IBM TotalStorage
Enterprise Automated Tape Library (3494)

Operator Guide

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Operator Guide

> **Note!**
>
> Before using this information and the product it supports, read the information in "Safety and Environmental Notices" on page xix and Notices.

Fifth Edition (April 2004)

This edition applies to the IBM TotalStorage Enterprise Automated Tape Library (3494) and to all subsequent releases and modifications until otherwise indicated in new editions.

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Safety and Environmental Notices

The following safety and environmental notices apply to the IBM® TotalStorage® Enterprise Automated Tape Library (3494).

Laser Safety and Compliance

The IBM TotalStorage Enterprise Automated Tape Library (3494) is a Class II laser product. It is important for the operator to be aware of the laser caution label. See Figure 1 for an example of the label.

Figure 1. Class II Laser Safety Caution Label

This product complies with the performance standards set by the U.S. Food and Drug Administration for a Class II laser product. Class II laser products require taking precautions to avoid prolonged viewing of the laser beam. Under normal working conditions, you must not come in direct contact with the laser beam. This product has protective housings and scanning safeguards that ensure that laser radiation is inaccessible during operation or is within Class II limits. These products have been reviewed by external safety agencies and have obtained approvals to the latest standards as they apply to this product type.

Operator Safety

The operator should remember the importance of safe operation when performing any of the tasks in this book. The operator should know the location and how to use the switches and controls on the IBM TotalStorage Enterprise Automated Tape Library (3494) (see Chapter 2, "Controls and Indicators," on page 43).

Safety Characteristics

The front doors on the library should not be opened during normal operation because of the moving components within the library. The doors have key locks to prevent the doors from being opened inadvertently. The 3494 includes integral safety control circuits that detect whether the doors are open or closed.

When a door is detected to be open, the power is removed from the cartridge accessor and the picker slowly descends. All host systems attached to the tape subsystems or through the RS-232 interfaces associated with the library are notified of the condition. This gives the operator a warning of a safety exposure and a warning of potential unauthorized access to the cartridges stored in the library.

End of Life (EOL) Plan

This product is a purchased unit. Therefore, it is the sole responsibility of the purchaser to dispose of it in accordance with local laws and regulations at the time of disposal.

Preface

About This Book

This publication provides information for the new operator and for the experienced operator to use the IBM TotalStorage Enterprise Automated Tape Library (3494). If you are a **new operator**, give special attention to the organization of this book (see "Organization of This Book") and read the sections indicated for **new operators**.

Organization of This Book

The information in this publication is presented as follows:

- Chapter 1, "Introduction," on page 1 contains an introduction and a description of the IBM TotalStorage Enterprise Automated Tape Library (3494). This section is required reading if you are a **new operator**.

- Chapter 2, "Controls and Indicators," on page 43 contains a description of the location and function of the controls and indicators found on the 3494. This section is required reading if you are a **new operator**.

- Chapter 3, "Operational Characteristics," on page 55 contains a description of the operational characteristics of the 3494. This section includes information for the experienced operator or system administrator.

- Chapter 4, "Operational Modes, Operational States and Informational States," on page 85 provides a description of the different modes and states of the 3494. This section includes information for the experienced operator or system administrator.

- Chapter 5, "Basic Operating Procedures," on page 95 provides a description of the tasks performed by using the operator panel on the 3494. This section is required reading if you are a **new operator**.

  A quick reference table for basic operating procedures is included at the start of this section.

- Chapter 6, "Advanced Operating Procedures," on page 105 provides detailed information about using the Library Manager and the tasks that may be performed with the Library Manager. This section includes information for the experienced operator or system administrator.

  Quick reference tables for Library Manager advanced operating procedures and for accessing IBM TotalStorage Peer-to-Peer Virtual Tape Server Specialist Web information are included at the start of this section.

- Chapter 7, "Remote Library Manager Console Feature," on page 345 provides information on the remote Library Manager.

- Chapter 8, "Problem Determination Procedures," on page 361 provides information on error reporting and recovery. This section includes information for the experienced operator or system administrator.

  A quick reference table for problem determination procedures is included in this section.

- Appendix A, "Keyboard Template," on page 419 identifies the uses of the Library Manager function keys.

- Appendix B, "VTS Export and Import Advanced Function," on page 421 provides information on the Export and Import functions of the 3494.

- "Glossary" on page 477 includes descriptions or terms used in this publication.

- "Index" on page 485 includes keywords and terms to help retrieve information in this publication.

Who Should Read This Book

This book is intended for operators of the IBM TotalStorage Enterprise Automated Tape Library (3494). Users of this information should be familiar with the IBM 3490E, 3590, and 3592 magnetic tape subsystems. IBM recommends that you also read the *IBM TotalStorage Enterprise Automated Tape Library (3494) Introduction and Planning Guide*.

Terminology Used in This Book

See "Glossary" on page 477 for definitions of terms, abbreviations, and acronyms in this publication.

Related Information

The following sections contain lists of information sources that you may need in order to operate the IBM TotalStorage Enterprise Automated Tape Library (3494).

IBM TotalStorage Enterprise Automated Tape Library (3494)

The following publications relate to the IBM TotalStorage Enterprise Automated Tape Library (3494) environment:

- *IBM TotalStorage Enterprise Automated Tape Library (3494) Introduction and Planning Guide*, GA32-0448
- *IBM 3494 Tape Library Dataserver Operator Safety Translations*, GA32-0299
- *IBM 3494 User's Guide: Media Library Device Driver for AS/400®*, GC35-0153
- *IBM 3494 User's Guide: Device Driver VSE/ESA™*, GC35-0176
- *IBM 3494 Operator Training Videotape*, GV38-0293 (NTSC format) or GV38-0294 (PAL® format)
- *IBM 3494 Operator's Quick Guide*, GX35-5051
- *IBM TotalStorage Enterprise Automated Tape Library (3494) Maintenance Information*, PN 19P6298
- *IBM TotalStorage Virtual Tape Server Planning, Implementing and Monitoring*, SG24-2229
- *Guide to Sharing and Partitioning IBM Tape Library Dataservers*, SG24-4409
- *IBM Magstar® Tape Products Family: A Practical Guide*, SG24-4632
- *IBM TotalStorage Peer-to-Peer Virtual Tape Server Planning and Implementation*, SG24-6115
- *IBM Online Library Hardware Collection*, SK2T-5843

IBM 3490E Tape Subsystem

The following publications relate to the IBM 3490E tape subsystem environment:

- *Tape Care and Handling*, GA32-0047
- *Tape and Cartridge OEMI for Standard Length Tapes*, GA32-0048
- *Tape and Cartridge OEMI for Extended Length Tapes*, GA32-0216
- *3490 Models C10, C11, C1A, C22 and C2A Introduction*, GA32-0217
- *3490 Models C10, C11, C22, C1A and C2A Operator's Guide*, GA32-0218
- *3490 Models C10, C11, C22, C1A and C2A Hardware Reference*, GA32-0219
- *3490E Models F01,F1A,F1,and FC0 Installation, Planning, and Operators's Guide*, GA32-0378
- *3490 Models C10, C11, C1A, C22 and C2A Planning and Migration Guide*, GC35-0219

IBM TotalStorage Enterprise Tape System 3590

The following publications relate to the IBM Magstar 3590 tape subsystem environment:

- *IBM TotalStorage Enterprise Tape System 3590 Introduction and Planning Guide*, GA32-0329
- *IBM TotalStorage Enterprise Tape System 3590 Operator Guide*, GA32-0330
- *IBM Magstar 3590 Tape Subsystem Hardware Reference Guide*, GA32-0331
- *IBM 3590 Operator Quick Reference*, GA32-0354
- *IBM 3590 High Performance Tape Subsystem (Operator Training on Video Tape)*, GV38-0290 (NTSC format) or GV38-0291 (PAL format)
- *Magstar and IBM 3590 High Performance Tape Susbsystem: Multiplatform Implementation*, SG24-2594

IBM TotalStorage Enterprise Tape System 3592

The following publications relate to the IBM TotalStorage Enterprise Tape System 3592 tape subsystem environment:

- *IBM TotalStorage Enterprise Tape System 3592 Introduction and Planning Guide*, GA32-0464
- *IBM TotalStorage Enterprise Tape System 3592 Operator Guide*, GA32–0465

AIX

The following publications relate to the AIX® systems and software environment:

- *Parallel and ESCON® Channel Tape Attachment: Installation and User's Guide*, GA32-0311
- *AIX General Concepts and Procedures for RISC System/6000®*, GC23-2202
- *IBM TotalStorage Tape Drive, Medium Changer, and Library Device Drivers: Installation and User's Guide*, GC35-0154

IBM AS/400 and IBM @server iSeries

The following publications relate to the AS/400 and iSeries™ software environment:

- *AS/400 Prog: Control Language Reference*, SC41-0030
- *AS/400 Automated Tape Library Planning and Management*, SC41-3309

IBM RS/6000 and IBM @server pSeries

The following publication relates to the RS/6000® and pSeries® software environment:

- *RISC System/6000 Getting Started: Managing RISC System/6000*, GC23-2378

MVS, OS/390, and z/OS

The following publications relate to the MVS™, OS/390®, and z/OS® systems and software environment:

- *DFSMS/MVS® General Information*, GC26-4900
- *MVS/ESA™ Planning: Installation and Migration*, GC28-1077
- *MVS/ESA Library Guide*, GC28-1601
- *MVS/ESA Conversion Notebook*, GC28-1608
- *MVS/ESA System Management Facilities (SMF)*, GC28-1628
- *JES3 Command Reference*, SC23-0063

- *DFSMS/MVS Object Access Method Planning, Installation, and Storage Administration Guide for Tape Libraries*, SC26-3051
- *DFSMS/MVSObject Access Method Application Programmer's Reference*, SC26-4917
- *DFSMS/MVS Planning for Installation*, SC26-4919
- *Basic Tape Library Support User's Guide and Reference*, SC26-7016
- *DFSMS/MVS DFSMShsm™ Implementing and Customizing*, SH21-1078

VM/ESA and z/VM

The following publications relate to the VM/ESA® and z/VM® systems and software environment:
- *VM/ESA General Information*, GC24-5745
- *VM/ESA TCP/IP Planning and Customization*, SC24-5847
- *VM/ESA TCP/IP User's Guide*, SC24-5848
- *VM/ESA TCP/IP Programmer's Reference*, SC24-5849

VSE/ESA

The following publications relate to the VSE/ESA systems and software environment:
- *IBM 3494 User's Guide: Device Driver VSE/ESA*, GC35-0176
- *VSE/ESA System Control Statements*, SC33-6613

Additional Information

The following publications contain additional information that relates to the IBM TotalStorage Enterprise Automated Tape Library (3494):
- *IBM General Information Manual Installation Manual-Physical Planning*, GC22-7072
- *Resource Access Control Facility General Information Manual*, GC28-0722
- *Environmental Record Editing and Printing (EREP) User's Guide*, GC28-1378
- *POWERstation and POWERserver® System/390® Enterprise Systems Connection Channel Emulator User's Guide and Service Information*, SA23-2722
- *VTAM® Resource Definition Reference*, SC31-6498
- *Distributed Console Access Facility: Installation and Configuration Guide*, SH19-4068
- *Distributed Console Access Facility: User's Guide*, SH19-4069
- *Distributed Console Access Facility: Target User's Guide*, SH19-6839

How to Send Your Comments

Your feedback is important in helping to provide the most accurate and high-quality information. If you have comments or suggestions for improving this publication, you can send us comments electronically by using these addresses:
- Internet: STARPUBS@us.ibm.com (or STARPUBS at us.ibm.com)
- IBMLink™ from U.S.A.: STARPUBS at SJEVM5
- IBMLink from Canada: STARPUBS at TORIBM
- IBM Mail Exchange: USIB3VVD at IBMMAIL
- Fax from U.S.A., Canada, and other countries/regions: 520-799-2906

Chapter 1. Introduction

This chapter contains an introduction and a description of the IBM TotalStorage Enterprise Automated Tape Library (3494).

