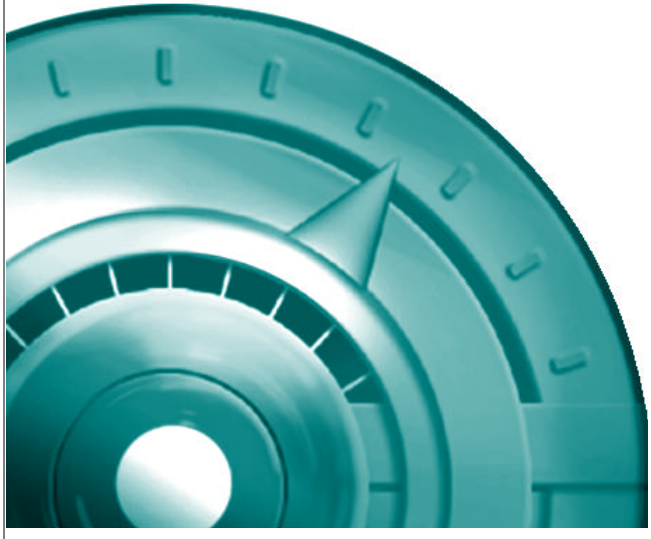
Dell™ PowerVault™
120T DDS4 Autoloader

USER'S GUIDE



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Dell™ PowerVault™ 120T DDS4 Autoloader User's Guide

Notes, Notices, Cautions, and Warnings

Through out this document, blocks of text may be accompanied by a icon and printed in bold type or in italic type. These blocks are notes, notices, cautions, and warnings and they are used as follows:

NOTE: *A NOTE indicates important information that helps you make better use of your storage system.*

NOTICE: A NOTICE indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

CAUTION: A CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

WARNING: A WARNING indicates the potential for bodily harm and tells you how to avoid the problem.

November 1999 P/N 79EJG

Contents

Chapter 1
Introduction

Overview

The Dell™ PowerVault™ 120T DDS4 Autoloader is a high-capacity data storage cartridge changer using 4mm DAT (Digital Audio Tape) technology. The tape autoloader achieves high data reliability through read-after-write and an additional level of error correction code (ECC).

The tape autoloader stores data on tape using a standard format called DDS (Digital Data Storage), DDSDC, DDS2, DDS3 and DDS4. This format is used by numerous other DDS tape drive manufacturers, providing a broad range of compatible tape drives. The tape autoloader is fully READ and WRITE compatible with the DDS4, DDS3, DDS2, DDS and DDSDC format tapes.

Features

The tape autoloader has the following features:

- Data capacity 160 (native) to 320 GB (typical)*
- Transfer rate (sustained) ~ 2.4 (native) to 4.7 MB/sec (typical)*
- 8 cartridge tape magazine
- Compatibility with SCSI-2 medium changer command set
- 80 seconds maximum to swap a tape cartridge
- High reliability, with a mean failure rate of less than 1 failure in 100,000 cartridge swaps
- Supported formats: DDS4, DDS3, DDS2, DDS, DDSDC
- High burst transfer rate -14 MB/sec asynchronous / 40 MB/sec synchronous
- Large 10 MB buffer
- 5.25-inch half height
- Embedded wide ultra SE/LVD SCSI interface
- Supports variable or fixed record length

- Supports SCSI-2 sequential-access devices command set
- Read after write (RAW)
- Frame rewrite function
- Three levels of ECC
- Quick search (Forward: 115 times / reverse: 155 times normal DDS4 read / write speed)

*2:1 compression. Actual capacity and transfer rate may vary since compression is depending upon data type.

Tape Backup Software

Drivers:
Please see instructions supplied with the tape backup application software.

Native Operating System Backup Utilities:
Tape autoloaders are not supported by Microsoft® Windows NT® 4.0 and Novell® NetWare® native backup utilities.

Tape Backup Applications:
Microsoft Windows NT 4.0: Computer Associates ARCServeIT 6.6, Seagate Backup Exec 7.2, Veritas Backup Exec 7.3
Novell NetWare: Computer Associates ARCServe 6.1, Seagate Backup Exec 8.0

Chapter 2

Getting Started

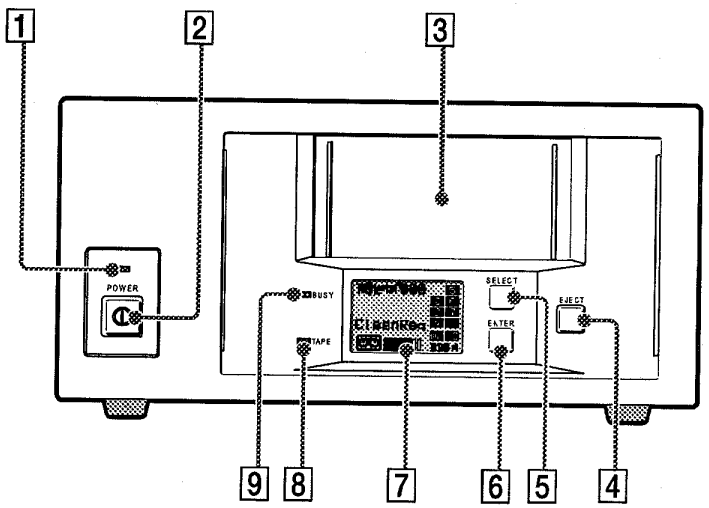


Figure 2-1. Front Panel (External)

The Autoloader front panel consists of the following:

- (1) A Power indicator
- (2) A Power button
- (3) A Magazine receptacle
- (4) An Eject button
- (5) Select button (6) Enter button
- (7) Liquid Crystal Display (LCD)
- (8) Tape Present (9) Busy Status

The Select button allows you to select any of the cartridges present in the magazine, once the magazine has been inserted into the loader. The number selected is displayed on the LCD. If you press the Select button repeatedly, the display cycles through the cartridges available in the magazine, see Figure 2-1.

Once a cartridge has been selected, the Enter button should be pressed for confirmation, and the autoloader will load the selected cartridge into the drive, see Figure 2-1.

The Eject Button

The Eject button starts the unload process. The drive unloads any currently loaded cartridge, and the loader mechanism returns it to the magazine. The magazine is then ejected, see Figure 2-1.

NOTE: *The host can disable the Eject button by sending a SCSI PREVENT MEDIA REMOVAL command.*

The Front Panel Liquid Crystal Display

Displays autoloader function and status, Figure 2-1.

Power Button (External Only)

Press to turn autoloader on or off.

External Power/SCSI Connection/Setting SCSI ID

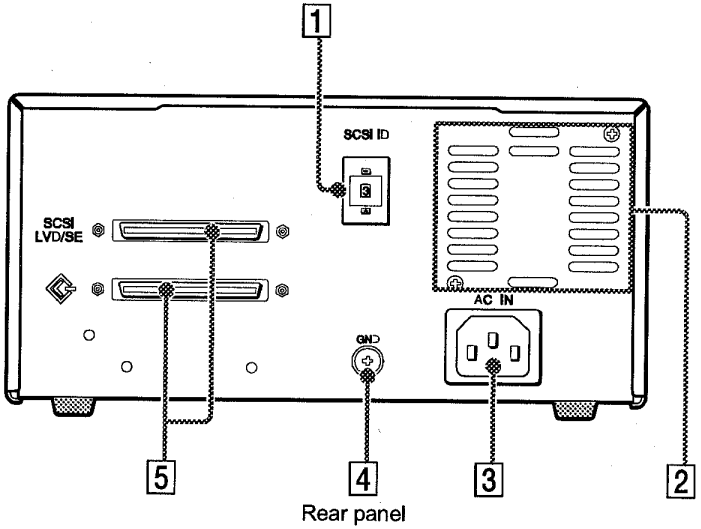


Figure 2-2. Rear Panel (External)

- **(1) Rotary Selector Switch for setting SCSI ID**
- **(2) Cooling Fan**
- **(3) AC In Connector**
- **(4) Ground (GND) Terminal**
- **(5) SCSI Connector**

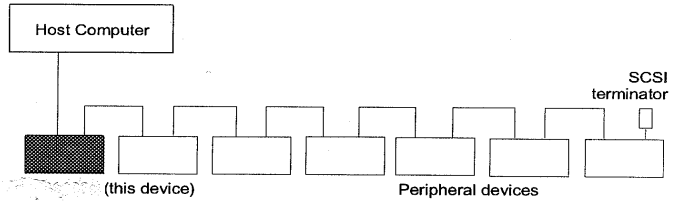
SCSI Connector

Connects to the SCSI bus connector of the host computer or another SCSI peripheral. The autoloader has a Ultra Wide Single Ended (SE) / Low Voltage Differential (LVD) SCSI bus. The autoloader will automatically detect the type (SE or LVD) of SCSI host adapter attached. In Ultra Wide SCSI, up to 15 peripherals can be attached to the SCSI bus, see Figure-2-2.

NOTE: *Turn off the host computer and autoloader power before connecting the supplied SCSI cable. Make sure the SCSI connectors are pressed tightly together and the screw tabs are secure.*

Termination

Please make sure to apply supplied External SE / LVD Terminator to the last device on the SCSI bus.



Example of System Components

Note
In order to use the device as a LVD device, please use terminators that support LVD. Also, please make sure that all the devices attached to the SCSI bus support LVD. If these requirements are not met, the device will function as a SE device.

SCSI ID

The SCSI ID is set by the push button switches on the rear panel. Press the + or - buttons to move the number up or down, respectively. The default SCSI ID is set to 0, see Figure 2-2.

NOTE: *The SCSI ID must be different from the IDs of the other peripherals on the SCSI bus. Before changing the SCSI ID setting, be sure to turn off the power with the power switch on the front panel.*

Power

Connect the supplied AC power cable. Turn on the autoloader using the front panel power button, see Figure 2-2.

Internal SCSI Connection/Setting the SCSI ID/Power

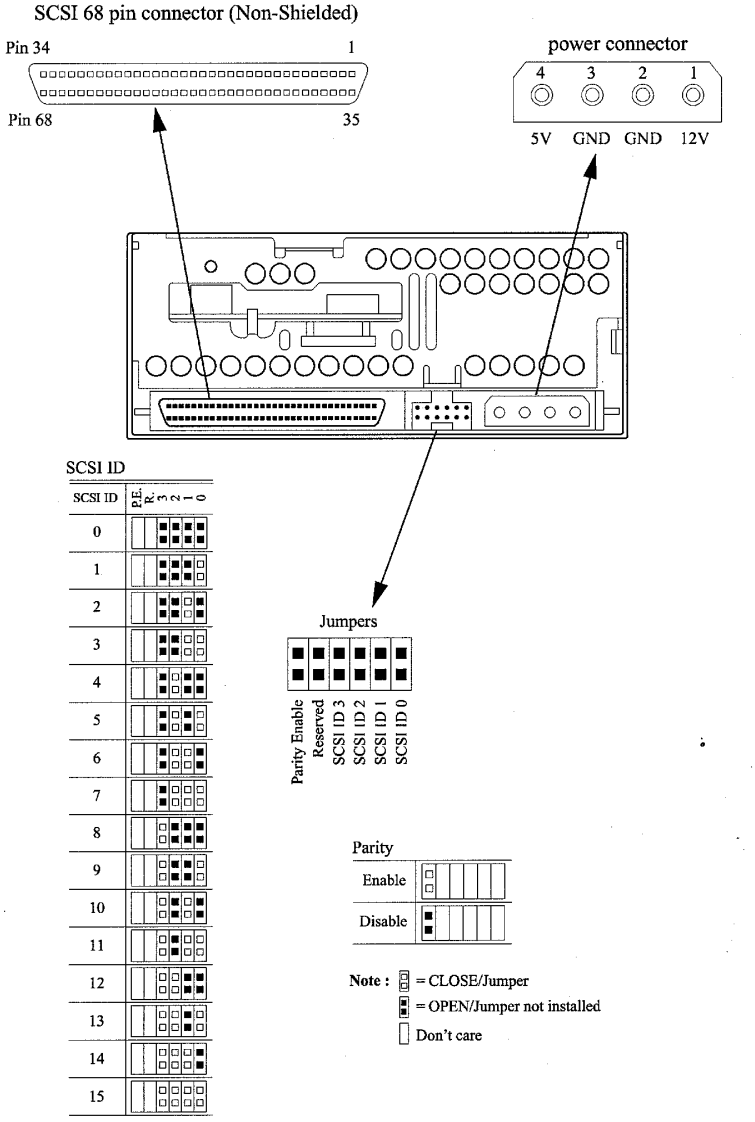


Figure 2-3. Rear Connectors and Jumpers (Internal)

NOTE: *Dell performs the installation and setup of tape autoloaders that are shipped as part of a system. If the software has been recently upgraded, however, you may need to install the software. In this case, installation instructions are provided with the software.*

Internal/External Option Switches (DIP Switch)

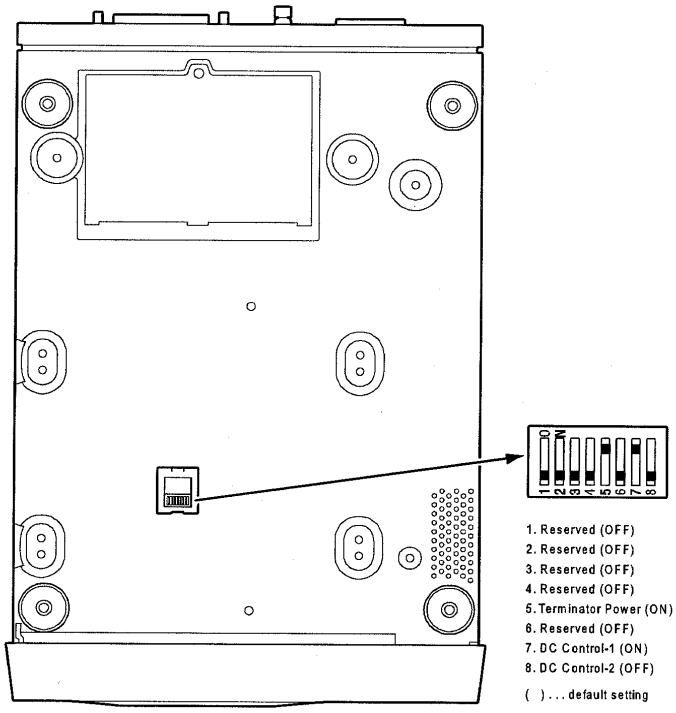


Figure 2-4. Dip Switch Settings

Terminator Power		Definition
OFF		No provided
ON		Provided
DC Control-1	DC Control-2	Definition
OFF	OFF	Compression disabled at power-on. The host is allowed to control compression.
OFF	ON	Compression disabled at power-on. The host is not allowed to control compression.
ON	OFF	Compression enabled at power-on. The host is allowed to control compression.
ON	ON	Compression enabled at power-on. The host is not allowed to control compression.

