. See "Mounting the Internal Autoloader" on page 24.*
- 4.** *Connect a SCSI interface cable to the drive. See "Connecting the SCSI Interface Cable" on page 25.*
- 5.** *Be sure the tape drive is not the last device on the SCSI bus (the drive does not provide SCSI termination). See "Installing SCSI Termination" on page 26.*
- 6.** *Connect a power cable to the drive. See "Connecting the Power Cord" on page 27.*

# 3. Installing the Autoloaders

This chapter describes how to install the desktop and internal DDS-4 and DAT 72 autoloaders.

Topics in this chapter are:

- “Unpacking and Inspection” on page 16
- “Installing the Desktop Autoloader” on page 16
- “Installing the Internal Autoloader” on page 20

## Unpacking and Inspection

Although Certance autoloaders are inspected and carefully packaged at the factory, damage may occur during shipping. Follow these steps for unpacking the autoloader.

1. Before you unpack the contents of your autoloader package, inspect the shipping containers for damage. If you spot damage to the container, notify your shipper immediately.
2. Place the shipping container on a flat, clean, stable surface. Then carefully remove the contents and compare the items received with those on the packing list. If any item is missing or damaged, please contact your place of purchase immediately.
3. Save the drive container and packing materials in case you ever need to ship the drive.

## Installing the Desktop Autoloader

The following sections describe how to install a desktop autoloader.

### Desktop Autoloader Installation Summary

The desktop DAT 72 and DDS-4 autoloader connects to the host computer as a turnkey subsystem. Installing the desktop autoloader involves the following steps:

1. Configuring the Desktop Autoloader
2. Setting the SCSI ID
3. Connecting the SCSI Interface Cable
4. Installing SCSI Termination
5. Connecting the Power Cord

## Configuring the Desktop Autoloader

Table 2 shows the default configuration for the desktop autoloader.

**Table 2. Default Configuration (Desktop Drive)**

Parameter	Default Setting
SCSI ID	6
Data Compression	Enabled
Media Recognition System (MRS) Verification	Enabled
Power On Self Test (POST) Diagnostics	Enabled
Host Operating System	Windows 98 SE/ME/NT 4.0/ 2000/XP/Windows Server 2003
SCSI Termination Power	Disabled
Parity Checking	Enabled

If these default settings are appropriate for your computer, skip to “Connecting the SCSI Interface Cable” on page 18.



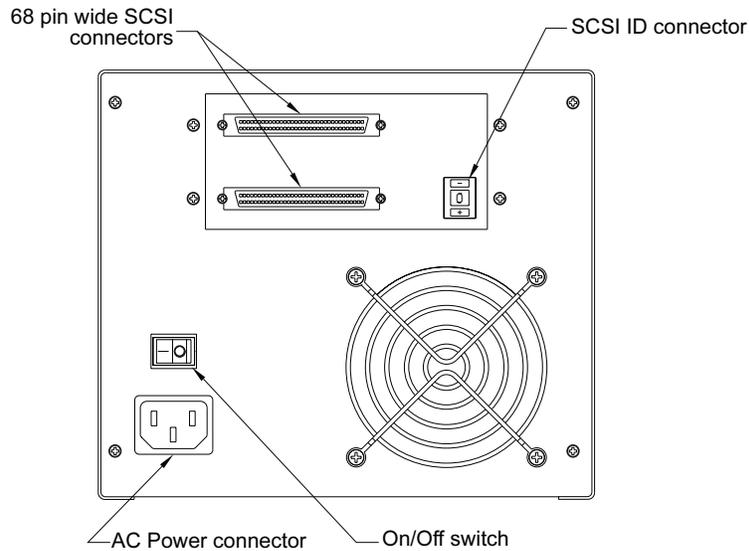
**NOTE:** These settings can be changed by accessing the switches located on the bottom of the autoloader. Turn the autoloader over and gently pull the tab on the access door to release it. Once the door is open, the switches will be accessible. See page 23 and page 45 for details on switch settings.

## Setting the SCSI ID

Make sure that the autoloader is turned off; then set the SCSI ID using the push-button switch on the back of the autoloader. The following figure shows this switch, as well as the two SCSI interface connectors, on/off switch, and the power cord connector.



**NOTE:** The autoloader must be restarted for any change in SCSI ID to take effect.



**Figure 2.** Autoloader Rear Panel

## Connecting the SCSI Interface Cable

Your autoloader provides two (2) High-Density 68-pin, shielded connectors on the rear panel of the enclosure. Either connector can be used as a SCSI IN or SCSI OUT connection (you can use either connector to attach the autoloader to the host computer or to another SCSI device).

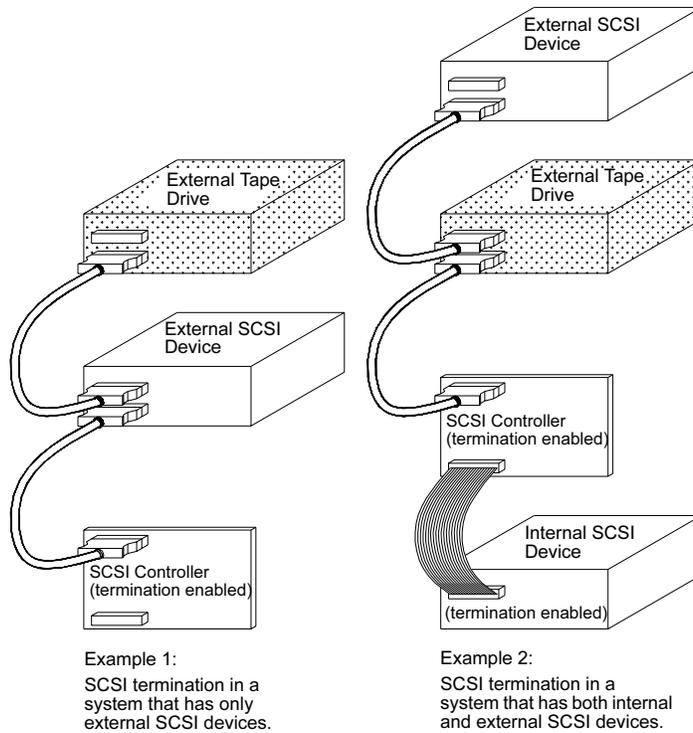
Turn off your computer and all SCSI devices. Then attach a SCSI cable from the host adapter or from another (unterminated) SCSI device to the autoloader.



**NOTE:** This autoloader will not work in a SCSI-1 environment.

## Installing SCSI Termination

If the autoloader is the last device or the only device in a SCSI chain, you must install a terminating plug on the unused SCSI connector. See the following figure for two SCSI termination examples.



**Figure 3.** SCSI Termination Examples

## Connecting the Power Cord

Attach the power cord securely to the power connector on the back of the autoloader. The location of the power connector on the autoloader is shown in Figure 2 and Figure 3.

# Installing the Internal Autoloader

The following sections describe how to install an internal autoloader.

## Internal Autoloader Installation Summary

The internal autoloader is installed horizontally in a 5.25-inch, full-height drive bay. Installing the internal autoloader involves the following steps:

1. Configuring the Internal Autoloader
2. Mounting the Internal Autoloader
3. Connecting the SCSI Interface Cable
4. Installing SCSI Termination
5. Connecting the Power Cord

## Configuring the Internal Autoloader

The internal autoloader is configured using jumpers and DIP switches. Table 3 shows the default configuration for the internal autoloader.

**Table 3. Default Configuration (Internal Drive)**

Parameter	Default Setting	Configuration Method
SCSI ID	6	Jumpers
Parity Checking	Enabled	Jumpers
SCSI Termination Power	Disabled	Jumpers
Data Compression	Enabled	DIP switches
Media Recognition System (MRS) Verification	Enabled	DIP switches
Power On Self Test (POST) Diagnostics	Enabled	DIP switches
Host Operating System	Windows 98 SE/ME/NT 4.0/ 2000/XP/Windows Server 2003	DIP switches

If these default settings are appropriate for your computer, skip to "Mounting the Internal Autoloader" on page 24.

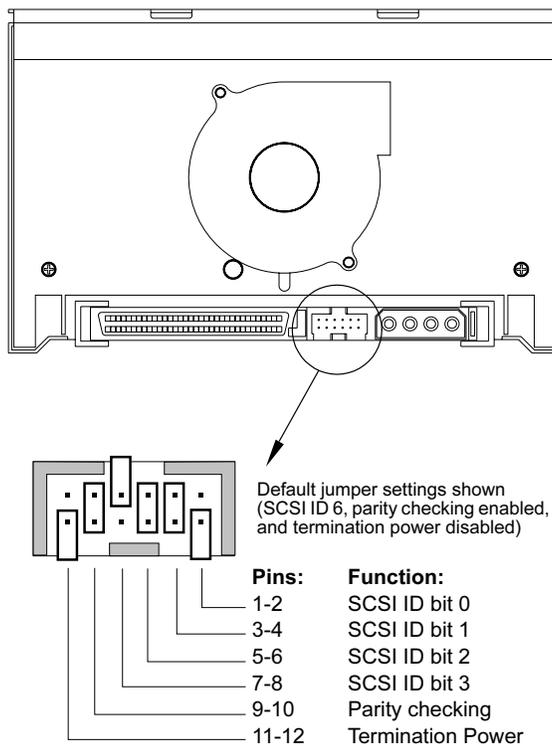
Changing Jumper Settings

Jumpers on the back of the internal drive let you change the following drive settings (see Figure 4 ):