The 3494 automates the retrieval, storage, and control of the following tape cartridge types:
- Cartridge System Tape
- Enhanced Capacity Cartridge System Tape
- High Performance Cartridge Tape
- Extended High Performance Cartridge Tape
- Enterprise Tape Cartridge
- Enterprise Economy Tape Cartridge
- Enterprise Write Once, Read Many (WORM) Tape Cartridge
- Enterprise Economy WORM Tape Cartridge

Note: The *IBM 3494 Tape Library Operator Training Video Tape* and the *IBM 3494 Tape Library Operator's Quick Guide* are supplied with accessories.

IBM TotalStorage Enterprise Automated Tape Library (3494)

Figure 2 on page 3 shows three possible configurations of the IBM TotalStorage Enterprise Automated Tape Library (3494). The 3494 is available in multiple configurations. You can use one Enterprise Tape Library Base Frame (L10, L12, L14, or L22 Frame) or (Model L10, L12, L14, or L22) and up to 15 optional frames. The following frame types are available in the tape library:

- The L1x and L22 Frame **1** or **3** , may include the following subsystems:
  - Operator panel
  - Tape subsystem
    - 3490E Model CxA or F1A with drives (L10)
    - 3590 Model B1A and E1A tape drives (L12 or L14)
    - 3590 Model H1A tape drives (L12)
    - 3592 Model J1A tape drives (L22)
    - 3590 Model A00 or A50 (L14)
  - Library Manager
  - Cartridge storage cells
  - Cartridge accessor
  - Convenience I/O station (if ordered)

  Every library configuration requires one L Frame

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/
- The optional IBM TotalStorage Enterprise Tape Drive Expansion Frame (D10, D12, D14, D22, or D24) or (Model D10, D12, D14, D22, or D24) **4** contains additional cartridge storage and may contain the following tape subsystems:
  - A 3490E Model CxA or F1A tape subsystem (D10)
  - 3590 Model B1A, E1A, or H1A tape drives (D12 or D14)
  - 3592 Model J1A tape drives (D22)
  - A 3590 Model A00, A50, or A60 Controller with 3590 drives (D14)
  - A 3590 Model A60 Controller with 3592 drives (D24)
  - A 3592 Model J70 Controller with 3590 drives (D14)
  - A 3592 Model J70 Controller with 3592 drives (D24)

- The optional IBM TotalStorage Virtual Tape Server (VTS) B16 **5** contains additional cartridge storage, the VTS controller, and associated disk storage. A D12 Frame **4** must be located to the left of the B16 VTS. The B16 VTS manages the 3590 Model B1A tape drives in the D12 Frame.

- The optional stand alone IBM TotalStorage Virtual Tape Server (B18, B10, B20 VTS) **8** contains the VTS controller and its associated disk storage. A D12 Frame **4** may be located at any position in the 3494 (except frame 1). However, it must be within a distance of 14 m (46 ft.) from the B18, B10, or B20 VTS. The B18, B10, and B20 VTSs manage the 3590 tape drives in the D12 Frame.

- The optional stand alone IBM TotalStorage Virtual Tape Frame (CX0) (not shown) contains two or four of the IBM TotalStorage Virtual Tape Controllers (AX0s). The AX0 is used in conjunction with the VTSs in an IBM TotalStorage Peer-to-Peer Virtual Tape Server (PtP VTS) (see "Peer-to-Peer Virtual Tape Server" on page 66). The AX0 provides interconnection of two Model B18, B10, or B20 VTSs in a PtP VTS and host system Enterprise Systems Connection (ESCON™) attachments.

- The optional stand alone IBM TotalStorage Virtual Tape Frame (CX1) (not shown) contains two or four of the IBM TotalStorage Virtual Tape Controllers (VTCs). The

VTC is used in conjunction with the VTSs in a PtP VTS (see "Peer-to-Peer Virtual Tape Server" on page 66). The VTCs provide interconnection of two B10 or B20 VTSs in a PtP VTS. They also provide host system ESCON or Fiber Connection (FICON®) attachments.

- The optional IBM TotalStorage Enterprise Tape Storage Frame (S10 Frame) or (Model S10) **6** contains additional cartridge storage only.
- The optional IBM TotalStorage Enterprise High Availability Tape Frames (HA1 Frames) service bays (left **2** and right **7**) contain service areas for the cartridge accessors.
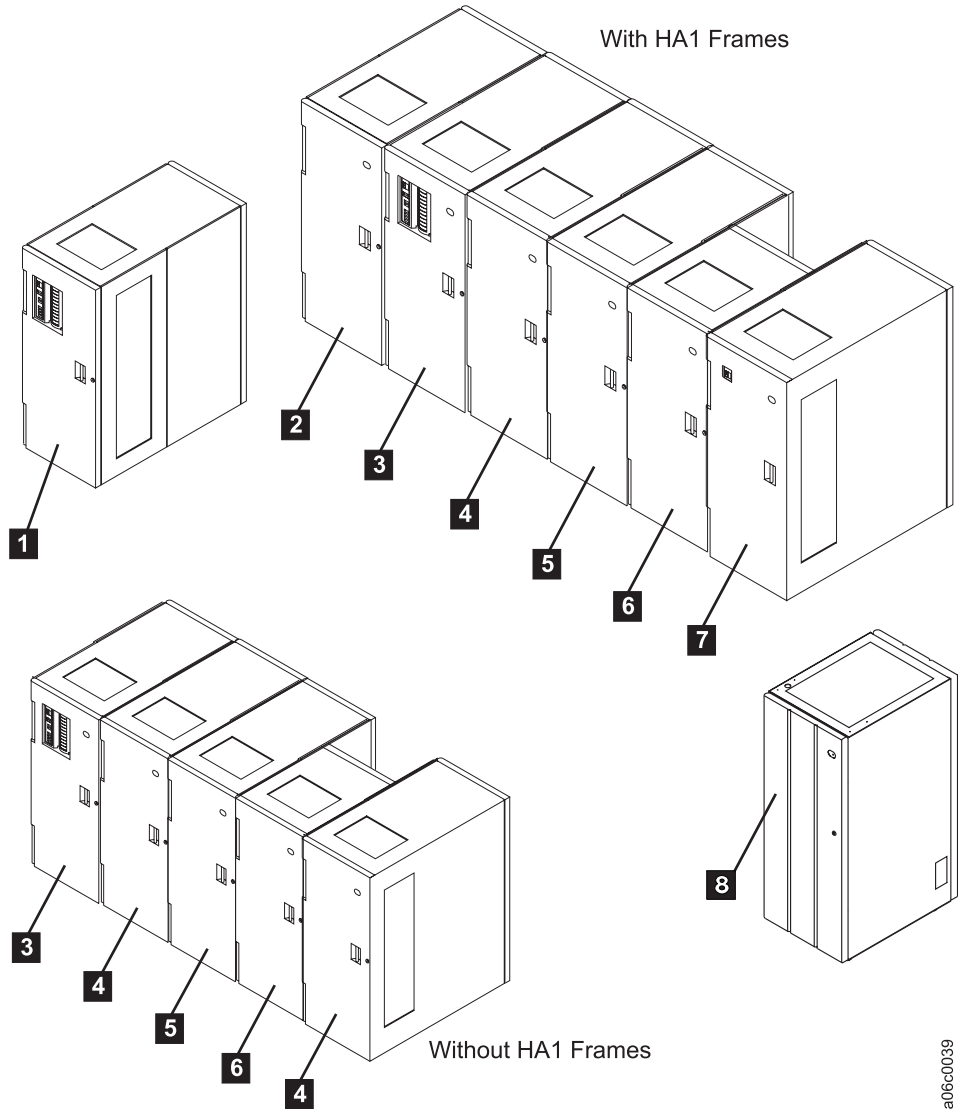
Figure 2. 3494 Configurations

Note: For additional 3494 configurations, see the *IBM TotalStorage Enterprise Automated Tape Library (3494) Introduction and Planning Guide.*

The L1x and L22 Frame provides full library function without the other optional frames. Adding the optional frames to the L1x and L22 Frame provides tape drive capabilities and additional storage. See Table 4 on page 36 for the cartridge capacity of each frame.

Functional Components

Figure 3, Figure 4 on page 5, and Figure 5 on page 6 show the front of various L Frames, with the following functional components:

1 **Cartridge storage cells**

The cells are located on the inside of the front door and on the back wall of the L Frame (see Figure 3, Figure 4 on page 5, or Figure 5 on page 6).

2 **Magnetic tape subsystem**

The 3494 uses the following tape subsystems:

- 3490E Model C1A, C2A, (see Figure 3 on page 5) or F1A (not shown)
- 3590 Model B1A or E1A with or without a 3590 or 3592 Controller
- 3590 Model H1A with or without a 3590 Model A60 Controller or a 3592 Model J70 Controller
- 3592 Model J1A with or without a 3590 Model A60 Controller or a 3592 Model J70 Controller

Note: The 3590 Model A60 Controller and the 3592 Model J70 Controller are not supported in Lx4 Frames.

3 **Rail system**

The rail system carries the cartridge accessor through the 3494. The rail system consists of two horizontal rails, one at the top and one at the bottom of the L Frame.

4 **Convenience I/O Station**

An optional convenience I/O station feature permits inserting or ejecting cartridges without interrupting normal automated operations.

Two convenience I/O station features are available:

- A 10-cartridge convenience I/O station (see Figure 3 or Figure 4 on page 5)
- A 30-cartridge convenience I/O station (not shown)

Note: Export and Import operations in the B18, B10, and B20 VTSs with the Advanced Function feature require a convenience I/O station.