Internal Mounting Holes for 5.25-inch

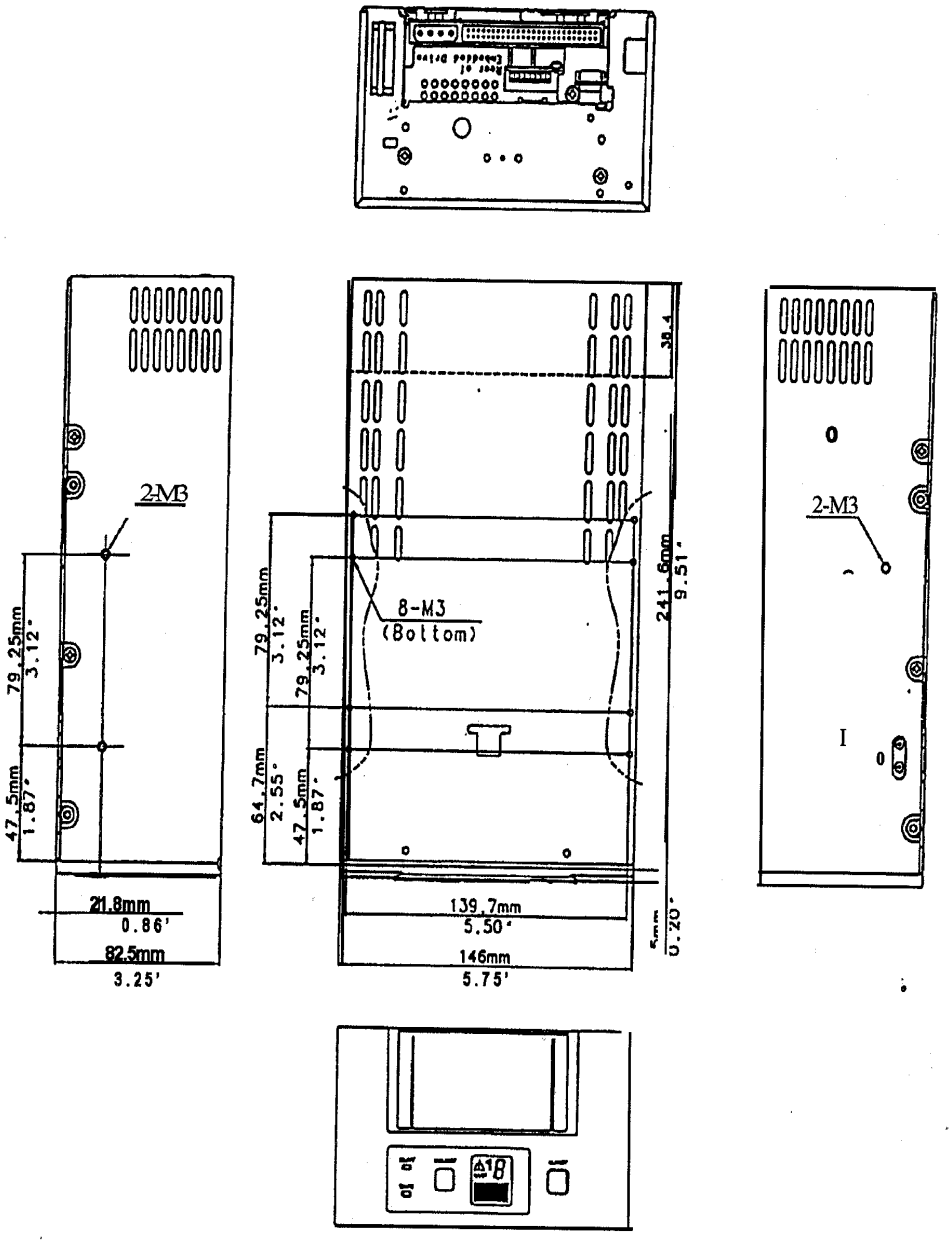


Figure 2-5. Mounting Holes 5.25-inch autoloader (Internal)

Orientation

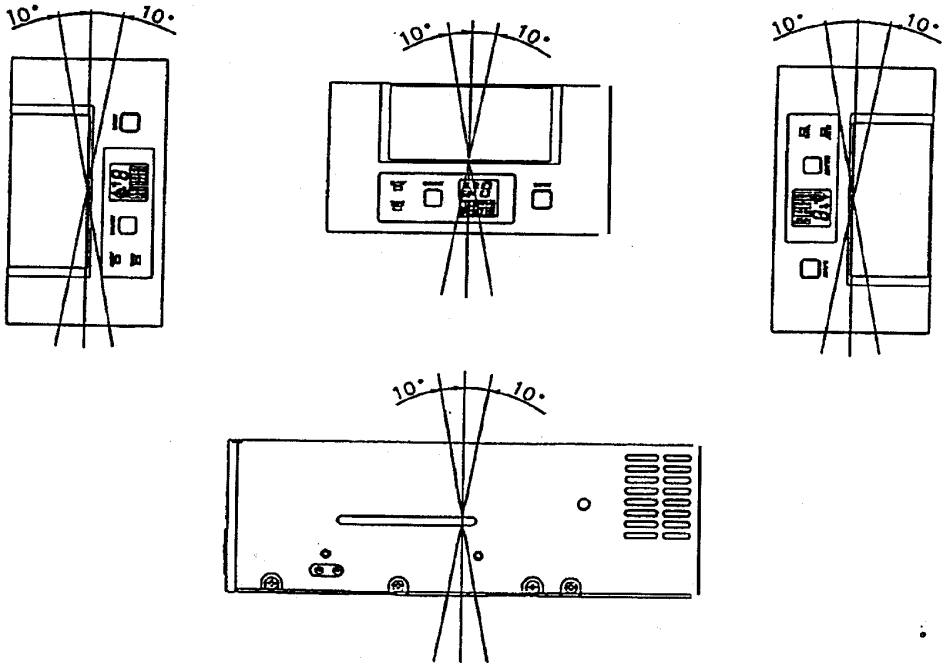


Figure 2-6. Orientation (Internal)

Loading Device Drivers

Drivers
See instructions supplied with the tape backup software.

Native Operating System Backup Utilities
Tape autoloaders are not supported by Microsoft® Windows NT® 4.0 or Novell® NetWare® native backup utilities.

Tape Backup Applications
Microsoft Windows NT 4.0: Computer Associates ARCServeIT 6.6, Seagate Backup Exec 7.2, Veritas Backup Exec 7.3
Novell NetWare: Computer Associates ARCServe 6.1, Seagate Backup Exec 8.0

Installing the Tape Backup Software

See instructions supplied with the tape backup software.

Chapter 3
Using the Autoloader

Autoloader Modes of Operation

There are basically four modes of operations.
At any one time, the autoloader can be considered to be in one of these modes.

EMPTY MODE

The autoloader is considered to be in this mode when there is no magazine loaded in the autoloader. A magazine must be inserted manually.

STANDBY MODE

The autoloader enters this mode immediately following a magazine insertion and successful magazine rotation-check sequence.
No buttons have been pressed and no SCSI commands have been received.

SEQUENTIAL MODE

The autoloader enters this mode when the Select button/the Enter button has been pressed and the selected tape is loaded successfully. In this mode, the autoloader will load the cartridges sequentially. Upon receiving an UNLOAD command (LUN 0) the cartridge will be automatically replaced in its slot in the magazine and the next highest cartridge is loaded.
This continues until there are no more cartridges. If the unload command is received for the last cartridge (for example, cartridge 8), the autoloader will simply place it in its slot and no further action is taken. A cartridge can be loaded in any order by using the Select button/the Enter button.
This mode can *only* be entered from STANDBY MODE.

RANDOM MODE

The autoloader enters this mode when it receives a SCSI MOVE MEDIUM command. The Select button will be disabled while the autoloader is in this mode. The Eject button or SCSI UNLOAD (LUN 1) command can be used to exit the random mode.

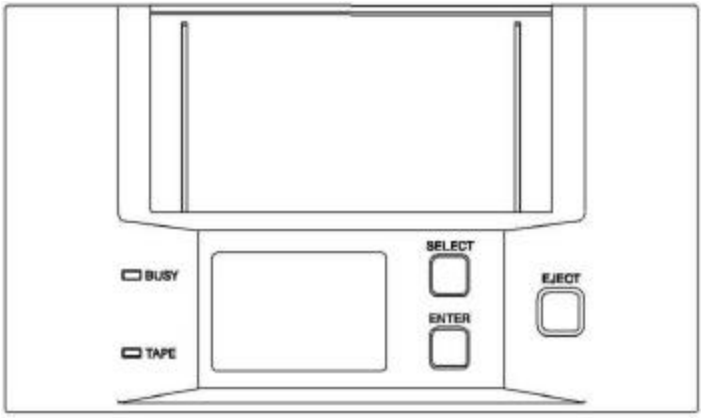


Figure 3-1. Front Panel

The Autoloader front panel consists of the following:

- A select button / An enter button
- A Liquid Crystal Display (LCD)
- An eject button
- Two lights (LED's): tape present, and busy status

The Select Button / The Enter Button

The Select button allows you to select any of the cartridges present in the magazine, once the magazine has been inserted into the loader. The number selected is displayed on the LCD. If you press the Select button repeatedly, the display cycles through the cartridges available in the magazine, see Figure 3-1.

Once a cartridge has been selected, the Enter button should be pressed for confirmation, and the autoloader will load the selected cartridge into the drive.

The Eject Button

The Eject button starts the unload process. The drive unloads any currently loaded cartridge , and the loader mechanism returns it to the magazine. The magazine is then ejected, see Figure 3-1.

NOTE: *The host can disable the Eject button by sending a SCSI PREVENT MEDIA removal command.*

The Front Panel Liquid Crystal Display

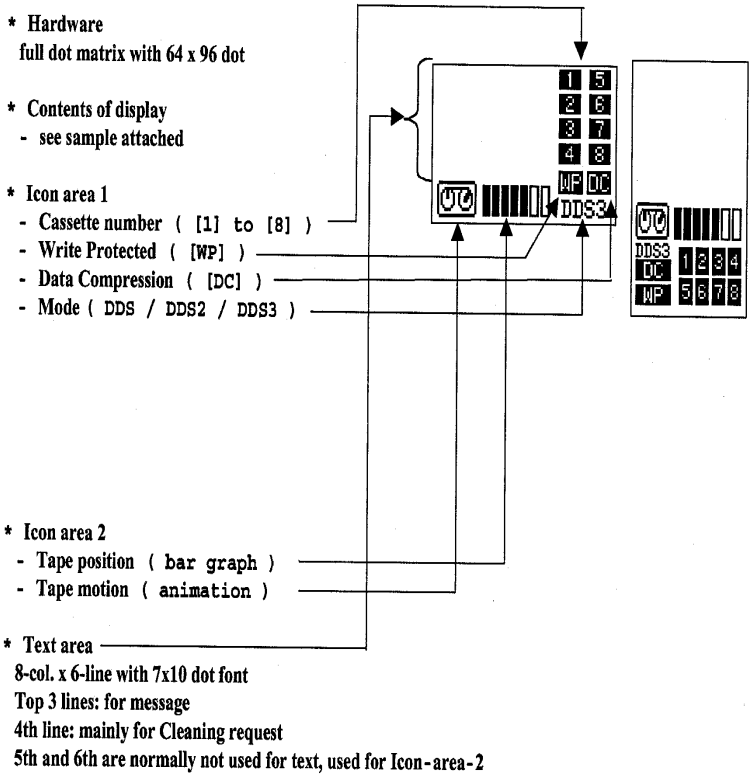


Figure 3-2. LCD Panel
Refer to LCD Panel specification in Appendix A (Figures A-1 to A-15) for further details.

Two LEDs (Tape Present, Busy Status)
BUSY Off: Not active, see Figure 3-1

- Steady green: SCSI active
- Flashing green: Drive active

TAPE Off: Cartridge outside drive, see Figure 3-1

- Steady green: Cartridge inside drive
- Flashing green: Loading/unloading

Operator Action

Loading and Unloading Definition
In order to clarify the load and unload sequences, the following definitions are used.

Unloaded: A cartridge is unloaded when it is moved from the drive back to the magazine. In this state the drive is offline; the host can not perform any operation which would cause tape motion, that is, write, read, and space commands.

Semi-loaded: A cartridge is semi-loaded when the cartridge is in the drive mechanism but the tape is not threaded around the head. The drive is offline in this state. The host may issue the LOAD command to take the drive online. It can also execute any diagnostic command that does not access the tape.

