



**INSTALLATION
AND
OPERATING GUIDE**

VLS DLT
V I R T U A L L I B R A R Y S Y S T E M



Advanced Digital Information Corporation

Copyright Notice

© *Copyright ADIC 1993*

The information contained in this document is subject to change without notice.

This document contains proprietary information that is protected by copyright. All rights are reserved. No part of this document may be photocopied, reproduced or translated to another language without the prior written consent of ADIC.

ADIC shall not be liable for errors contained herein or for incidental or consequential damages (including lost profits) in connection with the furnishing, performance or use of this material whether based on warranty, contract, or other legal theory.

Printed in the U.S.A.

March 1997

Document Number 62-0100-01 Rev D

Advanced Digital Information Corporation
(206) 881-8004

Customer Assistance: (206) 883-HELP

BBS: (206) 883-3211

Internet: <http://www.adic.com>

Shipping Address: 10201 Willows Road
Redmond, WA 98052

Mailing Address: P.O. Box 97057
Redmond, WA 98073-9757

ADIC Europe
21-23 Avenue Saint Fiacre,
Saint Germain-en-Laye,
78100 France

33 1 3087 5300

Fax: 33 1 3087 5301

ADIC and ADIC Europe are trademarks of Advanced Digital Information Corporation.

Copyright Notice (Europe)

© *Copyright 1995 ADIC Europe*

All rights reserved. No part of this document may be copied or reproduced in any form or by any means, without prior written permission of ADIC Europe, Z.A. du Bel-Air, 21 avenue Saint-Fiacre, 78100 - Saint-Germain en Laye, France.

ADIC Europe assumes no responsibility for any errors that may appear in this document, and retains the right to make changes to these specifications and descriptions at any time, without notice.

This publication may describe designs for which patents are pending, or have been granted. By publishing this information, ADIC Europe conveys no license under any patent or any other right.

ADIC Europe makes no representation or warranty with respect to the contents of this document and specifically disclaims any implied warranties of merchantability or fitness for any particular purpose. Further, ADIC Europe reserves the right to revise or change this publication without obligation on the part of ADIC Europe to notify any person or organization of such revision or change.

Every effort has been made to acknowledge trademarks and their owners. Trademarked names are used solely for identification or exemplary purposes, any omissions are made unintentionally.

ADIC Europe is a trademark of ADIC

EMI/RFI Compliance

United States – FCC

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

- Re-orient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

You may find the following booklet prepared by the Federal Communications Commission helpful: *How to Identify and Resolve Radio-TV Interference Problems*. This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00354-04.

Canada – Department of Communications

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus", ICES-003 of the Department of Communications.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Class B prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques", NMB-003 édictée par le ministre des Communications.

Shielded Cables

Shielded data cables are required in order to meet EMI/RFI limit specifications. The ADIC data cable meets this requirement. If you need a replacement cable, be sure to use an ADIC-approved shielded cable (to assure acceptability to EMI/RFI requirements).

Two or more VLS units cabled to each other on the same SCSI channel must have a ferrite bead clamped on the interface cable between the units. The ferrite bead is required to satisfy the EMI/RFI limit specifications. See Appendix A for instructions on installing the ferrite bead.

Declaration of Conformity

according to EN 45014

Manufacturer's Name: Advanced Digital Information Corporation

Manufacturer's Address: 11431 Willows Road NE 21-23 Av. Saint-Fiacre
Redmond, WA F-78100 Saint-Germain-en-Laye
98052 France
USA

Type of equipment: Virtual Library System

Model No.: VLS DLT 400, VLS DLT 700

Year of Manufacture: 1998

conforms to the following international specifications, as required by 89/336/EEC & 92/31/EEC:

EMI: EN 50081-1, EN-55022 Class B

EMC: EN 50082-1, IEC 801-2, IEC 801-3, IEC 801-4

Safety: EN 60950

Redmond, Washington USA

Location

31-July-1998

Date

On File
Signature

Name: Harvey Scott

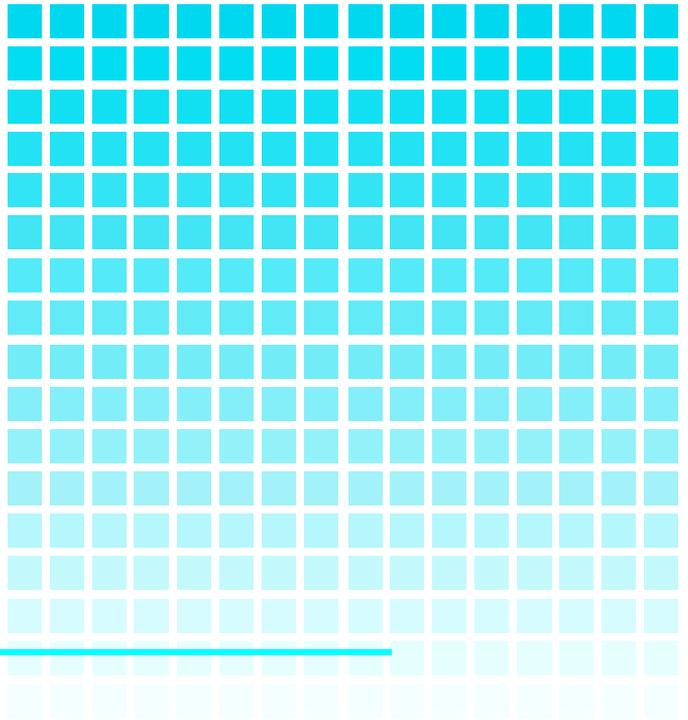
Title: Mgr, Product Engineering

Blank Page

Table of Contents

Copyright Notice.....	<i>ii</i>
Copyright Notice (Europe).....	<i>iii</i>
EMI/RFI Compliance.....	<i>iv</i>
Quickstart.....	<i>ix</i>
Chapter 1 Getting Started.....	1
Introduction.....	2
Requirements.....	2
Unpacking and Inspecting.....	3
Equipment Description.....	4
The VLS Unit.....	4
Drives.....	4
Magazine.....	5
DLT Media.....	6
Cleaning Tape.....	8
System Software.....	8
Preparing the Host Computer System.....	9
Power Off the Computer.....	9
Confirm and/or Install the SCSI Host Interface.....	9
Chapter 2 Connecting the VLS.....	11
Connecting the Interface Cables.....	12
Connecting More than One VLS.....	13
Powering on the System.....	14
Installing the Backup Software.....	15
Chapter 3 Equipment Description.....	17
Front Panel Switches and Indicators.....	18
Rear Panel Switches and Connectors.....	20
Menu Items.....	21
Configuration Menu.....	23
Diagnostics Menu.....	27
Write EEPROM Mode.....	28
Chapter 4 Operation and Maintenance.....	29
Inserting the Data Cartridges into the Magazine.....	30
Inserting the Magazine into the VLS.....	31
Loading the Magazine.....	33
Attempting to Load the Magazine with a Cartridge Already in Drive.....	34

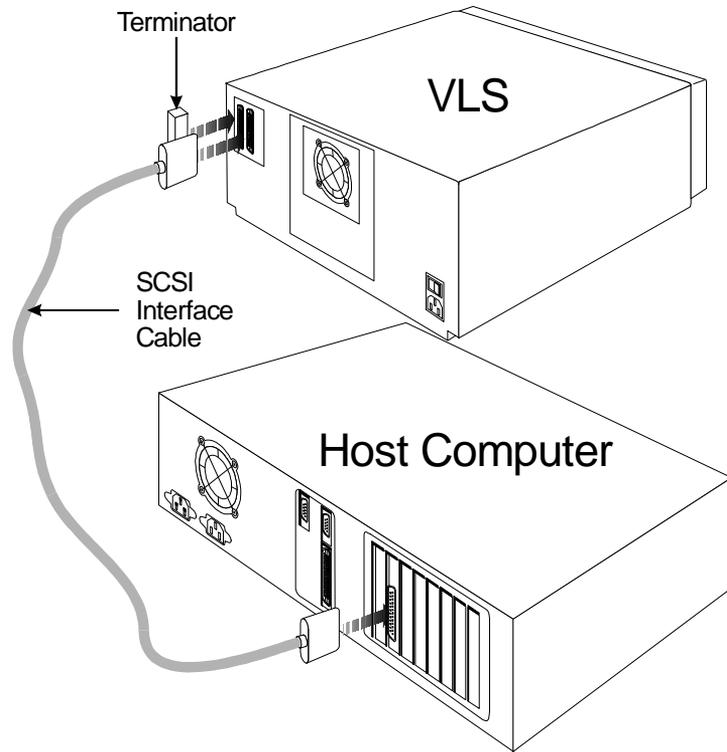
Manually Removing a Cartridge Loaded in the Drive	35
Removing a Cartridge Loaded in the Drive Using the Diagnostics Menu.....	35
Removing the Magazine from the VLS	37
Removing the Magazine while a Cartridge is in the Drive	38
Loading an Individual Cartridge	38
Manually Loading a Cartridge	39
Semi-automatically Loading a Cartridge.....	39
Unloading an Individual Cartridge	41
Semi-automatically Unloading a Cartridge	41
Removing a Cartridge from the Magazine.....	42
Storing the Magazine	43
Cleaning the Drive Head.....	43
Cleaning Tape	43
Head Cleaning Procedure.....	45
Cleaning the Enclosure	49
Chapter 5 Troubleshooting and Diagnostics	51
Installation Problems	52
Library and Drive Operational Problems.....	53
Library Error Messages	54
Drive Status and Warning Signals	55
Use Cleaning Tape Drive LED.....	57
Causes of the Use Cleaning Tape LED	58
Environmental Considerations.....	60
When You Call ADIC Customer Assistance	60
Return for Repair RMA (Return Merchandise Authorization)	62
Appendix A Installing the Ferrite Bead	65
Appendix B Diagnostics Menu	67
Appendix C Downloading New Firmware.....	75
Appendix D Glossary	77
Appendix E Specifications	81
Index	85



QUICKSTART

- ❑ provides a quick start guide for experts who are familiar with installing computer hardware and software.
-

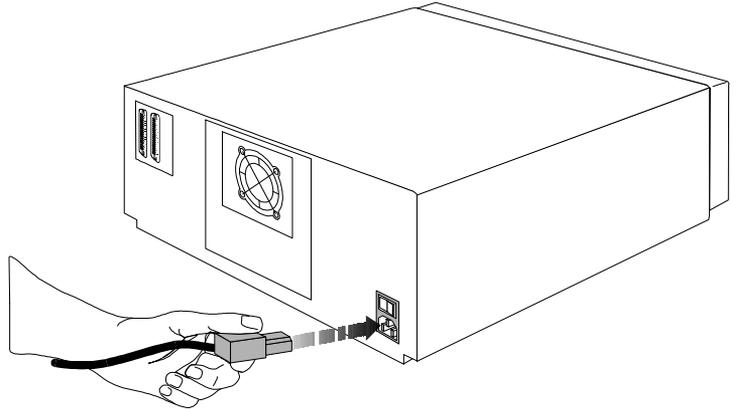
-
- ❑ Confirm that power is off and that you have a SCSI interface (either a separate board as offered by ADIC, or integrated on the mother-board) installed in the host computer. Consult your computer manual.
 - ❑ Place the ADIC VLS near the host computer to which it will be connected.



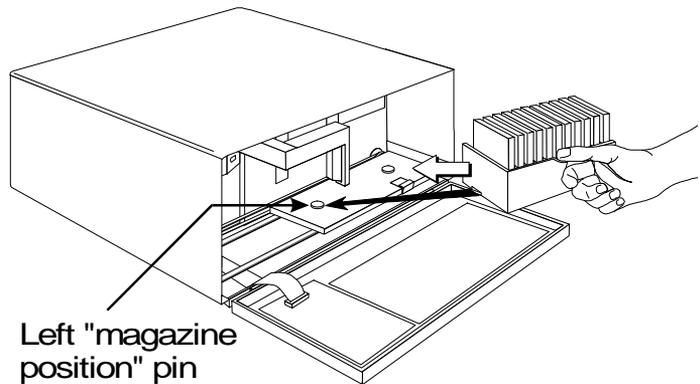
➔ The VLS has been shipped with the SCSI ID for the DLT drive set at "1" and the robotics set at "3".

- ❑ Connect the SCSI interface cable between the SCSI connector on the computer and the back of the VLS.
- ❑ Make sure there is a terminator installed on the last device of the SCSI chain.

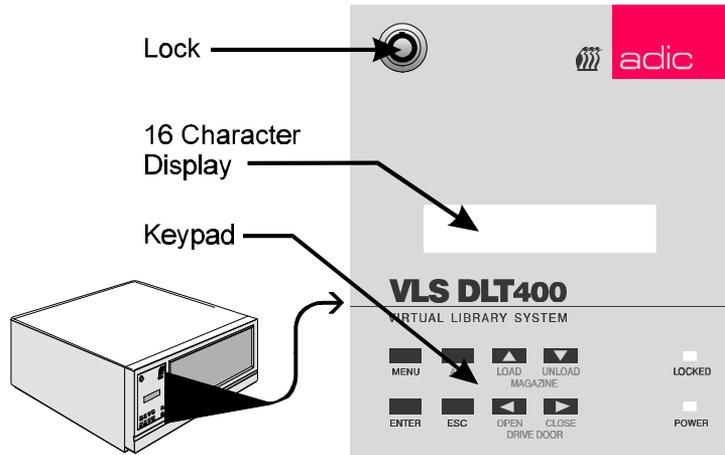
-
- ❑ Connect the AC power cord first to the VLS and then to the AC outlet. Power on the VLS. Power on the computer.



- ❑ Place the magazine on the carriage by slipping it over the left "magazine position" pin then rotating toward the right and pressing into place onto the right "magazine position" pin.

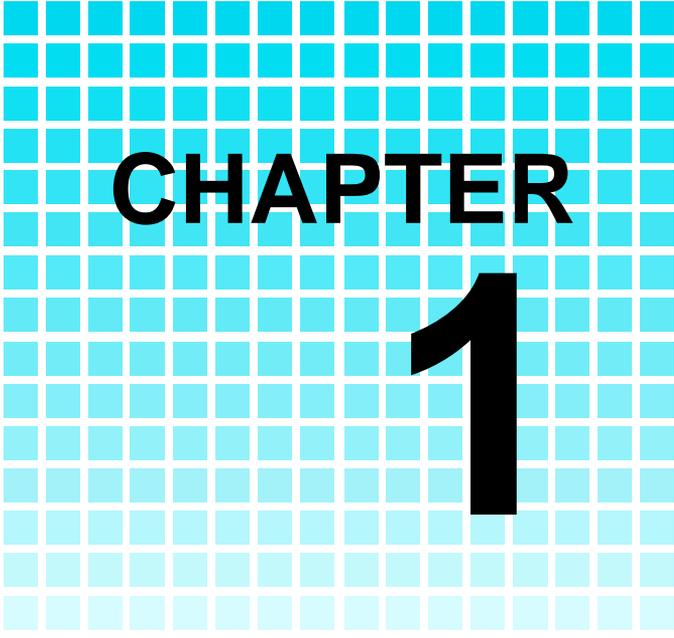


- ❑ If the application has not already done so, load the magazine by pressing first the **ALT** button and then the **LOAD** button. (If you are in sequential-access mode, the first cartridge will be inserted in the drive when the load finishes.)