5 **Operator panel**

The operator performs basic operating procedures from the operator panel.
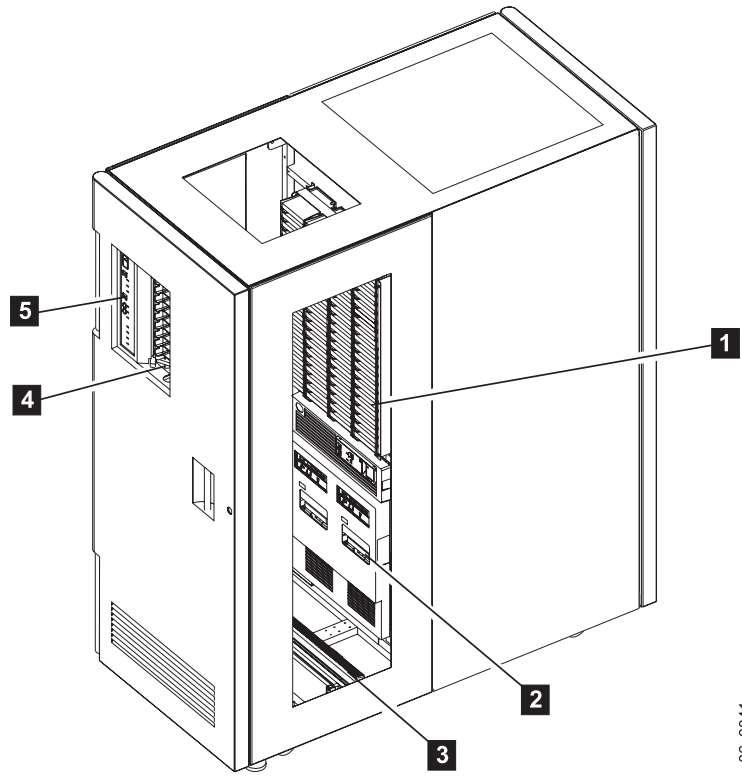
Figure 3. L10 Frame Functional Components, 3490E (Front View)
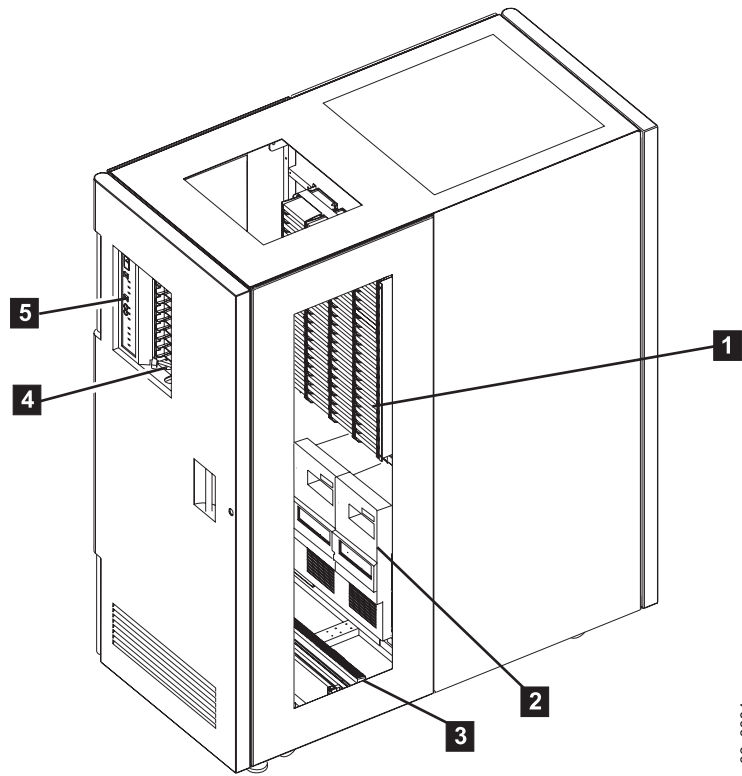
Figure 4. L12 Frame Functional Components, 3590 (Front View)
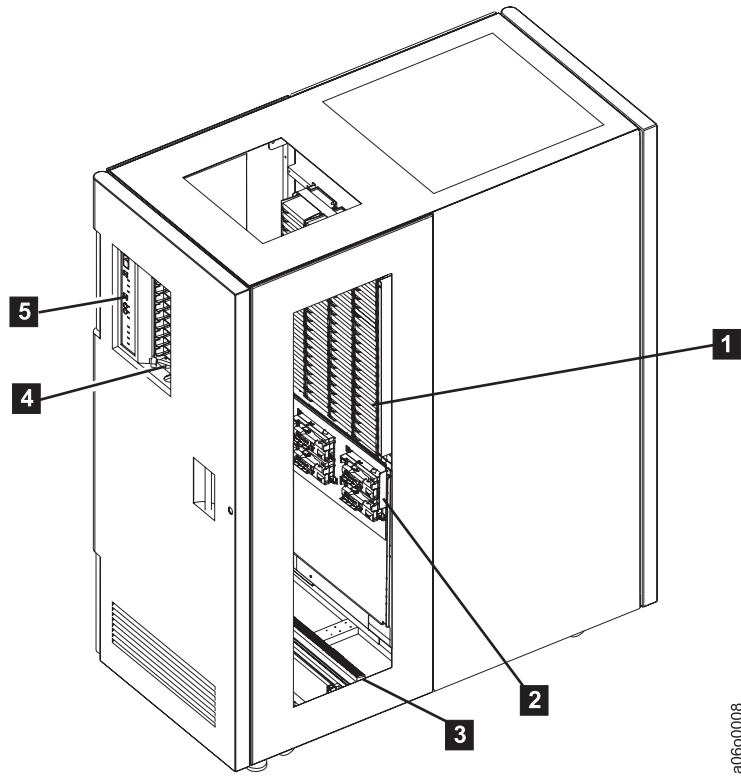
Figure 5. L22 Frame Functional Components, 3592 (Front View)

Figure 6 on page 7 shows the rear of the L1x or L2x Frame, with the following functional components:

1 Library Manager

The Library Manager controls all operations in the 3494. Its hardware consists of a controller, display, pointing device, and keyboard. An optional Remote Library Manager Console feature is available for remote installation in a local area network (LAN) environment. During normal operations, the operator panel controls operate the 3494. The Library Manager controls error recovery, operations status, and service.

2 Cartridge storage cells

The cells are located on the inside of the front door and on the back wall of the L Frame.

3 Cartridge accessor

The cartridge accessor moves on horizontal and vertical axes, moving cartridges between the storage cells, devices, and I/O facilities. The vision system (bar code reader) on the cartridge accessor identifies cartridges.

4 Picker

The picker is the part of the cartridge accessor that actually picks cartridges. The standard picker has one gripper. If the cartridge accessor has the optional Dual Gripper feature, the picker has two grippers.

5 3590 Model A00 or A50

The 3590 Model A00 or A50 Controller consists of a RISC processor and associated adapter cards.
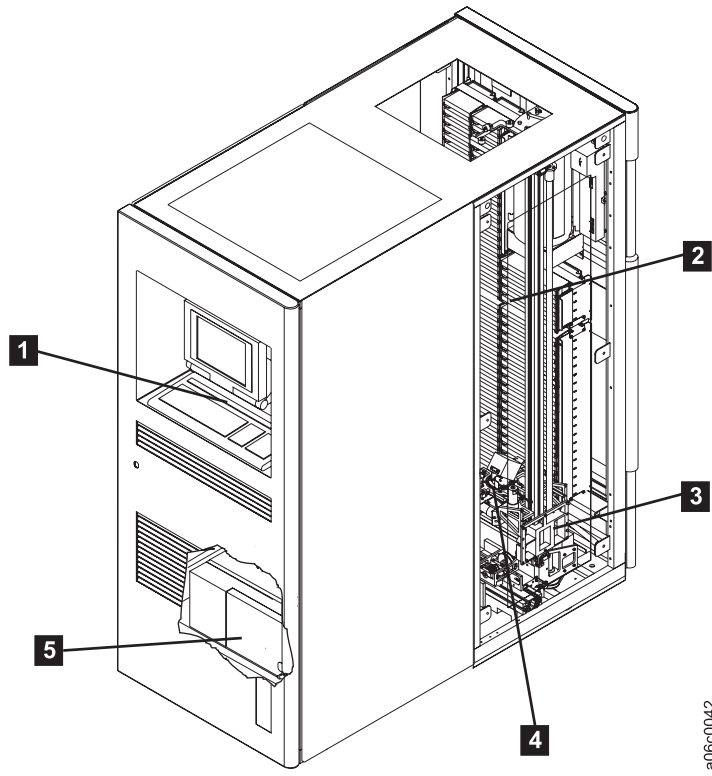
Figure 6. L14 Functional Components (Rear View)

Figure 7 shows the front of the IBM TotalStorage Enterprise Tape Storage Frame (S10 Frame) or (Model S10), with the following functional components:

1 **Cartridge storage cells**
> The cells are located on the inside of the front door and on the back wall of the S10 Frame.

2 **Rail system**
> The rail system carries the cartridge accessor through the 3494. The rail system consists of two horizontal rails, one at the top and one at the bottom of the S10 Frame.
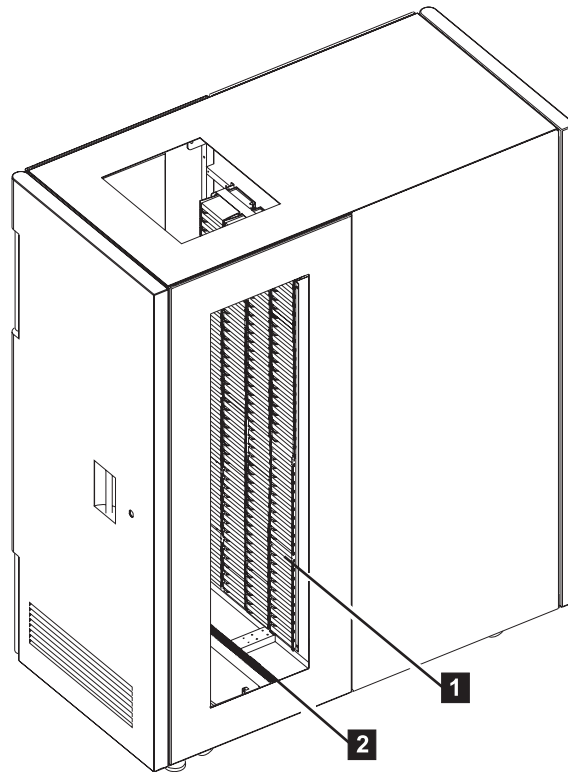
Figure 7. S10 Frame Functional Components (Front View)

Figure 8 shows the front of the D1x or D2x Frame. This example shows four 3590 tape subsystems, a 3590 Model A00, A50, or A60 Controller or a 3592 Model J70 Controller, and the following functional components:

1 **Cartridge storage cells**

   The cells are located on the inside of the front door and on the back wall of the D1x of D2x Frame.