Loaded: The tape is loaded at the end of the load sequence. The drive is then online; all commands can be executed, including those which set configurations or run diagnostic tests.

Magazine
The autoloader has 8 slots. We recommend that all 8 cartridges are inserted in the magazine, but the autoloader can operate even if the magazine is not full. The following cartridge numbers(1, 7, 8) are effective for operation. If you place incorrect numbers of cartridges into the magazine(not 1, 7, 8 cartridges), the autoloader automatically ejects the magazine.

Eight Cartridges Setting
It is recommended that 8 data cartridges are placed in the magazine. Slot "1" through "8" are reserved for data cartridges, see Figure 3-3.
Depending on application software, slot "8" can also be used for a cleaning cartridge. Slots "1" through "7" are accessed sequentially, while slot "8" can be accessed directly.

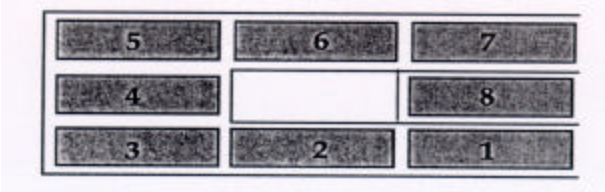


Figure 3-3. Eight Cartridge Setting Position

One Cartridge Setting
The cartridge should be placed to slot "8".
Upon insertion of the magazine, the autoloader will perform a scanning check for tapes. If the autoloader detects an empty slot in the magazine, other than slot "8", the autoloader will enter Single Tape mode. The autoloader always function regardless of slot "8" being empty or full. The magazine will be ejected if slot "8" is empty and there is also an empty slot between slot "1" though "7", see Figure 3-4.

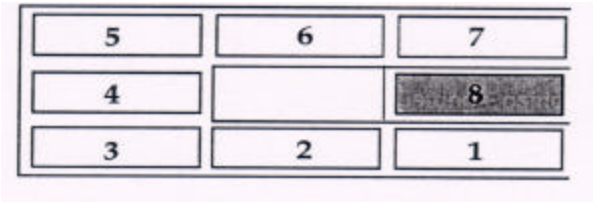


Figure 3-4. One Cartridge Setting Position

Seven Cartridges Setting

The cartridges should be placed in all slots except slot "8", see Figure 3-5.

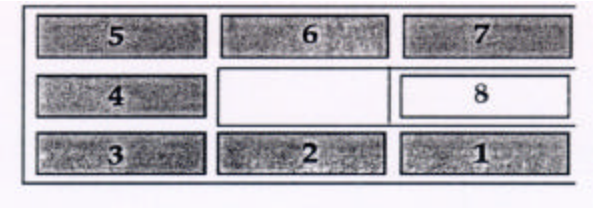


Figure 3-5. Seven Cartridges Setting Position

NOTE: *When you use the cleaning cartridge, it is recommended that the cleaning cartridge is placed to slot "8".*

How to Insert the Cartridges

Insert cartridges into the magazine as follows.

1. First, insert data cartridges into the bottom shelf of the magazine, see Figure 3-6. Insert cartridge No. 3 first, followed by cartridge No. 2 and No. 1 (in that order).

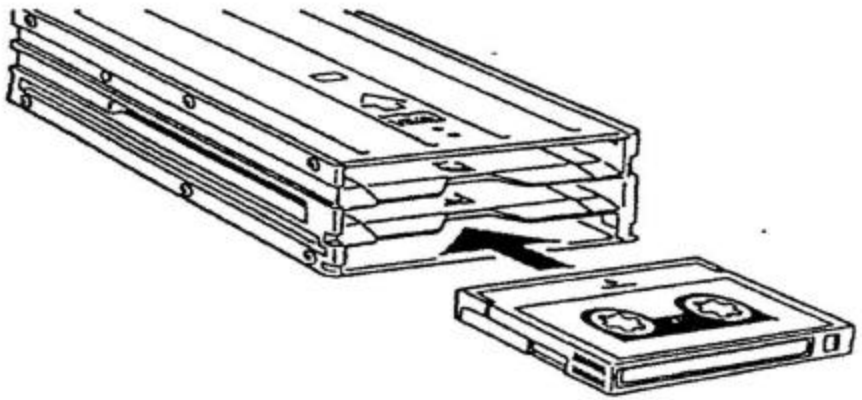


Figure 3-6. Inserting cartridges into the bottom magazine shelf

2. Insert data cartridges into the top shelf of the magazine. Insert cartridge 4 first, followed by cartridges 5, 6, 7 (in that order) , see Figure 3-7.

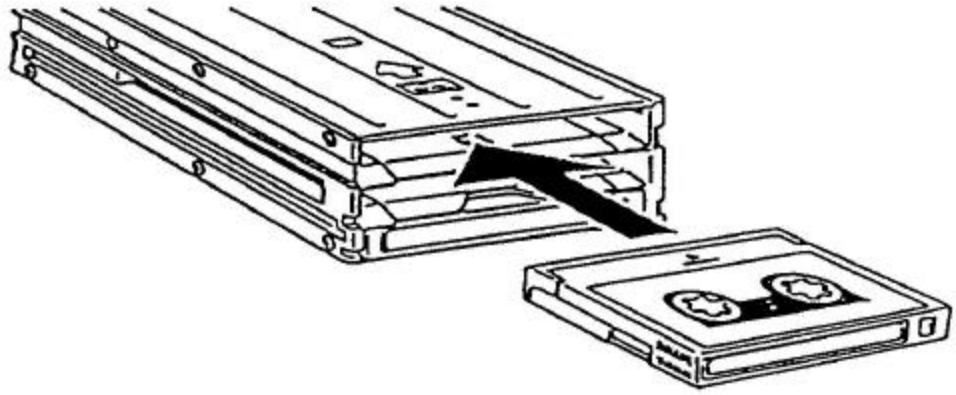


Figure 3-7 Inserting cartridges into the top magazine shelf

3. Data cartridge should be inserted in the middle shelf of the magazine (No. 8). A cleaning cartridge can be inserted instead of data cartridge on it depending on application software, see Figure 3-8.

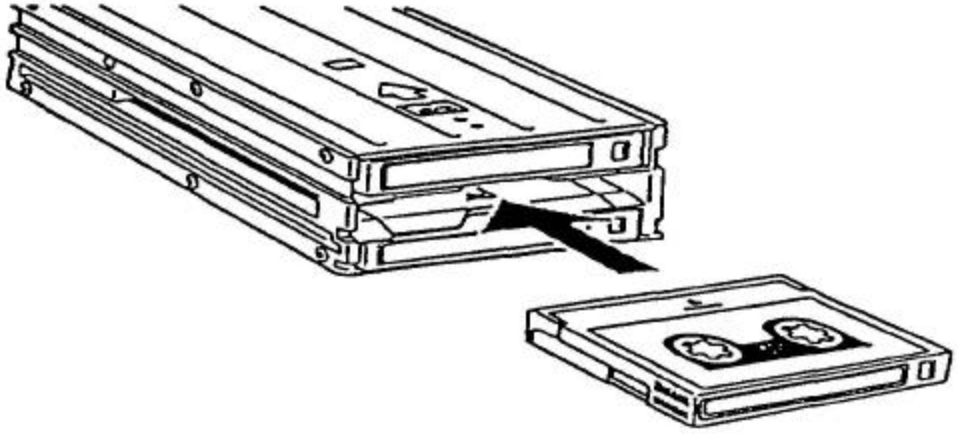


Figure 3-8. Inserting a cartridge into the middle magazine shelf

NOTE : *Insert the cartridge in the correct direction of the indication (arrow) on the top cover.If a cartridge is inserted into the magazine upside down, magazine is automatically ejected. After correcting to insert the cartridges with correct direction and setting them in turn as setting first, insert the magazine again into the autoloader. The autoloader starts to do the rotation check from the first.*

How to Remove the Cartridges

To remove the cartridges from the magazine may upset the orders of them. So you are recommended to store the cartridges in the magazine just as it is, provided that you have no special reason.

1. Pressing down on the magazine stopper, place your finger in the hole at the rear of the magazine and push data cartridges toward the front of the magazine, see Figure 3-9.

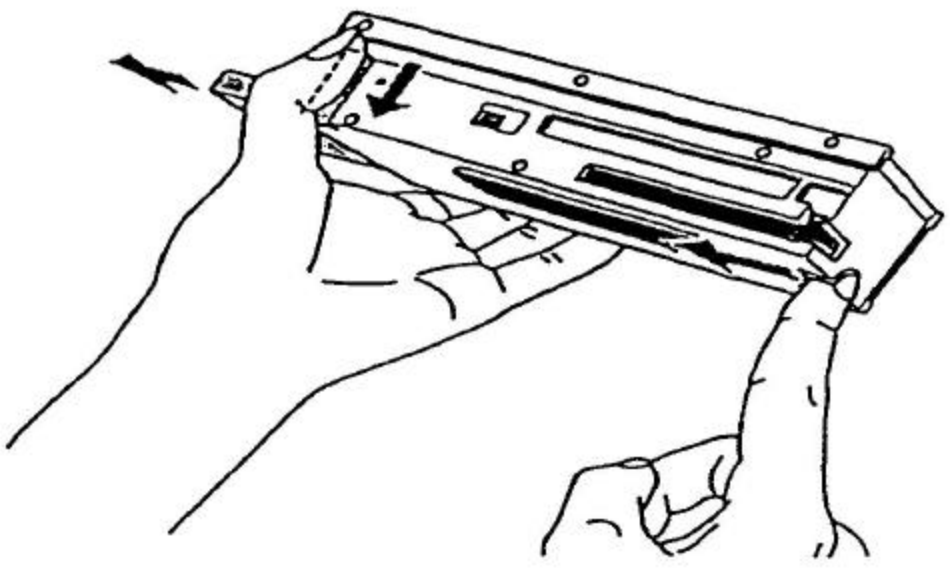


Figure 3-9. Pushing the cartridges from the rear of the magazine

2. Position your thumb in the slot in the bottom of the magazine and continue sliding the cartridges toward the front of the magazine, see Figure 3-10.

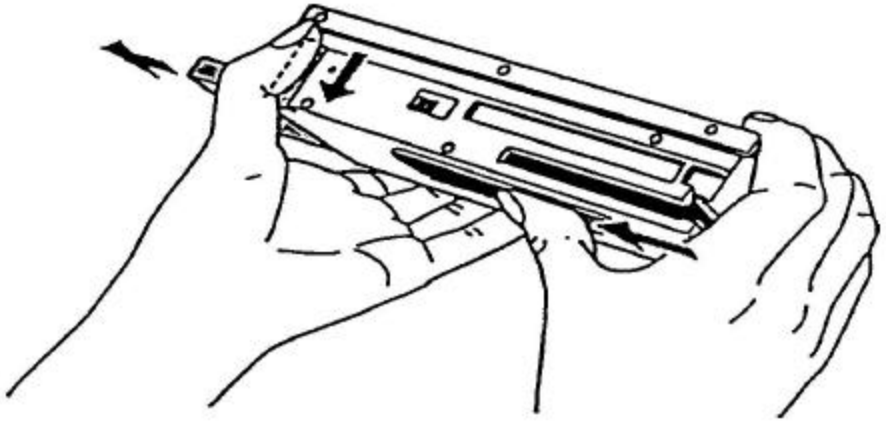


Figure 3-10. Pushing cartridges through the bottom of the magazine

3. Repeat step 1 and 2 to remove five of the cartridges.

4. Turn the magazine so that the open end faces up and tap it gently against your hand or a soft object. This makes cartridges move from the top shelf to the bottom shelf, see Figure 3-11.

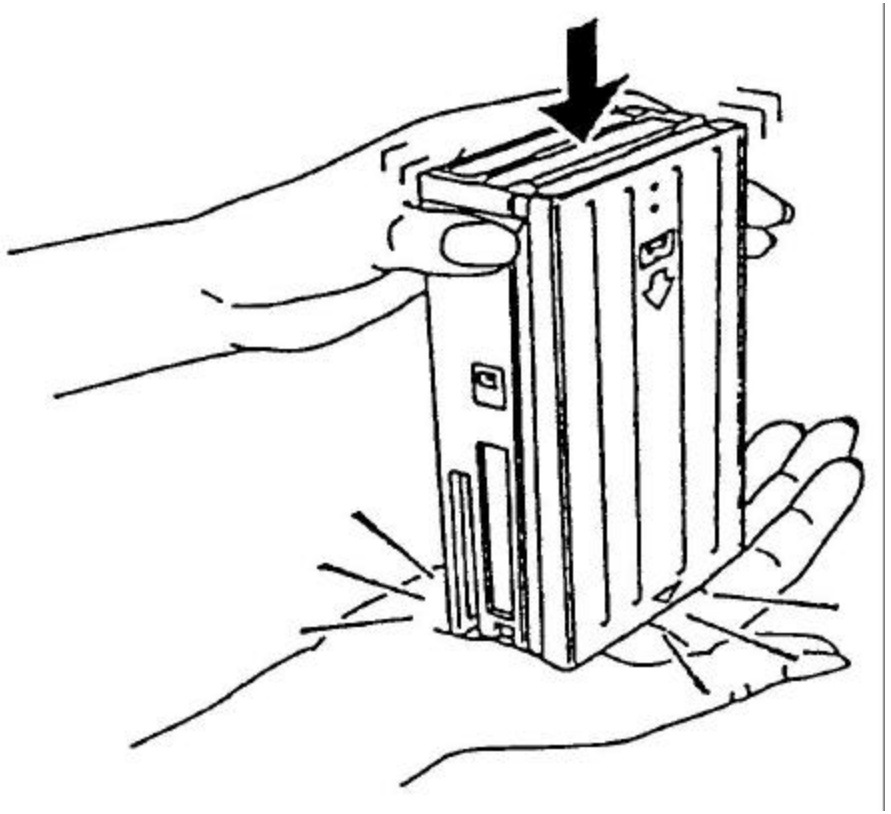


Figure 3-11. Moving top-shelf cartridges to the bottom shelf

5. Repeat steps 1 and 2 to remove the cartridges from the bottom shelf.
6. Finally, remove the cartridge in the middle shelf, see Figure 3-12.