- SCSI ID
- Parity checking
- SCSI termination power



**NOTE.** Power down the drive before changing jumper settings. Changes take effect when the drive restarts.



SCSI ID=0	■ ■ ■ ■ ■ ■ ■ ■
SCSI ID=1	■ ■ ■ ■ ■ ■ ■ ■
SCSI ID=2	■ ■ ■ ■ ■ ■ ■ ■
SCSI ID=3	■ ■ ■ ■ ■ ■ ■ ■
SCSI ID=4	■ ■ ■ ■ ■ ■ ■ ■
SCSI ID=5	■ ■ ■ ■ ■ ■ ■ ■
SCSI ID=6	■ ■ ■ ■ ■ ■ ■ ■
SCSI ID=7	■ ■ ■ ■ ■ ■ ■ ■
SCSI ID=8	■ ■ ■ ■ ■ ■ ■ ■
SCSI ID=9	■ ■ ■ ■ ■ ■ ■ ■
SCSI ID=10	■ ■ ■ ■ ■ ■ ■ ■
SCSI ID=11	■ ■ ■ ■ ■ ■ ■ ■
SCSI ID=12	■ ■ ■ ■ ■ ■ ■ ■
SCSI ID=13	■ ■ ■ ■ ■ ■ ■ ■
SCSI ID=14	■ ■ ■ ■ ■ ■ ■ ■
SCSI ID=15	■ ■ ■ ■ ■ ■ ■ ■
Parity enable	■ ■ ■ ■ ■ ■ ■ ■
Term. Power	■ ■ ■ ■ ■ ■ ■ ■

**Figure 4.** Jumper Pins on the Back of the Internal Autoloader

SCSI Address Selection (pins 1 through 8)

Each SCSI device on a SCSI bus must have a unique SCSI ID. The SCSI controller or host adapter generally uses ID 7. In some systems, the boot drive uses ID 0 or ID 1.

You can select an appropriate SCSI address for the drive by placing the appropriate jumpers on pin pairs 1-2 through 7-8, as shown in Figure 4 on page 21 .



**NOTE:** SCSI ID numbers 8 through 15 will only be recognized if DIP switch 9 is "ON." See "SCSI Wide/Narrow (switch 9) - DDS-4 autoloader only" on page 24 for more information.

Parity Checking (pins 9 and 10)

If a jumper is installed on pins 9 and 10, parity checking is enabled. If no jumper is installed, parity checking is disabled, but parity is still generated by the drive.

Terminator Power (pins 11 and 12)

If a jumper is installed on pins 11 and 12, terminator power is enabled.



**NOTE:** The internal autoloader drive does not provide SCSI termination, and therefore should not be installed as the last device in a SCSI chain. See "Installing SCSI Termination" on page 19 for more information.

If the terminator power jumper is installed, be careful not to short the TERMPWR signal to ground. In the event of a short, terminator power to the bus will be interrupted. After the short is removed, a fuse in the drive will automatically reset, restoring terminator power.

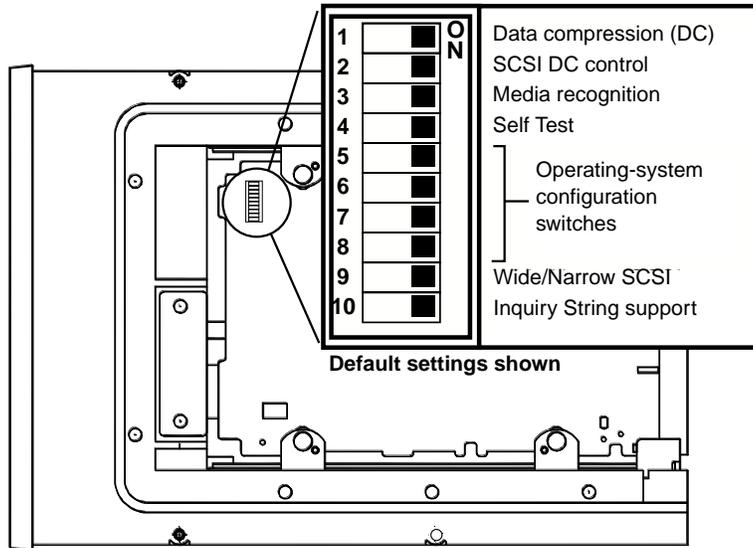
## Changing DIP Switch Settings

DIP switches on the underside of the internal autoloader let you change the following drive settings (see Figure 5 on page 23 ):

- Data compression
- MRS checking (DDS-4 autoloader only)
- POST diagnostics
- Operating system settings
- Wide/Narrow SCSI selection
- Inquiry string



**NOTE.** Power down the drive before changing DIP switch settings. Changes take effect when the drive restarts.



**Figure 5.** DIP-Switch Settings for the Internal Autoloader

### Data Compression (switches 1 and 2)

Switch 1 enables or disables hardware data compression. Switch 2 determines whether SCSI commands can be used to enable or disable hardware data compression.

- Switch 1 ON: Hardware data compression is enabled when drive is powered on. (*default*)
- Switch 1 OFF: Hardware data compression is disabled when drive is powered on.
- Switch 2 ON: SCSI commands can be used to enable or disable hardware data compression (*default*)
- Switch 2 OFF: SCSI commands cannot be used to enable or disable hardware data compression

### Media Recognition System (switch 3) - *DDS-4 autoloader only*

The Media Recognition System (MRS) allows the drive to determine whether a given tape cartridge conforms to the DDS tape standard. Switch 3 determines how the drive works with MRS and non-MRS media. Using non-DDS media may appear to give satisfactory results, but the inferior specifications of such media can cause data-integrity problems.

- Switch 3 ON: Drive reads from and writes to MRS media, and reads from but does not write to non-MRS media (*default*)
- Switch 3 OFF: Drive reads from and writes to both MRS and non-MRS media.

### Power On Self Test Enable/Disable (switch 4)

Switch 4 enables or disables execution of Power On Self Test (POST) diagnostics when the drive is powered on.

- Switch 4 ON: Drive performs POST when powered on. (*default*)
- Switch 4 OFF: Drive does not perform POST when powered on.

### Operating System configuration (switches 5 through 8)

Switches 5 through 8 configure the drive for use with UNIX, Novell, and Windows NT operating systems. These procedures are described in Chapter 6, "Configuration for Novell and UNIX" on page 44. The default setting for these switches is ON.

### SCSI Wide/Narrow (switch 9) - DDS-4 autoloader only

Switch 9 enables or disables SCSI Wide operation on the SCSI bus.

- Switch 9 ON: Drive can operate in Wide (16-bit) SCSI mode. *(default)*
- Switch 9 OFF: Drive can only operate as a Narrow (8-bit) SCSI device.



**NOTE:** If switch 9 is set to OFF, the drive can only use SCSI ID values 0 through 7.

### Inquiry String (switch 10)

Switch 10 selects the Vendor ID that the drive returns when queried with a SCSI Inquiry command.

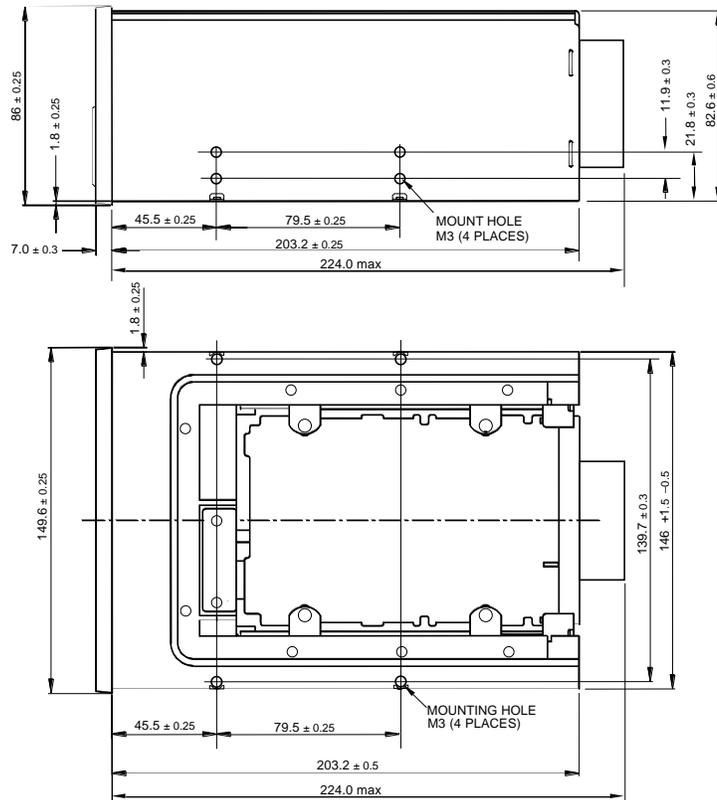
- Switch 10 ON: Vendor ID is "SEAGATE DAT." *(default)*
- Switch 10 OFF: Vendor ID is "ARCHIVE Python." This ID can be used by independent software vendors to provide software compatibility with previous Seagate DDS tape drives.

## Mounting the Internal Autoloader

The internal autoloader drive is mounted horizontally in a 5.25-inch, full-height drive bay. Mount the drive using four M3.0 metric screws on the sides or bottom of the drive, as shown in Figure 6 on page 25. Do not use screws longer than 4 mm or you may damage the drive.



**NOTE:** When mounting the drive, make sure that nothing blocks the exhaust fan or the ventilation slots on the bottom and rear of the autoloader.



**Figure 6.** Locations of Mounting Holes

## Connecting the SCSI Interface Cable

Turn off all power to your computer and drive. Then connect a 68-pin wide internal SCSI cable from your SCSI controller to the SCSI connector on the back of the autoloader. Be sure pin 1 on the SCSI controller and cable is connected to pin 1 on the drive. Figure 7 on page 26 shows the location of SCSI pin 1 on the drive's SCSI connector. Pin 1 on the SCSI cable should be indicated by a colored stripe.