- ❑ Install or confirm the backup software (to run the VLS) on the host computer.
- ❑ Run any diagnostic tests provided with the backup software to make sure the VLS is communicating correctly with the host computer.

You are now ready to run the VLS at a system level.



CHAPTER

1

GETTING STARTED

This Chapter...

- ❑ covers what you need (and what you need to know) to install the ADIC Virtual Library System. Read this section before you begin installation.

Introduction

ADIC has designed the Virtual Library System (VLS) for high-capacity, near and off-line storage applications, such as backup, hierarchical storage management (HSM) and video/design/data file libraries. For the most part, installation is simply a matter of checking all necessary SCSI connections, installing the software (backup or otherwise) and applying power. The defaults set at the factory should be sufficient for most applications.

Requirements

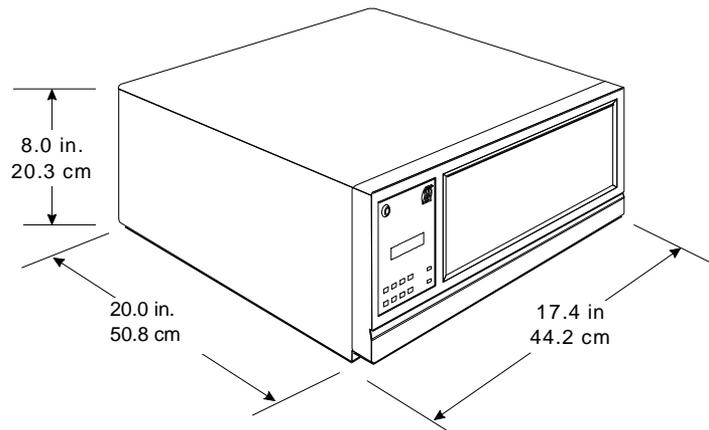


Figure 1: VLS Dimensions

- ❑ Space requirements: the VLS footprint is 17.4" x 20.0" x 8.0". You must allow adequate clearance to the rear (2 inches or more) and bottom (do not place on carpeting) to allow air flow. Also allow enough room at the front to open the door (which is 8" high and hinged at the bottom).

-
- We assume that you are familiar with your computer system. The VLS must be incorporated into the host computer system. The backup software, SCSI adapter (if required) and any additional, or different, SCSI interface cable (s) must be purchased separately.
 - Mode of operation: You must know whether the VLS will be operating in sequential- or random-access mode. This will be determined by the backup software you use.
 - Necessary tools: No special tools are required to install the VLS. If you are installing a host adapter (SCSI controller) card at this time, refer to the installation manual for your host adapter.

Unpacking and Inspecting

CAUTION

If the operating environment differs from the storage environment by 15°C (30°F) or more, let the unit acclimate to the surrounding environment for at least 12 hours.

Unpack all items from the carton. Save the packing materials in case you need to move or ship the system in the future.

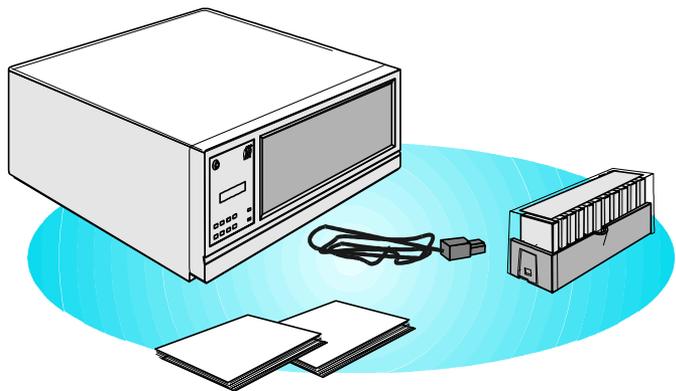


Figure 2: VLS Packaging Contents

CAUTION

You must ship the ADIC VLS in the original or equivalent packing materials or your warranty may be invalidated.

Equipment Description

The VLS Unit

The ADIC VLS is a fully automated, high performance, high capacity, mass storage system designed with a removable data cartridge magazine. The door can be locked to deactivate the unit's keypad and to assure only authorized removal of the magazine and media. In addition, to protect the unit, data and media, the VLS will not operate unless the door is closed.

Drives

The ADIC VLS can be equipped with any of the drives listed in the following table:

⇒ All drives are available configured for operation with a single-ended or differential SCSI bus.

VLS Model	Drive Model	Maximum Capacity (compressed mode)	Maximum Data Transfer Rate (compressed mode)
DLT 400	DLT4000	40GB	180MB/min.
DLT 700	DLT7000	70GB	600MB/min.

Table 1. Drive Capacity and Transfer Rate

Magazine

- ➔ ADIC strongly recommends that you use ADIC approved DLT media only.

The magazine for the VLS holds seven DLT cartridges. It includes a clear dust cover to protect the cartridges and for ease of storage. Figure 3 shows a DLT cartridge and a filled magazine with the cover in place.

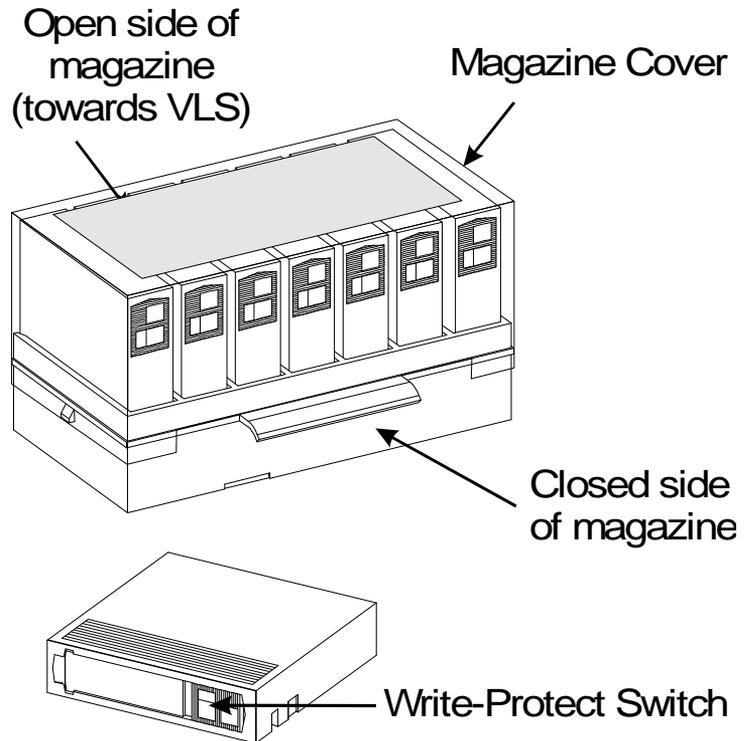


Figure 3. VLS Magazine and DLT Cartridges

DLT Media

The data cartridges used in the DLT drives are housed in 4-inch plastic cases and employ ½-inch metal particle tape. Table 2 describes and lists the media cartridges that can be used with the three drive models.

Drive Model	Cartridge Model	Color	Tape Length	Capacity
DLT4000	DLTTape III	gray	1100'	20 GB (compressed)
	DLTTape IIIXT	white	1800'	30 GB (compressed)
	DLTTape IV	black	1800'	40 GB (compressed)
DLT7000	DLTTape III	gray	1100'	20 GB (compressed)
	DLTTape IIIXT	white	1800'	30 GB (compressed)
	DLTTape IV	black	1800'	70 GB (compressed)

Table 2. Media Cartridges

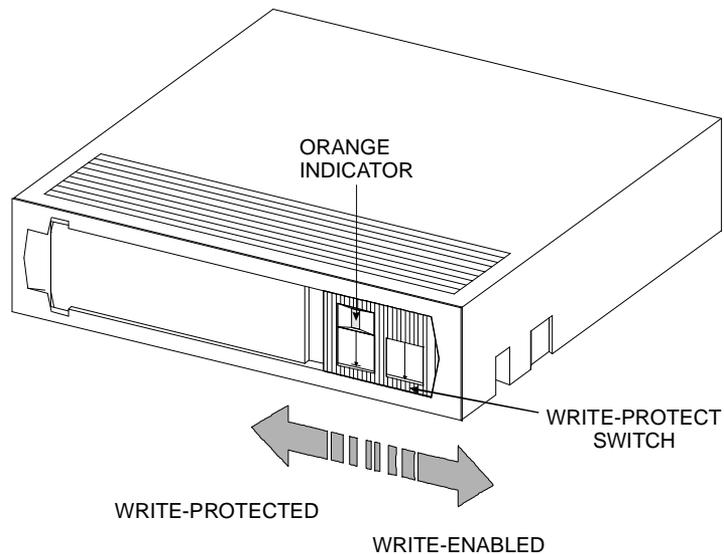


Figure 4: DLT Data Cartridge

The write-protect switch is used to prevent recording over existing data. To prevent recording or deleting, place the write-protect switch to the open position. The drive senses the position of the switch and will not allow writing in this

position. When installing cartridges in the library, place the switch in the closed position (unless you do not wish to record on a specific cartridge).

If the switch is moved all the way to the left, the cartridge is write-protected and the drive cannot write to, or erase data from, the cartridge. The small orange rectangle will be visible whenever the cartridge is write-protected. Additionally, an arrow (beneath the orange rectangle and above the two lines on the switch), lets you know that data cannot be written to the cartridge. If the switch is moved all the way to the right, the cartridge is write-enabled and the drive can write data to, or erase data from, the cartridge. The orange rectangle will not be visible whenever the cartridge is write-enabled. On the right side of the write-protect switch an arrow over one line indicates that if you slide the switch to the right, data can be written to the cartridge.

Note

- Store data cartridges in a dry, cool environment.
 - Never reset or power down your computer or VLS DLT while a function is in process or a tape is moving. In addition to getting tape with missing or corrupted data, you may also get tape run-on within the drive (a condition that can produce internal contamination requiring factory cleaning).
 - If a power outage occurs during a back-up sequence, restart your backup from the beginning.
-

Cleaning Tape

- If the cleaning cycle is noticeably shorter and the **Use Cleaning Tape** LED remains illuminated after a cleaning attempt, the cleaning tape has exhausted all of its cleaning cycles. Replace it with the same type and repeat the cleaning.

The tape heads should be cleaned when the **Use Cleaning Tape** LED on the drive front panel is illuminated. A cleaning tape is shipped with your ADIC VLS-DLT. Discard it when there are no cleaning cycles remaining, and replace it with the same or equivalent type cleaning tape.

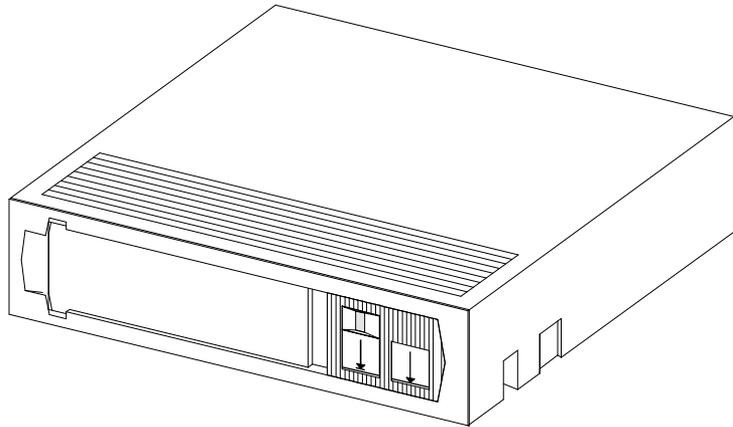


Figure 5.: DLT Cleaning Tape

Cleaning the head should always be performed as the first step if the **Use Cleaning Tape** LED is illuminated on the drive front panel.

System Software

A variety of backup and data storage software is available for use with the VLS. Please check with ADIC sales or Customer Assistance if you have a question on the compatibility of a particular software package.

Preparing the Host Computer System

Power Off the Computer

- Turn off the power switch.
- Unplug the cord from the AC outlet.

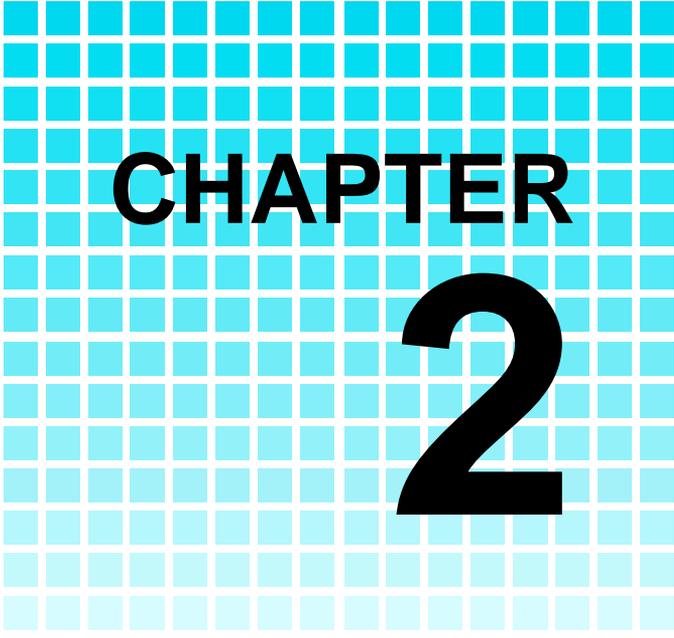
Confirm and/or Install the SCSI Host Interface

⇒ The host computer system normally is the server.

The VLS must be connected to either an integrated SCSI host or a SCSI interface (host adapter card installed in the computer – either directly to the I/O connector on the card or as part of an existing SCSI chain. The SCSI interface must be installed before you connect the VLS. Refer to the instructions supplied with the card.

Now you are ready to connect the VLS to your host computer. Follow the instructions provided in the next chapter.

Notes



CHAPTER 2

CONNECTING THE VLS

This Chapter...

- ❑ provides instructions for physically connecting your VLS to your host system.
- ❑ steps you through the final phase of the installation process.

Connecting the Interface Cables

⇒ NOTE: The interface cable must be shielded – ADIC can supply you with the correct type.

Make sure the SCSI interface cable you are using has the correct connectors on each end. If it does not, you will need to obtain a different cable. Consult your dealer or ADIC Customer Assistance if you need help. Connect the interface cable as shown in Figure 6 and explained in the following steps:

- Check that the VLS and host computer power switches are off.
- Attach one end of the cable to either connector on the rear of the VLS. Press firmly and secure the bail locks, or jack screws.
- Plug the other end of the SCSI interface cable into the external connector on the SCSI port card. Secure firmly.

⇒ The bail locks, or jack screws at both ends of the SCSI cable must be securely fastened in order for the VLS to communicate properly with the computer.