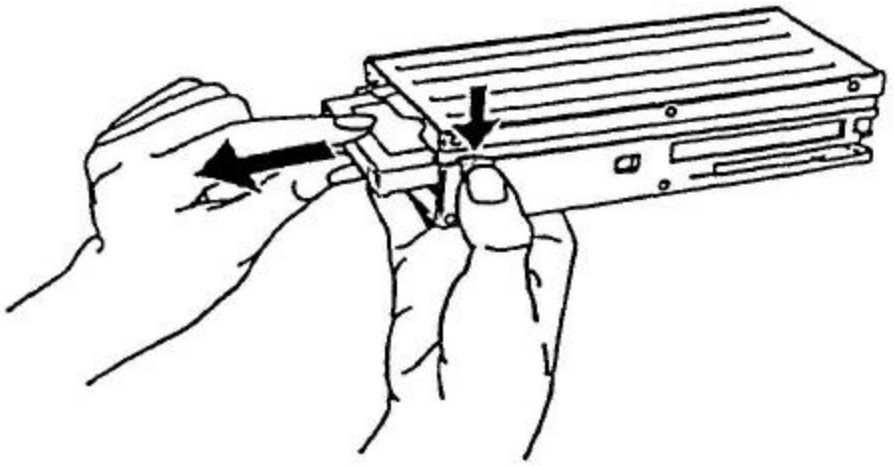


Figure 3-12. Removing cartridge from middle shelf

Slide Stopper
The Slide Stopper prevents the removal of the cartridges from the magazine with respect to vibration and shock during handling, see Figure 3-13.
Release the lock by sliding the slide stopper in the direction of the arrow when a cartridge must be removed from the magazine.

Write Protect
Slide the tab on the right side of the magazine in the direction of the arrow "SAVE" in order to prevent the tape from being over-written to or accidentally erased,.
In this state, a black plastic can be seen covering the reflecting sheet metal.
By write-protecting the magazine, all cartridges are write-protected and no data can be recorded regardless of the direction of the write-protect tab of each cartridge. (The write-protect function of each cartridges is ineffective), see Figure 3-13.
To record data, release the lock by sliding the tab on the magazine in the direction of the arrow "REC" (not black but reflecting sheet metal can be seen)
In this case, it depends on the tab direction of each cartridge whether the cartridge is write-protected or not.

NOTE: *The write protection status is demonstrated by checking for the reflective plate on the write protect tab. In order to ensure correct determination of the status, keep the plate reasonably clean, and never affix labels or the like over the write protect tab.*

Magazine Index Label
Make sure that the magazine index label is stuck firmly in the recessed label area on the side of the magazine. If the label is stuck in a position other than in the label area, the magazine may jam in the mechanism, see Figure 3-13.

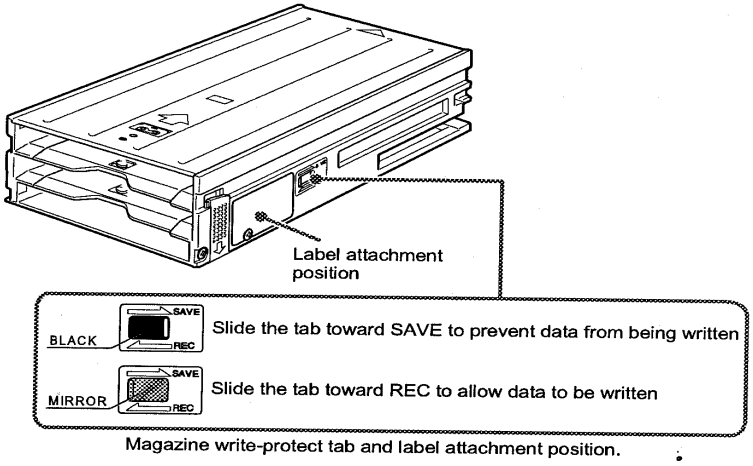


Figure 3-13. Slide Stopper, Write Protect and Index Label

Loading the Magazine
1. Put as many cartridges (1, 7 or 8) as you need into the magazine. Refer to how to Insert the Cartridges, see Figure 3-14.

2. To load the magazine, insert it into the slot in the front of the autoloader in the direction of the large arrow. Apply steady pressure until the mechanism takes the magazine and pulls it into the autoloader.

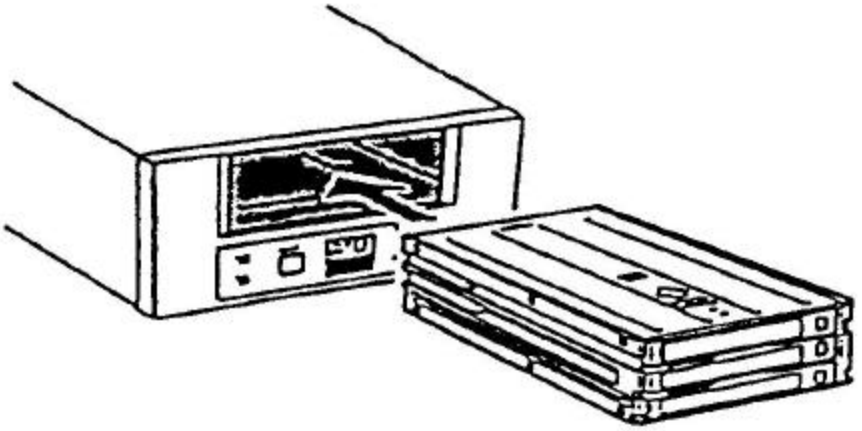


Figure 3-14. Inserting the magazine

3. The autoloader runs a rotation check automatically to check the following;

- cartridges are set in the magazine
- cartridges inserted in the correct direction

It takes about 90 seconds to complete this rotation check. After completing this check, the cartridge number icon "1"~"8" on the LCD should stop blinking and stay on. The LCD will indicate "Ready".

4. The cartridges can be selected by the following 2 methods.

By Front Panel Operation

You can select the cartridges loaded into the magazine as necessary by using the Select button/the Enter button on the front panel.

When you press the Select button, the LCD displays the number of the selected cartridge. (The number changes sequentially each time you press the Select button.) When the Enter button is pressed for confirmation, the cartridge whose number is displayed is loaded.

By Host Operation

Data cartridges can also be selected as necessary by using the MOVE MEDIUM command on your host computer.

Exchanging the Cartridges

By Front Panel Operation

You can select data cartridges loaded into the magazine as necessary by using the Select button/the Enter button on the front panel.

When you press the Select button, the LCD displays the number of the selected cartridge. (The number changes sequentially each time you press the Select button.) When the Enter button is pressed for confirmation, the data cartridge currently loaded in the DDS drive is unloaded and the cartridge whose number is displayed is loaded.

By Host Operation

1) Sequential Mode
Exchange the cartridge by using the UNLOAD command.
2) Random Mode
Exchange the cartridge as you request by using MOVE MEDIUM command.

Ejecting a Magazine in the Normal State

The magazine can be ejected from the autoloader by the Eject button on the front panel or an UNLOAD command (LUN 1) from the host.
The autoloader writes any buffered data to tape followed by an EOD prior to initiating the UNLOAD sequence.

1) The tape is rewound to BOT.
2) If the tape is write-enabled, a copy of the Tape log held in the RAM is written back on the tape.
3) The tape is then rewound to BOM and the tape is unthread from the mechanism.
At this stage the tape is either retained in the drive or ejected, depending on whether media removal is enabled by the PREVENT ALLOW MEDIA REMOVAL command.
4) The loader unloads the cartridge back to the magazine.
5) The cartridges in the magazine are rotated and put back in order.
6) The magazine is ejected.

NOTE: *If the host has previously sent a PREVENT MEDIA REMOVAL command, the unloading action is different in two ways:*

- *The Eject button is disabled and has no effect. It does not initiate an unload sequence.*
- *An Unload command puts the drive into the semi-loaded state. That is, it takes the drive offline and unthreads the tape, but does not eject it.*

The effects of PREVENT MEDIA REMOVAL continue until an ALLOW MEDIA REMOVAL command is received, or the drive is reset.

NOTES ***:*** *The magazine may be ejected automatically for the following conditions.*
1) When a magazine , having at least one of the slots(1~7) and slot 8 empty, has been inserted.
2) When a cartridge in the magazine has been inserted with incorrect orientation, or slide shutter is positioned incorrectly.
3) When an unexpected power shutdown/outage has occured that potentially may result in cartridge positioning disorder.
4) When the EEPROM on the the autoloader cannot be read.

Chapter 4
Troubleshooting

Reinstalling the Tape Backup Software

See the user's guide instructions supplied with your tape backup software application.

Reinstalling Drivers for Windows NT

See the user's guide instructions supplied with your tape backup software application.

Autoloader Makes Noises During System Startup

During system start-up, the computer accesses the autoloader for operation (if tape is loaded, it will be threaded and the drive will become Ready). The noise and vibration associated with this activity are normal for this technology and do not indicate a problem with the drive.

Drive Failures During Backup or Restore Operations

Make sure you are using the correct type of tape cartridge.
Make sure that the tape cartridge is not write protected.
Remove and reinsert the tape cartridge by the tape magazine.
Try a different tape cartridge, preferably a new one.
Clean the tape drive read/write heads using a cleaning cartridge.
Verify the autoloader settings in the system setup program.
Check all cables and connections.
Check the front display LEDs for error information, see Figures 4-1 and 4-2.

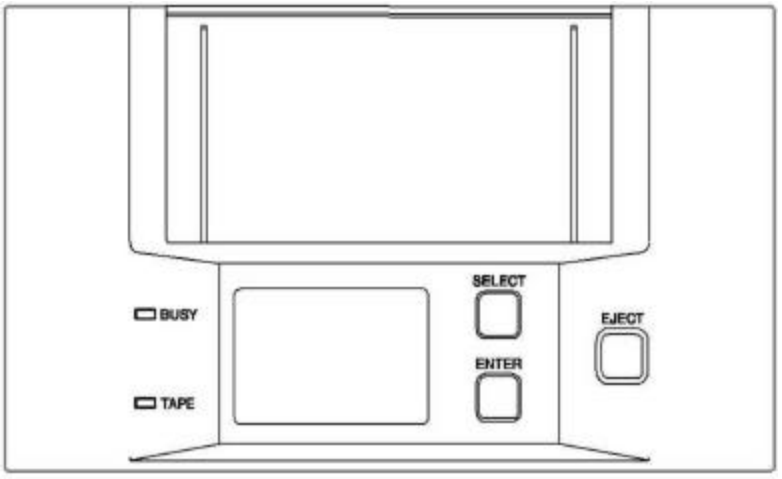


Figure 4-1. Front Panel

LCD Indication for Autoloader Status

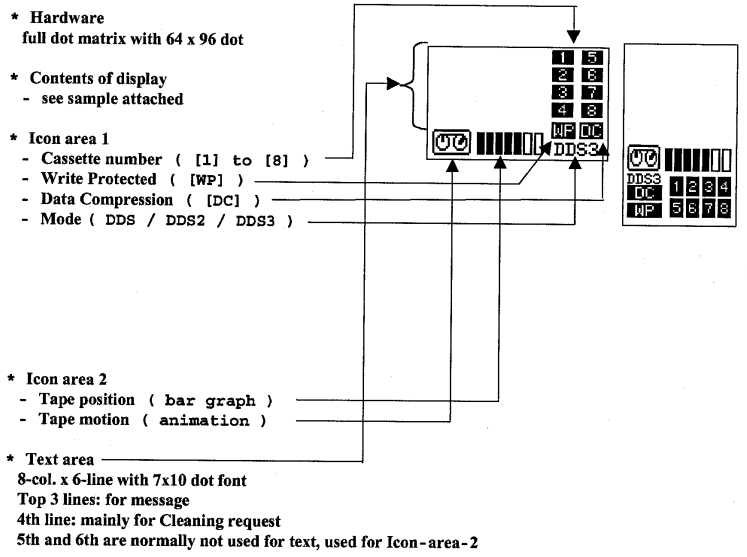


Figure 4-2. LCD Panel

Please refer to Appendix A "LCD Panel" (Figures A-1 to A-15) for further details.

Tape Backup Software Errors

Check the user's guide supplied with your tape backup software application.

Running the Dell Diagnostics

Please see your system user's guide .

Cleaning the Autoloader:

The tape drive in the autoloader requires periodic cleaning.

The frequency with which your drive should be cleaned depends how much the DDS cassettes(s) have been used for backup operations. Dell recommends that you use the following guidelines to determine when to clean your drive:

1.) When the "CleanReq" warning is shown on the LCD.

2.) If the DDS cassette has been used 12 hours or more, it is recommended that the drive be cleaned once every 24 hours of backup operation.

You should also clean the drive if you get an error message during a backup operation.

Use the cleaning cartridge that is provided to perform the following cleaning procedure:

Sequential Mode:

1) Place the cleaning cartridge into one of the magazine slots (for example, slot 8) and insert the magazine into the autoloader.

2) Use the Select button to select the slot in which you placed the cleaning cartridge. The autoloader will automatically perform a cleaning cycle.