2 **Tape subsystems**

   A D1x Frame can contain one of the following tape subsystems:

   - 3490E Model C1A, C2A (not shown), or F1A (one or two per frame)
   - 3590 Model B1A, E1A, or H1A with or without a 3590 or 3592 Controller
   - 3592 Model J1A with or without a 3590 Model A60 Controller or higher

   A D2x Frame can contain one of the following tape subsystems:

   - 3592 Model J1A with or without a 3590 Model A60 or higher

3 **Rail system**

   The rail system carries the cartridge accessor through the 3494. The rail system consists of two horizontal rails, one at the top and one at the bottom of the D1x of D2x Frame.
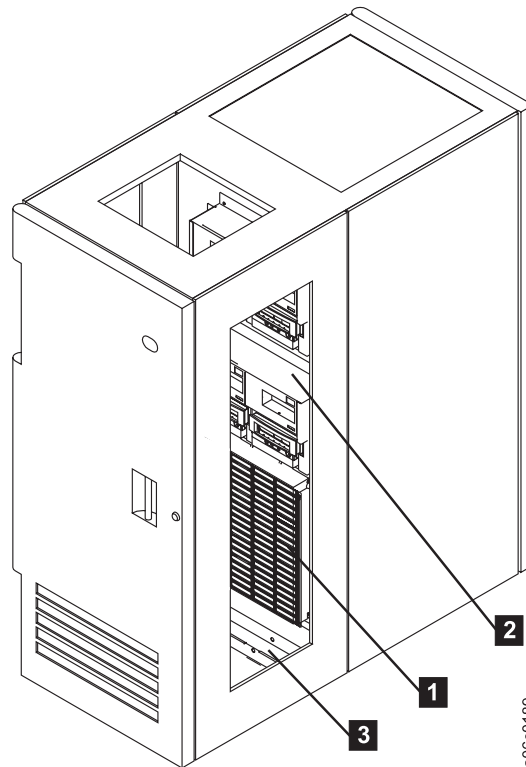
Figure 8. D1x or D2x Functional Components (Front View)

Figure 9 shows the rear (without the rear door) of the D1x Frame. This example shows four 3590 tape subsystems, a controller, and the following functional components:

1 **Cartridge storage cells**

The cells are located on the inside of the front door and on the back wall of the D1x Frame.

2 **Rail system**

The rail system carries the cartridge accessor through the 3494. The rail system consists of two horizontal rails, one at the top and one at the bottom of the D1x Frame.

3 **Primary control compartment**

The primary control compartment distributes power to all components in the frame.

4 **3590 Model A00, A50, A60 Controller or 3592 Model J70 Controller**

The 3590 Model A00, A50, A60 Controller or 3592 Model J70 Controller consists of a RISC processor and associated adapter cards.

5 **3590 tape subsystems**

Figure 9. D14 Frame Functional Components (Rear View)

Figure 10 shows the rear (without the rear door) of the D2x. This example shows eight 3592 tape subsystems, a 3592 Model J70 Controller, and the following functional components:

1 **Cartridge storage cells**
The cells are located on the inside of the front door and on the back wall of the D1x Frame.

2 **Rail system**
The rail system carries the cartridge accessor through the 3494. The rail system consists of two horizontal rails, one at the top and one at the bottom of the D1x Frame.

3 **Primary control compartment**
The primary control compartment distributes power to all components in the frame.

4 **3590 Model A60 Controller or 3592 Model J70 Controller**
The 3590 Model A60 Controller or 3592 Model J70 Controller consists of a RISC processor and associated adapter cards.

5 **3592 tape subsystems**
The D2x Frame can contain from zero to eight 3592 tape subsystems with a 3590 Model A60 or 3592 Model J70. The frame can contain from zero to twelve 3592 tape subsystems without a 3590 Model A60 or 3592 Model J70
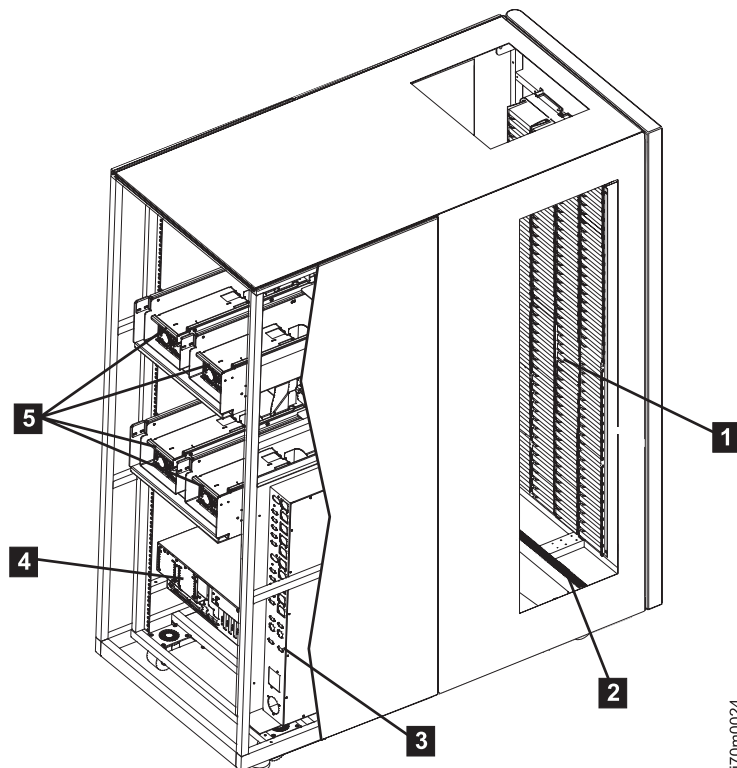
Figure 10. D2x Functional Components (Rear View)

Figure 11 on page 12 shows the front of the B16 VTS, with the following functional components:

1 **Cartridge storage cells**

The cells are located on the inside of the front door and on the back wall of the B16 VTS.

2 **Rail system**

The rail system carries the cartridge accessor through the 3494. The rail system consists of two horizontal rails, one at the top and one at the bottom of the B16 VTS.
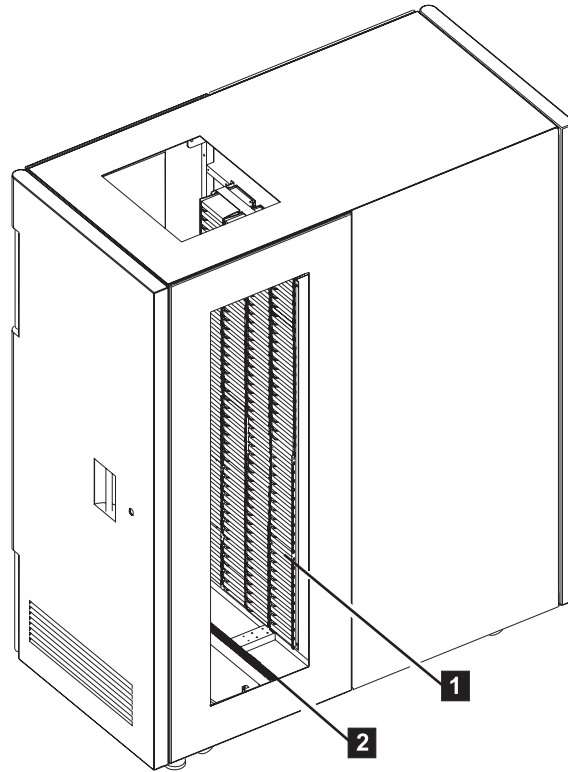
a06c0188

Figure 11. B16 VTS Functional Components (Front View)

Figure 12 shows the rear (without the rear door) of the B16 VTS, with the following functional components:

1 **Cartridge storage cells**

The cells are located on the inside of the front door and on the back wall of the B16 VTS.

2 **Rail system**

The rail system carries the cartridge accessor through the 3494. The rail system consists of two horizontal rails, one at the top and one at the bottom of the B16 VTS.

3 **Primary control compartment**

The primary control compartment distributes power to all components in the B16 VTS.

4 **VTS controller**

The VTS controller consists of a RISC processor and associated adapter cards.

5 **Disk storage**

Disk storage holds the contents of the tape volume cache. The VTS controller manages the disk storage. The VTS frame contains two or four disk storage drawers.
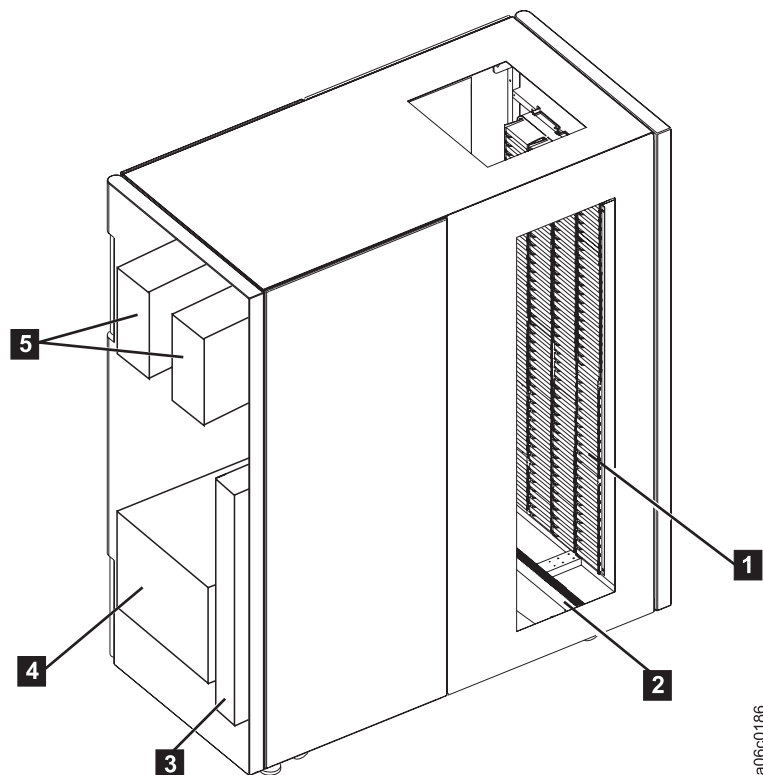
Figure 12. B16 VTS Functional Components (Rear View)

Figure 13 shows the front of the B18, B10, and B20 VTS.

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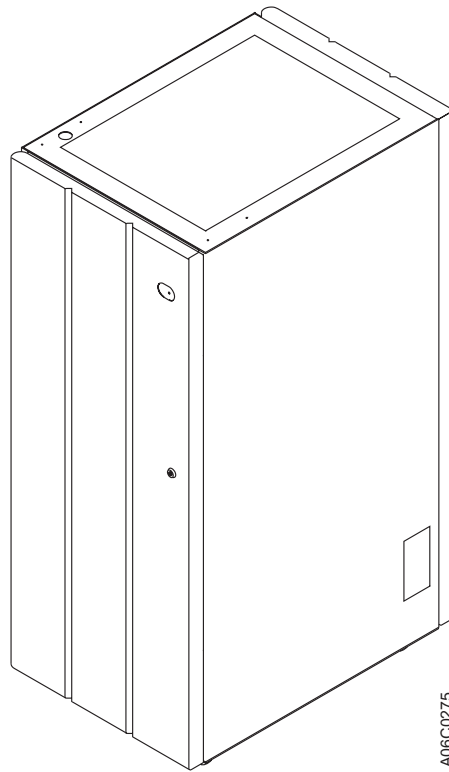
Figure 13. B18, B10, and B20 VTS (Front View)

Figure 14 shows the rear (without the rear door) of the B18, B10, and B20 VTSs, with the following functional components:

1 **Disk storage**
Disk storage holds the contents of the tape volume cache. The VTS controller manages the disk storage. A VTS may contain from one to four disk storage drawers, depending on the model.

2 **VTS controller**
The VTS controller consists of a RISC processor and associated adapter cards.