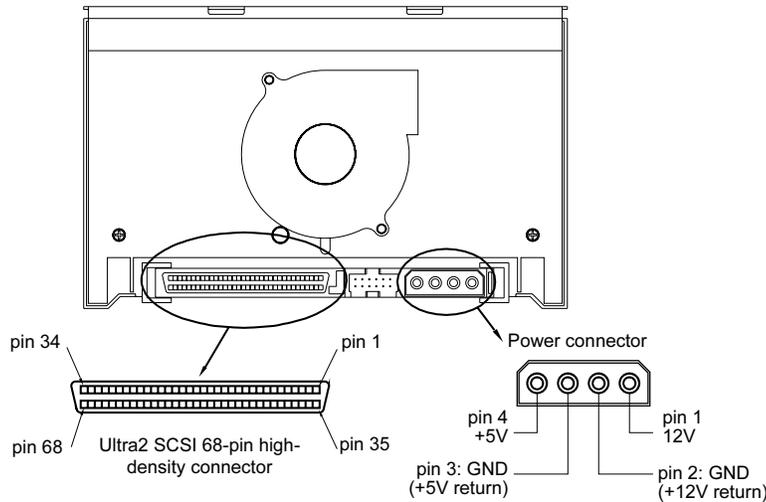
The internal autoloader drive can be used with two types of SCSI interfaces:

- Ultra2 SCSI (LVD)
- "Wide" (16-bit) single-ended SCSI

The drive can automatically detect whether it is connected to an LVD or single-ended wide SCSI bus.



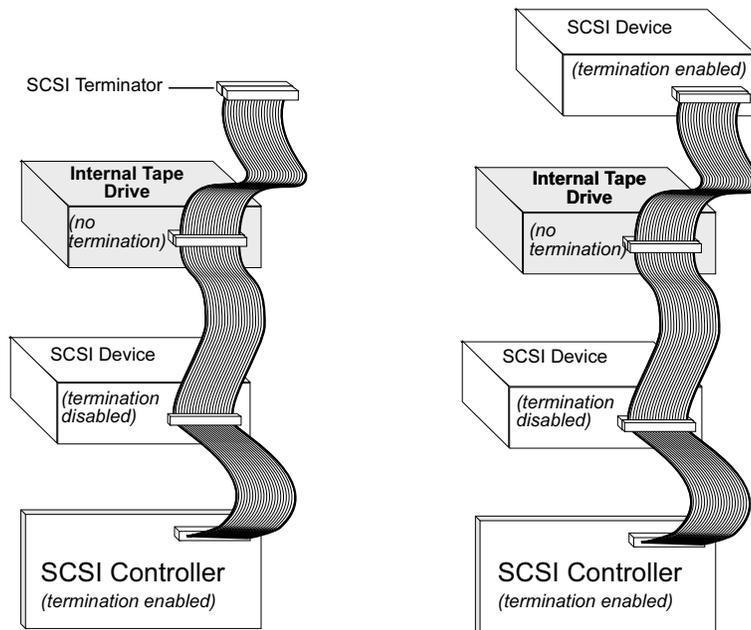
**NOTE:** The internal autoloader will not operate properly in a SCSI-1 environment.



**Figure 7.** Interface Connectors on the Internal Autoloader

### Installing SCSI Termination

The internal autoloader does not provide SCSI termination. For this reason, it should not be the last device on a SCSI chain. However, if the drive is the only SCSI device, attach the drive to the connector which is next to last on the SCSI chain and attach an LVD/single-ended multi-mode terminator to the last connector in the chain. Two termination examples are shown in Figure 8 on page 26 .



**Figure 8.** Two SCSI Termination Examples for the Internal Autoloader

## Connecting the Power Cord

Attach a 5/12-volt, four-pin power cable to the power connector on the back of the drive. Figure 7 on page 26 shows the location of the power connector.

The recommended 4-pin power connector for the internal drive is an AMP 1-48024-0 housing with AMP 60617-1 pins or equivalent.

# 4. Operating Your Autoloader

This chapter describes how to operate your autoloader.

Topics in this chapter are:

- “Using the Appropriate Media” on page 28
- “Starting the Autoloader” on page 29
- “Applying Labels” on page 30
- “Loading a Cartridge” on page 30
- “Ejecting a Cartridge or Magazine” on page 31
- “Write-Protecting a DAT Cartridge and Magazine” on page 33
- “Cleaning the Tape Path” on page 34
- “Preparation for Shipping” on page 35

## Using the Appropriate Media

The DDS-4 and DAT 72 autoloaders are designed to use datagrade DAT cartridges, such as those listed below.



**NOTE:** 60-meter DAT cartridges cannot be used with these autoloaders. The use of 90-meter DAT cartridges is not recommended for these products.

**Table 4. Matching Drives with the Media They Support**

<b>Media</b>	<b>Tape Length</b>	<b>DDS-4 Drives</b>	<b>DAT 72 Drives</b>
DDS-2	120 meters, 4-Gbyte uncompressed capacity	P	
DDS-3	125 meters, 12-Gbyte uncompressed capacity	P	P
DDS-4	150 meters, 20-Gbyte uncompressed capacity	P	P
DAT 72	170 meters, 36-Gbyte uncompressed capacity		P

# Starting the Autoloader

Turn on all external SCSI devices attached to your computer before you turn on the computer. When the autoloader is first started, the following events should occur:

1. The Clean, Media, and Drive LED's light up for two seconds, then start flashing.
2. The LCD display shows the current SCSI ID.
3. If a magazine is loaded, the LCD display shows the message "SCAN X" while the autoloader determines which slots in the magazine contain cartridges.
4. As each cartridge is identified by the autoloader, the cartridge's slot number is displayed on the LCD. If there is no cartridge in a slot, the slot number will not be displayed.
5. When all tests are completed, the LCD display shows the message "READY" if a magazine is loaded. If no magazine is loaded, the message "NO MAGAZINE" is shown.



**NOTE:** If your computer does not recognize the autoloader, you may need to load the appropriate autoloader module for your backup software. See your backup software installation manual for additional information.

## Handling Cartridges

To protect your data cartridges and the information on them, observe the guidelines and avoid the pitfalls in the following table.

**Table 5. Cartridge Guidelines and Pitfalls**

Guidelines to Follow...	Pitfalls to Avoid
Use DAT cartridges at temperatures from 5° C (40° F) to 40° C (104° F). Cartridges can be stored at temperatures down to -40° C (-40° F).	Do not expose cartridges to direct sunlight, moisture, excessively dry or humid places, extreme changes in temperature or humidity, or X-rays.
Handle cartridges gently.	Do not treat cartridges roughly or drop them.
Keep cartridges in plastic cases when they are not in use.	Do not try to clean the tape guides or tape path inside the cartridge.
Apply just one label to the designated area on the cartridge. Affixing more labels can jam the drive.	Never touch the exposed tape media with your fingers.
If your data is important, consider reading data off of tapes and rewriting to new and perhaps more modern tapes every few years.	Never leave cartridges close to magnetic fields, such as near a monitor or telephone handset.
If cartridges are exposed to temperatures or humidities outside the specified operating environment, expose them to the operating environment for a time equal to the period that the cartridges were exposed to the out-of-specification environment (up to a maximum of 24 hours).	Do not read from or write to cartridges when a temperature change of 10° C per hour is occurring.

## Applying Labels

When applying labels to a cartridge, observe the following precautions to prevent the cartridge from getting stuck in the autoloader:

- Apply labels firmly, only in recessed label areas on the top side of the cartridge.
- Do not let labels extend beyond label areas or fold over the edge of a cartridge.
- Do not apply labels over other labels.

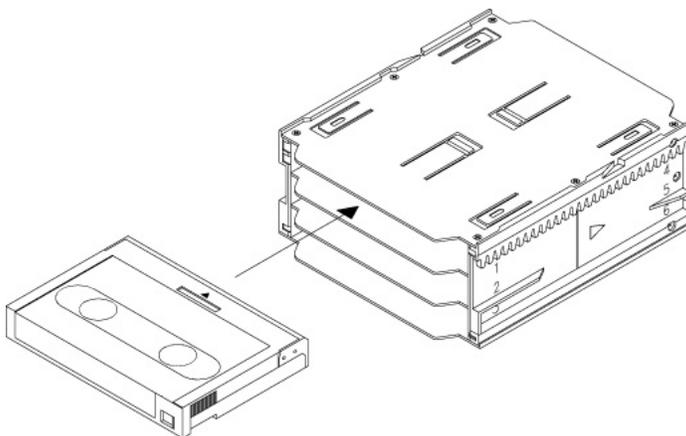


**CAUTION:** Do not place any labels on the autoloader magazine, since this may cause the tape mechanism to jam.

## Loading a Cartridge

Use only approved DAT cartridges in the autoloader. To load cartridges into the magazine, follow these steps:

1. Make sure that the cartridges are write-protected or write enabled, as necessary. For more information, refer to “Write-Protecting a DAT Cartridge and Magazine” on page 33.
2. Hold the magazine so that the slot numbers on the side of the magazine are right-side-up.
3. Insert cartridges with the cartridge door facing the magazine slot, as shown in the following figure.