3) At the end of the cleaning cycle, the drive automatically ejects the cartridge and the autoloader replaces it in the magazine.

Random Mode:

1) The host sends a MOVE MEDIUM command to move the cleaning cartridge from the magazine to the drive.

2) The drive will the automatically carry out a cleaning cycle.

3) The drive automatically ejects the cartridge when the cleaning cycle is complete. The autoloader returns the cartridge to its magazine slot.

NOTES: *If you still get an error message after performing the cleaning procedure, try the procedure a maximum of 5 more times. If the error message persists after 6 cleanings, the problem may not be related to cleaning. Try using another DDS cassette for backup operations instead.*

The cleaning cassette cannot be used for recording.

The cleaning cassette can be used approximately 50 times.

Emergency Cassette Removal Procedure

Emergency Ejecting a Magazine

When the autoloaders encounters a fatal error, the LCD on the loader will indicate an error.

Some of these errors may be recoverable by doing a power reset. Others may be unrecoverable because a cartridge may be jammed inside the drive causing the ejection of the cartridge to fail. In any case, when the autoloader encounters a fatal error, the user has an option of doing a power reset or attempting an emergency eject. The emergency eject sequence will be described hereafter.

If Magazine is still in the autoloader after the following procedure, the drive has a serious problem and should be returned for repair with the magazine in place.

Ejecting by Manual Operation

When the elevator is located in front of the Magazine and occupies its way out, perform steps 1 through 4 for ejecting the magazine.

When the elevator stays in front of the drive, perform steps 3 and 4.

1. Loosen the screws (not remove) and slide to the left, see Figure 4-3.

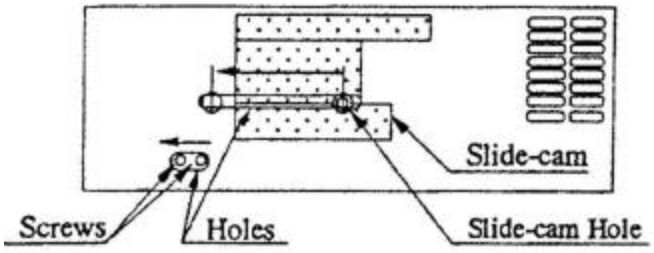


Figure 4-3. Right View

2. **S**lide the "Slide-cam Hole" left all the way with a screwdriver. Consequently, the Elevator gets down (Figures 4-17, 4-18, 4-19) with the internal mechanical link (Figure 4-16) and makes a way out for the stuck magazine.

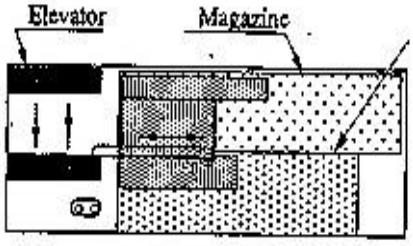


Figure 416

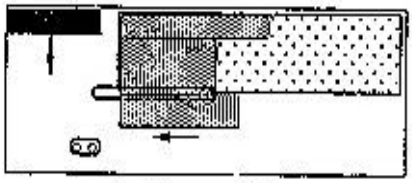


Figure 417

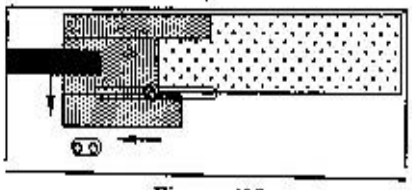


Figure 418

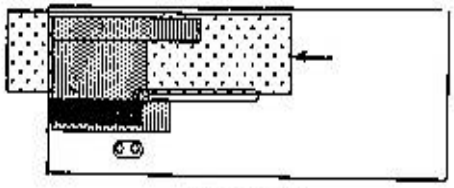


Figure 419

Figures 4-16, 4-17, 4-18, 4-19. Internal Mechanical Link

3. Slide the "Hook to Unlock Magazine" right, and push the stuck magazine through the "Hole to Push Magazine" with a screwdriver, see Figure 4-4.

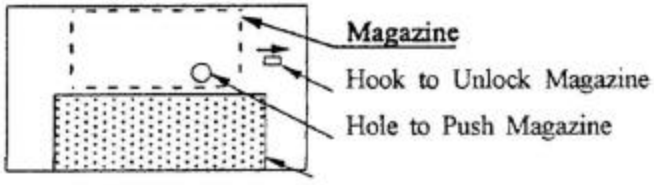


Figure 4-4. Rear View

In case the tape is stuck inside the drive, you could remove the tape cartridge manually by performing the following steps.

1. Remove the drive from the chassis or enclosure to allow access to the bottom and left side of the drive.

2. Remove the drive's top cover to monitor the degree of tape slack throughout the process.

NOTE: *Never touch the inside of the drive when the top cover is opened. Otherwise it may cause a trouble.*

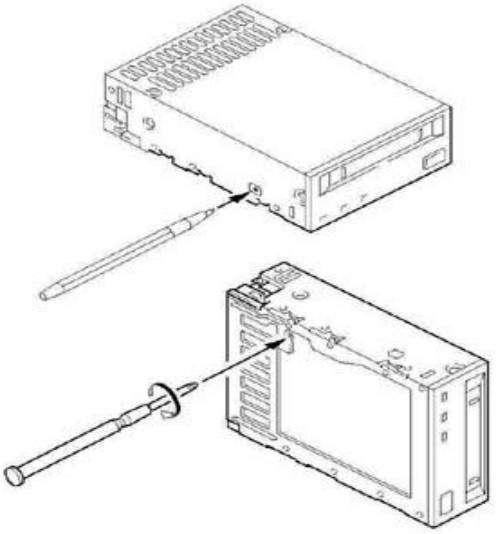
3. Rotate the Loading/Threading motor clockwise with a small screwdriver (ex. Phillips "+" No. 1) put into the plastic screw head on the back of the drive (see the location in a drawing below). This will enable you to move back the threading mechanism to the initial position.

NOTES: *Do not rotate the screw further when you reach to the mechanical limit to avoid damage on the mechanism.*

To prevent damage on the tape, take up the slack of tape from time to time by clicking the ratchet mechanism located on the left side of the drive.