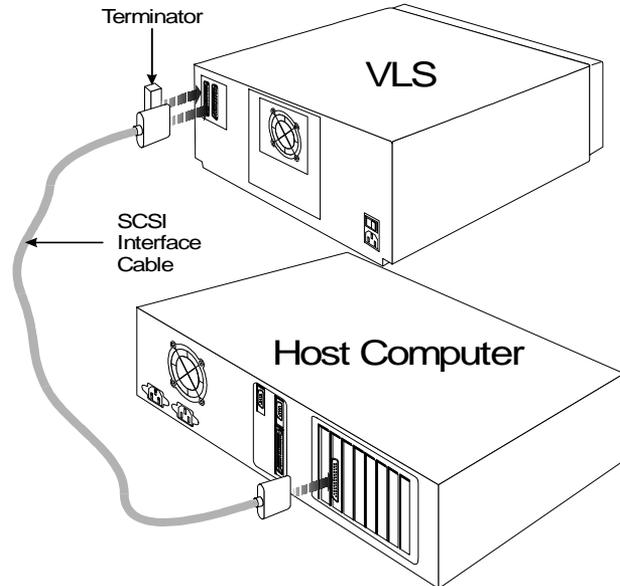


Figure 6. Connecting the Interface Cable

- ❑ If this is the only unit you are installing, insert an external terminator into the second SCSI connector at the rear of the VLS. If you plan to connect another unit on the same SCSI channel, see the next section.

Connecting More than One VLS

- ➔ When counting SCSI devices, keep in mind that a VLS can contain two devices (the drive and the robotics). Don't forget to include in your count other devices on the SCSI channel, (i.e. a tape unit, an additional hard drive, etc.).
- ➔ * When connecting two or more VLS units to a single SCSI channel, you must install a ferrite bead on the cable. Refer to Appendix A for details.

If you are connecting additional VLS units on the same SCSI channel, simply attach each subsequent unit to the previous unit with an interface cable. Make sure all cables are properly secured. It makes no difference which connector you use for each connecting cable (see Figure 7).

You can attach up to seven devices on each SCSI channel (8-bit), or up to fifteen devices on each wide SCSI channel, but each VLS may represent more than one SCSI device.

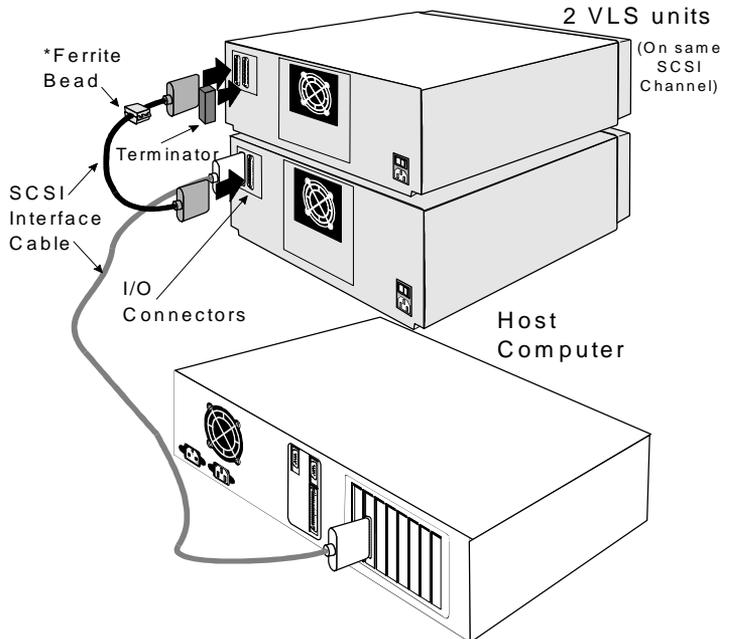


Figure 7. Cable Diagram for two VLS Units

Each VLS unit contains more than one SCSI device and may require more than one SCSI address (depending on the mode

of operation). The following chart shows the number of SCSI addresses required in each operating mode. The second chart illustrates how many VLS units you can attach to one SCSI channel (if there are no other devices on the channel).

Number of SCSI Addresses Required	
Sequential Mode	Random Mode
1	2

Maximum VLS units on one SCSI Channel (8-bit)	
Sequential Mode	Random Mode
7	3

Maximum VLS units on one wide SCSI Channel	
Sequential Mode	Random Mode
15	5

Powering on the System

- Plug the power cord into the back of the VLS.
- Plug the power cord from the VLS into a grounded electrical outlet.
- Plug the power cord from your host computer into a grounded electrical outlet.
- Turn on the VLS power. Turn on the host computer power.

A display similar to the following will appear:



```
MEDIUM SRC:  ?
```

You are now ready to install the backup software – if it has not already been installed.

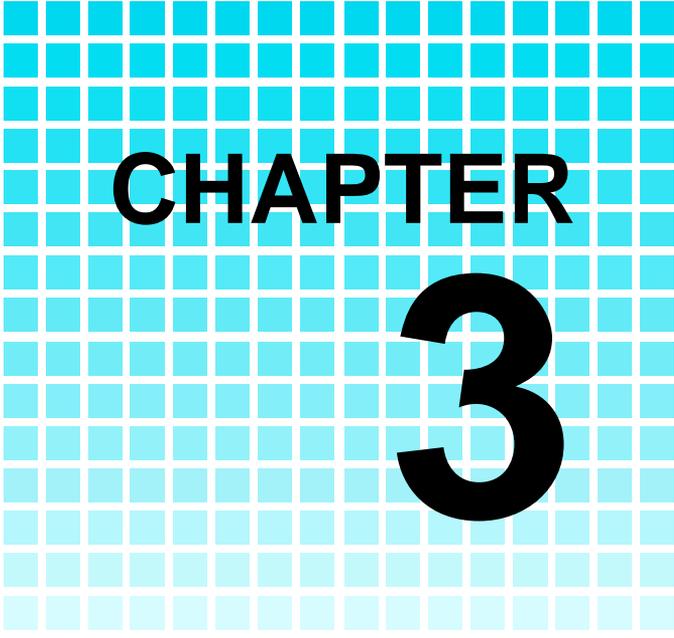
Installing the Backup Software

⇒ This is the software that runs the VLS, not the data being transferred to the VLS cartridges. Two examples of backup software are Cheyenne's ARCserve and Legato's NetWorker.

At this point you need to refer to your software installation guide for instructions on installing the backup/controlling software for the VLS onto the host computer.

After you have completed installation of the VLS unit and of the software, to make sure your unit is operating correctly, you should run any diagnostic test(s) supplied with the backup software.

Notes



CHAPTER 3

EQUIPMENT DESCRIPTION

This Chapter ...

- describes the switches, indicators and connectors on the front and rear of the VLS.
- describes the various functions available via the front panel buttons.
- describes the power-up procedure and messages on the front panel LCD display.

➔ Note: The pick arm must be in its out position. You can move it manually when power is off (or with [ALT] and [UNLOAD] when power is on).

For the most part, once your Virtual Library System has been connected to your host computer system and the software has been installed, the VLS is ready for use. Just turn on the power switch, place a magazine on the carriage and press **ALT** and then **LOAD**.

If you need to change certain functions, you can use the front panel keys (as described in the next section).

Front Panel Switches and Indicators

Switches and indicators on the front of the VLS are shown in Figure 8 and described in Tables 2 and 3.

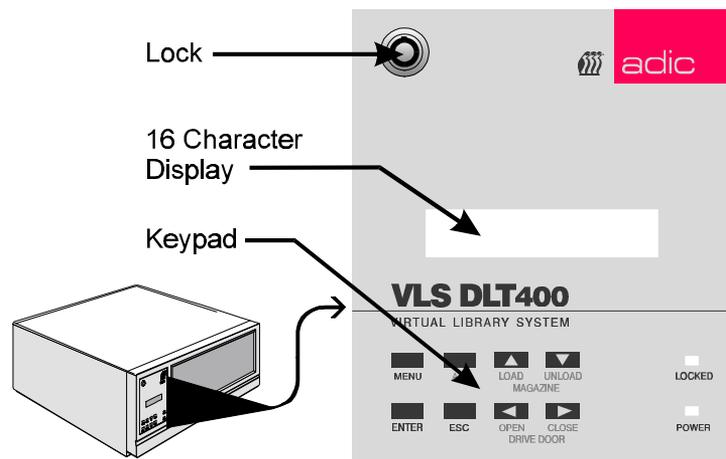


Figure 8. Front Panel Display and Keypad

INDICATOR	Description
Display	The two-line 16-character LCD shows current drive status of the VLS, allows access to change features or displays error messages.
Power LED (green)	Lights up when the power is on.
Locked LED (green)	Lights up when door is locked. No one can access the magazine, drive or keypad when the Locked LED is on.

Table 2. Front Panel Indicators

KEY	Description
MENU	Press this button to enter or exit Off-Line Mode menus and mode
ALT	Selects alternate function for another button. For example, press the ALT button and the UP button to activate the load function.
LOAD MAGAZINE	Selects previous item or value in the menu. Press the ALT button and then this button to initiate a "load magazine" – the VLS will check all cartridges in the magazine (making note of empty spaces) and that all cartridges can be inserted in the drive.
UNLOAD MAGAZINE	Selects next item or value in the menu. Press the ALT button and then this button to initiate the unload program – the VLS will return the magazine to the unload position.
ENTER	Selects currently displayed item.
ESC	Exits current menu and returns to previous menu.
Open Door	Scrolls message display left or selects previous field. Press the ALT button and then this button to open the drive door.
Close Door	Scrolls message display right or selects next field. Press the ALT button and then this button to close the drive door.

Table 3. Front Panel Keypad

- ⇒ The VLS uses the LOAD function to detect cartridges (or the absence of a cartridge).
- ⇒ Never attempt to remove a magazine unless it is in the unload position – you may damage the pick arm.
- ⇒ This function is available for all VLS models with firmware version 2.32 or later.
- ⇒ This function is available for all VLS models with firmware version 2.32 or later.

Rear Panel Switches and Connectors

Switches and connectors on the rear of the VLS are shown in Figure 9 and described in Table 4.

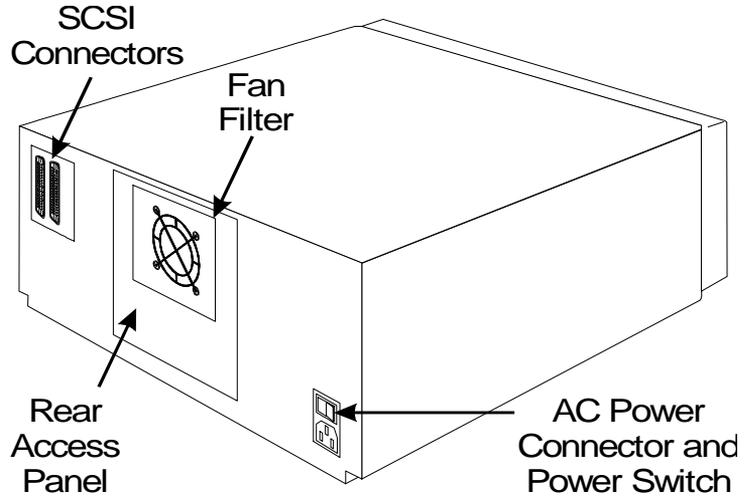


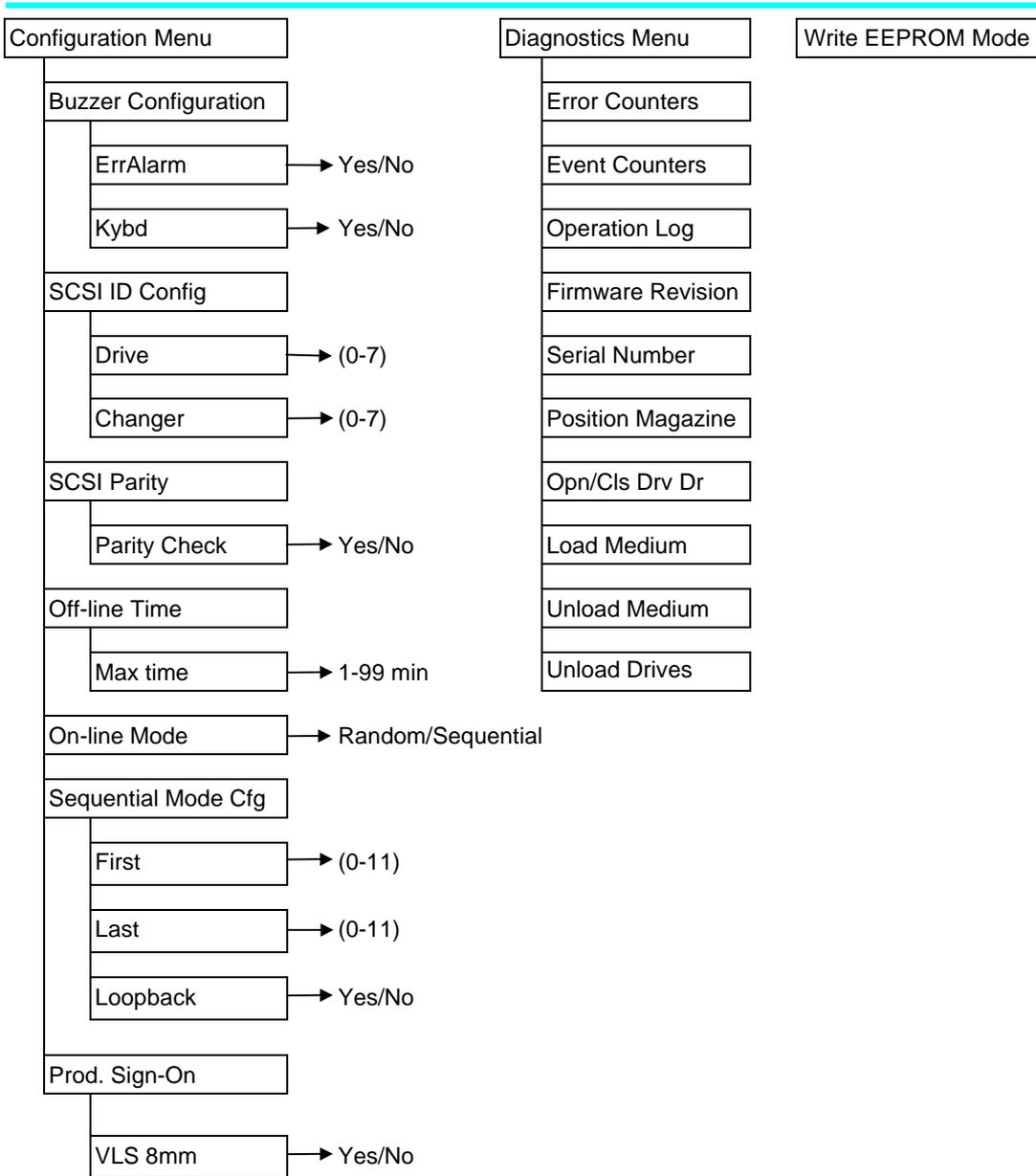
Figure 9. VLS Rear Panel

Power Switch	Turns on the AC power to the VLS.
AC Power Connector	Plug the VLS AC power cord into this connector.
SCSI I/O Connectors	For the interface cable that connects the VLS to the computer, to other VLS units and/or to other devices on the SCSI channel.