3 **Primary control compartments**
The primary control compartments distribute power to all components in the frame. Early B18 VTSs have only one primary control compartment.
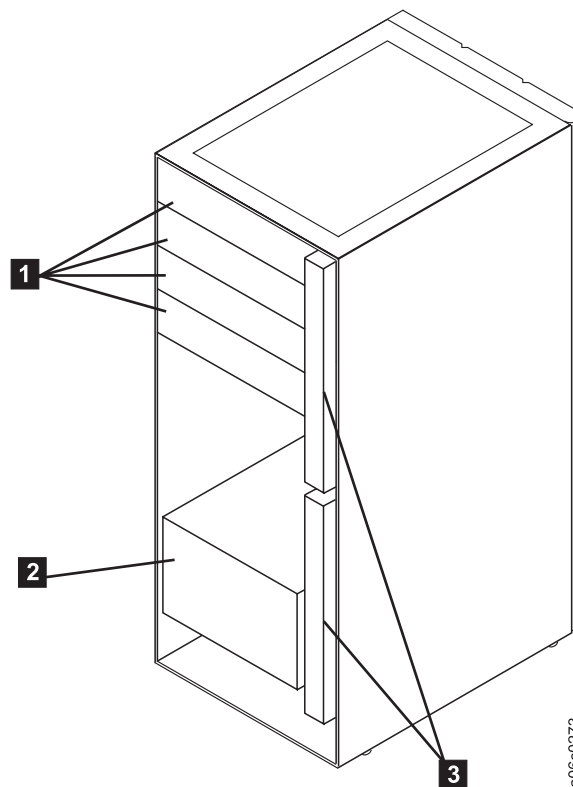
Figure 14. B18, B10, and B20 VTS Functional Components (Rear View)

Figure 15 shows the front of the CX0/CX1.
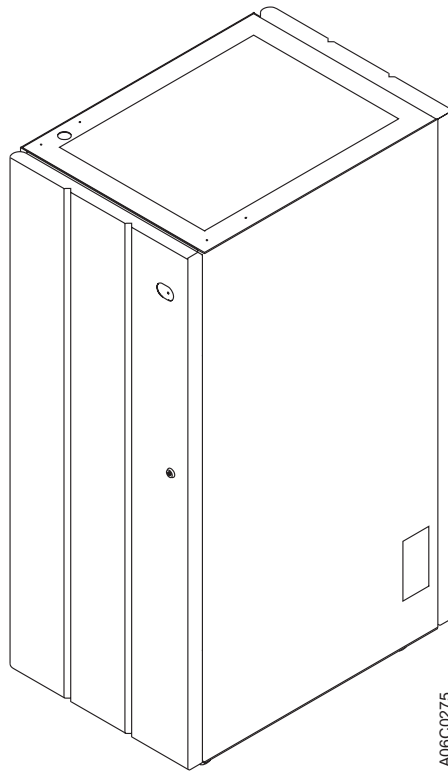
Figure 15. CX0/CX1 (Front View)

Figure 16 shows the rear (without the rear door) of the CX0, with the following functional components:

1 **AX0s**

Two or four AX0s may be installed in the CX0. The AX0s provide interconnection between the B18, B10, and B20 VTSs and host system ESCON attachments.

The position numbers for the AX0s are 0, 1, 2, and 3. Position 0 is the lowermost position; position 3 is the uppermost position. When the CX0 contains only two AX0s, they are in positions 0 and 1.

2 **Primary control compartments**

The primary control compartments distribute power to the AX0s in the CX0. The lower primary control compartment powers the AX0s in positions 0 and 2. The upper primary control compartment powers the AX0s in positions 1 and 3.
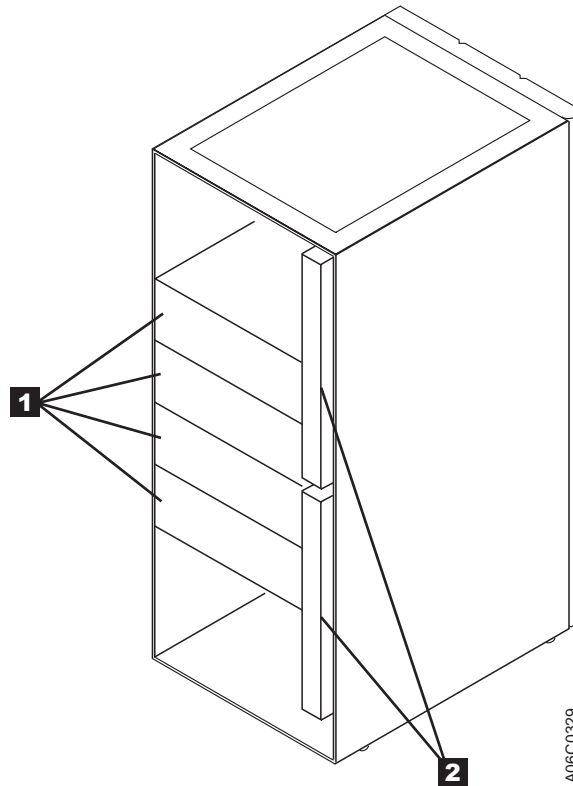
Figure 16. CX0 Functional Components (Rear View)

Figure 17 shows the rear (without the rear door) of the CX1, with the following functional components:

1 VTCs

Two or four VTCs may be installed in the CX1. The VTCs provide interconnection between the B18, B10 and B20 VTSs and host system FICON (B10/B20 only) and/or ESCON attachments.

The position numbers for the VTCs are 0, 1, 2, and 3. Position 0 is the lowermost position. Position 3 is the uppermost position. When the CX1 contains only two VTCs, they are in positions 0 and 1.

2 Primary control compartments

The primary control compartments distribute power to the VTCs in the CX1. The lower primary control compartment powers the VTCs in positions 0 and 2. The upper primary control compartment powers the VTCs in positions 1 and 3.
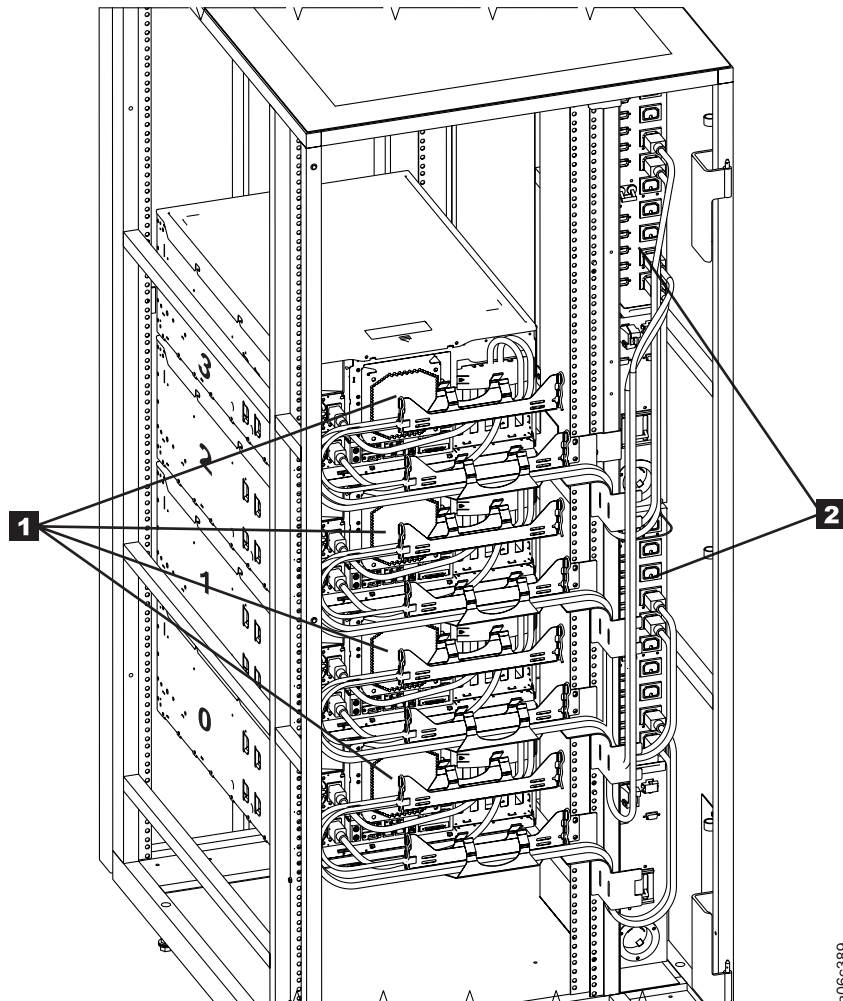
Figure 17. CX1 Functional Components (Rear View)

Figure 18 on page 19 shows the right-front of the HA1 Frames, left service bay, with the following functional components:

1 **Cartridge storage cells**
> The cells are located on the inside of the front doors and on the back walls of the HA1 Frames. They are for service use only.

2 **Barrier door**
> Service personnel use the barrier door to separate the service bay from the main aisle of the 3494. This allows concurrent service of the accessor and its associated hardware.
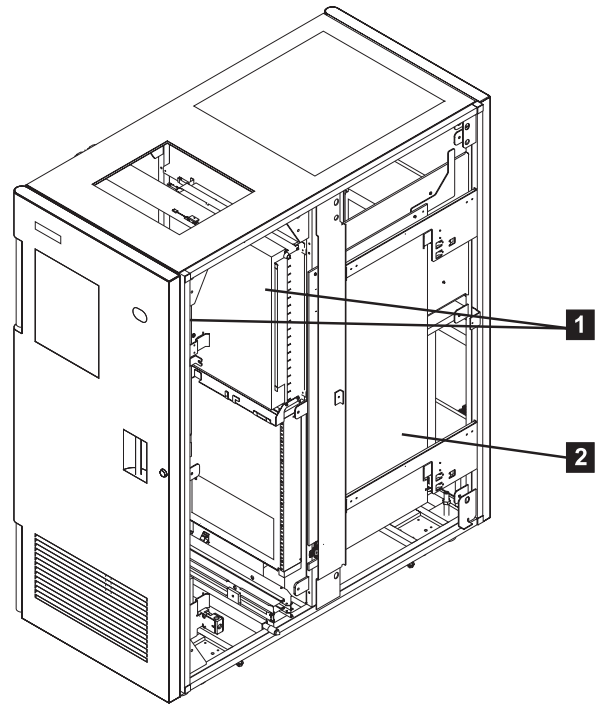
Figure 18. HA1 Frames, Left Service Bay Functional Components (Right-Front View)

Figure 19 shows the left-front of the HA1 Frame right service bay frame, with the following functional components:

1 Cartridge storage cells

> The cells are located on the inside of the front doors and on the back walls of the HA1 Frames. They are for service use only.

2 Barrier door

> Service personnel use the barrier door to separate the service bay from the main aisle of the 3494. This allows concurrent service of the accessor and its associated hardware.

3 Hot standby Library Manager

> The hot standby Library Manager can take control of all operations in the 3494. Its hardware consists of a controller, display, pointing device, and keyboard. An optional Remote Library Manager Console feature is available for remote installation in a Local Area Network (LAN) environment.