4. Continue the procedure until the tape is lifted out of the drive mechanism and ejected.

5. Return the drive to a service station for repair.



Appendix A

LCD Panel

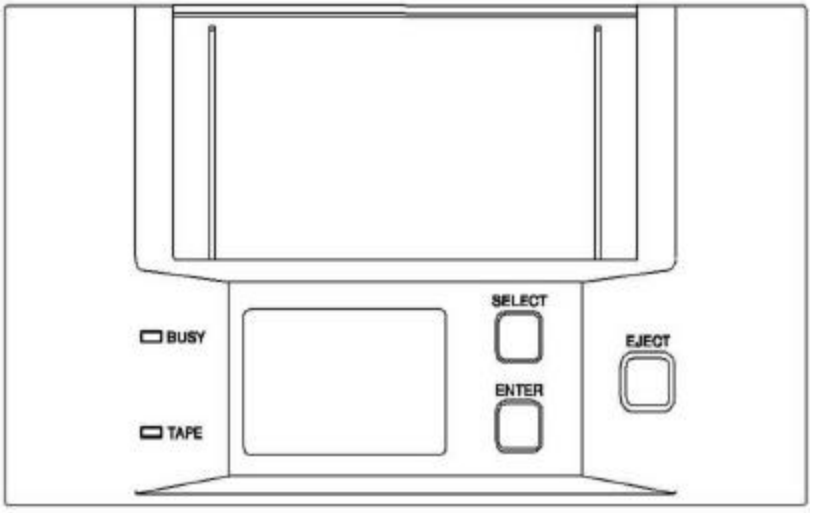


Figure A-1. Front Panel

LCD Indication for Autoloader Status

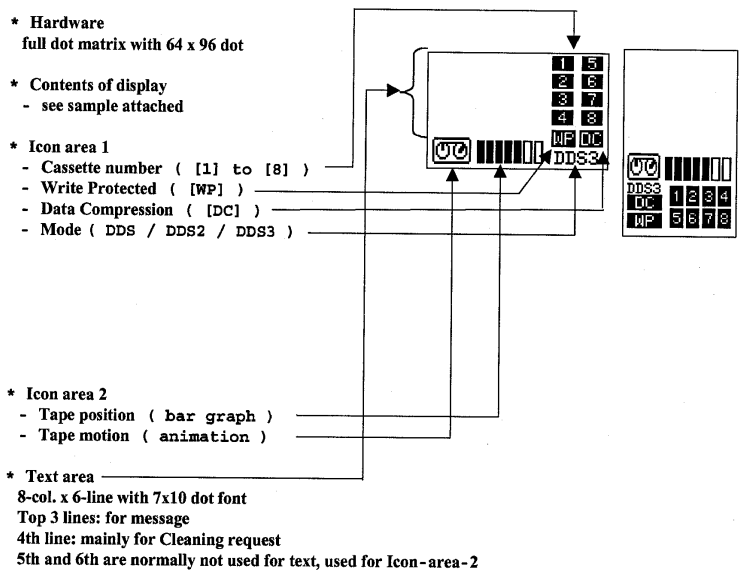


Figure A-2. LCD Panel

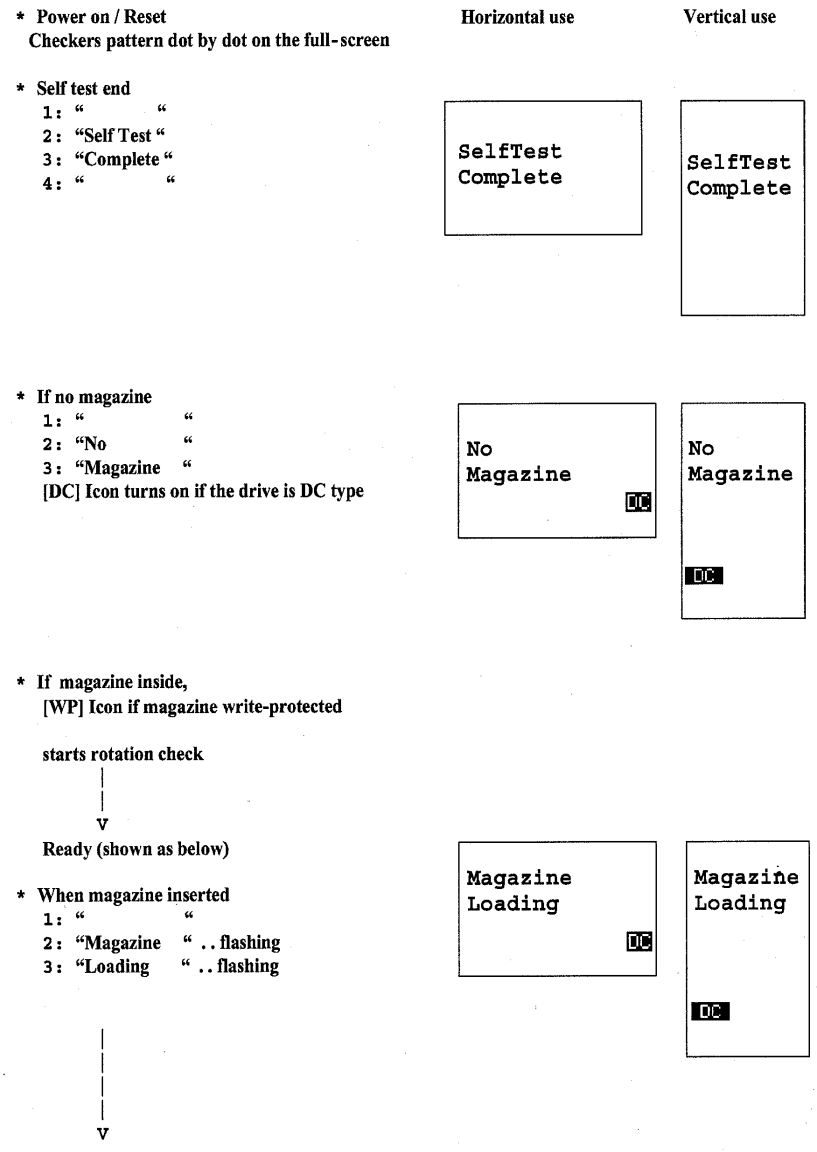


Figure A-3. Magazine Loading

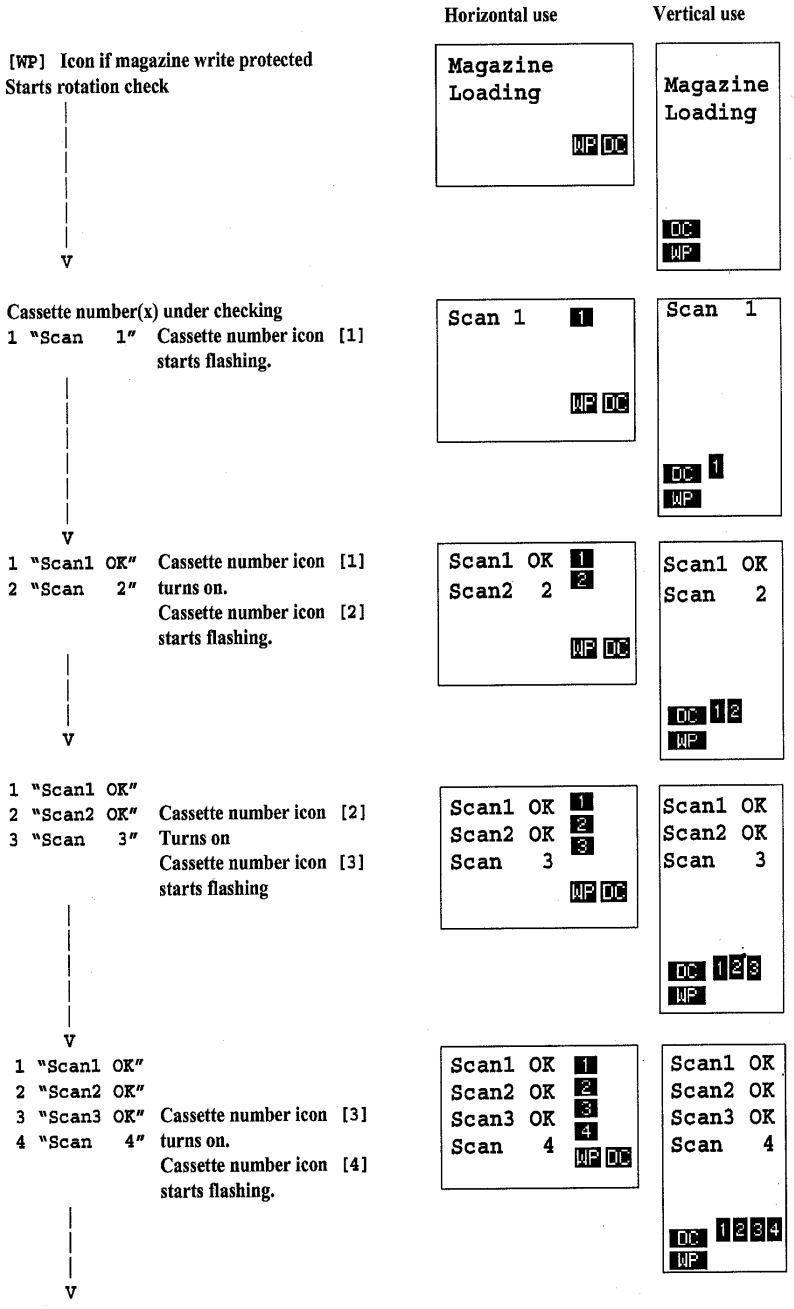


Figure A-4. Magazine Loading Continued

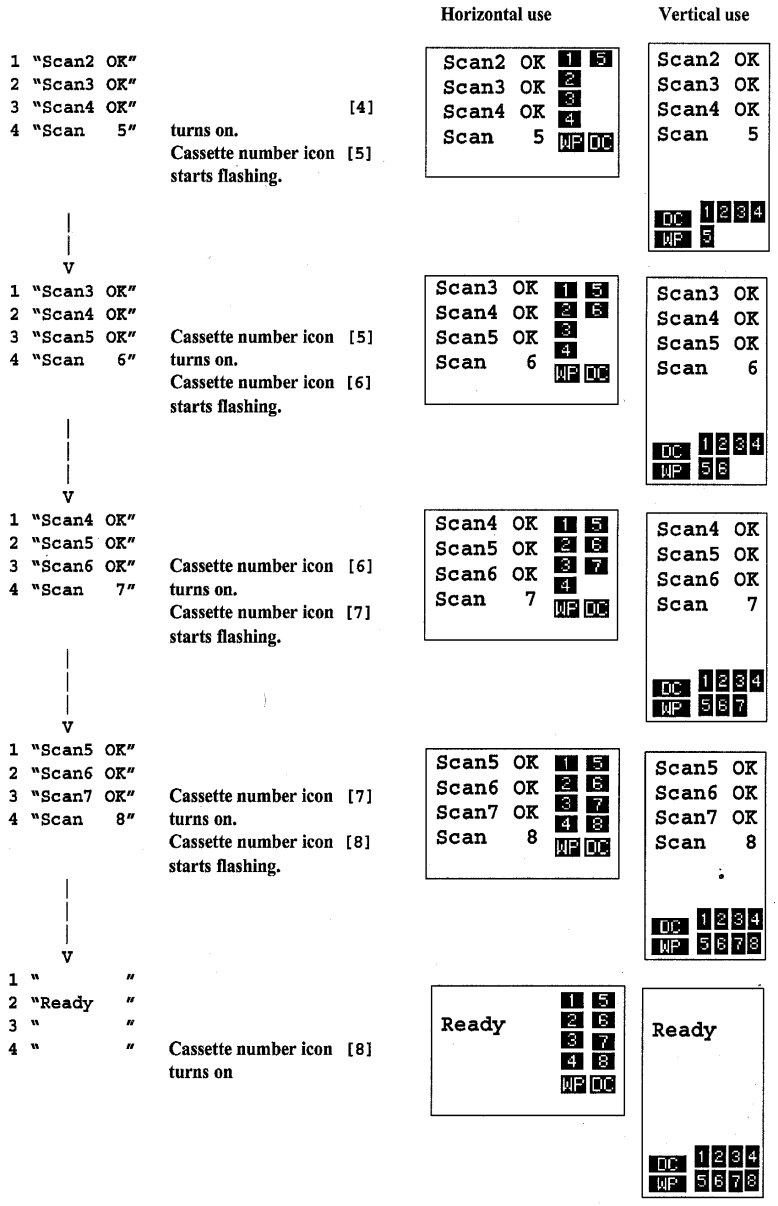


Figure A-5 Magazine Loading Continued

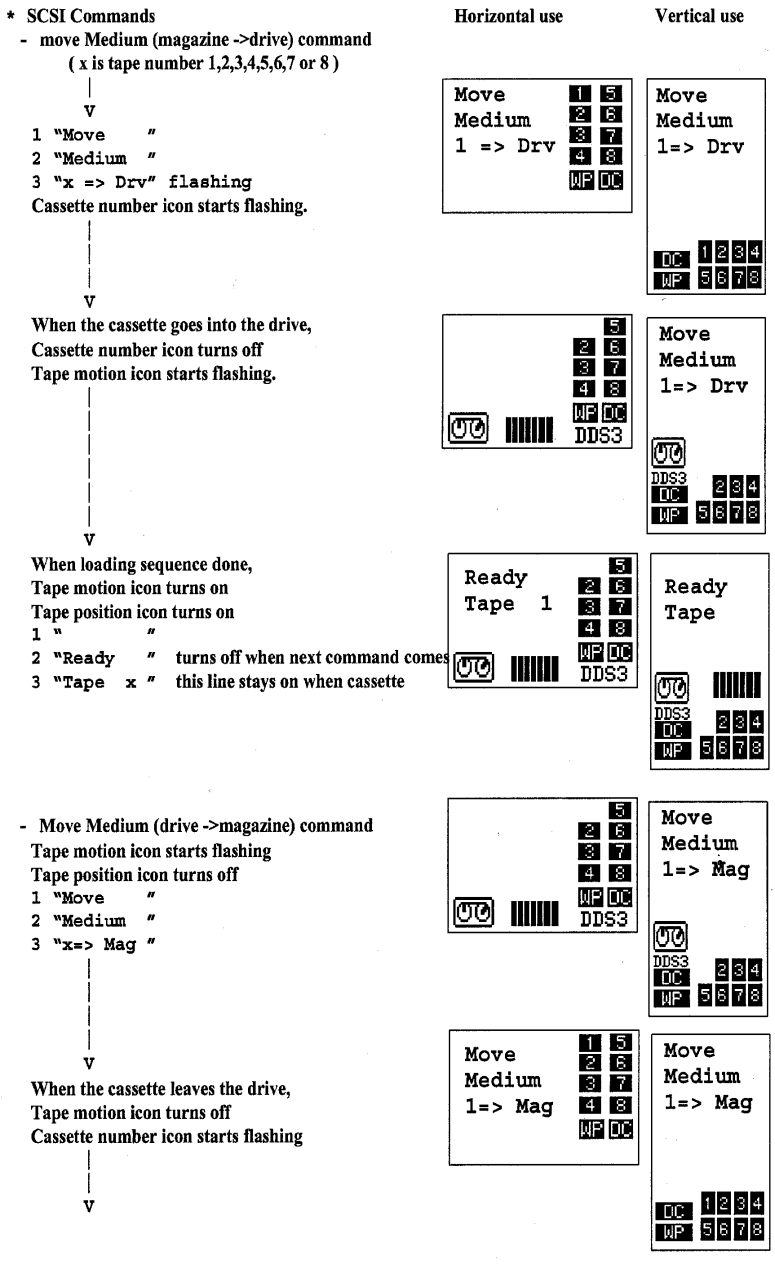
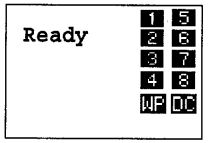
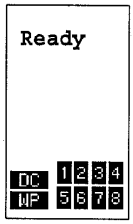


Figure A-6. Move Medium Command

Horizontal use Vertical use

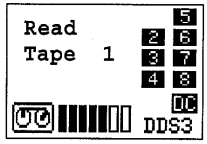
Done,
Cassette number icon turns on
1 " "
2 "Ready "
3 " "

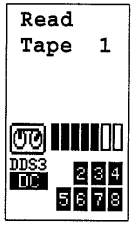




- Read command

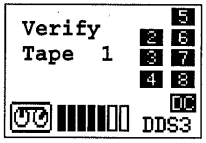
Tape motion icon indicates motion
Tape position icon shows the position
1 " "
2 "Read "
3 "Tape x"





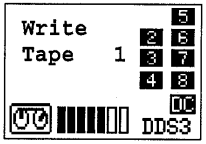
- verify command

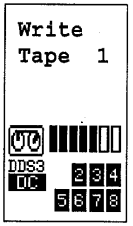
Tape motion icon indicates motion
Tape position icon shows the position
1 " "
2 "Verify "
3 "Tape x"



- write

Tape motion icon indicates motion
Tape position icon shows the position
1 " "
2 "Write "
3 "Tape x"





- erase

Tape motion icon indicates motion
Tape position icon shows the position
1 " "
2 "Erase "
3 "Tape x"