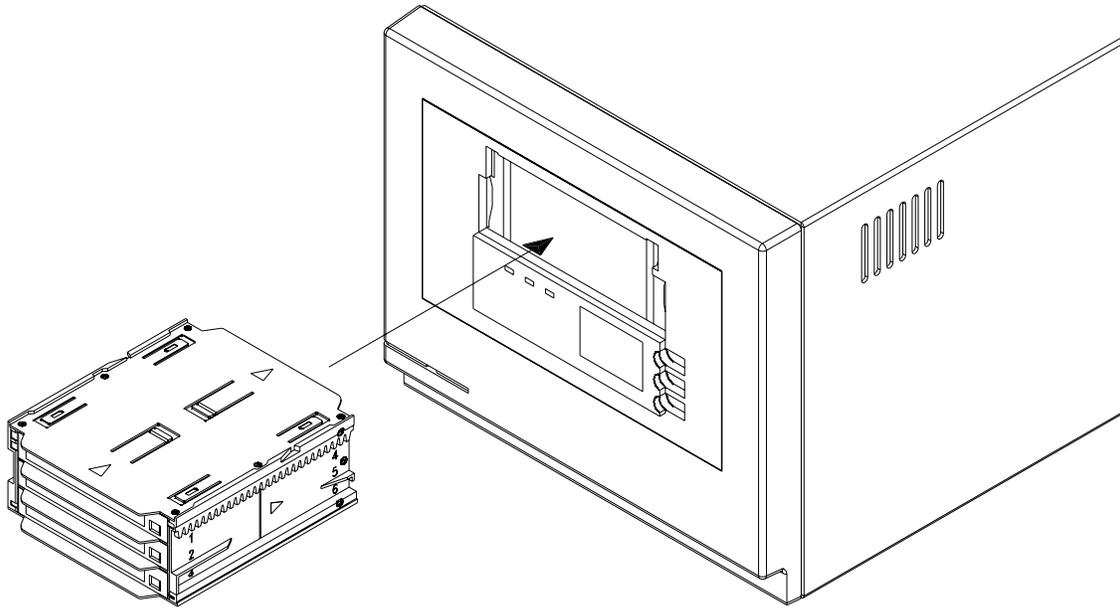
**Figure 9.** Loading a Cartridge into the Autoloader Magazine

## Loading a Magazine into the Autoloader



**CAUTION:** Do not load a magazine if all the LED's are flashing; this indicates that the autoloader is performing a Power On Self Test (POST).

1. Make sure the autoloader is powered on and operating normally.
2. Hold the magazine so that the slot numbers are right-side-up.
3. Write-protect or write-enable the magazine as appropriate. For more information, refer to "Write-Protecting a DAT Cartridge and Magazine" on page 33.
4. Insert the magazine into the autoloader with the triangles facing into the autoloader bay, as shown below. Gently push the magazine into the autoloader bay until the autoloader mechanism senses the magazine and pulls it inside.



**Figure 10.** Loading a Magazine into the Autoloader

## Ejecting a Cartridge or Magazine

To eject the magazine from the autoloader, press the Eject button. If the drive mechanism contains a cartridge, the LCD display shows the message "EJECT? PRESS ENTER". Press the Enter button, and wait for the following events to complete:

1. The tape rewinds to the beginning-of-partition (BOP) mark.
2. If the data cartridge is not write-protected, the operating system writes the updated copy of the tape log back to the tape.
3. The tape rewinds to the beginning-of-media (BOM) and is unthreaded.
4. The changer places the cartridge back into the magazine.

5. The magazine is ejected.

If there is no cartridge loaded in the autoloader mechanism, the magazine is ejected without delay.

## Forcing an Eject

If you press the Eject button when the autoloader is busy, the autoloader will complete the current task before responding to the eject request. This way no data is lost.

However, in extreme cases, you may need to force an eject operation to unload a cartridge, even at the risk of losing the data on the cartridge. A forced eject should only be tried when there is no other way to recover a cartridge.



**CAUTION:** If you force an eject, the cartridge may become unreadable and therefore require erasing or re-initialization by the application software.

To force an eject, hold down the Eject button for at least five seconds, then release the button. When you force an eject, the following occurs:

If there is a cartridge loaded, the Status Panel displays the message "UNLOAD TAPE X" (where X is the number of the magazine slot which held the cartridge currently in the autoloader). After the cartridge has been returned to the magazine, the display changes to "EJECTING MAGAZINE" and the magazine is ejected.



**NOTE:** Because forcing an eject can interrupt an operation, the autoloader might not write the end of data (EOD) mark on the tape before the cartridge is ejected. If the EOD mark is not written on the tape, the cartridge might be formatted incorrectly and the data on the tape might be lost. However, the data can usually be read up to the point where the error occurred.

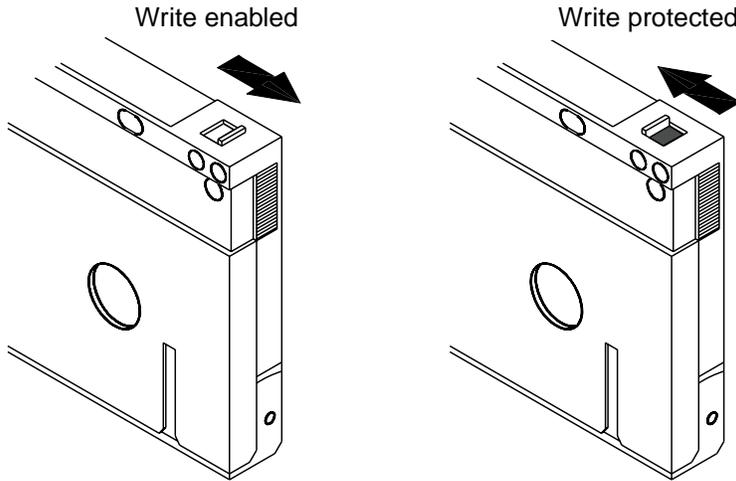
## Automatic and Manual Cartridge Loading

After cartridges have been loaded into the magazine and the magazine has been inserted into the magazine bay, the autoloader can be left indefinitely for unattended write or read operations (controlled by your backup software).

To load a cartridge manually, press the SELECT button repeatedly until the desired slot location is identified, then press the ENTER button.

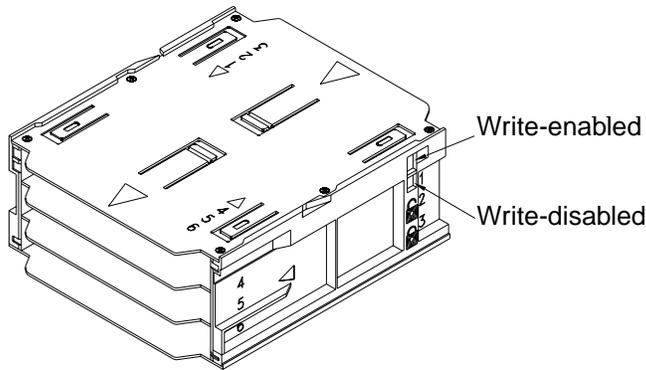
# Write-Protecting a DAT Cartridge and Magazine

Write-protecting a DAT cartridge protects the data on the cartridge from being changed, overwritten, or deleted. To write-protect a cartridge, slide the write-protect tab on the back of the cartridge to the open position. To write-enable the cartridge, slide the write-protect tab so the hole is closed.



**Figure 11.** Write-protecting a DAT Cartridge

The following figure shows how to write-protect a magazine. To enable writing to the magazine, move the switch upward. To protect all cartridges in the magazine from being written to, move the switch down.



**Figure 12.** Write-protect switch on autoloader magazine

# Cleaning the Tape Path

If excessive magnetic dust or debris collects at one or more of the tape heads, the autoloader may not be able to read from or write to tape, or may experience excessive errors. When the cleaning threshold is exceeded, the autoloader will display the cleaning request in two ways:

- The LCD display will show the message "CLEANING REQUIRED."
- The Clean LED will remain ON continuously.



**NOTE:** A slowly flashing Clean LED may indicate that a tape is damaged or is nearing the end of its life. If cleaning the tape path does not correct the flashing LED condition, replace the cartridge.

**Table 6. Cleaning the Autoloader**

Daily Usage (hours).	Optimum Cleaning Frequency
0-4	Three times per month
4-8	Weekly
8-12 or more	Twice a week

## Cleaning Procedure

To clean the tape heads on your DAT 72 and DDS-4 autoloader, use only a Certance-approved cleaning cartridge. You can purchase a Certance DDS Cleaning Cartridge on the internet at: <http://shop.certance.com> (U.S. only).



**NOTE:** The autoloader cannot recognize audio DAT cleaning cartridges.

## Manual Cleaning

You can clean the autoloader manually using the following procedure:

1. Place the cleaning cartridge in a magazine slot and insert the magazine into the autoloader.
2. Use the Select button to select the slot where you placed the cleaning cartridge.
3. Press the Enter button to load the cleaning cartridge into the autoloader. The autoloader starts the cleaning cycle automatically.
4. When the cleaning cycle is complete, the cartridge will automatically eject. If the cartridge is not automatically ejected, press the Eject button to return the cleaning cartridge to the magazine. Press the Eject button again to unload the magazine and remove the cleaning cartridge.
5. Record the date of the cleaning on the cleaning cartridge label.

Each time the cleaning cartridge is loaded, a new, unused portion of cleaning tape is advanced over the entire tape path. The drive does not rewind a cleaning cartridge. After about 30 cleaning cycles, the entire tape is used up, and you must purchase a new cleaning cartridge.

If you insert a cleaning cartridge that has been used up, the cleaning cycle will not be carried out. Instead, the Clean LED will flash rapidly and the LCD will display the message, "REPLACE CLEANING TAPE." The cleaning cartridge will not be returned to the magazine, the Clean LED will stay on, and the LCD will display the message, "CLEANING REQUIRED." In this case, press the Eject button to remove the magazine and replace the spent cleaning cartridge with a new one.