Hot standby accessor or second active accessor (not shown)

> This accessor moves on horizontal and vertical axes, moving cartridges between the storage cells, devices, and I/O facilities. The vision system (bar code reader) on the cartridge accessor identifies cartridges. Either Library Manager can control this accessor.

Picker (not shown)

> The picker is the part of the cartridge accessor that actually picks cartridges. The standard picker has one gripper. If the cartridge accessor has the optional Dual Gripper feature, the picker has two grippers.
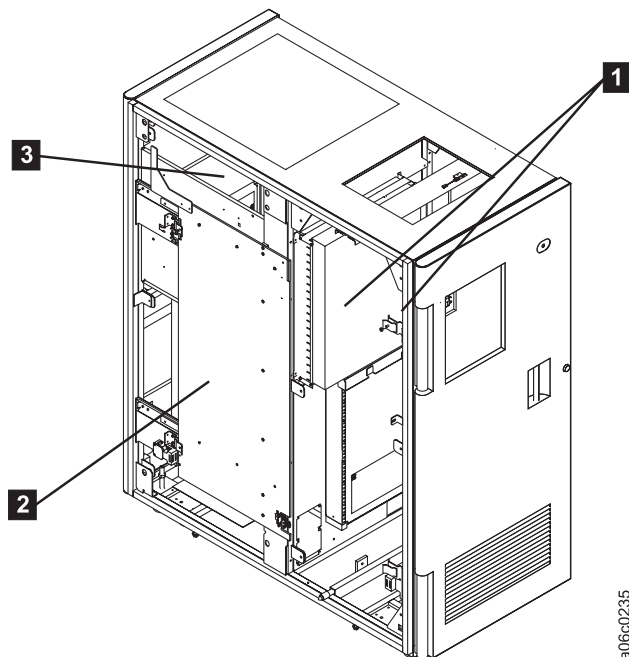
Figure 19. HA1 Frames, Right Service Bay Functional Components (Left-Front View)

Cartridge I/O Facilities

The following types of input and output facilities are available in the 3494:

- High-Capacity Output facility
- High-Capacity I/O facility
- Single-Cell Output facility
- Convenience I/O Station feature

High-Capacity Output Facility

The high-capacity output facility, if defined during installation, reserves a section of the cartridge storage area for high-capacity output of cartridges.

Library Type	Cartridge Capacity
Single Gripper	10, 20, 40, 80, or a full door
Dual Gripper	10, 20, 36, 72, or a full door

The cartridge storage cells are located inside the L1x of L2x Frame on wall 2, column A, starting with cell 1. This is expressed as location 2 A 1 **2** (see Figure 20 on page 22). See "Removing Ejected Cartridges from the High-Capacity Output Facility" on page 102 for operating instructions.

High-Capacity I/O Facility

A high-capacity I/O facility may be defined for the inside wall (drive side walls) so that the 3494 can perform inserts (Input) and ejects (Output). S10 Frame, B16 VTS, or odd-numbered D1x Frame (DU) walls 3 through 31 can be configured as high-capacity I/O. An S10 Frame or B16 VTS, configured as high-capacity I/O, can contain 100 (upper half) or 200 (whole wall) cells. A D1x or D2x Frame configured as high-capacity I/O contains from 50 (six 3590 drives) to 135 (two 3590 drives) cells. It uses all available cells in the wall. Only a single wall can be configured at any time (single high-capacity I/O facility).

Single-Cell Output Facility

If a convenience I/O station is not installed and a high-capacity output facility or high-capacity I/O facility is not defined, a single cell in the door of the L Frame is provided for output. The location of the single cell **1** as shown in Figure 20 on page 22 is defined as 2 A 1. If the cartridge accessor has the optional Dual Gripper feature, the single cell location is 2 A 3. Any empty and unassigned cell can be used for input operations. See "Removing an Ejected Cartridge from the Single-Cell Output Facility" on page 102 for operating instructions.
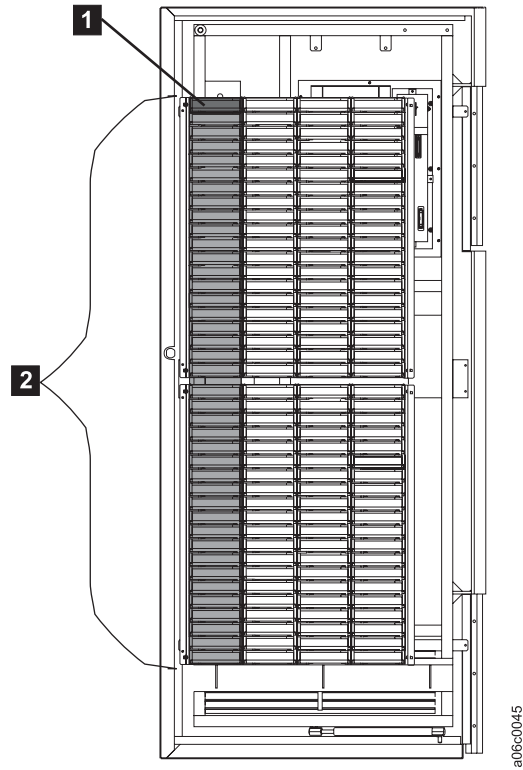
Figure 20. L1x Frame Cartridge Storage Cells

Convenience I/O Station Feature

If the 3494 has a convenience I/O station feature, you can add or remove up to ten cartridges without interrupting the normal operations of the 3494 (you can add or remove up to thirty cartridges if a high capacity convenience I/O station is installed). See "Using the Convenience I/O Station to Insert Cartridges" on page 98 and "Removing Ejected Cartridges from the Convenience I/O Station" on page 103 for the operating instructions for this feature.

There are two modes of operation for the convenience I/O station while in Input mode: **Insert** and **Import**. If one or more VTSs are capable of Export and Import operations, then the convenience I/O station is in **Import** mode.

Tape Storage Media

Notes:

1. **Cartridge tape** is the term used for 3490E & 3590 tape storage media.
2. **Tape cartridge** is the term used for 3592 tape storage media.
3. **Cartridge** is the generic term used when referring to any 3494 tape storage medium.

The design of the 3494 automates the storage and movement of two physical types of cartridges:

- **Cartridge tapes** for use with 3490E and 3590 drives
- **Tape cartridges** for use with 3592 drives

Cartridge Tapes (3490E and 3590 Drives)

The 3494 supports the following 3490E and 3590 cartridge tapes:

- Cartridge System Tape (3490E only)
- Enhanced Capacity Cartridge System Tape (3490E only)
- High Performance Cartridge Tape (3590 only)
- Extended High Performance Cartridge Tape (3590 only)

Figure 21 shows the Cartridge System Tape **1** , the Enhanced Capacity Cartridge System Tape **2** , the High Performance Cartridge Tape **3** , and the Extended High Performance Cartridge Tape **4** .
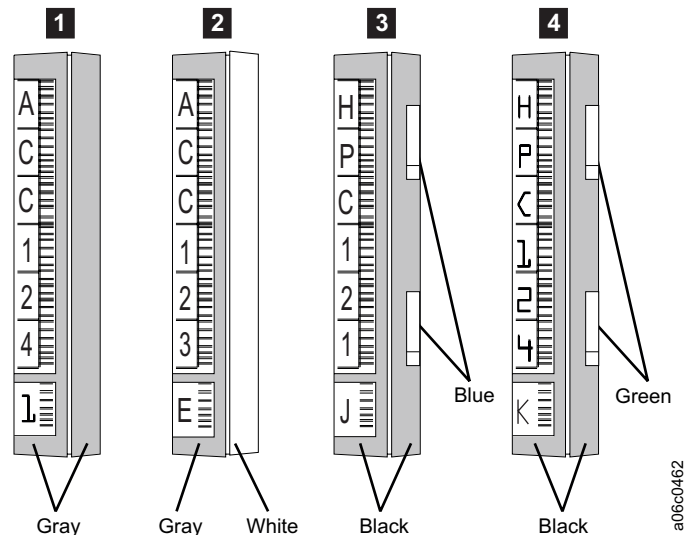
Figure 21. 3490E and 3590 Cartridge Tape Identification

All four cartridge tapes have a six-digit volume serial number (volser) label and a single-digit media-type label. During an Inventory or an Insert operation, the vision system reads the volser label and media-type label and stores their information in the Library Manager database. The media-type label identifies the cartridge tapes as follows:

- **1** identifies the Cartridge System Tape
- **E** identifies the Enhanced Capacity Cartridge System Tape.
- **J** identifies the High Performance Cartridge Tape

- **K** identifies the Extended High Performance Cartridge Tape

See "Unlabeled Tape Facility" on page 31 for more information.

Note: If the 3494 has more than one type of tape drive, all cartridge tapes should have a media-type label (see Figure 21 on page 23).

Cartridge Tape Requirements (3490E & 3590 Drives)
Figure 22 shows the following 3490E and 3590 cartridge tape requirements:
- The cartridge tape **1** must have an external volser label **2** applied.
- The write-protect switch **3** must be set to the correct position for the cartridge's intended purpose (see "Cartridge Tape File Protection (3490E and 3590 Drives)").
- The leader block **4** on the tape cartridge must be seated before inserting the cartridge into the 3494.
- The tape cartridge must be inserted into the 3494 cartridge storage cells in the direction **5** shown so that the external label is readable when stored.

  Note: When inserting the tape cartridges into the convenience I/O station, insert the label side first in the direction **6** .
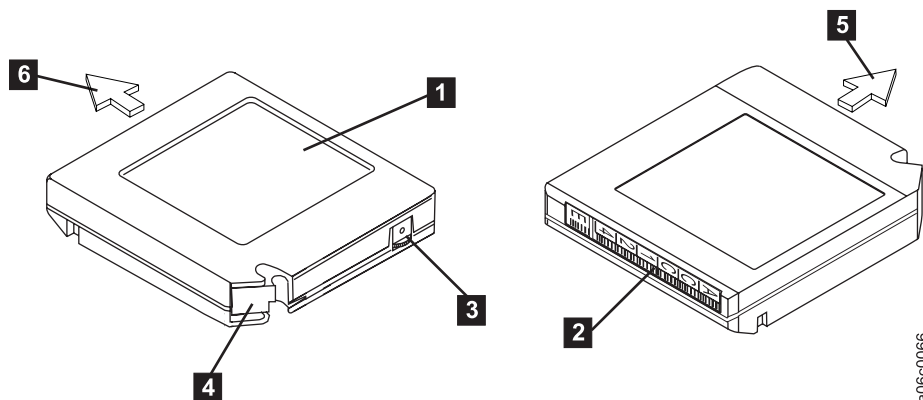
Figure 22. 3490E and 3590 Cartridge Tape Requirements

Cartridge Tape File Protection (3490E and 3590 Drives)
Each cartridge tape includes a write-protect switch (**3** in Figure 22) that, when set to the write-protect position, prevents either writing data to the tape or erasing data from the tape.

Normally, cartridges used in the 3494 should not be write-protected manually. If required, software can be used to write-protect the cartridges. This allows the host, when appropriate, to identify a cartridge that no longer contains current data and can therefore be used as a scratch cartridge. Do not write-protect scratch cartridges as new data cannot be written to write-protected cartridges.