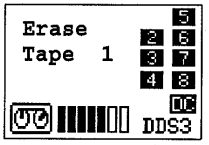


Figure A-7. Read , Erase

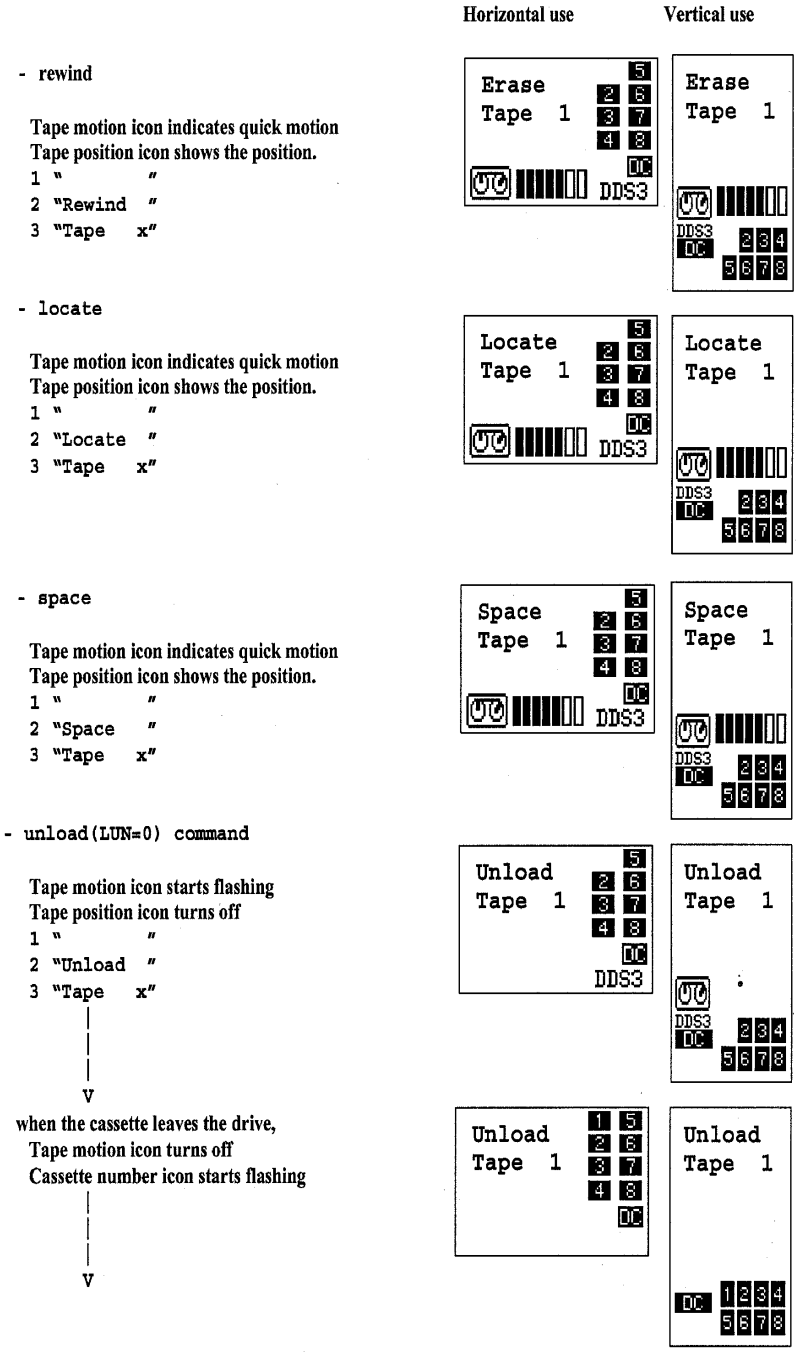


Figure A-8. Erase, Locate Tape, Space Tape, Unload Tape

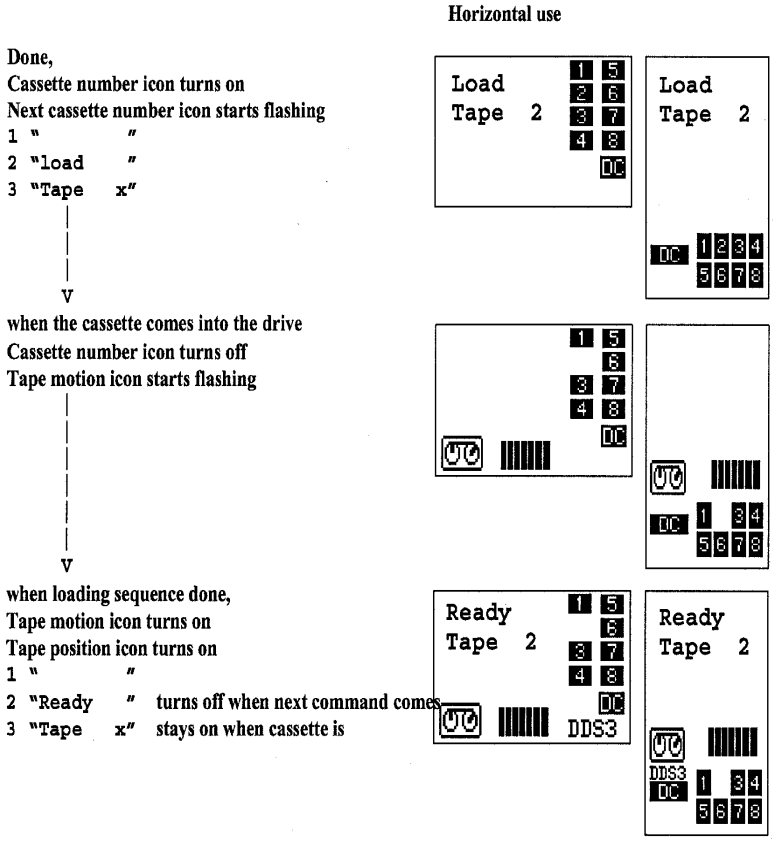


Figure A-9. Load Tape Continued

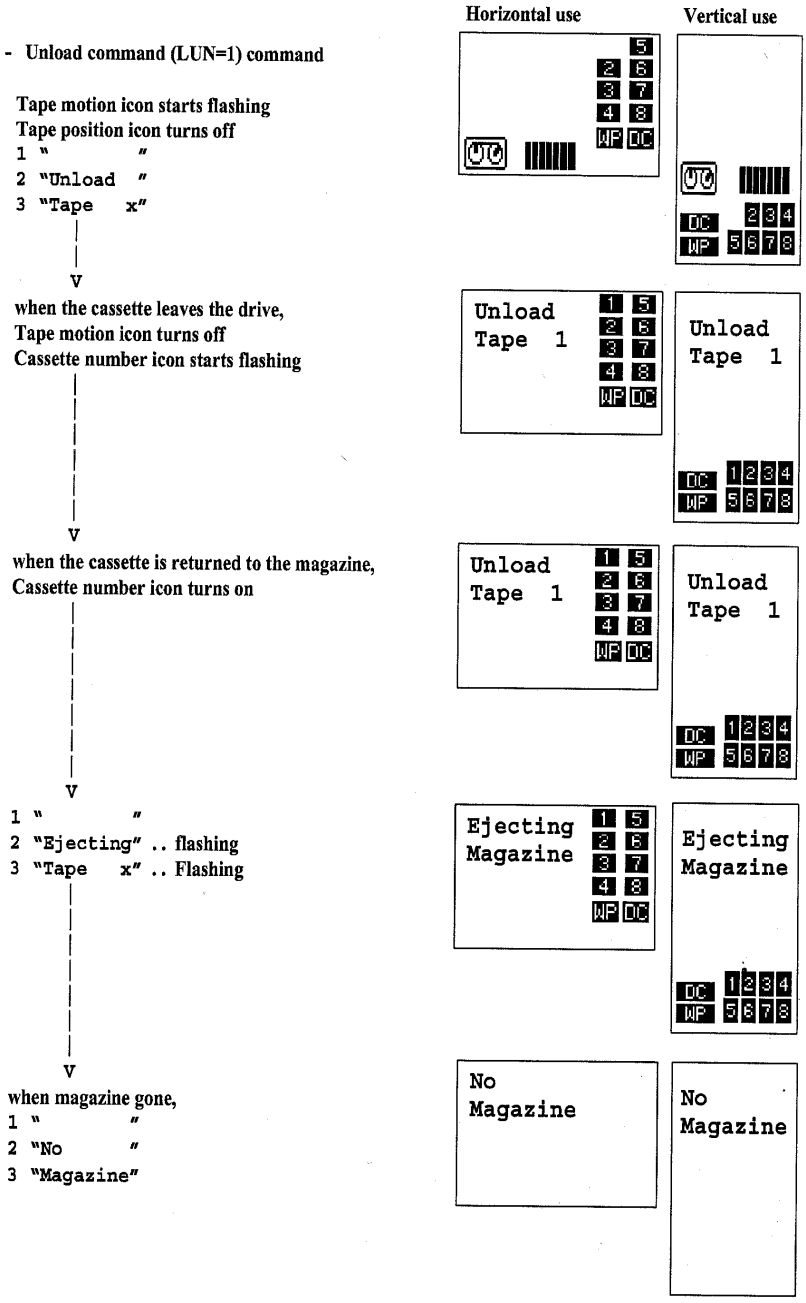


Figure A-10. Unload Tape, Ejecting Magazine

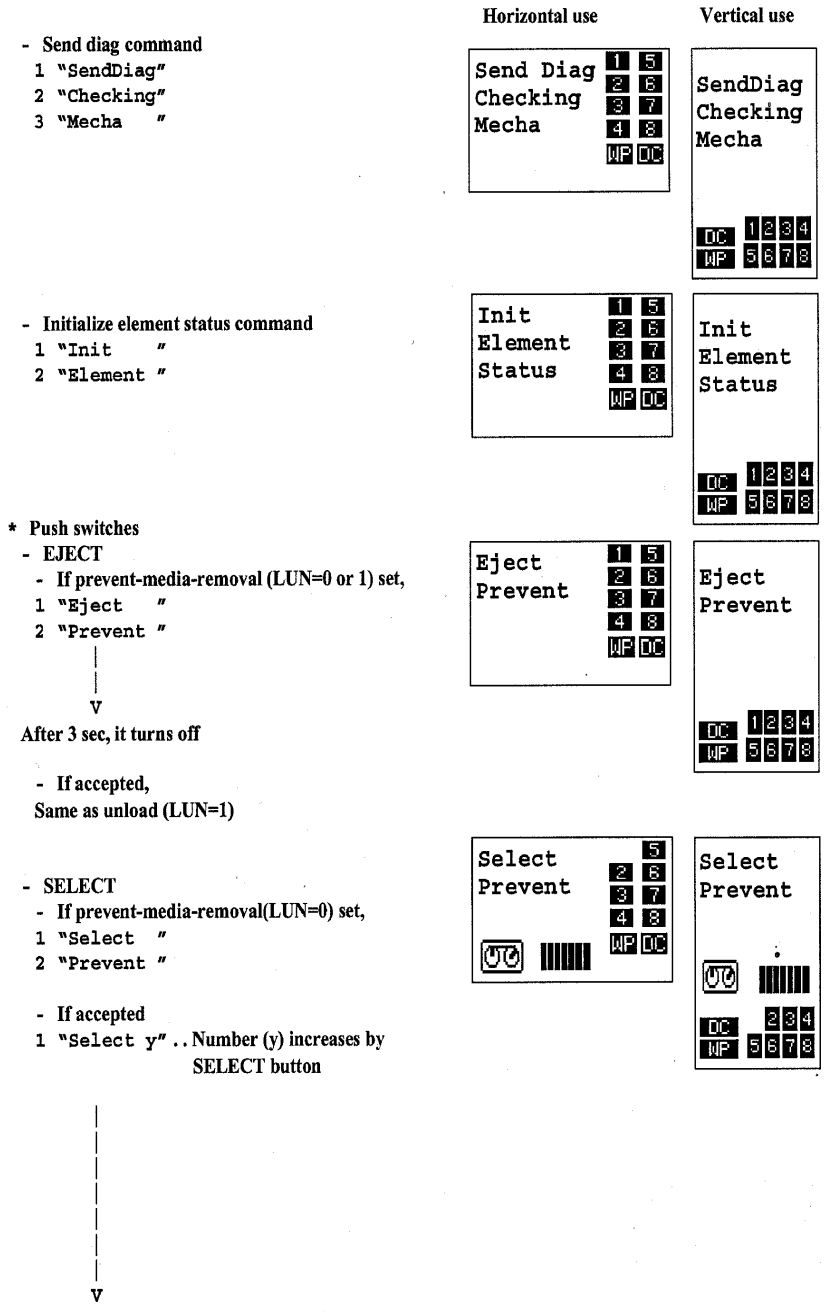


Figure A-11. Send Diag Checking, Init Element Status, Eject Prevent, Select Prevent