## Automated Cleaning

If your backup-and-restore software includes a tape drive head-cleaning feature, you can use the software to clean the autoloader. Some software packages are preprogrammed to use the cartridge in slot 6 to clean the tape path automatically. The software prompts the autoloader to load the cleaning cartridge and initiate the cleaning cycle. When the cleaning cycle completes, the tape drive ejects the cleaning cartridge and automatically returns it to the original magazine slot. Refer to your software documentation for details.

If, during automated cleaning, a cleaning cartridge is loaded that has been used up, the cleaning cycle will be aborted. Instead, the LCD will display the message "REPLACE CLEANING TAPE", and the cleaning cartridge will be returned to the magazine. The Clean LED will stay lit, and the LCD will display the messages "REPLACE CLEANING TAPE" and "CLEANING REQUIRED". After the software operations are complete, you may use the Eject button to remove the spent cleaning cartridge and insert a new one.

## Preparation for Shipping

Before shipping the autoloader, you must secure the autoloader door to prevent damage to the device. Follow the procedure below to secure the door as the last step before switching off the autoloader:

1. Make sure there is no magazine in the autoloader. The LCD should display the message "NO MAGAZINE."
2. Press and hold the Select button for 5 seconds. The LCD should show the following menu:  
>VERSION  
LANGUAG  
CONTRAST
3. Press the Select button four times. The cursor (>) will move down to the word "DOOR," as shown below:  
CONTRAST  
AUTO/LD  
>DOOR
4. Press the Enter button. The LCD should display the following sub-menu:  
DOOR  
>LOCK  
UNLOCK
5. Press the Select button once to move the cursor to "LOCK" and then press the Enter button. The display returns to the menu shown in step 3 above.

- 6.** Wait 5 seconds. The LCD screen will again display the message "NO MAGAZINE." After another 5 seconds, the LCD will display the message, "DOOR LOCKED."
- 7.** Switch off the autoloader.
- 8.** Tap the door to make sure it has been successfully locked.

The door is now locked in the closed position and the autoloader is ready to be packed and shipped. The door is automatically unlocked when the autoloader is restarted.

# 5. Understanding the Drive LEDs

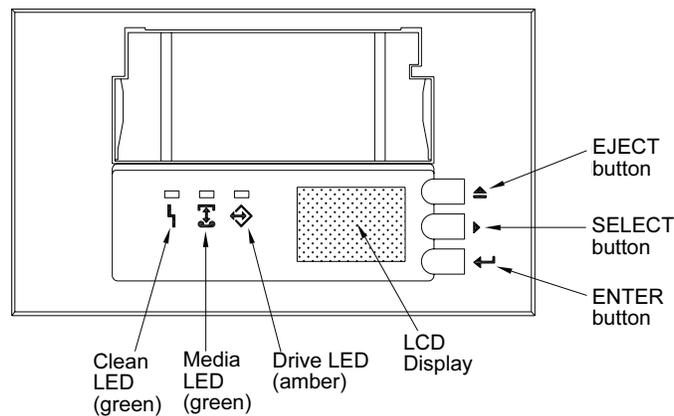
This chapter describes the LEDs on the front panel of the DDS-4 and DAT 72 autoloader. These LEDs provide information about both normal and error conditions.

Topics in this chapter are:

- “Front Panel LEDs” on page 37
- “LED Summary” on page 38
- “Clean LED” on page 39
- “Media LED” on page 39
- “Drive LED” on page 40
- “About the Operator Panel LCD Display” on page 41

## Front Panel LEDs

The following figure shows an example of the LEDs on the drive front panel of the DDS-4 and DAT 72 autoloaders.



**Figure 13.** Front Panel LEDs

## Eject Button

You can use the Eject button to eject the magazine or to unload a cartridge from the drive. After pressing the Eject button, you must press the Enter button to confirm your request.

## Select Button

You can use the Select button to select individual cartridges by their slot numbers (1 through 6), to scroll through items from menus on the LCD display, and to access loader menus if no magazine is installed.

## Enter Button

You can use the Enter button to select specific items from menus on the LCD display, to load a cartridge into the autoloader (after you have selected the cartridge using the Select button), or to confirm that you want to eject the magazine when there is a cartridge in the autoloader

# LED Summary

The following table summarizes the actions of the front-panel LEDs.

**Table 7. LED Quick Summary**

LED	Color	Action	Description
Clean	Green	ON (Lit)	Cleaning is required because the autoloader has been operating for at least 25 hours (DDS-2) or 50 hours (DDS-3, DDS-4, or DAT 72).
		Slow Flashing	Internal error rate threshold has been exceeded and cleaning is required.
		Flashing	Cleaning cartridge in the drive has exceeded its useful life. Replace the old cleaning cartridge with a new one.
Media	Green	ON (Lit)	An inserted cartridge is operating properly.
		Flashing	Drive could not write the tape correctly (write error). Use a DDS cleaning cartridge to clean the drive.
Drive	Amber	ON (Lit)	Drive is reading or writing the tape normally.
		Rapid Flashing	A hardware fault has occurred.

## Clean LED

The Clean LED indicates whether a drive needs to be cleaned.

**Table 8. Clean LED**

LED Status	Description
ON continuously	Drive requires cleaning. Use only an approved DDS cleaning cartridge.
Flashing slowly (approximately ON 2 seconds, OFF 1 second)	Tape cartridge in use has exceeded a predefined soft-error threshold. This signal is a warning only and does not indicate that data has been compromised. Remove the tape and clean the drive using an approved DDS cleaning cartridge. If the Clean LED still flashes after cleaning and reinserting the original data cartridge, use a new cartridge for future backups.
Flashing rapidly	A cleaning cartridge that has exceeded its useful life has been inserted into the drive. Replace the cleaning cartridge with a new approved DDS cleaning cartridge.

## Media LED

The Media LED indicates whether a DAT cartridge is operating normally.

**Table 9. Media LED**

LED Status	Description
ON continuously	A DAT cartridge has been inserted and the drive is operating normally.
Flashing rapidly	Drive could not write the tape correctly (maximum rewrite count exceeded) and the write operation failed. Clean the drive heads using an approved DDS cleaning cartridge. If you reinsert the original data cartridge and the LED continues flashing, insert a new data cartridge and retry the operation.



**NOTE:** As routine maintenance, follow the cleaning recommendations listed in Table 5.

## Drive LED

The amber Drive LED lets you know when data is being read from or written to tape. It also informs you when a hardware fault occurs.

**Table 10. Drive LED**

LED Status	Description
ON continuously	The drive is reading or writing the tape (SCSI or tape movement is present).
Flashing rapidly	<p>A hardware fault occurred. If the fault occurs immediately after powering on the drive, the Power On Self Test (POST) switch (switch 4) is enabled and a POST has failed. If the front panel LEDs are flashing together, contact the Technical Support department.</p> <p>If the Drive LED is flashing rapidly during drive operation, press the Eject button to remove the tape. If the tape does not eject within 2 minutes, press and hold the Eject button for more than 5 seconds. The tape should eject within 40 seconds. Contact Technical Support for more information.</p>



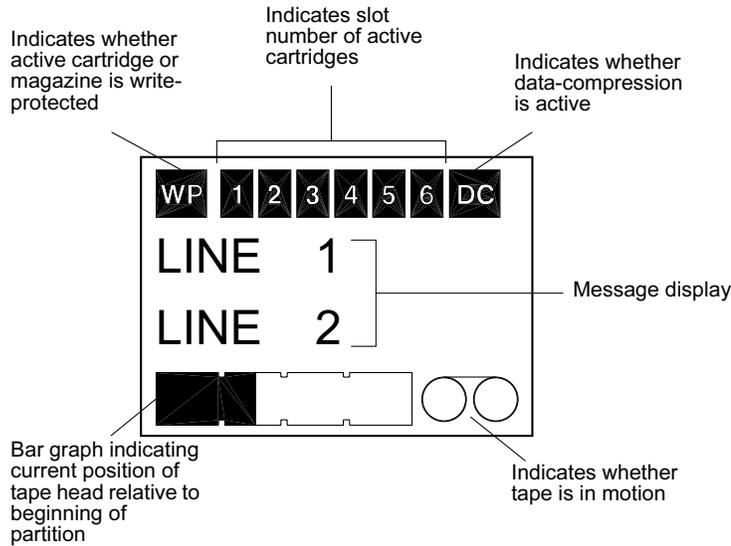
**CAUTION:** If you push the Eject button while the Drive LED is ON, you will interrupt any host operation, causing an application error. It may not be possible to append to the tape if a write operation is aborted in this way.



**NOTE:** If your backup software issues a SCSI "Prevent Media Removal" command, the Drive LED remains ON and the Eject button is disabled, so that the tape cannot be ejected accidentally. To eject the tape, use your backup software's Eject command.

# About the Operator Panel LCD Display

The following figure shows the types of information shown on the operator panel LCD display.



**Figure 14.** LCD display features

## LCD Display Backlighting

Backlighting on the LCD display is turned on automatically when the autoloader is first powered on and whenever an operator panel button is pushed. The backlight remains on for two minutes, and then shuts off automatically (unless an operator panel button is pressed).

## LCD Display Messages

The table on the following pages describes the messages that may be shown on the LCD display. The messages are listed in alphabetical order. An "X" indicates the number of the currently active cartridge slot.

LCD Message	Description
CASSETTE INSTALL PROBLEM	A cartridge has been inserted into the magazine incorrectly. Eject the magazine from the autoloader; then remove the cartridge from the magazine and reinsert it correctly.
CHECK DOOR	The autoloader door is open.
CLEANING	The autoloader is loading a cleaning cartridge into the drive.
CLEANING REQUIRED	The tape drive mechanism requires cleaning.
DOOR LOCKED	The autoloader door is locked.
DOOR UNLOCKED	The autoloader door is unlocked.