Table 4. Rear Panel Switches and Connectors

Menu Items

Use the following diagram as a quick reference once you have become familiar with the LCD menus described on the next few pages. The names at the top of the diagram are selections available from the Main Menu. When you choose one of the Main Menu items, a set of options appears; these options are listed below the Main Menu selections. If an option has sub-options, these sub-options are listed to the right of the option.



To access the Off-Line Menu, press the **MENU** key. The display will read as follows:

```
OFF-LINE MENU
Config Menu
```

Use the **↑** or **↓** buttons to scroll through the menu. Press **ENTER** to select a displayed item. Use the **←** or **→** buttons to scroll through fields on the same line.

To exit the Off-Line Menu press the **MENU** button.

Configuration Menu

The Configuration Menu allows you to select the following items:

- Buzzer Config
- SCSI Parity
- On-Line Mode
- Prod. Sign-On
- SCSI ID Config
- Off-Line Time
- Seq Mode Config

Buzzer Configuration

Enables/disables alarm when there is an error message.
Enables/disables keyboard beep sound when you press a button.

```
BUZZER CONFIG
ErrAlarm#N Kbd#Y
```

To enable the alarm mode use the **←** button to select the ErrAlarm field. Use **↑** or **↓** to select "Y" to enable or "N" to disable alarm. When ErrAlarm is enabled, a continuous alarm will sound in the event of an error message. The alarm will sound until the condition that caused the error has been

removed or any key is pressed. (To clear an error message, press **ALT** and **ENTER**.)

To disable the keyboard beep, use the  button to select the Kybd field. Use  to select "N" to disable the beep.

⇒ Buzzer Configuration
default: ErrAlarm:N,
Kybd:Y

Press **ENTER** to make the changes effective or press **ESC** to return to previous menu item.

SCSI ID Config

Lets you select the SCSI ID for the drive and the robotics on the VLS.



```
SCSI SETUP
Drv# 1 Changer# 3
```

Use  or  to select the desired field. Drv is the drive, and Changer is the robotics unit on the VLS. Use  and  to scroll to the desired ID for that particular element. Press **ENTER**.

Note

SCSI ID changes entered do not take effect until you cycle power on the VLS unit.

⇒ SCSI ID Configuration
default: Drive :1
Changer:3

See the section titled *Connecting More than One VLS* in *Chapter 2: Connecting the VLS* noting the number of SCSI IDs required.

SCSI Parity

Enables or disables the reporting of SCSI parity check.

```
SCSI PARITY
Parity Check:N
```

- ⇒ SCSI Parity default: Parity Check:N

Use **↑** or **↓** to select "Y" to enable, or "N" to disable the reporting of parity check. Press **ENTER** to activate the change.

Off-Line Time

Lets you set the number of minutes the VLS will remain in the Off-Line mode. If someone leaves the VLS in the Off-Line Mode, after the pre-set number of minutes the VLS will automatically return On-Line. This assures that your automatic backup will be done even if the VLS has accidentally been left Off-Line.

```
OFF-LINE TIME
Max time: 5 min
```

- ⇒ Off-line time default setting is "5" minutes.

Use **↑** or **↓** to select the number of minutes you wish the VLS to remain Off-Line. Press **ENTER** to execute the change.

On-line Mode

- ⇒ The software you use with the VLS determines whether you can operate the VLS in sequential and/or random mode.

Lets you select random or sequential operating mode.

When in random-access mode, the VLS allows software selection of *any* cartridge in the magazine in *any* order. You can logically divide cartridge usage to satisfy particular data storage needs. For example, you can assign one or more cartridges to specific data functions (such as certain directories or network servers), or you can assign specific cartridges to individual users.

ADIC's VLS can also be used as a stacker in sequential mode if your software does not support the random mode function.

A display similar to the following will appear:

```
ON-LINE MODE
Random
```

⇒ Operating Mode default setting is "Random".

Use \blacktriangleleft or \blacktriangleright to select "random" or "sequential."

Sequential Mode Configuration

If you are using Sequential Mode, this option lets you select which cartridges the drive will write to, and whether or not you wish the drive to start again at the beginning after the last cartridge has been written to.

```
SEQ MODE CFG
F:01 L:07 Lpbk:Y
```

Use \blacktriangleleft or \blacktriangleright to select the item you wish to change. "F" is the number of the First cartridge you wish the VLS to insert into the drive. "L" is the number of the Last cartridge you wish the VLS to insert into the drive.

⇒ Default setting is F: 01 L: 11 Lpbk: Y

The Loopback (LPBK) mode determines what happens when the last cartridge has been filled. If you select "Y" for "Lpbk" the designated first cartridge will be loaded into the tape drive after the last cartridge has been filled and ejected. If you select "N" an error message will be issued and the backup will stop.

Product Sign-On

Normally, the VLS DLT will sign-on as a VLS DLT product and most application software will support it.. However, some older software will not recognize it as a VLS DLT. If

your software does not recognize it, change the Product Sign-On to Use “VLS 8mm”: Y.



```
Prod. Sign-On
Use "VLS 8mm": N
```

⇒ Product Sign-On default is "VLS 8mm : N".

Use  or  to select "Y" for VLS 8mm, or "N" to select VLS DLT.

Note

Product Sign-On changes entered do not take effect until you cycle power on the VLS unit.

Diagnostics Menu



```
OFF-LINE MENU
Diag Menu
```

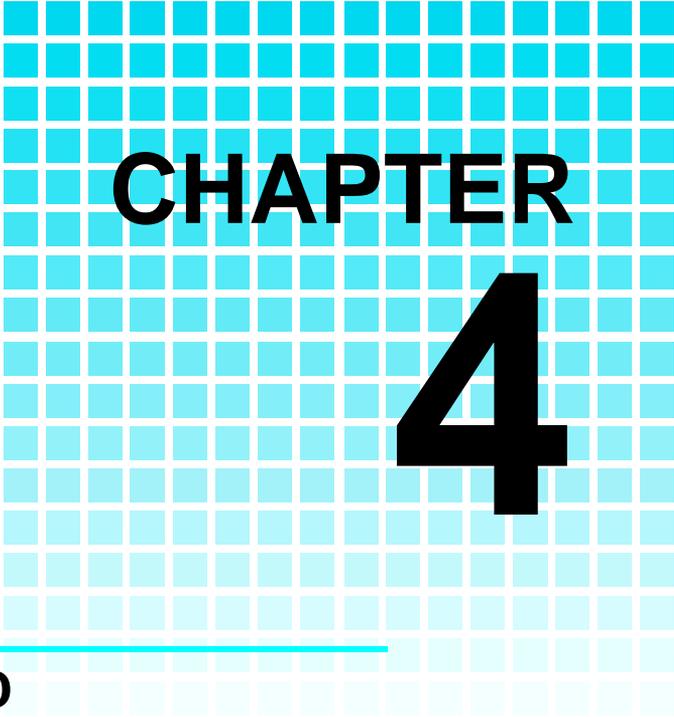
The following items are available under the Diagnostics Menu:

- Error Counters
- Operation Log
- F/W Revision
- Opn/Cl's Drv Dr
- Unload Medium
- Event Counters
- Serial Number
- Position Magazine
- Load Medium
- Unload Drive

For information on these options, refer to Appendix C later in this manual.

Write EEPROM Mode

The Write EEPROM Mode is used whenever you upgrade the VLS firmware. When ADIC releases new firmware for the VLS, complete instructions on using Write EEPROM Mode and performing the upgrade will be included with the new firmware.



CHAPTER 4

OPERATION AND MAINTENANCE

This Chapter ...

- describes normal operation features of the VLS
- provides details on the media and magazine
- explains normal maintenance procedures

- ⇒ Since the drive status LEDs are located on the top front of the drive, to see them you must be eye-level with the gripper arm of the VLS. Look beyond the arm to the drive.

The VLS DLT is a highly sophisticated unit composed of one DLT drive along with the robotics that control the drive, magazine and media. No modifications have been made to the drive. The built-in drive status LEDs function as the manufacturer has specified.

Very little routine maintenance is required – apart from cleaning the head whenever the **Use Cleaning Tape** LED is illuminated on the drive front panel (see *Cleaning the Drive Head* later in this chapter).

Inserting the Data Cartridges into the Magazine

- ⇒ ADIC strongly recommends that you use ADIC-approved media only.

The magazine for the VLS DLT holds seven DLT cartridges. It includes a clear dust cover to protect the cartridges and for easy storage. See Figure 10. Insert each cartridge into a slot of the magazine making sure that the write-protect switch is toward the *top*, facing the closed side of the magazine (as illustrated).

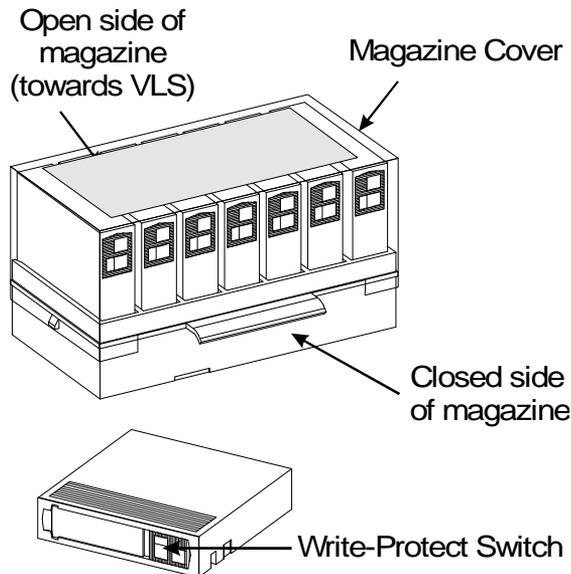


Figure 10. Magazine for VLS

-
- ⇒ Be very careful when handling the magazine. The cartridges can fall out once the cover has been removed.

The open side of the magazine faces the VLS. Make sure each cartridge touches the bottom floor of the magazine.

Do not use wrap-around labels on the individual cartridges. Most labels use a removable adhesive and have a tendency to curl or tear after multiple uses. This can jam the movement of the VLS. Place labels only in the space provided on the cartridge.

Note the following:

- Store magazines (and data cartridges) in a dry, cool environment. Keep the dust cover on each magazine.
- Never reset or power down your computer or VLS unit while a function is in process or a tape is moving. In addition to a tape with missing or corrupted data, you may also get tape run-on within the drive (a condition that can produce internal contamination requiring extra cleaning).
- If a power outage occurs during a back-up sequence, restart your backup from the beginning.

Inserting the Magazine into the VLS

Warning

Due to static the label or other items included in this package will occasionally cling to the DLT cartridge.

Before loading into a drive, ensure that all other items from this package are separated from the cartridge.

⇒ Do not attempt to place a covered magazine onto the VLS carriage.

- ❑ Remove the magazine dust cover. You can remove the cover by pressing the middle of both ends (where it is labeled PUSH) and lifting up (see Figure 9).
- ❑ Open the VLS door. (The pick arm must be in the "out" position before you try inserting a magazine.)
- ❑ Holding the magazine by the handle, and at a 45° angle to the carriage, slip the magazine onto the left side of the carriage, over the left magazine position pin (see Figure 11).

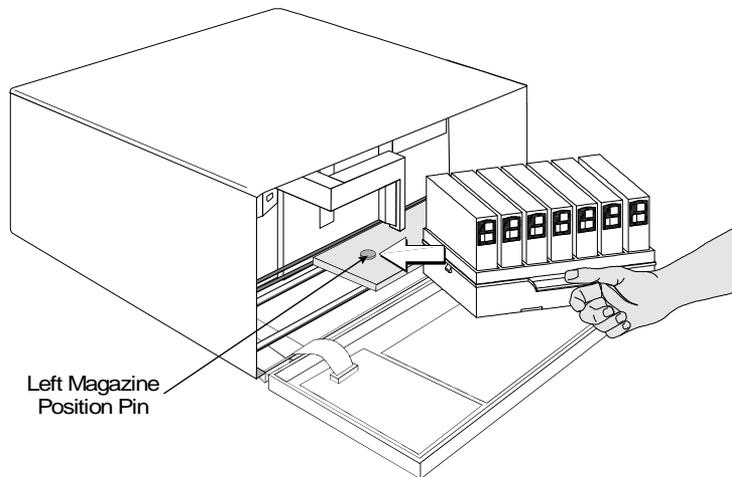


Figure 11. Placing the Magazine onto the VLS

Push the right side of the magazine over the right magazine position pin until you hear a click. See Figure 12.

-
- ⇒ You may need to apply downward pressure as you slip the magazine over the right magazine pin and then press the magazine into place with your index finger.

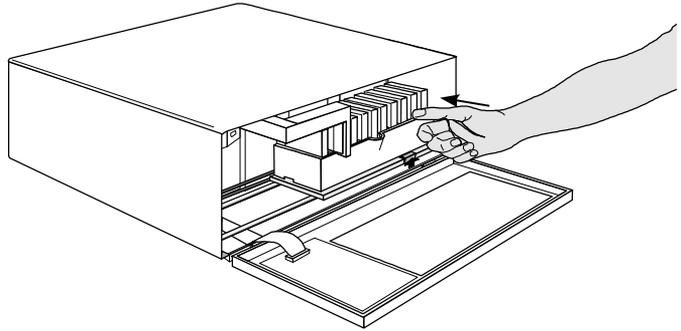


Figure 12. Pushing the Magazine in Place

The magazine will snap into place. If you don't hear a click, make sure that the slot on the right side of the magazine has slipped around the right magazine position pin and is not just sitting on top of it (the magazine will not load correctly in this position).

Loading the Magazine

Once you have placed the magazine on the carriage, the VLS must initiate a loading process. During this procedure the VLS checks and maps the position of each cartridge and makes sure that all cartridges are inserted into the magazine correctly. If you are using the sequential mode the VLS inserts the first cartridge into the drive.

- ⇒ The door must be closed before the LOAD or UNLOAD functions will activate.

- Make sure the magazine is placed correctly on the carriage.
- Close the door and press **ALT** and then **LOAD**. The VLS will initiate the load magazine procedure.

Note

In the sequential mode, if you press **UNLOAD** before the VLS has finished loading the magazine, the robotics will finish mapping and checking the cartridges and then move the magazine to the unload position (the far right) without inserting a cartridge into the drive.

In random mode, if the VLS has not finished loading the magazine, pressing **UNLOAD** will have no effect.

Attempting to Load the Magazine with a Cartridge Already in Drive

If your VLS is equipped with firmware version 2.31 or earlier, refer to Appendix C.

Random Mode: If the cartridge was loaded manually, it must be unloaded manually – before you attempt to have the VLS load the magazine. Refer to the next section for manual removal of a cartridge. If the VLS robotics was used to load the cartridge via applications software, attempting to "load magazine" from the keyboard will fail – the unit will remain On-Line.