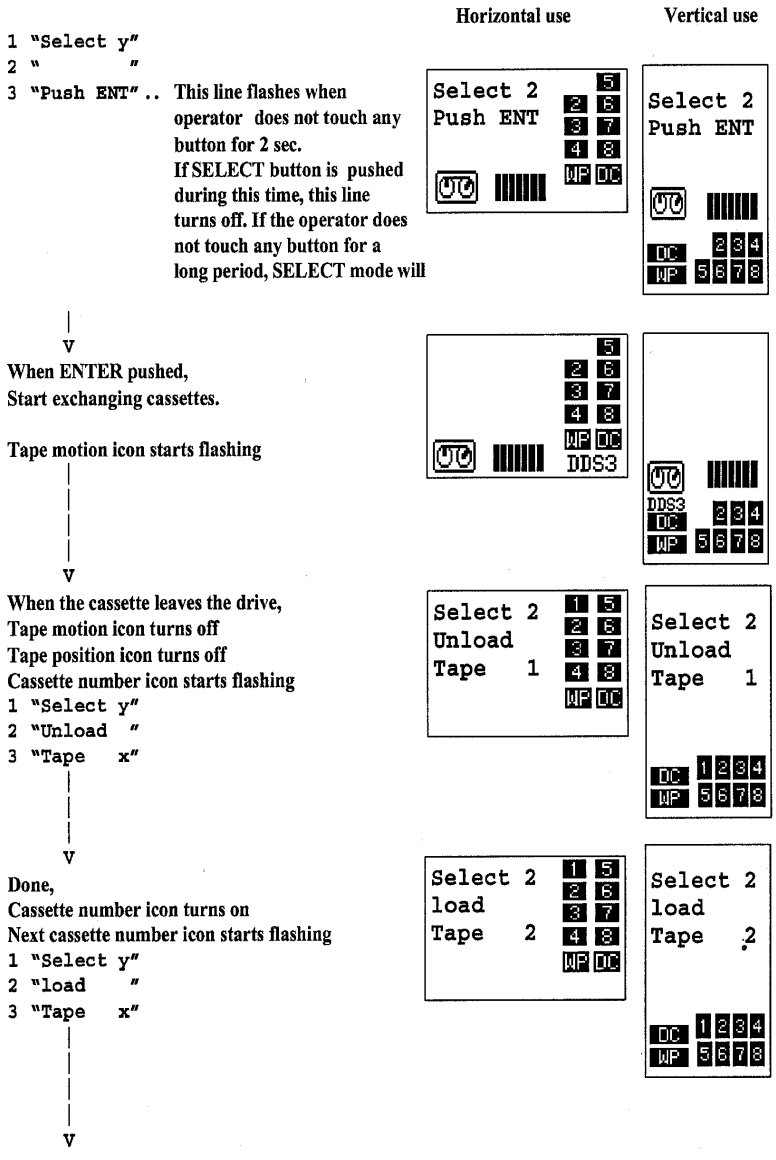


Figure A-12. Select and Load Tape

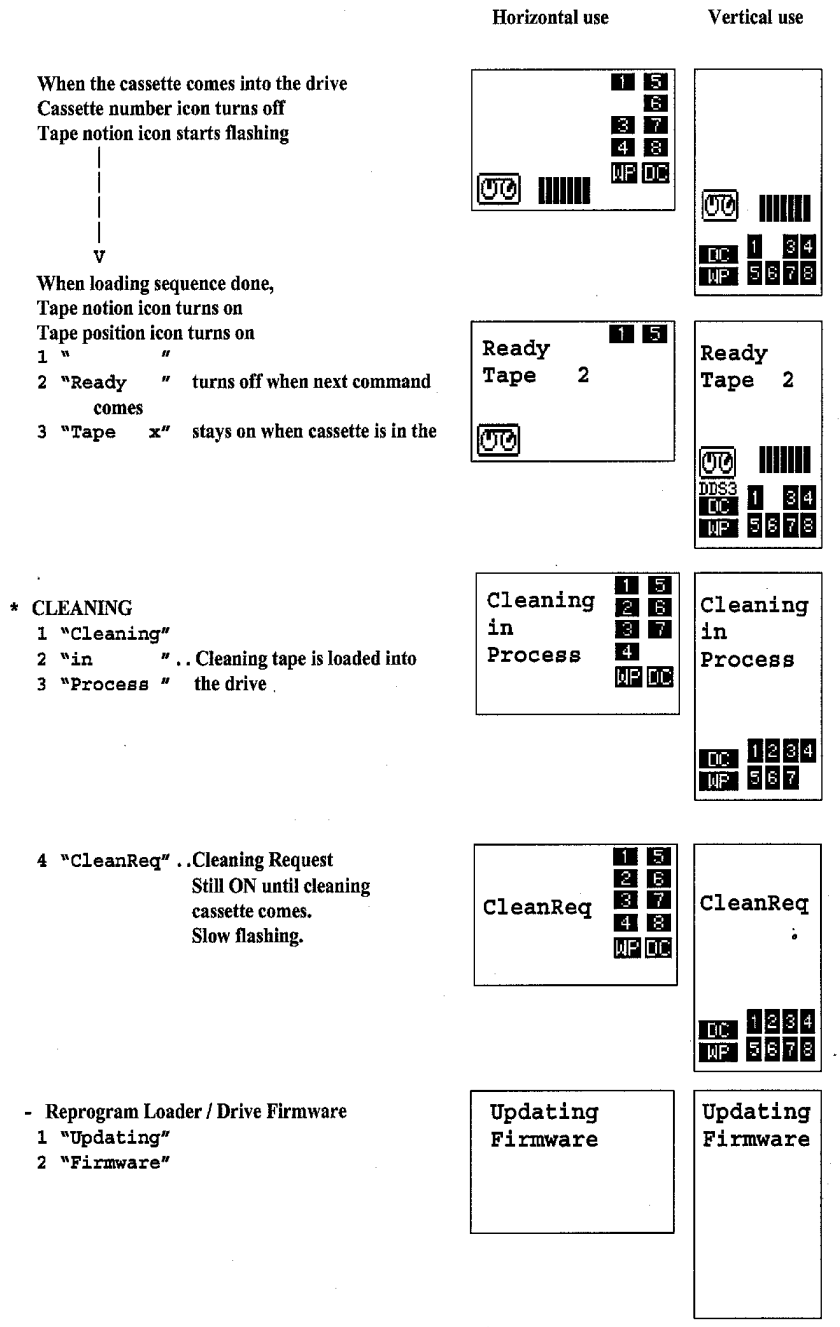


Figure A-13. Cleaning in Process, Cleaning Req, Updating Firmware

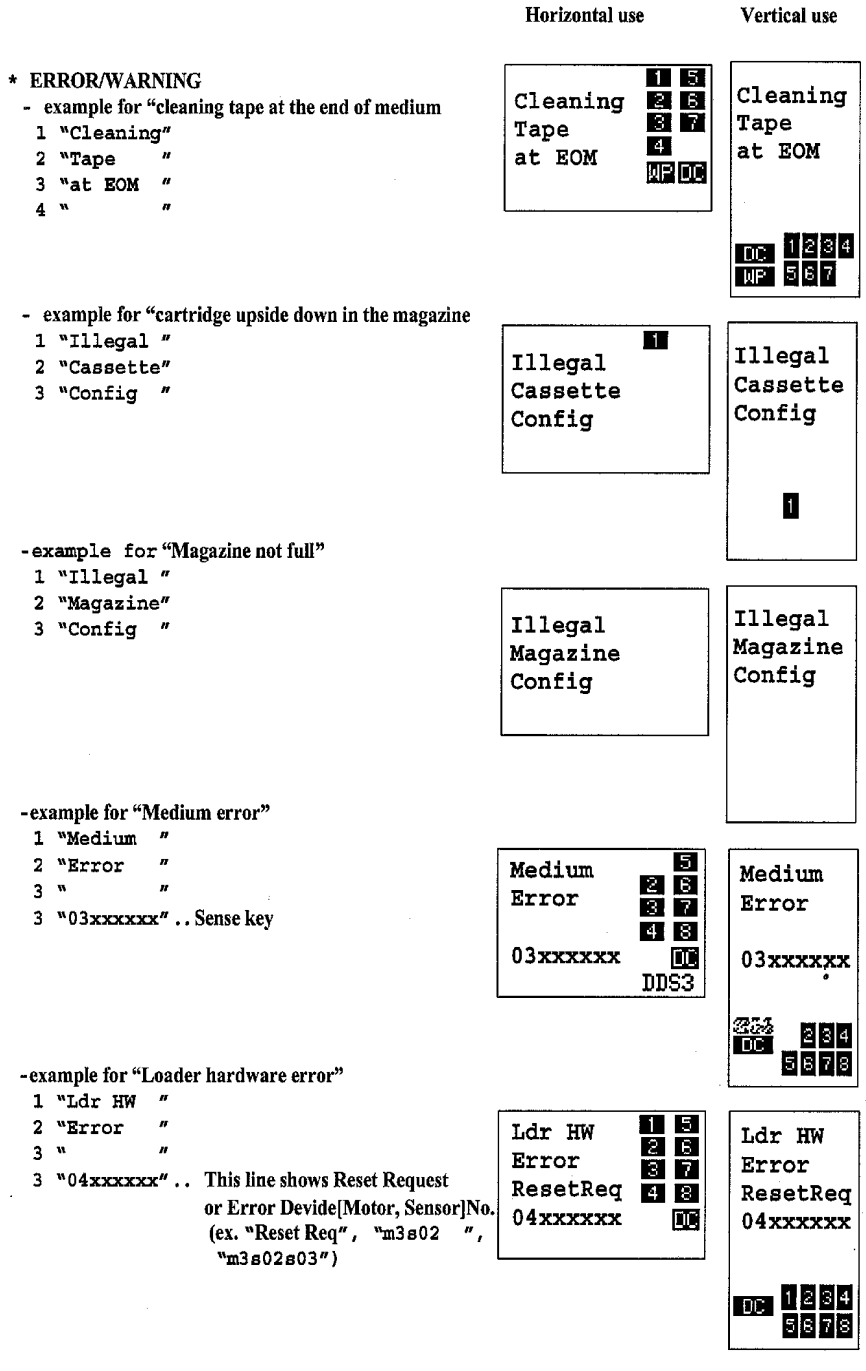
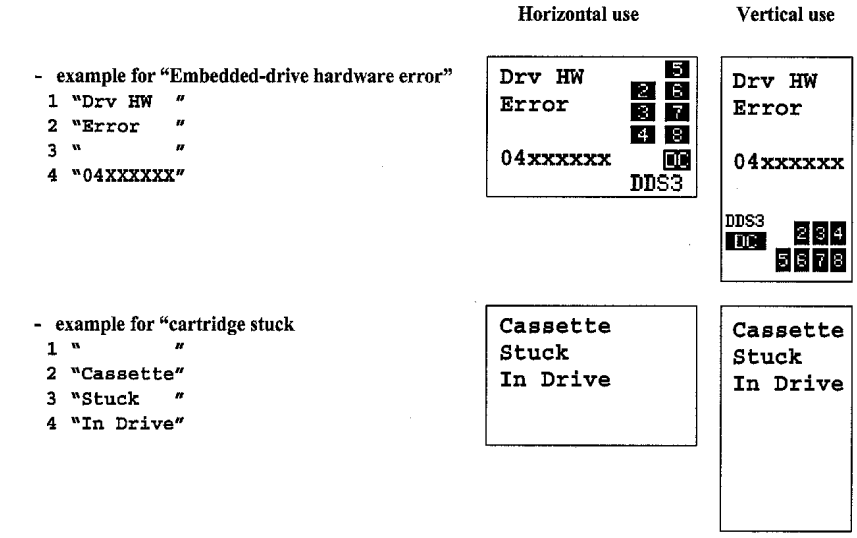


Figure A-14. Cleaning Tape at EOM, Illegal Cassette Config, Illegal Magazine

Config, Medium Error, Loader HW Error ResetReq



* MENU system

- How to enter menu mode

  Hold SELECT button down for 5 seconds.[at No Magazine]

- Display

  Horizontal mode only. Vertical mode is not supported.

  Full screen as a text mode. 12 . X 6 lines available.

  is available with small font.

- Menu screen

```
">Version    "
" Auto Load  "
" Unload     "
" Contrast   "
" Orientation"
" Language   "
```

```
>Version
 Auto Load
 Unload
 Contrast
 Orientation
 Language
```

- Version screen

```
"PV120TDDS4AL"
"SCSI ID#5   "
"Ver.0000    "
"S/NLxxxxxxxx"
"S/NDxxxxxxxx"
"            "
```

```
PV120TDDS4AL
SCSI ID#5
ver. 0000
S/NL xxxxxxxx
S/ND xxxxxxxx
```

Figure A-15. Drive HW Error, Cassette Stuck in Drive, Version

- Auto Load screen

```
"Auto Load    "
"             "
"             "
"             "
">OFF         "
" ON          "
```

```
Auto Load


>OFF
 ON
```

- Unload screen

```
"Unload       "
"Continuous   "
"             "
"             "
">OFF         "
" ON          "
```

```
Unload
Continuous

>OFF
 ON
```

- Contrast screen

```
"Contrast     "
"Adjustment   "
"             "
"             "
```

```
Contrast
Adjustment
```

- Orientation screen

```
"Orientation  "
"             "
"             "
">Horizontal  "
" R-side down"
" L-side down"
```

```
Orientation


>Horizontal
 R-side down
 L-side down
```

- Language screen

```
"Language     "
"             "
">English     "
" French      "
" German      "
" Spanish     "
```

```
Language

>English
 French
 German
 Spanish
```

Figure A-16. Auto Load, Unload Continuous, Contrast Adjust, Orientation, Language

Appendix B
Specifications

General

Manufacturer	Manufactured for Dell
Connection type	Single Ended / Low Voltage Differential Ultra Wide SCSI
SCSI compliance	Compatible with SCSI-2 medium changer command set ANSI X3T9.2/86-109

Performance

Capacity:	
Without data compression	DDS4 20.0 GB typical per tape (8 Tapes Maximum)
With data compression	DDS4 40.0 GB assuming 2:1 compression ratio
Type of Compression	Hardware, DCLZ, adaptive coding with embedded dictionary
Data Transfer Rate	2.36 MB/sec (Native) to 4.72 MB/sec (2:1 Compression ratio)
Burst Transfer Rate	14 MB/sec Asynchronous 40 MB/sec Synchronous
Initialize Time	less than 1 second
Magazine Initialization Time	Typical 90 seconds
Load Time	less than 24 seconds (for a single partition tape)
Rewind Time	less than 80 seconds with 150 meter tape
Search Time	less than 90 seconds for 150 meter tape
Unload Time	less than 20 seconds (for a single partition tape)

Error Rate	the uncorrectable error rate is < 10 -15

Reliability

Mean Time Between Failures:
The MTBF is 225,000 power on hours, assuming a duty cycle of 40%, where: Duty cycle = Tape Motion Time / Power-on Time x 100.
Mean Time To Repair:
MTTR is 30 minutes because at the field level the entire drive is considered a Field Replacable Unit (FRU).
Durability:
Autoloader:
Cartridge Swap (MSBF): 180,000
Magazine Load/Unload: 30,000
Drive:
Start/Stop: 400,000 times Reposition: 3,000,000 times Thread/Unthread: 10,000 times
Load/Eject: 10,000 times

Recommended Tapes

DDS-4	Sony DGD150F
DDS-3	Sony DGD125P
DDS-2	Sony DGD120P
DDS-1	Sony DG90P
Cleaning	Sony DGD15CL

Power

External

100-120 V 0.5[A]
200-240 V 0.3[A]

Internal

Voltage	Max Ripple	
DC 5 V +/-5%	100 mV p-p	Maxium (load/unload) 2.9 A Typical (write/read) 1.3 A

DC 12 V +/-10%	100 mV p-p	Maxium (load/unload) 1.6 A Typical 0.3 A

Dimensions

Internal Height 82.5mm Width 146.0mm Depth 241.6mm

External Height 109.0mm Width 211.0mm Depth 296.0mm

Environmental

Operating Temperature	5C to 40C (T<10C/h)
Non-Operating Temperature (mech)	-40C to 70C (T<C/h)
Non-Operating Temperature (tape)	-40C to 45C (T<20C/h)
Operating Humidity	20 to 80% RH , non-condensing, Maxium wet bulb temperature = 26C
Non-Operating Humidity (mech)	5 to 95% RH (RH <30%/h)
Non-Operating Humidity (tape)	20 to 80% RH (RH <30%/h)
Operating Altitude	0 to 4572 meters (0 to 15,000 feet)
Operating Dust	Less than 150 microgram/m3, Based sampling period 24 hours
Operating Vibration	Swept Sine 5 to 500 Hz @ 0.5 G Peak .25 Octave/min. 3 axis, 3 direction
Non-Operating Vibration	Swept Sine 5 to 500 Hz @ 0.75 G Peak .25 Octave/min. 3 axis, 3 direction
Operating Shock	No Data Loss Half Sine 10 G Peak 11 ms 3 axes, 3 directions Interval 10 seconds
Non-Operating Shock	No Device Damage Half Sine 90 G Peak 11 ms 3 axes, 3 directions

Appendix C
Regulatory

UL and cUL

Underwriters Laboratories, Inc.
UL 1950 (Third Edition), Safety of Information Technology Equipment, Including Electrical Business Equipment.
Canadian Standards Association
CSA-C22.2 No. 950-95, Safety of Information Technology Equipment, including Electrical Business Equipment.

EMC Directive

CE Mark

TUV

This device complies with:

- EN 60950/92 A1+A2+A3+A4+A11

FCC Compliance Statement

External Only

- FCC Part 15 Subpart B Class B

Canadian Compliance (Industry Canada)

- ICES - 003 Class B

Manufacturer Declaration

This certifies that this product is in compliance with EU Directive 89/336/EEC, using the EMC standards EN55022 (Class B) +A/95+A2/97 and EN50082-1/92. This product has been tested and verified to meet CISPR 22 Class B requirements.

Year 2000 Statement

Neither the performance nor the functionality of the Dell™ PowerVault™ 120T DDS4 Autoloader will be affected by the date change before, during and after the year 2000. See Dell Computer Corporations 's World Wide Web site for more information.

Printed in Japan.

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