LCD Message	Description
DRIVE ERROR04/XX/XX	There is a problem with the autoloader. For additional information, contact Certance Technical Support.
ERASE TAPE X	The tape drive is erasing the data cartridge from slot X.
EJECTING MAGAZINE	The autoloader is ejecting the cartridge magazine.
EJECT? PRESS ENTER	A cartridge resides in the drive and the Eject button has been pressed. Eject confirmation is required before the cartridge can be ejected.
EJECT PREVENT	The autoloader is preventing you from ejecting the magazine because the software has enabled PMR (Prevent Media Removal).
FAN FAILURE	There is a problem with the autoloader fan. Contact Certance Technical Support.
INSERT EMPTY MAGAZINE	The autoloader cannot unload a cartridge from the tape drive to the magazine because the magazine in the autoloader is fully loaded. Eject the magazine; then insert an empty magazine into the autoloader
LOADER ERROR04/XX/XX	There is a problem with the autoloader hardware. For additional information, contact Certance Technical Support.
LOAD TAPE X	The tape drive is loading the cartridge from slot X.
MEDIA ERROR03/XX/XX	There is a problem with the data cartridge. For additional information, contact Certance Technical Support.
NO MAGAZINE	There is no magazine in the autoloader.
READ TAPE X	The tape drive is reading from a data cartridge.
READY	The autoloader has scanned all cartridge slots in the magazine and is ready to perform an action.
READY TAPE X	There is a cartridge (from slot X) in the tape drive and the autoloader is ready to accept commands.
REPLACE CLEANING TAPE	The cleaning cartridge has been used up and must be replaced with a new cleaning cartridge.
REWIND TAPE X	The tape drive is rewinding the data cartridge from slot X.
SCAN X	The autoloader is sequentially scanning the cartridge slots in the magazine.
SEARCH TAPE X	The tape drive is searching the data cartridge from slot X.
SELECT X PUSH ENTER	This message displays when the Select button is pressed. Press the Select button repeatedly to display the desired cartridge location number (X); then press the Enter button to load the selected cartridge into the drive.
SELECT PREVENT	The autoloader is prevented from ejecting the magazine because the software has enabled PMR (Prevent Media Removal). Use your backup software to eject the tape, then press the Eject button to eject the magazine.
UNLOAD TAPE X	The tape drive is unloading the cartridge from slot X.
UPDATING FIRMWARE	The autoloader firmware is being updated.
WAITING SELF TEST	This message displays while the autoloader is performing a POST during startup.
WRITE TAPE X	The tape drive is writing to the data cartridge from slot X.

## Configuring Autoloader Features Using the LCD Display

To configure the autoloader using the LCD, first make sure that there is no magazine installed in the autoloader; then press and hold the Select button for five seconds. You can then use the Select button to cycle through the following menus: VERSION, LANGUAG (Language), CONTRST (Contrast), AUTO/LD (Auto Load), and DOOR. Each of these is described below. To display a particular menu, select the menu item and press the Enter button.

### Version Menu

In the VERSION menu, you can use the Select button to view the name of the autoloader, its SCSI ID, its firmware level, and the autoloader serial number.

### Language Menu

In the LANGUAG menu, you can enable the autoloader to display messages on the LCD in English, French, German, Italian, Portuguese, Japanese, or Spanish by scrolling to the appropriate language and pressing the Enter button.

### Contrast Menu

In the CONTRST menu, you can make the LCD display brighter by pressing the Enter button repeatedly until the desired contrast is displayed. To make the LCD darker, press the Select button repeatedly until the desired contrast is displayed.

### Autoload Menu

In the AUTO/LD menu, you can enable or disable automatic loading of cartridges from the magazine into the tape drive.



**NOTE:** This feature should only be used to automate cartridge loading if application software to support the loader operation is not available.

Most software available for the Windows NT/2000 platform does support the SCSI commands necessary for loader operation. In this environment we suggest leaving automatic load disabled (the default state). Check with your software vendor if you are unsure about your particular software application.

In Unix/Linux environments backup software may not support autoloader operation directly. In this case, the 'offline' command is used to change cartridges sequentially (in numerical order by slot number). In Unix/Linux environments, enabling automatic cartridge loading can allow you to setup an unattended backup.

To enable cartridge autoloading from within the autoload menu, select "ON" and then press the Enter button. After the magazine is inserted, cartridge 1 will automatically be loaded into the drive. When autoloading is enabled, the Select button can still be used to exchange cartridges, but only in a sequential manner (in numerical order, by slot number).

To turn off autoload mode, display the autoload menu, select "OFF", and then press the Enter button. When autoloading is disabled, cartridges can only be loaded or unloaded via the operator panel or using application software that has autoloader support.

### Door Menu

In the DOOR menu, you can lock the autoloader door by selecting "LOCK" and pressing the Enter button. You can unlock it by selecting "UNLOCK" and pressing the Enter button.

# 6. Configuration for Novell and UNIX

This section explains how to configure the DAT 72 and DDS-4 autoloader for use with various Novell and UNIX operating systems.

Topics in this chapter are:

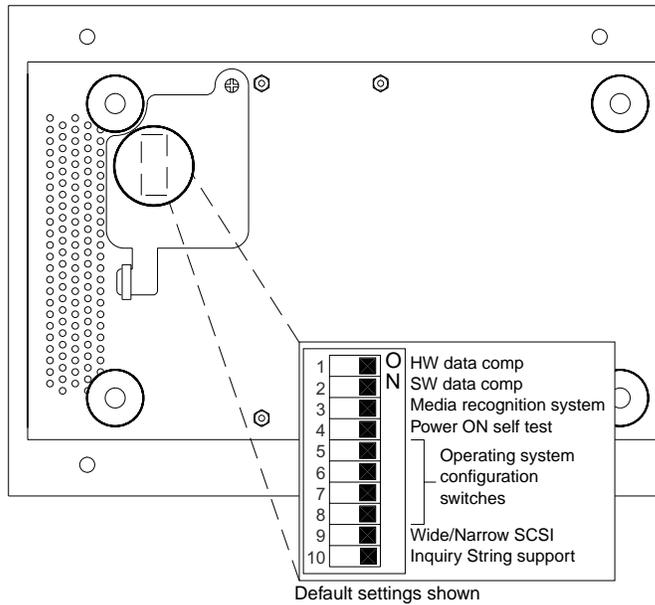
- "Operating System Configuration" on page 44
- "Configuration for Novell Environment" on page 45
- "Configuration for DEC UNIX Environment" on page 45
- "Configuration for Sun UNIX Environment" on page 47
- "Configuration for SGI Environment" on page 48
- "Troubleshooting Installations on the SGI Platform" on page 50
- "Configuration for HP-UX Environment" on page 50
- "Configuration for IBM AIX Environment" on page 51
- "Configuration for SCO UNIX" on page 52
- "Configuration for LINUX" on page 52

## Operating System Configuration

The following figure shows the location of the operating system configuration DIP switches (switches 5 through 8) on the underside of the autoloader.



**NOTE:** If the autoloader is to be used with an operating system other than those described here, these switches should be left in their default positions.



**Figure 15.** Operating System DIP Switches

## Configuration for Novell Environment

There are two possible ways to configure the DAT 72 and DDS-4 autoloader to work with the NetWare native backup application, depending on which tape driver you use.

*Configuration 1:* If you are using the original Novell NWTAPE driver or any version created before 11/3/99, you must change the Operating System Configuration DIP switches so that switches 5 and 8 are OFF. This is different from their default settings (switches 5 through 8 ON).

*Configuration 2:* If you use the latest Novell NWTAPE driver (available on the Novell web site), the Operating System Configuration DIP switches can be left in their default positions (switches 5 through 8 ON).

## Configuration for DEC UNIX Environment

### DIP Switch Settings

Before using the DAT 72 or DDS-4 autoloader in a DEC UNIX environment, set the operating-system DIP switches as shown below:

	S5	S6	S7	S8	S10
<b>Setting</b>	OFF	ON	ON	ON	ON

## Digital UNIX Version 4.0 and Later

With Version 4.0 of the Digital UNIX operating system, DEC introduced a new method of configuring the CAM SCSI driver. Modify the file `/etc./ddr.dbase` as follows:

1. Look through the file and locate the database entry for the DEC TLZ07 DAT drive
2. Copy this entry and paste it later in the file, taking care to maintain the file syntax.
3. Modify this new entry as shown below.

```
SCSIDEVICE
#
Type = tape
Name = "ARCHIVE Python" "DAT"
#

PARAMETERS:
TypeSubClass      = rdat
TagQueueDepth     = 0
MaxTransferSize   = 0xffffffff # (16MB - 1)
ReadyTimeSeconds  = 60          # seconds

DENSITY:
#
DensityNumber = 0,3,4,5,6,7
DensityCode = default
CompressionCode = 0x0
Buffered = 0x1

DENSITY:
#
DensityNumber = 1,2
DensityCode = default
CompressionCode = 0x1
Buffered = 0x1
```

4. Save the database file.
5. Run the following command: `ddr_config -c`. This takes the default input file, `ddr.dbase`, and builds a new device database. The new device database is effective immediately, and there is no need to rebuild the kernel.