For additional information, see *Care and Handling of the IBM Magnetic Tape Cartridge*.

Cartridge Tape Labels (3490E and 3590 Drives)
Each cartridge tape in the 3494 must have external labels that are operator- and device-readable. The labels identify the volser and the media type of the cartridge.

Currently supported labels are Tri-Code, available from Wright Line Corporation, Tri-Optic, available from Engineered Data Products, and labels available from Information Data Storage.

Note: The **only exception** for the label requirement is when using the Unlabeled Tape Operations function. See "Unlabeled Tape Facility" on page 31 for more information.

The volser label contains up to six characters, and the separate media-type label provides a seventh character for media type identification. A volser can contain one to six characters, with blanks that are padded on the right for a volser with fewer than six characters. Characters can be uppercase A–Z, the numerals 0–9, a blank space, or the characters enclosed in square brackets: [@ # $ * & - ?]. Each tape cartridge typically has a separate single-character media-type label that identifies the cartridge type as follows:

- **1** identifies the Cartridge System Tape.
- **E** identifies the Enhanced Capacity Cartridge System Tape.
- **J** identifies the High Performance Cartridge Tape.
- **K** identifies the Extended High Performance Cartridge Tape.

Notes:

1. Use the following rules to determine the volser media type:
   - The media type returned by the vision system is the first choice unless media type **J** or **K** is present.
   - If the media type is **J** or **K** and there are multiple partitions, the volser ranges are checked to determine whether to assign the volser to a VTS or to a non-VTS partition.
   - The volser ranges are used to determine a volser media type if the vision system can not determine it. If the volser being inserted is within one of the ranges, the range's associated media type is used. The search of the ranges is an inclusive search.
   - The system uses the default media type defined during the teach process to determine the media type if the volser does not fall into one of the ranges.
   - If there is no default media type, the volser is ejected, and an operator intervention is set.

The external labels on the cartridges identify the cartridges to the 3494. Host control software in some operating environments requires that internally written labels on volumes correspond to external volsers. IBM recommends that correspondence of external and internal cartridge labels be verified by library control software as part of mount processing. Cleaner cartridges must also have operator- and device-readable external labels to identify each cartridge.

High Performance Cartridge Tapes and Extended High Performance Cartridge Tapes that are managed by the VTS are checked automatically for the correct internal volume label. They are relabeled if necessary.

Figure 23 on page 26 shows the possible labeling configurations of the 3490E & 3590 cartridge tapes.Table 1 on page 26 shows how the 3494 processes the different types of 3490E & 3590 cartridge tape labeling configurations.
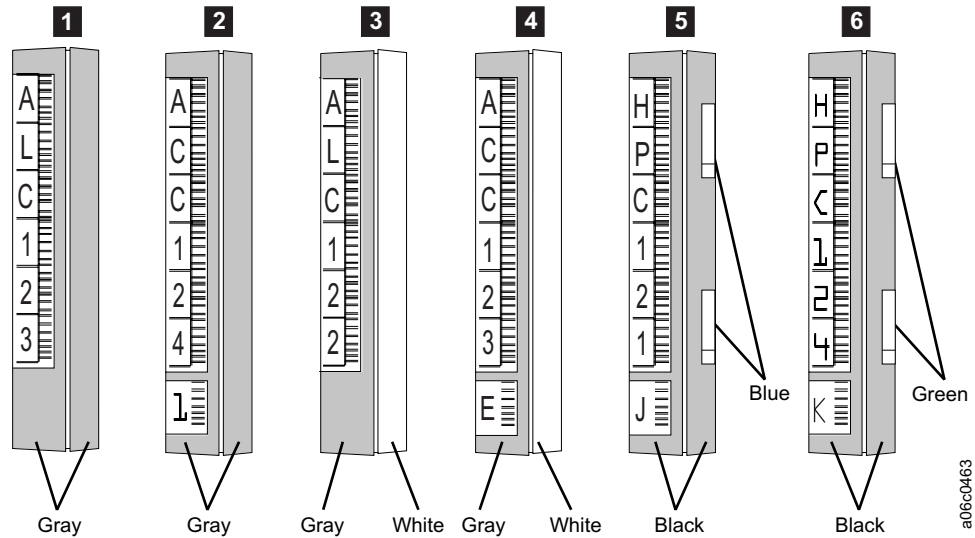
Figure 23. Cartridge Tape Labels (3490E and 3590 Drives)

Table 1. Cartridge Tape Labeling (3490E & 3590 Tape Drives)

Cartridge Type	Color	Media-Type Label	Processed as:
1 Cartridge System Tape	Gray	Not present	Cartridge System Tape (default, see note)
2 Cartridge System Tape	Gray	Present (**1**)	Cartridge System Tape
3 Enhanced Capacity Cartridge System Tape	Gray and white	Not present	Cartridge System Tape (default, see note)
4 Enhanced Capacity Cartridge System Tape	Gray and white	Present (**E**)	Enhanced Capacity Cartridge System Tape
5 High Performance Cartridge Tape	Black with blue leader block and identification notches	Present (**J**)	High Performance Cartridge Tape
6 Extended High Performance Cartridge Tape	Black with green leader block and identification notches	Present (**K**)	Extended High Performance Cartridge Tape
Note: The default could be Enhanced Capacity Cartridge System Tape, High Performance Cartridge Tape, or Extended High Performance Cartridge Tape instead of Cartridge System Tape (see "Operational Status" on page 138).			

Cartridge Tape Media-Type Labeling (3490E and 3590 Drives)

Apply the media-type label in one of the following areas:

- If the cartridge has no separate area below the volser label (for example, an indented area), place the media-type label in line with and just below the volser label.
- If the cartridge has a separate area (for example, an indented area) approximately 2 mm (0.08 in.) below the volser label, place the media-type label in the separate area.

See examples **2**, **4**, **5**, and **6** in Figure 23.

The label must be flat to within 0.5 mm (0.02 in.) over the length of the label and have no folds, missing pieces, or smudges. The label must not be rotated more than 3° from being parallel with the edges of the cartridge.

/ Tape Cartridges (3592 Drives)

/ The 3494 supports the following 3592 tape cartridges:

/ • Enterprise Tape Cartridge
/ • Enterprise Economy Tape Cartridge
/ • Enterprise WORM Tape Cartridge
/ • Enterprise Economy WORM Tape Cartridge

/ Figure 24 shows the Enterprise Tape Cartridge **1** , the Enterprise Economy Tape
/ Cartridge **2** , the Enterprise Economy WORM Tape Cartridge **3** , and the
/ Enterprise WORM Tape Cartridge **4** .
/

1

0 0 0 0 0 2 JA

Black Case

Dark blue
write-protect switch

2

0 0 0 0 0 2 JJ

Black Case

Light blue
write-protect switch

3

0 0 0 0 0 2 JR

Platinum Case

Light blue
write-protect switch

4

0 0 0 0 0 2 JW

Platinum Case

Dark blue
write-protect switch
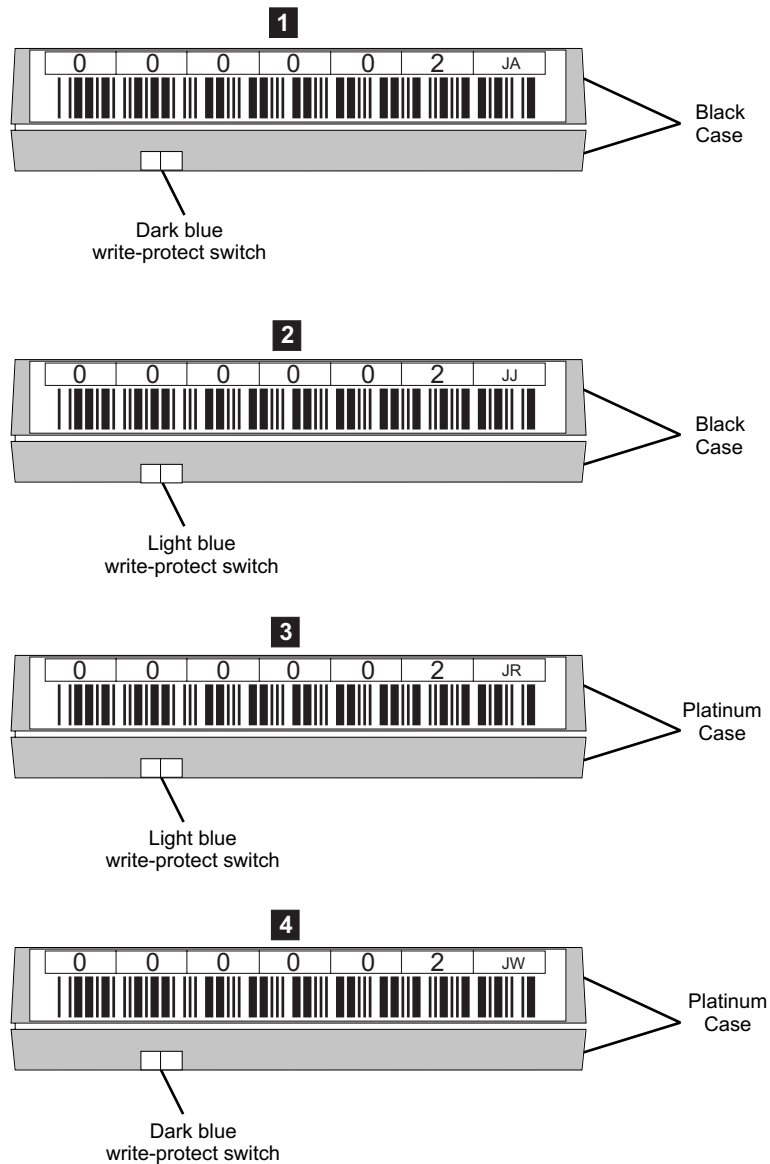
a06c0466

Figure 24. 3592 Tape Cartridge Identification

/ Table 2 summarizes the characteristics of the 3592 tape cartridges.

/ *Table 2. 3592 Tape Cartridges*

Name	Type[1]	Native Capacity	Case Color	Label, Door, & Write-Protect Switch Color	Part Number
Enterprise Tape Cartridge	JA	300 GB	Black	Dark Blue	18P7534
Enterprise Economy Tape Cartridge	JJ	60 GB	Black	Light Blue	24R0316
Enterprise Economy WORM Tape Cartridge	JR	60 GB	Platinum (silvery gray)	Light Blue	24R0317
Enterprise WORM Tape Cartridge	JW	300 GB	Platinum (silvery gray)	Dark Blue	18P7538
[1] The type identifier appears as the last two characters on the cartridge bar code label.					