Sequential Mode: If the cartridge was loaded manually, it must be unloaded manually – before you attempt to have the VLS load the magazine. Refer to the next section for manual removal of a cartridge. If the VLS robotics was used to load the cartridge, the VLS will remember and not allow a "load magazine" from the keyboard. Press **ALT** and then **ENTER** to bring the VLS back On-Line.

Manually Removing a Cartridge Loaded in the Drive

Follow this procedure to remove the cartridge from the drive if it was loaded manually, *not by* the application software or by using the Diagnostics Menu.

- Press **ALT** and then **UNLOAD**. This will place the magazine in the unload position.

-
- Open the VLS door and remove the magazine by pressing the Magazine Release.
 - Press the **UNLOAD** button on the drive front panel (see figure 13 for location).
 - Close the VLS door.
 - On the VLS front panel, first press **ALT**, then the **OPEN DOOR** keys.
 - Open the VLS door and remove the ejected cartridge from the drive.
 - If the cartridge was loaded into drive from the magazine place it back in the correct slot.
 - Replace the magazine onto the carriage.
 - Close the door. You can now initiate the load procedure.

Removing a Cartridge Loaded in the Drive Using the Diagnostics Menu

Use this procedure to load the magazine if there is a cartridge in the drive, and the cartridge was loaded *by either* the application software or by using the Diagnostics Menu.

- Open the VLS door.
- Press the **UNLOAD** button on the drive front panel (see figure 13 for location). The drive will prepare the cartridge for ejection.
- Close the VLS door.
- To access the Diagnostics Menu, press the **MENU** button. The display will read as follows:

```
OFF-LINE MENU
Config Menu
```

- Press **F7** to access the Diagnostics Menu. A display similar to the following will appear:

```
OFF-LINE MENU
Diag Menu
```

- Press **ENTER** to select the Diagnostics Menu.
- Press **F7** to move to the Opn/Cls Drv Dr option. A display similar to the following will appear:

```
DIAG MENU
Opn/Cls Drv Dr
```

- Press **ENTER** to select the Opn/Cls Drv Dr option. The drive will eject the cartridge and the pick arm will place it back in the magazine.
- You can now initiate the load procedure.

Removing the Magazine from the VLS

If your VLS is equipped with firmware version 2.31 or earlier, refer to Appendix C.

⇒ You cannot initiate an (UNLOAD), or remove the magazine, if the door is locked. When the locked LED is on, the VLS ignores the (LOAD) and (UNLOAD) buttons.

Before physically removing the magazine from the carriage, you must first initiate the UNLOAD procedure.

- ❑ Make sure there is no cartridge in the drive. If there is, go to the next procedure, *Removing the Magazine with a Cartridge in Drive*.
- ❑ Press **ALT** and then **UNLOAD** and wait until the unload procedure is finished. (If the carriage is not in the unload position, it will move to the right. In addition, the grippers on the pick arm will close.)
- ❑ Press the Magazine Release on the carriage. The magazine will release from the holding pins.

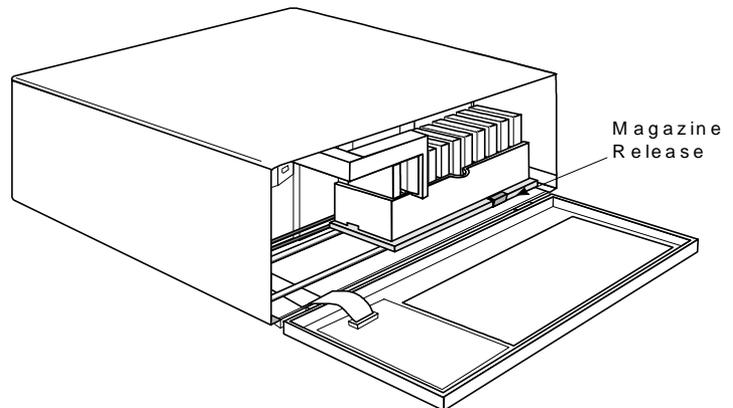


Figure 14. The Magazine Release

⇒ Make sure you have labeled each cartridge as to magazine and slot number. The magazine slots do not restrain the cartridges, and if you tip or drop the magazine, the cartridges will fall out.

- ❑ Grab the thumb handle on the magazine and pull the right side of the magazine toward you. The magazine will come out at a 30°- 40° angle.
- ❑ Place the transparent cover over the magazine and store the unit in a cool, dry place.

Removing the Magazine while a Cartridge is in the Drive

If you wish to remove the magazine but there is a cartridge in the drive, do the following:

- Open the VLS door.
- Press the **UNLOAD** button on the drive front panel (see figure 13).
- Close the door of the VLS.
- Press **ALT** and then **UNLOAD**. The arm will return the cartridge to the magazine slot and the VLS will move the magazine to the unload position.
- Remove the magazine as noted earlier.

Loading an Individual Cartridge

If your VLS is equipped with firmware version 2.31 or earlier, refer to Appendix C.

If for some reason you need to use a single cartridge, you can load it manually or semi-automatically, using the VLS robotics controlled by the Diagnostics Menu.

Manually Loading a Cartridge

- Unload the magazine by pressing **ALT** and then **UNLOAD**. The magazine will move completely to the right.
- Open the door and remove the magazine from the carriage. (See instructions in previous section *Removing the Magazine from the VLS*).

-
- Close the VLS door.
 - On the VLS front panel, first press **ALT**, then the **OPEN DOOR** keys.
 - Open the VLS door.
 - Insert the cartridge into the drive opening with the label facing you and the write-protect switch up.
 - Close the VLS door.
 - On the VLS front panel, first press **ALT**, then the **CLOSE DOOR** keys.
 - If the drive does not eject the cartridge when the program is finished, follow the procedure described in *Manually Unloading a Cartridge Loaded in the Drive* earlier in this chapter.

Semi-automatically Loading a Cartridge

- Take the VLS-DLT to the Off-Line Mode by pressing the **MENU** key on the Operator Panel.
- Unload the magazine by pressing **ALT** and then **UNLOAD**. The magazine will move completely to the right.
- Open the door and remove the magazine from the carriage. (See instructions in previous section *Removing the Magazine from the VLS*).
- Place the cartridge that you want to use into an empty slot of the magazine.
- Replace the magazine onto the carriage.
- Close the VLS door.

-
- Load the magazine by pressing **ALT** and then **LOAD**. The VLS will map the magazine.
 - Use the **↑** key to scroll the display to the **Diagnostic Menu** option.

The display will now show:

```
DIAGNOSTIC MENU
```

- Press the **ENTER** key to select the **Diagnostic Menu**.

Use the **↑** key to scroll the display to the **LOAD MEDIUM** option.

The display will now show:

```
Load Medium  
Slot:es
```

Use the **↑** key to move to the **Slot** field. Use the **←** or **→** keys to select the slot you want to load from. Press **ENTER**. The VLS will load the cartridge into the drive.

If the drive does not automatically eject the cartridge when the program is finished, follow the procedure described in *Manually Removing a Cartridge Loaded in the Drive* earlier in this chapter.

- Return the VLS DLT to On-Line Mode by pressing **MENU**.

Your VLS DLT library is once again ready for use.

Unloading an Individual Cartridge

Semi-automatically Unloading a Cartridge

If you have used the VLS robotics and the Diagnostics Menu to load a single cartridge, you should unload it the same way.

Note

Observe the drive status on the display. The VLS should be displaying the slot number of the magazine that you previously loaded the cartridge from. If it is not, you should not use this procedure to unload the cartridge. Instead, follow the instructions in *Manually Removing a Cartridge Loaded in the Drive* earlier in this chapter.

- Take the VLS-DLT to the Off-Line Mode by pressing the **MENU** key on the Operator Panel.
- Use the  key to scroll the display to the **Diagnostic Menu** option.

The display will now show:



```
DIAGNOSTIC MENU
```

- Press the **ENTER** key to select the **Diagnostic Menu**.

Note

The VLS knows which slot to return the cartridge to, it is not necessary to position the magazine, the VLS will do this automatically.

-
- Open the VLS door.
 - Press the **UNLOAD** button on the drive front panel (see figure 13).
 - Close the VLS door.

Use the  key to scroll the display to the **UNLOAD MEDIUM** option.

The display will now show:



Unload Medium

Press **ENTER**. The VLS will unload the cartridge and return it to the magazine.

- Return the VLS DLT to the On-Line Mode by pressing **MENU**.

Your VLS DLT library is once again ready for use.

Removing a Cartridge from the Magazine

The data cartridges easily slip into and out of the slots of the magazine. To remove a cartridge, simply grasp it with two fingers and pull up. Make sure each cartridge is labeled so you know the contents (and where it belongs in the magazine sequence).

Remember – Do not use wrap-around labels on the individual cartridges. Most labels use a removable adhesive and have a tendency to curl or tear after multiple uses. This can jam the movement of the VLS. Place labels only in the space provided on the cartridge.

Storing the Magazine

Store magazines in a dry, cool environment. Always keep the dust cover on the magazine.

The removable magazine allows for long-term archiving or off-site safety storage of groups of cartridges.

You can duplex multiple VLS units so your system can mirror data backups on each separate unit. With duplexing you have real time data assurance and the ability to remove one magazine for off-site storage while the other remains for on-line data access.

Cleaning the Drive Head

If your VLS is equipped with firmware version 2.31 or earlier, refer to Appendix C.

Cleaning Tape

The tape heads should be cleaned when the **Use Cleaning Tape** LED is illuminated on the drive front panel.

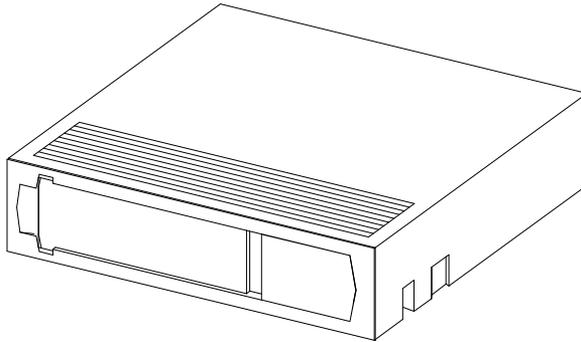


Figure 15. DLT Cleaning Tape

Cleaning the head should always be performed as the first step if the **Use Cleaning Tape** LED is illuminated.

The following table tells you when to use the cleaning tape:

If . . .

It means . . .

You should . . .

1. The Use Cleaning Tape LED is illuminated on the Operator Panel	The drive head needs cleaning or the tape is bad	Use the cleaning tape. Load the cleaning tape using the procedure in section <i>Cleaning Head Procedure</i>
		When cleaning is complete, the beeper will sound alerting you to remove the cleaning tape. Use the procedure in subsection <i>Unloading a Cartridge from Drive</i> to remove the cleaning tape from the drive.
2. A data cartridge causes the Use Cleaning Tape LED to be illuminated on the Operator Panel	The data cartridge may be damaged	Back up the data from this cartridge onto another cartridge, it may be damaged. A damaged cartridge may cause unnecessary use of the cleaning cartridge.
3. The Use Cleaning Tape LED remains illuminated on the Operator Panel after you clean the drive head.	Your data cartridge may be causing the problem	Try another data cartridge.
4. The Use Cleaning Tape LED re-illuminates on the Operator Panel after you load the cleaning tape	Cleaning has not been accomplished and the cleaning tape has no remaining cycles available.	Replace the cleaning tape.

Caution

Using cloth swabs, cotton swabs, cleaning agents, or ***unapproved*** cleaning tapes will void your warranty. Use ***only*** an ADIC-approved cleaning tape.

Head Cleaning Procedure

Clean the drive head and tape path whenever the **Use Cleaning Tape** LED is illuminated. The cleaning frequency does not depend on the format in which you write and read data.

If your application software cannot, or is not configured to automate the cleaning cycle, follow these cleaning directions carefully to assure that no damage will occur to your VLS-DLT, a tape drive, or media.

⇒ Some application packages may allow a magazine slot to be used for a cleaning cartridge and automate its use. Refer to your application software manual.

Please follow these cleaning directions carefully to assure that no damage will occur to the drive, VLS or media.

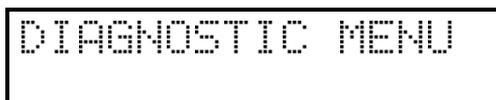
- Unload the magazine by pressing **ALT** and then **UNLOAD**. The magazine will move completely to the right.

Loading from Dedicated Magazine Slot

If your cleaning tape is inserted in a dedicated magazine slot perform the following steps:

- Take the VLS-DLT to the Off-Line Mode by pressing the **MENU** key on the Operator Panel.
- Use the **↑** key to scroll the display to the **DIAGNOSTIC MENU** option.

The display will now show:

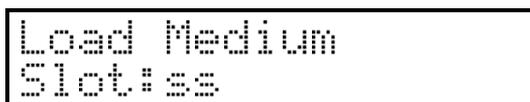


```
DIAGNOSTIC MENU
```

- Press the **ENTER** key to select the **Diagnostic Menu**.

Use the **↑** key to scroll the display to the **LOAD MEDIUM** option.

The display will now show:



```
Load Medium  
Slot# ss
```

Use the **↑** key to move to the **Slot** field. Use the **←** or **→** keys to select the slot you want to load the cleaning tape

from. Press **ENTER**. The VLS will load the tape and the cleaning cycle will begin.

- To confirm that a cleaning was done, check the **Use Cleaning Tape LED** on the drive front panel. If the cleaning cycle was successful, the LED will no longer be illuminated. If the cleaning cycle was not performed, the **Use Cleaning Tape LED** will still be illuminated.

Returning the Cleaning Tape to the Magazine

- Open the VLS door.
- Press the **UNLOAD** button on the drive front panel (see figure 13).
- Close the VLS door.

Note

The VLS knows which slot to return the cleaning tape to, it is not necessary to position the magazine, the VLS will do this automatically.

Use the **↑** key to scroll the display to the **UNLOAD MEDIUM** option.

The display will now show:



Unload Medium

- Press **ENTER**. The VLS will unload the cartridge and return it to the magazine.
- Return the VLS DLT to the On-Line Mode by pressing **MENU**.

Your VLS DLT library is once again ready for use.

Caution

Cleaning cartridges are considerably more abrasive to the drive's recording head than standard data cartridges. Usage should be kept within the recommended limits, or the warranty may not be applicable to the affected equipment.

Manually Loading a Cleaning Tape

To load a cleaning tape manually follow these instructions:

- Unload the magazine by pressing **ALT** and then **UNLOAD**. The magazine will move completely to the right.
- Open the door and remove the magazine from the carriage. (See instructions in earlier section *Removing the Magazine from the VLS*).
- Close the door and press **ALT**, then press the **Open Door** key.
- Open the door and insert the cleaning tape into the drive opening with the label facing you (see Figure 16).
- Close the door and press **ALT**, then press the **Close Door** key.