## Digital UNIX Versions Earlier Than 4.0.

Configure the system by modifying the file `cam_data.c`. This is located in either `/usr/sys/data` or `/sys/data`, depending on the system configuration. The `cam_data.c` file should be modified as shown below:

1. Look through the file to locate the database entry for the "TLZ07 – RDAT" drive.
2. Make a copy of this entry and paste it later in the file, taking care to maintain the syntax of the C source.
3. Modify the new entry as shown below.

```
/* Iomega DAT Drive Returning "ARCHIVE Python DAT" Inquiry
*/
{"ARCHIVE Python DAT", 14, DEV_TLZ07,
 (ALL_DTYPE_SEQUENTIAL << DTYPE_SHFT) | SZ_RDAT_CLASS,
```

```
(struct pt_info *)ccmn_null_sizes, SZ_NO_BLK, (DEC_MAX_REC - 1),
&tlz07_dens, NO_MODE_TAB, SZ_NO_FLAGS,
NO_OPT_CMDS, SZ_READY_DEF, SZ_NO_QUE,
DD_REQSNS_VAL | DD_INQ_VAL, 36, 64
},
```

4. Rebuild the kernel using the doconfig script. Then reboot the system.

## Configuration for Sun UNIX Environment

### DIP switch settings

Before using the DAT 72 or DDS-4 autoloader in a Sun UNIX environment, set the operating-system DIP switches as shown below:

	<b>S5</b>	<b>S6</b>	<b>S7</b>	<b>S8</b>	<b>S10</b>
<b>Setting</b>	ON	OFF	ON	ON	OFF

### Sun OS 4.1.x

To configure SunOS 4.1.x to use the DAT 72 or DDS-4 autoloader, you must modify the `stdef.h` and `st_conf.c` files (in the directory `/usr/sys/scsi/targets`), then rebuild the kernel, as described below:

1. Modify the `stdef.h` file by adding a define statement for the lomega drive like the one shown below:

```
#define ST_TYPE_ARCHIVE Python_DAT <value>
```

This statement should be added after the last `ST_TYPE_` define statement in the file. `<value>` should be the next unused hexadecimal value. This value will depend on the release and number of devices supported by the system. For example, if the last value for an existing device is `0x2d`, then use a value of `0x2e`.

2. Modify the `st_conf.c` file by adding the following lines at the end of the device definition list:

```
{
  "ARCHIVE Python", 7, "ARCHIVE Python", ST_TYPE_ARCHIVE_Python, 10240,
  (ST_VARIABLE|ST_BSF|ST_BSR|ST_LONG_ERASE|ST_KNOWS_EOD),
  5000, 5000,
  {0x0, 0x8c, 0x8c, 0x8c},
  {0, 0, 0, 0}
}
```

3. Use the `config` command to rebuild the kernel and include the new device definition. Refer to the `config` command page for details.

## Solaris 2.x

1. To configure Solaris 2.x for compatibility with the DAT 72 or DDS-4, add the following lines to the file `st.conf` in the directory `/kernel/drv`.

```
tape-config-list=
"ARCHIVE Python", "Iomega DAT Drive", "ARCHIVE Python DAT";
ARCHIVE Python DAT = 1, 0x34, 0, 0xd639, 4, 0x00, 0x8C, 0x8C, 0x8C, 3;
```

2. After modifying the file `st.conf`, you must reconfigure the kernel by booting the system using the `boot -r` command.

## Configuration for SGI Environment

### DIP Switch Settings

Before using the DAT 72 or DDS-4 autoloader in a SGI UNIX environment, ensure that the DIP switches are set as shown in the following table:

	Switch 5	Switch 6	Switch 7	Switch 8	Switch 10
<b>Setting</b>	ON	ON	ON	ON	OFF



**NOTE:** The main difference between tape autoloader support in Irix 5.x and 6.x is the introduction of Data Compression switching via software in Irix version 6.2. When running Irix 5.x, the autoloader will operate in the compression setting determined by switches 1 and 2, accessible through a removable panel on the bottom of the autoloader.

## Irix V5.x

To configure Irix 5.x to use the DAT 72 and DDS-4 autoloader, you must modify the file `/var/sysgen/master.d/scsi` as described below:

1. Edit the file `/var/sysgen/master.d/scsi` and add the following entry:

```
{DATTAPE, TPDAT, 7, 3, "ARCHIVE
Python", "DAT"/*DAT*/, 0, 0, {0, 0, 0, 0},
MTCAN_BSF|MTCAN_BSR|MTCAN_APPEND|MTCAN_SETMK|MTCAN_PART|MTCAN_
PREV|
MTCAN_SYNC|MTCAN_SPEOD|MTCAN_CHKRDY|MTCAN_VAR|MTCAN_SETSZ|
MTCAN_SILI|MTCAN_SEEK|MTCAN_CHTYPEANY,
/* minimum delay on i/o is 12 minutes, to allow the Drives
* full error recovery sequence to be performed. */
40, 12*60, 12*60, 12*60, 512, 512*512 }
```

2. Rebuild the kernel using the `autoconfig` command (see the `autoconfig` man page for details). After the kernel is rebuilt you will need to reboot the system again to bring the changes into effect.



**NOTE:** Irix 5.3 and later will detect the changes made and automatically rebuild the kernel the next time the system boots.

## Irix V6.x through V6.5

To configure Irix 6.x-6.5 to use a DAT 72 or DDS-4 autoloader, you must modify the files `/var/sysgen/master.d/scsi` and `/dev/MAKEDEV.d/TPS_base`, as described below. After modifying these files you must rebuild the kernel.

1. Edit the file `/var/sysgen/master.d/scsi` and add one of the following entries, depending on your version of Irix:

### Irix V6.x through V6.4:

```
{ DATTAPE, TPDAT, 7, 3, "ARCHIVE Python","DAT"/*DAT*/, 0, 0, {0},
/* This drive uses mode select page 0xf for compression control;
* most of the other drives supporting compression use page 0x10 */
MTCAN_BSF|MTCAN_BSR|MTCAN_APPEND|MTCAN_SETMK|MTCAN_PART|MTCAN_PREV|
MTCAN_SYNC|MTCAN_SPEOD|MTCAN_CHKRDY|MTCAN_VAR|MTCAN_SETSZ|
MTCAN_SILI|MTCAN_SEEK|MTCAN_CHTYPEANY|MTCAN_COMPRESS,
/* minimum delay on i/o is 12 minutes, to allow the Drives
* full error recovery sequence to be performed. */
40, 12*60, 12*60, 12*60, 512, 512*512, 0, (u_char *)0 },
```

### Irix V6.5:

```
{ DATTAPE, TPDAT, 7, 3, "ARCHIVE Python","DAT"/*DAT*/, 0, 0, {0},
/* This drive uses mode select page 0xf for compression control;
* most of the other drives supporting compression use page 0x10 */
MTCAN_BSF|MTCAN_BSR|MTCAN_APPEND|MTCAN_SETMK|MTCAN_PART|MTCAN_PREV|
MTCAN_SYNC|MTCAN_SPEOD|MTCAN_CHKRDY|MTCAN_VAR|MTCAN_SETSZ|
MTCAN_SILI|MTCAN_SEEK|MTCAN_CHTYPEANY|MTCAN_COMPRESS,
/* minimum delay on i/o is 12 minutes, to allow the Drives
* full error recovery sequence to be performed. */
40, 12*60, 12*60, 12*60, 512, 512*512,
tpsc_default_dens_count, tpsc_default_hwg_dens_names,
tpsc_default_alias_dens_names,
{0},0,0,0,
0, (u_char *)0 },
```

2. Edit the file `/dev/MAKEDEV.d/TPS_base` and make the following modification (this modification is not required on systems running IRIX 6.4 or 6.5).

Locate the area of code that deals with DAT drives. This starts with:

```
*Drive?type:*DAT*
```

Then insert the following text before or after the similar entries for other supported devices:

```
*Device:*DAT*06240*) # DAT drive with compression
    mdev=`expr $mdev + 8`;
    mknod ${prf}$lc c ${C_TPS} $mdev;
;;
```

3. Restart the system. Irix 6.x will detect the changes made and automatically rebuild the kernel on startup.

Alternatively, you could manually rebuild the kernel using the `autoconfig` command (see the `autoconfig` man page for details), then reboot the system again.

## Troubleshooting Installations on the SGI Platform

### Checking the Inquiry String

It may be useful to confirm the autoloader’s inquiry string. This is done using the `mt` command. The following command line will retrieve the Inquiry string and other status data from the autoloader on SCSI bus 1, ID 6.

```
mt -f /dev/rmt/tps1d6 status
```

### System Interchange Problems

If the following error appears when trying to restore a cpio archive from another system, it is likely that a mistake was made in the installation sequence:

```
Byte swapped Data - re-try with correct device
```

If this error is encountered, make sure that the correct modifications were made to the file `/var/sysgen/master.d/scsi`.

### Switching Compression

Irix 6.x provides support for software switching of data compression through the use of different device drivers. Drivers including a “c” in the device name should enable compression. You may be able to resolve problems with data compression by installing the latest Irix 6.x patch set.

## Configuration for HP-UX Environment

### DIP Switch Settings

Before using the DAT 72 or DDS-4 autoloader in an HP UNIX environment, set the operating-system configuration DIP switches as shown below:

	<b>S5</b>	<b>S6</b>	<b>S7</b>	<b>S8</b>	<b>S10</b>
<b>Setting</b>	ON	ON	OFF	ON	OFF

### HP-UX Version 10.2 and 11

Follow the steps below to configure HP-UX systems:

1. Log in as root.
2. Run the SAM utility.
3. Choose the Peripheral Devices option.
4. Choose Tape Drives.
5. From the Actions menu in the Tape Device Manager window, choose Add.
6. Within the Add a Tape Drive window, read the instructions, then click on OK.
7. SAM may detect that your HP-UX kernel lacks the drivers necessary to make use of your new tape drive. If so, within the “Device Driver Check” window, read the message and choose the appropriate action. If the chosen option is Build a new kernel and shut down the system

immediately, SAM will create a new kernel, and automatically reboot the system. Once the system comes back up, the necessary drivers will be loaded, and the system will be able to use the tape drive.

8. If you had to shut down the system in order to physically connect the tape drive, re-enter SAM and repeat steps 3 through 6 above.
9. Choose the new tape drive.
10. From the Actions menu, choose Create Device Files.
11. Press OK and then exit from SAM.

## Configuration for IBM AIX Environment

### DIP Switch Settings

Before using the DAT 72 or DDS-4 autoloader in an IBM AIX environment, set the operating-system configuration DIP switches as shown below:

	Switch 5	Switch 6	Switch 7	Switch 8
<b>Setting</b>	ON	OFF	ON	OFF

### AIX Versions 3.2 and Later

AIX versions 3.2 and later can be configured to work with the DAT 72 or DDS-4 by using the SMIT "Other SCSI Tape Drive" option.



**NOTE:** To use this procedure, you will need to know the SCSI ID being used by the tape autoloader.

To configure AIX using the SMIT utility, use the following procedure:

1. Enter SMIT at the Tape Drive menu by typing "smit tape".
2. Select "Add a tape drive".
3. Select the type of tape drive you will be adding. Use the "Other SCSI Tape Drive" option.
4. Select the parent SCSI Adapter from the available list.
5. The Add a Tape Drive entry fields now appear. Some of the standard options need to be changed to maximize drive performance and functionality:
  - Set the "Connection Address" with the tape drive's Target and LUN (always use 0 for the LUN). In the list, the Target is the first number and the LUN is the second. For example, if the drive is ID 5, choose 5,0
  - Set the Fixed "Blocksize" to 1024
  - Set "Density 1" to 140
  - Set the "Maximum delay for the Read/Write command" to 900
6. Press the RETURN key. The autoloader will be installed in the system database and the appropriate devices created.

7. Exit SMIT.

## Controlling Data Compression under AIX

After you run SMIT, device files will have been created for your new tape drive. Typical filenames are listed below:

```
/dev/rmt0/dev/rmt0.1/dev/rmt0.2/dev/rmt0.3  
/dev/rmt0.4/dev/rmt0.5/dev/rmt0.6/dev/rmt0.7
```

If you enter the configuration information specified in step 5 of the configuration process, devices `rmt0`, `rmt0.1`, `rmt0.2` and `rmt0.3` will cause the drive to write in compressed mode. Using devices `rmt0.4`, `rmt0.5`, `rmt0.6` and `rmt0.7` will cause the drive to write with compression disabled.

## Configuration for SCO UNIX

Before using the DAT 72 and DDS-4 autoloader in an SCO UNIX environment, set the operating-system configuration DIP switches as shown below:

	<b>S5</b>	<b>S6</b>	<b>S7</b>	<b>S8</b>	<b>S10</b>
<b>SCO</b>	ON	ON	ON	OFF	OFF
<b>UnixWare 7.x</b>	ON	ON	ON	ON	OFF

## Configuration for LINUX

Before using the DAT 72 and DDS-4 autoloader in a LINUX environment, make sure the operating system configuration DIP switches (switches 5 through 8) are all set to ON.

# 7. Troubleshooting

This chapter provides suggestions for troubleshooting your drives in the unlikely event you encounter a problem with them.

Topics in this chapter are:

- “Missing or Damaged Parts” on page 53
- “SCSI ID Problems” on page 53
- “SCSI Termination Problems” on page 54
- “Drive Does Not Work” on page 54
- “Power On Self Test Fails” on page 54
- “Computer Does Not Boot” on page 54
- “Computer Does Not Recognize Drive” on page 54
- “Backup Program Does Not Recognize Drive” on page 55
- “Write Error” on page 55
- “Hardware Error” on page 55

## Missing or Damaged Parts

If any of the contents included with your DDS-4 or DAT 72 drive are missing or damaged, contact your place of purchase immediately.

## SCSI ID Problems

Each SCSI device on the same SCSI bus must have a unique SCSI ID. The default SCSI ID for the DDS-4 and DAT 72 drives is 6. You should leave this default SCSI ID unchanged unless another device on the SCSI bus is already using this ID.

If the default SCSI ID is already in use, you can change the default SCSI ID on the drive using the SCSI ID Selector switch on the back of the external SCSI drives. After you set the SCSI ID, record your setting.

## SCSI Termination Problems

If the DDS-4 or DAT 72 autoloader is the last device or the only device in a SCSI chain, you must install a terminating plug on the unused SCSI connector. If the drive is the only SCSI device, attach the drive to the connector which is next to last on the SCSI chain and attach a multi-mode terminator to the last connector in the chain. For more information, see "Installing SCSI Termination" on page 19 and "Installing SCSI Termination" on page 26.

## Drive Does Not Work

If the green Power-On LED on the desktop tape drive does not go ON, or if the internal tape drive does not work:

1. Check the power connection to the drive.
2. If the connection is secure, replace the power cable with one that is known to work.
3. If the drive still does not work, contact the Technical Support department.

## Power On Self Test Fails

If the drive fails its Power On Self Test (POST):

1. Check for a cartridge in the drive. If you find one, eject it.
2. Power-down the drive and power it up again.
3. If the drive still fails its POST, contact the Technical Support department.

## Computer Does Not Boot

If the computer does not boot after you install the drive:

1. You may have forgotten to reattach the computer's power cable. Be sure all cables are connected properly to the computer.
2. Be sure the computer's power cable is connected to a power outlet that is known to work. Plug into the outlet another appliance, such as a lamp, that you know to work. If the appliance does not work, the problem is with the outlet.
3. The power outlet connected to the computer is controlled by a wall switch that is removing power from the outlet. Either switch outlets or set the wall switch so that power is applied to the outlet.
4. The computer has two SCSI host adapters installed whose resources are conflicting with each other. Remove the conflicting device or consult the documentation that came with the device for suggestions about resolving the problem.

## Computer Does Not Recognize Drive

If your computer does not recognize the drive:

1. Verify that the SCSI and power cables to the drive are installed properly.
2. The drive may be using a SCSI ID assigned to another SCSI device on the SCSI bus. If so, reassign a unique SCSI ID to the drive or to the conflicting device.

3. Check that the SCSI bus is terminated properly. Note that the DDS-4 and DAT 72 autoloaders do not provide SCSI termination and, therefore, should not be the last devices on a SCSI chain.

## Backup Program Does Not Recognize Drive

If your backup application program does not recognize the drive:

1. Use the Windows Device Manager to determine whether the operating system has recognized the drive. If the tape drive is recognized properly, it appears under the **Tape Drive** category. If the tape drive was recognized, but native drivers are not installed, it appears under **Other Devices**. The backup software supplies the necessary drivers for the tape drive and native drivers are not required.
  - If the Device Manager shows the drive, check the documentation that came with your backup program to determine whether the program needs a particular driver to be installed.
  - If the Device Manager does not list the drive, the drive may not be installed or configured properly. Check your drive installation and configuration.

## Write Error

If the Media LED is flashing, a write error has occurred.

1. Use a Certance-qualified DDS cleaning cartridge to clean the tape heads (see "Cleaning the Tape Path" on page 34).
2. Try to run a short backup and verify.
3. If the Media LED continues to flash, contact the Technical Support department.

## Hardware Error

If the Drive LED is flashing rapidly, a hardware error has occurred. If the fault occurs immediately after powering on the drive, the POST switch (switch 4) is enabled and a POST has failed. If the front panel LEDs are flashing together, contact the Technical Support department.

If the Drive LED is flashing rapidly during drive operation:

1. Press the Eject button to remove the tape.
2. If the tape does not eject within 2 minutes, press and hold the Eject button for more than 5 seconds. The tape should eject within 40 seconds.
3. Contact Technical Support for more information.

# Appendix A: Loading Revised Firmware

Your DDS-4 or DAT 72 autoloader includes permanently installed, electrically upgradeable flash memory. This memory allows qualified OEMs to revise DAT 72 and DDS-4 SCSI firmware quickly and easily. It also prolongs the life of the tape drive by allowing the drive to inherit leading technologies as soon as those technologies become available.

This appendix describes how to load firmware onto your tape drive. Topics in this appendix are:

- “Firmware Upgrade Methods” on page 56
- “Using Firmware Cartridges” on page 56

## Firmware Upgrade Methods

You can upgrade your tape drive’s firmware two ways:

- Using the diagnostic software provided on your Tape Resource CD or available at <http://support.certance.com>. This software uploads a firmware file via SCSI from your host computer to the tape drive.
- Using Certance OEM firmware cartridges

## Using Firmware Cartridges

The following procedure describes how to upgrade the tape drive firmware using a firmware upgrade tape cartridge. Firmware upgrade cartridges are available only to qualified Certance OEM customers. Contact your sales representative for information.



**NOTE:** The firmware can also be upgraded from a host computer via the SCSI connection using software available at <http://support.certance.com>.

1. Power on the host system with the DDS-4 or DAT 72 autoloader installed.
2. Close all applications that might try to communicate with the drive during the firmware upgrade procedure.
3. Insert the firmware upgrade cartridge. The drive automatically recognizes the firmware upgrade cartridge and begins downloading the firmware from the cartridge into DRAM. When the firmware has been downloaded into DRAM, the drive ejects the firmware upgrade

cartridge and the drive LEDs blink in a progressive pattern. When the blinking pattern stops, the firmware upgrade operation is complete.



**WARNINGS:** Once the firmware upgrade cartridge is inserted into the drive, no power interruption can occur while the firmware is loading. Do not power off the drive. If a power interruption occurs, the firmware may not be loaded correctly and the drive may not operate properly.

Do not power down the host system or disconnect power to the drive until the drive LEDs stop flashing. Otherwise, the drive may be rendered inoperative.

4. It may be necessary to reboot the system to ensure that your backup software application continues to recognize the tape drive.

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