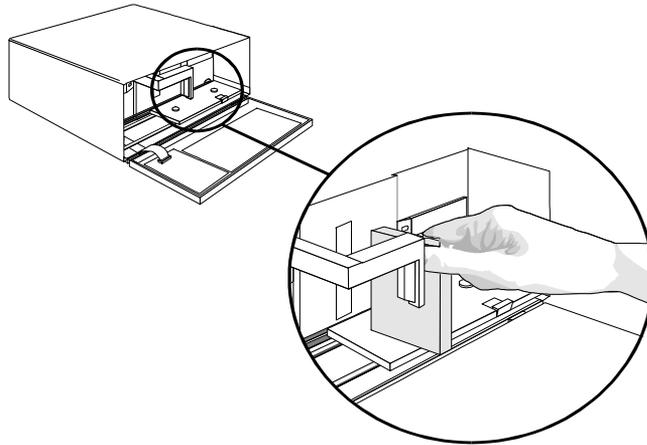


Figure 16. Inserting the Cleaning Tape

The cleaning cycle will run automatically.

- To confirm that a cleaning was done, check the **Use Cleaning Tape** LED on the drive front panel. If the cleaning cycle was successful, the LED will no longer be illuminated. If the cleaning cycle was not performed, the **Use Cleaning Tape** LED will still be illuminated.

Removing the Cleaning Tape from the Drive

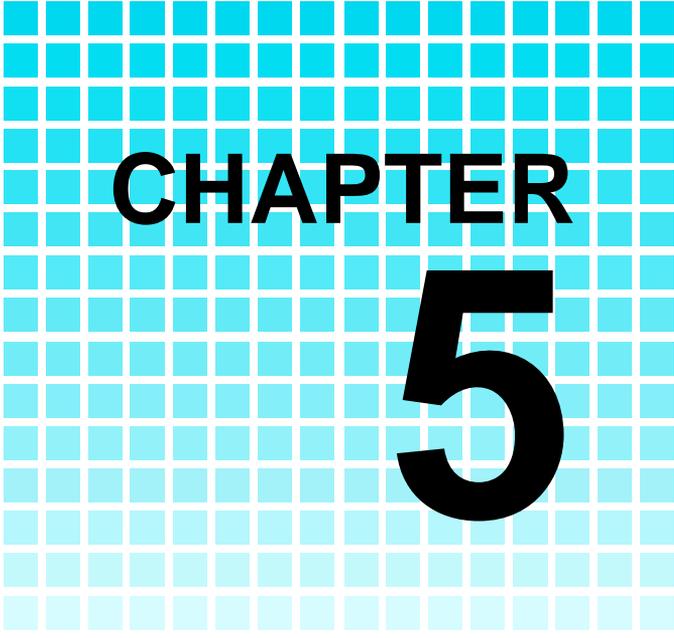
- Press the **UNLOAD** button on the drive front panel.
- Close the door and press **ALT**, then press the **Open Door** key.
- Open the VLS door, remove the cleaning tape and set it aside.
- Place the magazine onto the carriage. Close the VLS door. Press **ALT** and then **LOAD** to initiate the load procedure.

Your VLS DLT library is once again ready for use.

Cleaning the Enclosure

The outside of the enclosure can be cleaned with a damp towel. If you use a liquid all-purpose cleaner, apply it to the towel. Do not directly spray the enclosure.

Blank Page



CHAPTER 5

TROUBLESHOOTING AND DIAGNOSTICS

This Chapter ...

- ❑ contains some general suggestions to aid you in solving problems – should you ever run into them.
- ❑ includes information on error codes and the built-in diagnostics.

Installation Problems

Usually, problems encountered during the installation of your library are caused by improper SCSI bus configuration, application software configuration errors or by an OS that has not been correctly configured. If the application software that you are attempting to use is not communicating with your VLS DLT after installation, check the following:

✓ **SCSI IDs**

Make sure that the IDs you selected for the robotics and tape drive are not the same as the ID used by any other SCSI device on that bus, including the host SCSI adapter card.

⇒ The length of the VLS DLT internal SCSI cables is 3 feet. This length must be included in any calculations of cable length.

✓ **SCSI Cabling**

Verify that all SCSI cables are securely connected at both ends and that the bail locks are secured. Also, check the length and integrity of your SCSI cabling. The total length of all SCSI cables must not exceed 19.7 feet (6.0 meters) for single-ended configurations and 82 feet (25 meters) for differential configurations. Try replacing suspected cables with known good cables.

✓ **Termination**

Check that all SCSI buses are properly terminated.

⇒ For a list of compatible SCSI adapters and application software, call ADIC's Customer Assistance Center at (206) 883-HELP.

✓ **Compatibility**

Ensure sure that your library and its tape drives are compatible with the SCSI adapter card and application software you plan to use.

✓ **SCSI Adapter Card Installation**

Verify that you have installed your SCSI adapter card correctly. Refer to the documentation that came with your card for installation and troubleshooting instructions. Pay particular attention to any steps describing the settings of various jumpers and/or

switches on the card. Check that the card is seated fully in your computers I/O connector.

✓ **Application Software Installation**

Refer to the documentation included with your software for instructions on how to verify installation.

Library and Drive Operational Problems

Most problems with the operation of your VLS and/or DLT drive happen when the drive is not cleaned regularly or when you use incorrect data cartridges. If you have been successfully operating the application software and library in the past, but are now experiencing problems reading and writing data, check the following:

- ✓ If you are writing data, make sure that the cartridge is write enabled (move the write-protect switch to the enabled position).
- ✓ Check the data cartridge you are using. The DLT4000 and DLT7000 drives can use DLTTape III, DLTTape IIIXT, and DLTTape IV cartridges.
- ✓ If the cartridge has been in use for a long time or if it has been used frequently, try using a new cartridge.
- ✓ Clean the drive head.

Library Error Messages

If any component of the VLS is not communicating correctly, a warning message will appear on the front display.

In all cases, after removing the cause of the problem (or if you can't find a cause) push **MENU** to return the VLS DLT to the On-Line Mode.

Most error messages are self-explanatory and give a good indication of the problem. If the error message does not clearly indicate what the problem may be, try to return to the On-Line Mode by pressing **ALT** and/or **ENTER**. If that does not work, or if the error message reappears, call the ADIC Customer Assistance and be prepared to tell them what the error message is – and what the conditions are (see *When You Call ADIC Customer Assistance* later in this chapter).

.

Drive Status and Warning Signals

Normally, the Operator Panel will display error messages that describe a problem with a drive. The following table of drive LED messages is provided as additional information.

Label	Color	State	Operating Condition
LED (Right Indicator Panel)			
Write Protected	Orange	ON OFF	Tape is write-protected. Tape is write-enabled.
Tape in Use	Yellow	Blinking ON	Tape is moving. Tape is loaded; ready for use.
Use Cleaning Tape	Yellow	ON Remains on after unloading cleaning tape After cleaning, turns on again when reloading data cartridge	Drive head needs cleaning, or the tape is bad. Cleaning attempted, but tape expired, so cleaning not performed. Problem data cartridge. Try another cartridge.
Operate Handle	Green	ON OFF	OK to operate the Cartridge Insert/Release Handle. Do not operate the Cartridge Insert/Release Handle.
All Right Indicator Panel LEDs or, All Left Indicator Panel LEDs		ON Blinking	POST is starting. An error has occurred.

(continued on next page)

Label	Color	State	Operating Condition
LED (Left Indicator Panel)			
2.6 (DLTTape III)	Yellow	ON Blinking	Tape is recorded in 2.6 format. Tape is recorded in another density. You selected this density for a write from BOT.
6.0 (DLTTape III)	Yellow	ON Blinking	Tape is recorded in 6.0 format. Tape is recorded in another density. You selected this density for a write from BOT.
10.0 (DLTTape III) 15.0 (DLT2000XT drive) 20.0 (DLT4000 drive) 70.0 (DLT7000 drive)	Yellow	ON (default) Blinking Blinking Blinking	Tape is recorded in 10.0 format. Tape is recorded in 15.0 format Tape is recorded in 20.0 format. Tape is recorded in 70.0 format. Tape is recorded in another density. You selected this density for a write from BOT.
Compress	Yellow	ON OFF	Compression mode enabled. (Compression can be done only in 10.0, 15.0, or 20.0 density.) Compression mode disabled.
Density Override	Yellow	ON OFF (default) Blinking	You selected a density from the front panel. Density will be selected by the host (automatic). You are in density selection mode.
All Right Indicator Panel LEDs, or, all Left Indicator Panel LEDs		Blinking	A POST error has occurred.

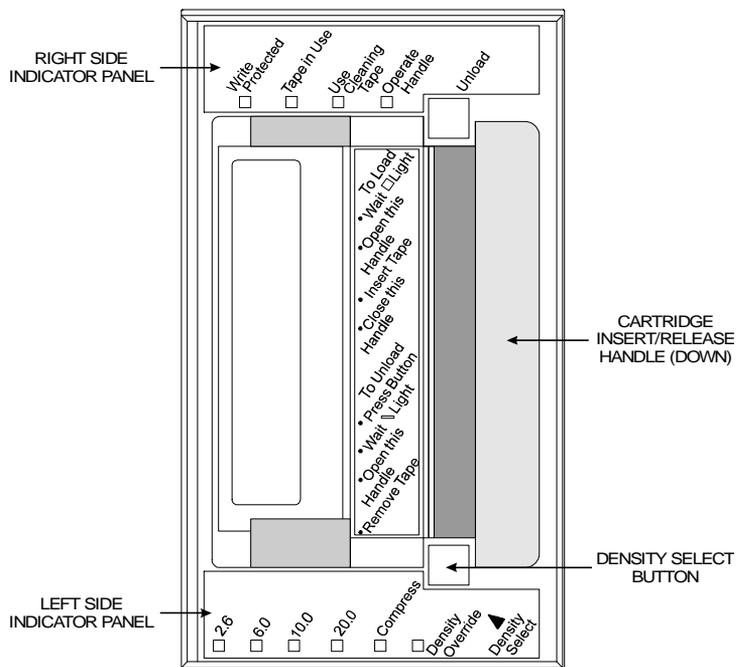


Figure 17. DLT Drive Status LEDs (DLT4000 shown)

Use Cleaning Tape Drive LED

If an excessive number of read-after-write errors are detected during normal operation of a DLT drive, the **Use Cleaning Tape** warning will be displayed on the Operator Panel and the **Use Cleaning Tape** LED will be turned on by the drive.

Usually, the **Use Cleaning Tape** LED is illuminated by the drive because of a dirty head, so the head should be cleaned (see *Cleaning the Drive Head* in Chapter 5, *Operation and Maintenance*, earlier in this manual) and the operation tried again.

If the **Use Cleaning Tape** LED is again turned on, and this seems to be a cartridge rather than a drive problem, make sure that all the data on that cartridge is backed up to a new cartridge by doing a complete backup from the source

drive, if necessary. Then discard the old cartridge. If you are unsure of the problem source, call ADIC Customer Assistance (for more information see *When You Need Assistance* later in this chapter).

The **Use Cleaning Tape** LED is normally turned off by executing a cleaning cycle or by cycling power to the VLS DLT.

Causes of the Use Cleaning Tape LED

The **Use Cleaning Tape** LED will be turned on whenever the drive has determined that low level error performance has degraded to a point where drive head cleaning is absolutely required. It does this by counting the number of C3 (soft) errors as well as the RAW (Read After Write) errors over a number of Mbytes. When a predetermined error rate threshold is reached, the Operator Panel and drive both display the warning. Some drive types display the warning after a specified number of hours of tape motion have been logged. When a tape is loaded, it may take several minutes for the indication to come on because the drive will wait for a specific number of bytes to be written. A hard (non-recoverable) error will cause the warning to be displayed immediately.

The most common reasons that the **Use Cleaning Tape** LED gets turned on for, in order of highest rate of occurrence, are listed below:

- Dirty ("Stained") heads.

A cleaning cycle *must* be executed to clear this indication.

- Worn tape.

DLT tapes are rated at 500,000 passes. Applications that overwrite small blocks of data cause "shoe shining"

of the tape against the head and will reach the 500,000 passes sooner than might be expected.

Bad environment.

⇒ Example:
Placing a CRT monitor on top of, or directly next to, a VLS DLT should always be avoided.

Data errors result from a number of factors, each of which subtract from the margin between good data recovery and an error. Electrical or magnetic interference can decrease this margin. High levels of dust contamination, high humidity, and heat can also be significant factors.

Worn heads.

The tape heads will eventually wear out causing the time between cleanings to get shorter and shorter. Tape head failure is usually predicted at about 12% of the MTBF rating (12,000 hours).

Defective drive.

Drive amplifier settings could be off, causing error rate degradation. The drive could simply have failed.

Environmental Considerations

For best performance of your VLS, please observe the following guidelines:

- If you expose cartridges to temperatures outside the operating limits – 40-113°F (5-40°C) – stabilize them by leaving the cartridges in the operating temperature for a minimum of two hours before you use them.
- Avoid temperature problems by ensuring that the VLS's rear and bottom are not obstructed, so that the drive has adequate ventilation.
- Position the VLS where the temperature is relatively stable (i.e. away from open windows, fan heaters and doors).
- Avoid leaving cartridges in severe temperature conditions, for example, in a car standing in bright sunlight.
- Avoid transferring data (reading from and writing to cartridges) when the temperature is changing by more than 20°F (10°C) per hour.

When You Call ADIC Customer Assistance

Before calling ADIC Customer Assistance, follow these steps – which will help you take full advantage of your call:

- Review all documentation carefully. (Experience has demonstrated that most questions are answered in your documentation.)

-
- Be prepared to explain whether the software or hardware has worked properly at anytime in the past. Have you changed anything recently?
 - Pinpoint the exact location of your problem, if possible. Note the steps that led to the problem. Are you able to duplicate the same problem or is it a one-time occurrence?
 - Note any error messages displayed on your PC or file server screen. Write down the exact error message.
 - If at all possible, call while at your computer, with ADIC's system installed and turned on.
 - If running on a network, have all relevant information available (i.e. type, version #, network hardware, etc.).

Be prepared to provide:

- Your name and your Company's name
- Model number
- Serial number of unit (located on the rear face by the power switch)
- Software version numbers
 - device driver
 - archive/restore
- Hardware configuration, including firmware version, date and number.
- Type of PC, DOS version, clock speed, RAM, network type, network version, and any special boards installed
- Type and brand of media

-
- A brief description of the problem
 - Where you purchased the ADIC system

⇒ Call ADIC Customer Assistance at (206) 883-4357.

Having this information available when you call for customer assistance will enable ADIC to resolve your problem in the most efficient manner possible. Then call the Customer Assistance line.

Return for Repair RMA (Return Merchandise Authorization)

When you and ADIC Customer Assistance have determined that you need an RMA (see previous section *When You Call ADIC Customer Assistance*), be prepared with the following information:

⇒ Be sure you have tried all trouble shooting techniques in the various manuals.

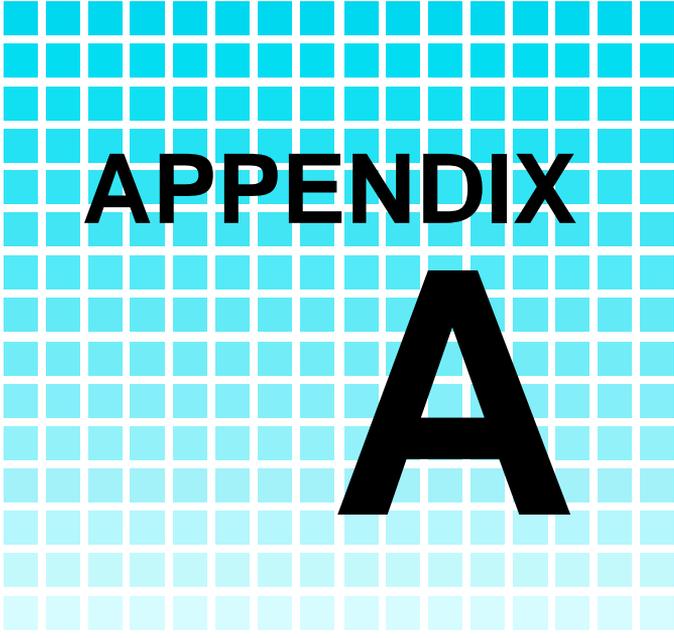
- Model number, serial number, and a brief, descriptive explanation of the problem.
- Complete address information (be sure you give any mail stops or special codes at the time the RMA is issued).
- If the item is NOT in warranty, you will be charged for the repairs. Therefore, the Customer Assistance personnel will need a P.O. number at the time the RMA number is issued. Until credit information can be obtained by our accounting department, the system may be shipped back COD to first-time customers.
- It is also necessary to send the *complete* system, including the SCSI interface card/controller, interface cables, and the unit. Problems may have been caused by a defective external component and/or the drive itself.
- Current labor rates will be quoted at the time the RMA is issued.

⇒ Following these RMA procedures will help ADIC expedite the handling, repairs and return of your equipment.

Loaner or replacement systems are generally NOT available. In extreme circumstances, they may be arranged for, depending on the nature of the problem and past history with the customer.

Keep the RMA number as a reference if you call to check on the status of an open RMA. It MUST also be written on the outside of the package for identification purposes.

Notes



APPENDIX

A

INSTALLING THE FERRITE BEAD

This Appendix ...

- ❑ describes how to install a ferrite bead (supplied) on the SCSI cable to assure compliance with EMI/RFI suppression specifications with dual VLS installations.

If you are using two or more VLS units on the same SCSI channel, you **must** install a ferrite bead on the interface cable between the units.

- Clip the clamp-on bead on the cable at any point between the two units. Refer to Figure 18.

⇒ All SCSI interface cables must be shielded and ADIC-approved.

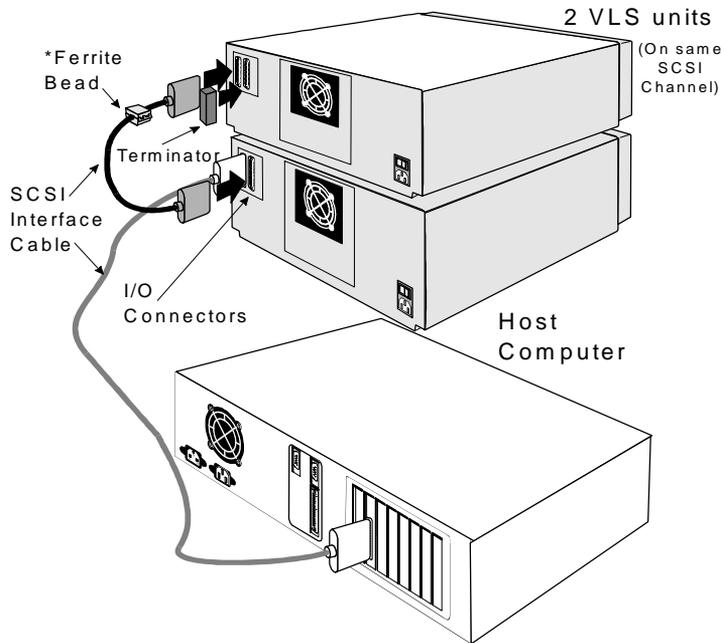
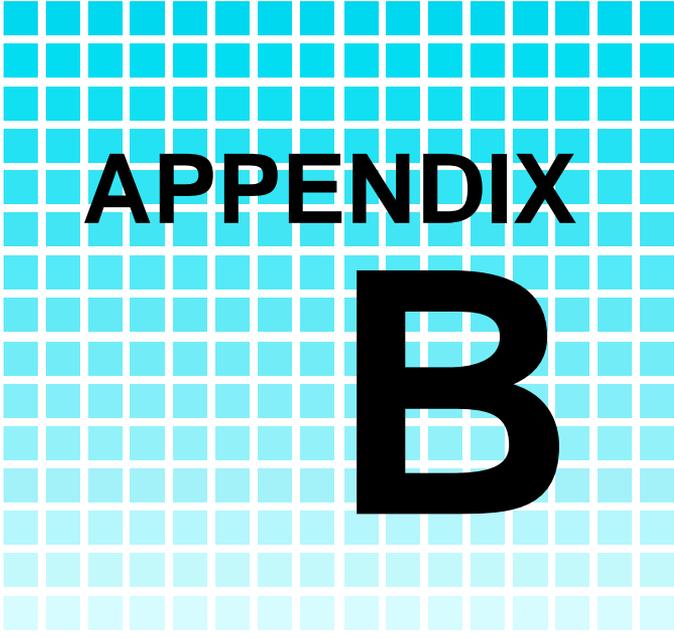


Figure 18. Installing the Ferrite Bead

The ferrite bead is required to satisfy the EMI/RFI suppression limits. The bead does not affect the functionality of your system in any way.



APPENDIX B

DIAGNOSTICS MENU

This Appendix ...

- describes the built-in diagnostic functions as available via the Diagnostics Menu

One of the most valuable features of ADIC's VLS series is the extensive built-in diagnostics. In this Appendix we discuss each of the Diagnostic functions available through the front panel keypad.

To access the Diagnostics Menu, press the **MENU** key. The display will read as follows:

```
OFF-LINE MENU
Config Menu
```

Press **F7** to access the Diagnostics Menu. Press **ENTER**; a display similar to the following will appear:

```
OFF-LINE MENU
Diag Menu
```

The following items are available under the Diagnostics Menu:

- Error Counters
- Operation Log
- F/W Revision
- Opn/Cls Drv Dr
- Unload Medium
- Event Counters
- Serial Number
- Position Magazine
- Load Medium
- Unload Drive

Use **F8** or **F9** to scroll through the list. Press **ENTER** to choose a particular function.

Use the **ESC** button to return to a previous menu (or to abandon current change).

Error Counters

```
ERROR COUNTERS
nnnnnnnnn!cccc+*
```

A chronological listing (beginning with the last error issued) of the errors encountered by the VLS system. These are VLS internal hardware/firmware errors. This register records each error name and assigns it a sequential number.

nnnnnnnn = Counter name
cccc = Counter value (0 - 65535)

Event Counters

```
EVENT COUNTERS  
nnnnnnnn#cccc#*
```

A listing of the various VLS operations and how many times they have occurred.

nnnnnnnn = Counter name
cccc = Counter value (0 - 65535)

Operation Log

```
OPERATION NNN *  
SCSI selection *
```

Provides a chronological logging (beginning with the latest) of up to 255 operations. These operations can be SCSI commands, operator requested operations, errors, and status operations. This information can be vital for trouble shooting problems. The following is a partial listing of some of the loggable operations. You may encounter other operations not included here.

NNN = Logged operation number (1-255).
When log is full, new operations are logged in as operation 255, scrolling the old operation 1 off the log

Power on or user reset

Unit on-line due to user request
Unit off-line due to user request
Cmd: 03 00 00 00 20 00 (cmd from SCSI host adapter)
SCSI selection by SCSI ID N (N = host SCSI ID)
SCSI reselection of SCSI ID N
SCSI disconnect from SCSI ID N
SCSI status = 00h (status to SCSI host adapter)
Load magazine
Unload magazine
Door opened
Door closed
Position magazine to slot ss (ss = 01- 11)
Load from slot ss to drive d
Unload from d to slot ss
ERROR: Can't unload, media in drive(s)
ERROR: Source location empty
ERROR: Unexpected Gripper Arm Sensor brk
Retrying operation

Firmware Revision



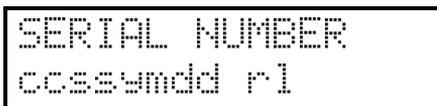
```
F/W REVISION
Rev:UVvv Date: †
```

Provides a record of the internal revision date and number. This information is vital for trouble shooting problems. Be prepared to provide this information to ADIC's Customer Assistance personnel if you ever need to talk with them. The following chart shows what each character in the sequence means.

VV = Major version number (00-99)

vv	=	Minor version number (00-99)
mm	=	Build-date month (01 - 12)
dd	=	Build-date day (01 - 31)
yy	=	Build-date year (00 - 99)
cccc	=	Internal checksum (0000 - FFFF)

Serial Number



```
SERIAL NUMBER
ccssy mdd r l
```

Provides a record of the unit's unique hardware serial number. This information is vital for trouble shooting problems. Be prepared to provide this information to ADIC's Customer Assistance personnel if you ever need to talk with them. The following chart shows what each character in the sequence means.

cc	=	Model code
ss	=	Sequence number
y	=	Year code (one digit only)
m	=	Month code (one digit only)
dd	=	Day code
r	=	Revision level
l	=	Modification level

Position Magazine

```
POSITION MAG
Slot number: ss
```

Use the Position Magazine function to line up the magazine with the drive at a particular slot. Select the slot number using \leftarrow or \rightarrow . Press **ENTER** to activate.

ss = Slot number (01 - 07)

Opn/Cls Drv Dr

```
Opn/Cls Drv Dr
```

⇒ The Operate Handle LED must be illuminated before attempting to open or close the door.

Use the Opn/Cls Drv Dr function to open or close the cartridge door on the drive. Press **ENTER** to activate.

Load Medium

```
LOAD MEDIUM
Load d from ss
```

The Load Medium function is used to line up the magazine with a the drive at a particular magazine slot and load that cartridge.

Use \leftarrow or \rightarrow to select the desired field. Select the slot and/or drive using \leftarrow or \rightarrow . Press **ENTER** to activate.

d = Drive (A)

ss = Slot number (01 - 07)

Unload Medium

```
UNLOAD MEDIUM
Unload d to 00
```

⇒ The VLS assumes that the cartridge you are trying to unload is ejected from the drive.

The Unload Medium function is used to line up the magazine with a the drive at a particular slot so that the cartridge will be placed in that slot.

Use or to select the desired field. Select the slot using or . Press **ENTER** to activate.

d	=	Drive (A)
ss	=	Slot number (01 - 07)

Unload Drive

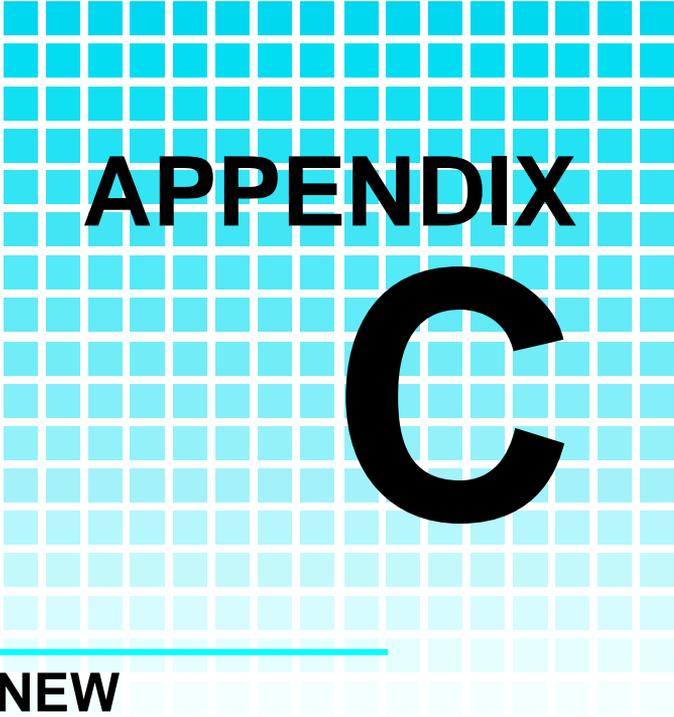
```
UNLOAD DRIVE
All configured 
```

The Unload Drive function provides a message prompting the operator to manually eject media from the drive and then returns the media to the magazine, or informs the operator that the drive is empty.

If the VLS thinks that media is present in the drive it will perform the following steps:

1. Verifies appropriate magazine slot is empty.
2. Aligns magazine slot with cartridge window.
3. Displays message: “Manually eject media
4. Waits until door is opened, then closed (because operator should have opened door, pressed eject button on drive, then closed door).
5. Checks that cartridge in transit sensor detects presence of media (because drive ejected cartridge).
6. Returns media to magazine.

If the VLS thinks that the drive is empty it will display: “All



APPENDIX C

DOWNLOADING NEW FIRMWARE

This Appendix ...

- explains the procedure for upgrading your VLS firmware.

Another of the special features built into the VLS series of ADIC products is the ability to upgrade firmware and built-in diagnostics at your installation site.

The process is simple. As upgrades become available upgrade diskettes will be provided along with all necessary instructions. Upgrading requires a PC and a SCSI interface with ASPI drivers. Current upgrade information and code will be available on ADIC's BBS.



APPENDIX D

GLOSSARY

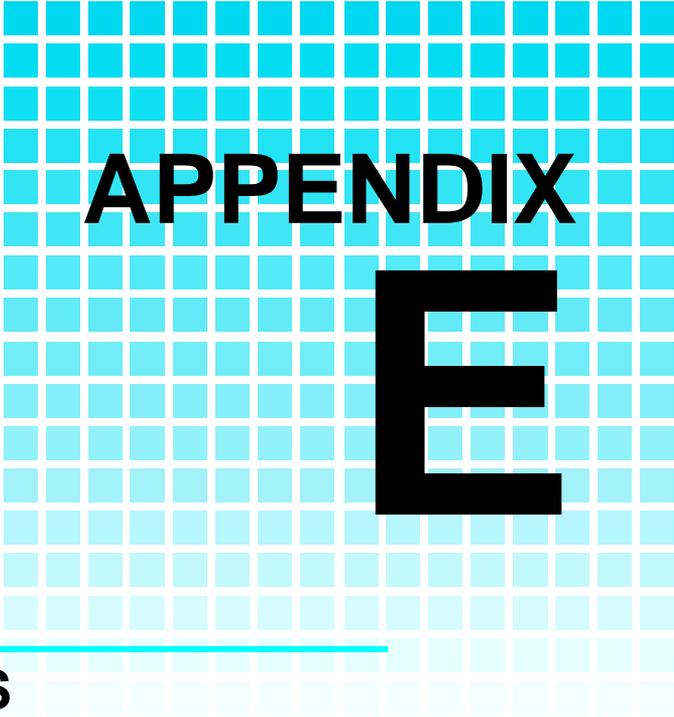
This Appendix ...

- ❑ contains terms and definitions of expressions commonly used with the VLS and the DLT drive.

byte	8 bits of digital data
C	Celsius (Centigrade)
cartridge	A storage medium item. A cartridge is sometimes called a tape or cassette and is capable of storing vast amounts of magnetically-written data. Some cartridges can store more than 30 gigabytes of data.
cleaning cartridge	Media used to clean the drive head and tape path.
cm	centimeter (0.3937 inches)
DLT cartridge	Media used in the VLS DLT unit. It uses data-quality ½-inch metal-particle tape. These cartridges require no formatting or other media conditioning before use. These cartridges must be ADIC approved.
DLT4000 DLT7000	Drive used in the VLS DLT. They are digital streaming tape device subsystems.
FCC	Federal Communications Commission
ferrite bead	A device required to suppress radio noise in certain conditions to meet FCC specifications.
GB	gigabyte (1 GB = 1,024 Megabytes)
HSM	Hierarchical Storage Management – a system where different types of storage media are used based on cost and time efficiency. For example, for fastest access, data is usually stored on a local hard drive. If you have a very large file that is needed occasionally, you may store it on a tape in a VLS magazine, or on an optical drive. In an HSM system, the data source should be transparent to the user.
Hz	Hertz (replacement for "cycles-per-second").
initiator	A host computer system that requests an operation to be performed by a target device.

KB	kilobyte (1 KB = 1,024 bytes)
keypad	Front panel on the VLS with 8 buttons used to activate the various functions of the VLS.
LCD	Liquid Crystal Display, a commonly used alphanumeric display that responds to specified input voltages and signals.
LED	Light Emitting Diode, a commonly used semiconductor device that glows when supplied with a specified voltage.
load	The process where the VLS checks each slot to see if a cartridge is physically present, and if so, whether the orientation of the cartridge in the magazine is correct. It also places the magazine in position for the first cartridge to be inserted into the drive. In sequential mode, the first cartridge is physically inserted into the drive.
magazine	The item that holds the tape cartridges for use by the VLS. The VLS DLT magazine holds 7 cartridges. The magazine also provides long-term covered storage of cartridges.
MB	megabyte (1 MB = 1,024 Kilobytes)
mm	millimeter (0.03937 inches)
POST	Power-On Self-Test is a built-in self-test for the DLT drive. POST automatically occurs each time the VLS powers up.
random-access mode	Gives the software the ability to communicate with the robotics in such a way as to be able to access the cartridges in the magazine (and data on the cartridges) in any order. (See also, sequential-access mode.)
RMA	Return Merchandise Authorization.
RMA number	An identifying number given to a customer who needs to return equipment for repair, whether under warranty or not.

SCSI	Small Computer System Interface. An industry standard for connecting peripheral devices and their controllers to a microprocessor. The SCSI defines both hardware and software standards for communication between a host computer and a peripheral.
SCSI address	The octal representation of the unique address (0 to 7) assigned to a SCSI device.
SCSI bus	Signal path or line shared by the devices on the same SCSI channel. Information is sent to all devices throughout the same bus; only the device to which it is addressed will accept or respond to it.
sequential-access mode	The cartridges in the magazine are inserted into the drive in a sequential manner, i.e. number 1 is first, number 2 is second, etc. When the last cartridge is ejected from the drive, the sequence will either stop and the VLS will issue an error message, or loop back to the first cartridge. (See also, random-access mode.)
slot	The place within the magazine where the media is placed. Each slot has a reference position, i.e. position 1 through position 7.
terminator	A physical block that tells the SCSI bus that this is the end of the line. A terminator is required at both ends of a SCSI bus. A bus may be terminated internally (on a device inside the host system) or externally on a peripheral device.
unload	The process that returns the magazine to its resting position where it can be removed from the VLS unit.
VLS	Virtual Library System



APPENDIX E

SPECIFICATIONS

This Appendix ...

- contains specification information on the VLS and the DLT drive.

Specifications

Drive

Type:	Quantum DLT4000 Quantum DLT7000
Data Transfer Rate:	Up to 210 MB/min (DLT4000) Up to 600 MB/min (DLT7000)
Load Time:	20 seconds

Changer

Magazine:	7 Cartridges
Media type:	DLT 1/4 inch metal-particle cartridges
Cartridge Change:	10 seconds, maximum
Indicators/Controls:	8-button keypad with LCD menu display, POWER LED and LOCKED LED to monitor and control system status, diagnostics and configuration. 8-button keypad with LCD menu display, POWER LED and LOCKED LED to monitor and control system status, diagnostics and configuration.
Interface:	SCSI 2
Magazine capacity:	140GB (DLT4000, native mode) 245GB (DLT7000, native mode) DLT4000 40GB maximum data, per cartridge, compression ratio of 2:1; 280GB per seven cartridges DLT7000 70GB maximum data, per cartridge, compression ratio of 2:1; 490GB per seven cartridges

Reliability

Maintenance:	Use cleaning tape whenever Use Cleaning Tape LED on drive front panel is illuminated
MSBF:	Greater than 100,000 cartridge changes (net, drive and media)
MTBF:	More than 50,000 power-on hours
MTTR:	Within 30 minutes

Physical

Dimensions:	17.4" (w) x 20.0" (d) x 8.0" (h)
Weight:	30 lb.

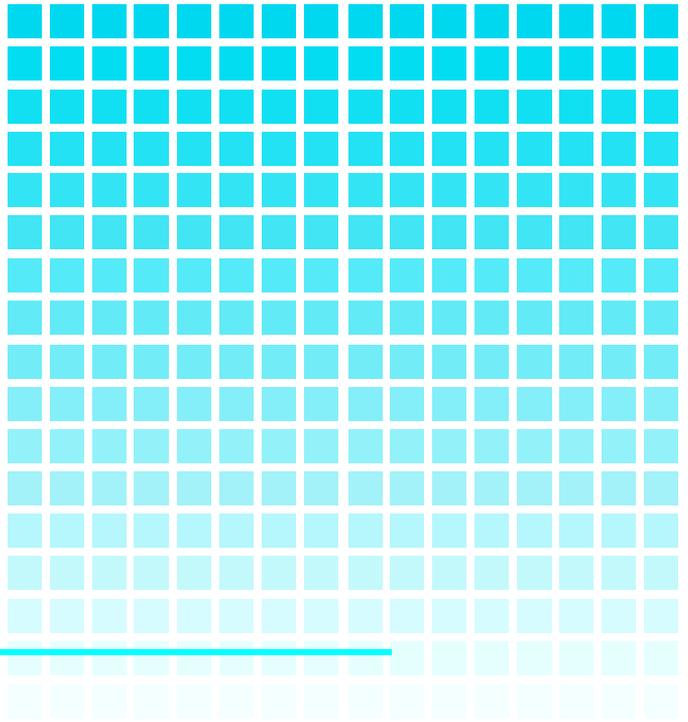
Power Consumption

Less than 65 Watts

Environment

Electrical:	100-240 VAC Automatic AC line voltage selection
Temperature:	5°C to 40°C (Operating) -40°C to 70°C (Storage/Shipping)
Humidity:	20% to 80% (Operating) 5% to 95% (Storage/Shipping)
Vibration:	0.25g (5-500 Hz) (Operating) 0.5g (5-500 Hz) (Storage/Shipping)
Shock:	2g Operating 30g Storage/Shipping

Notes



INDEX

#

10.0 format, 56
15.0 format, 56
2.6 format, 56
20.0 format, 56
6.0 format, 56
70.0 format, 56

A

alarm mode, 23
alarm sound, 23
application software, 26, 45, 52, 53
application software installation, 53
archiving, 43
ASPI drivers, 76

B

backup, 7
backup software, *xii*, 2, 3, 15
bail locks, 12, 52
buzzer configuration, 24
Buzzer Configuration, 22, 23

C

carriage, *xi*, 18, 32, 33, 35, 37, 39, 40, 47, 48
cartridge, 25, 78
Cartridge Change Time, 82
Cartridge Insert/Release Handle, 55
cartridge label, 47
cartridge labels, 42
Causes for the Use Cleaning Tape LED, 58
Changer Indicators/Controls, 82
Changer Interface, 82
Changer Magazine Capacity, 82
cleaning cartridge, 44, 45, 78
cleaning cartridges, 47

cleaning confirmation, 46, 48
cleaning cycle, 48, 58
cleaning cycles, 8
cleaning frequency, 45
cleaning tape, 8, 43
cleaning the drive head, 30, 43
Cleaning the Enclosure, 49
Close Drive Door, 27
Compression mode, 56
Configuration Menu, 22, 23
connecting multiple VLS units, 13
Connecting the Interface Cables, 12
Copyright, *ii*, *iii*
customer assistance, 8, 12, 58, 60, 62, 70, 71

D

data cartridges, 7
Declaration of Conformity, *v*
Density Override, 56
density selection mode, 56
Diagnostics Menu, 22, 27, 36, 38, 40, 41, 45, 68
differential SCSI bus, 4
dimensions, 83
DLT cartridge, 5
DLT media, 5, 6
Drive Capacity and Transfer Rate, 4
drive eject button, 73
drive front panel, 8, 56
Drive Load Time, 82
drive maximum capacity, 4
drive maximum data transfer rate, 4
Drive Operational Problems, 53
Drive Status, 55
drive status LEDs, 30
Drive Transfer Rate, 82
Drive Type, 82
Drive Warning Signals, 55
duplexing, 43

dust cover, 5, 32, 43

—E—

electrical environment, 83
EMI/RFI Compliance, *iv*
EMI/RFI limit specifications, *iv*
EMI/RFI suppression limits, 66
environmental considerations, 60
Equipment Description, 4
Error Counters, 22, 27, 68
error message, 54, 61

—F—

FCC specifications, 78
ferrite bead, 13, 66, 78
Firmware Revision, 22, 27, 68, 70
front panel keypad, 4, 68, 79, 82
Front Panel LCD Display, 19, 79
Front Panel Locked LED, 19
Front Panel MENU key, 19, 23, 36, 54
Front Panel Power LED, 19
Front Panel Switches and Indicators, 18

—H—

Head Cleaning Procedure, 45
hierarchical storage management, 2, 78
host computer, *x, xii, 9, 12, 14, 15, 18, 78, 80*
HSM, 2, 78
humidity, 59, 83

—I—

I/O connector, 9
inserting data cartridges into magazine, 30
Inserting Magazine into VLS, 31
Inserting the Magazine, 31
Installation Problems, 52
Installing the Backup Software, 15

interface cable, *iv, 12, 13, 20, 62, 66*
interference, *iv, 59*

—J—

jack screws, 12

—L—

labels, 31
left magazine position pin, *xi, 32*
Library Error Messages, 54
Library Operational Problems, 53
Load Magazine, 70
Load Medium, 22, 27, 40, 45, 72
Loading Cleaning Cartridge from
Dedicated Storage Slot, 45
Loading Individual Cartridge, 38
Loading Magazine with Cartridge in
Drive, 34
loading the magazine, 33
LOCKED LED, 82

—M—

magazine, *xi, xii, 4, 5, 18, 19, 25, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 42, 43, 45, 47, 48, 72, 73, 78, 79, 80*
Magazine capacity, 82
magazine release, 37
Main Menu, 21
Main Menu selections, 21
maintenance, 83
Manually Loading Cartridge, 39
Manually Loading Cleaning Tape, 47
Manually Removing Cartridge from
Drive, 35
Manually Removing Cartridge Loaded in
Drive, 40, 41
Manually Removing Cleaning Tape from
Drive, 46, 48

Manually Unloading Cartridge in Drive, 39

mean swaps between failures (MSBF), 83

mean time between failures (MTBF), 83

mean time to repair (MTTR), 83

Media Type, 82

Mode of operation, 3, 14

—N—

necessary tools, 3

—O—

Off-Line Menu, 23

Off-Line Mode, 25, 39, 41, 45

Off-line Time, 22, 25

On-line Mode, 22, 25, 41, 42, 47, 54

Open/Close Drive Door, 22, 36, 72

Operate Handle LED, 55

operating environment, 3

operating mode, 14, 26

operating temperature, 60

Operation Log, 22, 27, 68, 69

—P—

packing materials, 4

PC power switch, 9

pick arm, 18, 19, 32, 36, 37

Position Magazine, 22, 27, 70, 72

POST, 55, 56, 79

power consumption, 83

POWER LED, 82

Preparing the Host Computer, 9

Product Sign-On, 22, 26, 27

—Q—

quick start guide, ix

—R—

random-access mode, 3, 25, 26, 34, 79

rear panel power connector, 20

rear panel power switch, 20

rear panel SCSI I/O connectors, 20

Rear Panel Switches and Connectors, 20

Removing Cartridge from Drive Using Diagnostics Menu, 35

Removing Cartridge from Magazine, 42

Removing Magazine from VLS, 37, 39, 40, 47

Removing Magazine with Cartridge in Drive, 37, 38

return merchandise authorization, 62, 79

right magazine position pin, xi, 32, 33

RMA, 62, 79

RMA number, 62, 63, 79

routine maintenance, 30

—S—

SCSI adapter, 3

SCSI Adapter Card Installation, 52

SCSI address, 14, 80

SCSI bus configuration, 52

SCSI buses, 52

SCSI cable, 12, 52

SCSI chain, x, 9

SCSI channel, iv, 13, 14, 20, 66, 80

SCSI commands, 69

SCSI connector, x, 13

SCSI controller, 3

SCSI device, 13, 14, 52

SCSI host adapter, 9, 70

SCSI ID, x, 52, 70

SCSI ID configuration, 22, 24

SCSI interface, 9, 62, 76

SCSI interface cable, x, 3, 12

SCSI Parity, 22, 25

SCSI Termination, 52

Semi-automatically Loading Cartridge, 39

Semi-automatically Unloading a

Cartridge, 41

Sequential Mode Configuration, 22, 26

sequential-access mode, *xii*, 3, 14, 25, 26,
34, 79, 80

Serial Number, 22, 27, 62, 68, 71

shielded cable, *iv*

shock, 83

space requirements, 2

specifications, 82

storage environment, 3

storing magazine, 31, 38, 43

System Software, 8

—T—

Tape in Use LED, 55

temperature environment, 83

temperature problems, 60

terminator, *x*, 13, 80

—U—

Unload Drive, 22, 27, 68, 73

Unload Magazine, 70

Unload Medium, 27, 42, 46, 73

Unloading a Cartridge from Drive, 44

Unloading Individual Cartridge, 41

Unpacking and Inspecting, 3

upgrade firmware, 76

Use Cleaning Tape LED, 8, 30, 43, 44, 45,
46, 48, 55, 57, 58, 83

—V—

ventilation, 60

vibration, 83

—W—

warranty, *ii*, *iii*, 4, 44, 47, 62, 79

weight, 83

When You Need Assistance, 54

Write EEPROM Mode, 22, 28

Write Protected LED, 55

write-enabled, 7, 53, 55

write-protect switch, 6, 7, 30, 39, 53

write-protected, 7, 55

Notes