Tape Cartridge Requirements (3592 Drives)

/ Figure 25 on page 29 shows the following 3592 tape cartridge requirements:

- The 3592 tape cartridge must be inserted into the 3494 cartridge storage cells in the direction **1** shown so that the external label is readable when stored.
- The 3592 tape cartridge **2** must have an external volser label **4** applied.
- The write-protect switch **5** must be set to the correct position for the cartridge's intended purpose (see "Tape Cartridge File Protection (3592 Drives)" on page 29).
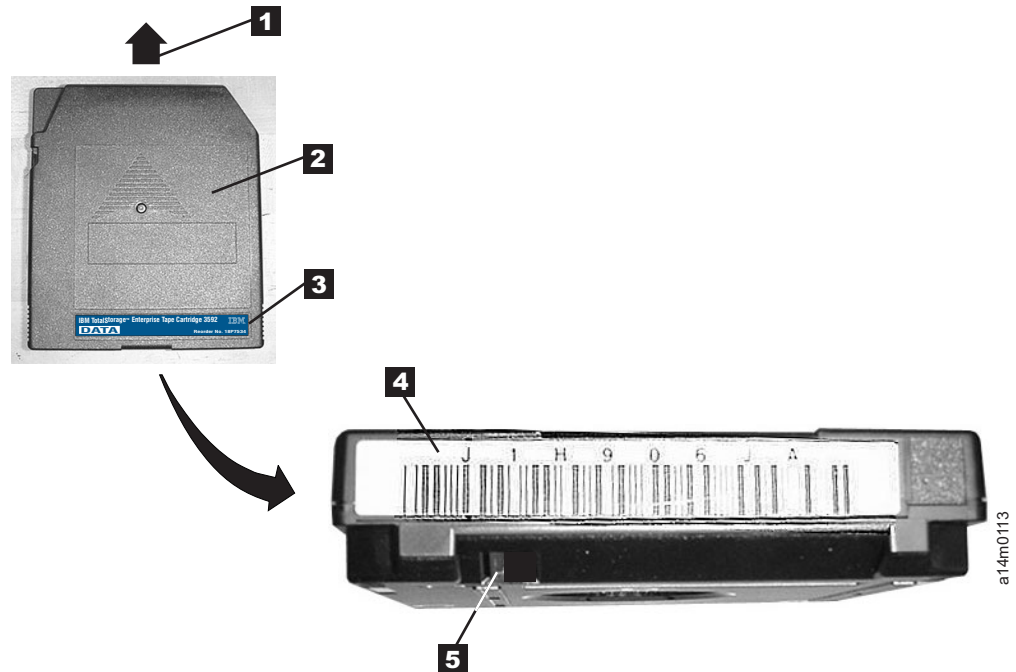
Figure 25. Tape Cartridge Requirements (3592 Drives)

Tape Cartridge File Protection (3592 Drives)

Each tape cartridge includes a write-protect switch (**5** in Figure 25) that, when set to the write-protect position, prevents either writing data to the tape or erasing data from the tape.

Normally, cartridges used in the 3494 should not be write-protected manually. If required, software can be used to write-protect the cartridges. This allows the host, when appropriate, to identify a cartridge that no longer contains current data and can therefore be used as a scratch cartridge. Do not write-protect scratch cartridges as new data cannot be written to write-protected cartridges.

For additional information, see *Care and Handling of the IBM Magnetic Tape Cartridge*.

Tape Cartridge Bar Code Labels (3592 Drives)

Each tape cartridge in the 3494 must have an external bar code label that is operator- and device-readable. The bar code label identifies the volser and the media type of the cartridge.

Note: The **only exception** for the label requirement is when using the Unlabeled Tape Operations function. See "Unlabeled Tape Facility" on page 31 for more information.

The bar code label contains eight characters. Characters can be uppercase A–Z, the numerals 0–9, a blank space, or the characters enclosed in square brackets: [@ # $ * & - ?]. The first six characters identify the volser; these characters are left-justified on the label. The seventh and eighth characters identify the cartridge type as follows:

• **JA** identifies the Enterprise Tape Cartridge (**1** in Figure 26 on page 30).

/   • **JJ** identifies the Enterprise Economy Tape Cartridge (**2** in Figure 26).

/   • **JR** identifies the Enterprise Economy WORM Tape Cartridge (**3** in Figure 26).

/   • **JW** identifies the Enterprise WORM Tape Cartridge (**4** in Figure 26).

/ Note that host control software in some operating environments requires that
/ internally written labels on volumes correspond to external volsers. IBM
/ recommends that correspondence of external and internal cartridge labels be
/ verified by library control software as part of mount processing. Cleaner cartridges
/ must also have operator- and device-readable external labels to identify each
/ cartridge.

/ Figure 26 shows the labeling conventions of the 3592 tape cartridges.

/
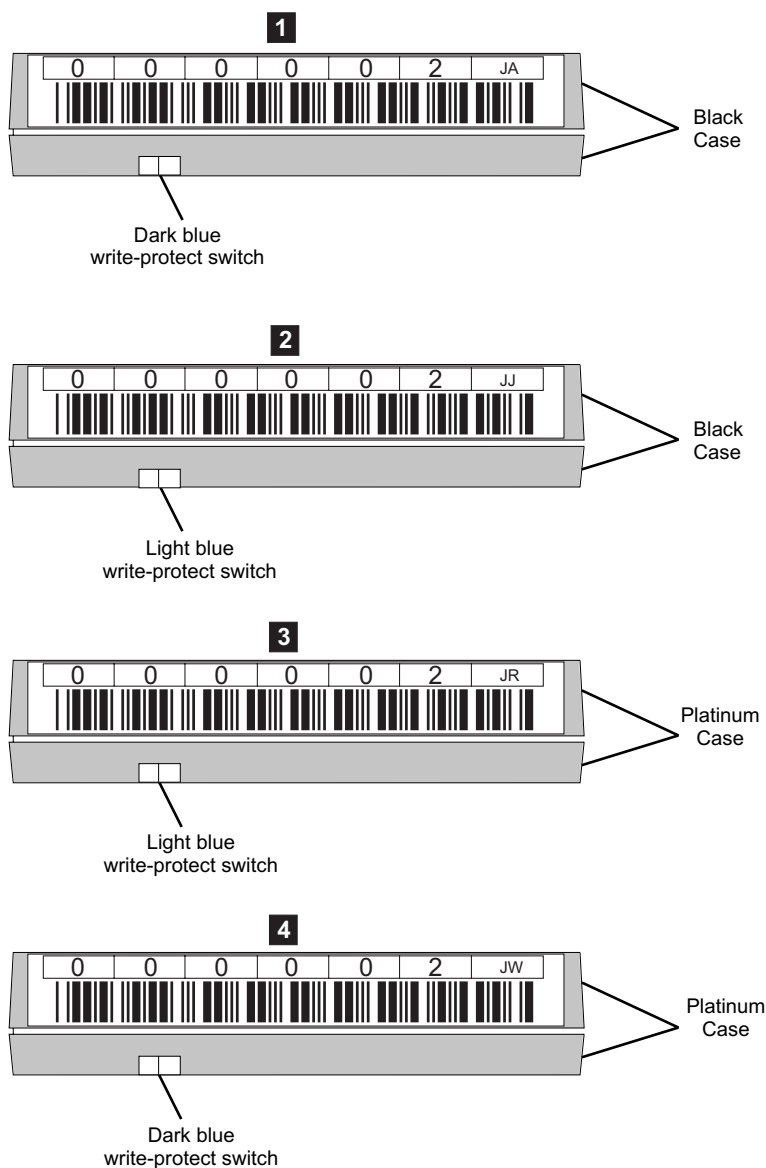
Figure 26. 3592 Tape Cartridge Labels

/ Labels can be ordered directly from the authorized label suppliers listed in Table 3.

/ *Table 3. Authorized Suppliers of 3592 Tape Cartridge Bar Code Labels*

In the Americas	In Europe and Asia
EDP/Colorflex 2550 West Midway Boulevard Broomfield, CO 80020-1633 U. S. A. Telephone: 800-432-1337 or 303–666-2160 `http://www.colorflex.com/Ai/Home.asp`	EDP Europe, Ltd. 43 Redhills Road South Woodham Ferrers Chelmsford, Essex CM3 5UL U. K. Telephone: 44 (0) 1245-322380 `http://www.edpeurope.com/media_labelling.htm`
Dataware 7570 Renwick Houston, TX 77081 U. S. A. Telephone: 800-426-4844 `http://www.datawarelabels.com/`	Dataware Labels Europe Heubergstrasse 9 D-83052 Bruckmuhl-Gotting Germany Telephone: 49 806-29455 `http://www.datawarelabels.com/`
NetC P. O. Box 320784 Fairfield, CT™ 06432 U. S. A. Telephone: 203-372-6382 `http://www.netcllc.com/`	NetC Europe Ltd Town Farm Bungalow North Curry Taunton Somerset U. K. TA3 6LX Telephone: 44 (0) 1823 491439 `http://www.netclabels.co.uk`
	NetC Asia Pacific Pty Ltd Locked Bag 14 Kenthurst NSW Australia 2156 Telephone: 61 (0) 2 9654 8272 `http://www.netclabels.com.au`

/ Unlabeled Tape Facility

Note: Do not use this function with cartridges that have device-readable labels.

The design of unlabeled tape operations allows you to insert volumes occasionally into the 3494 that do not have external device-readable volser and media-type labels. When inserted through the unlabeled tape facility, the volumes may be used in the same manner that regular, properly labeled volumes are used, with the exception of any operations that require the external device-readable label to be read.

It is not recommended that volumes to be managed by the VTS be inserted using this facility. However, if the external label on a stacked volume becomes damaged, this facility can be used to reinsert the volume until its external label can be replaced.

To use the unlabeled tape facility, select the **Insert Unlabeled Cartridges...** option on the Commands window on the Library Manager. Then provide the volser and media-type information requested. The unlabeled tapes are then placed into the convenience I/O station. The 3494 then moves the cartridges from the convenience I/O station to their designated cells. The Library Manager database is updated to indicate the location of the cartridges using the volser and media-type information provided. All hosts are notified that the cartridges have been added to the insert category just as regular, properly labeled volumes are handled.

Inventory update operations verify only that all unlabeled cartridges are in cells that previously contained unlabeled cartridges.

Note: Do not use this facility for a large number of cartridges or for cartridges that are stored in the 3494 for a long time. See "Insert Unlabeled Cartridges" on page 271 for additional information.

Cartridge Bar Code Labeling

To apply an external cartridge bar code label, perform the following:

1. Examine the label before you apply it to the cartridge. Do not use the label if it has voids or smears in the printed characters or bar codes.
2. Remove the label from the label sheet carefully; do not stretch the label or cause the edges to curl.
3. Line up either end of the label with the lip of the label indentation. Be sure to position the bar code side of the label toward the inside edge of the indentation. Do not allow the label to roll up or over this lip; the label must be flat within the cartridge indentation surface. Apply the label either from the top or from the bottom. Carefully position the label within the indentation on the end of the cartridge away from the leader block. The device-readable bar code must face to the right.
4. Apply the label parallel to the long edge of the indentation. Do not pull the label excessively because it will stretch.
5. Smooth out the label so that no wrinkles or bubbles exist on the label. Use light finger pressure to smooth the label and secure it to the cartridge.
6. Verify that the label is smooth and parallel and has no roll-up or roll-over.

   The label must be flat to within 0.5 mm (.02 in.) over the length of the label and have no folds, missing pieces, or smudges. Figure 27 on page 33 shows the correct position of the label on the cartridge case.
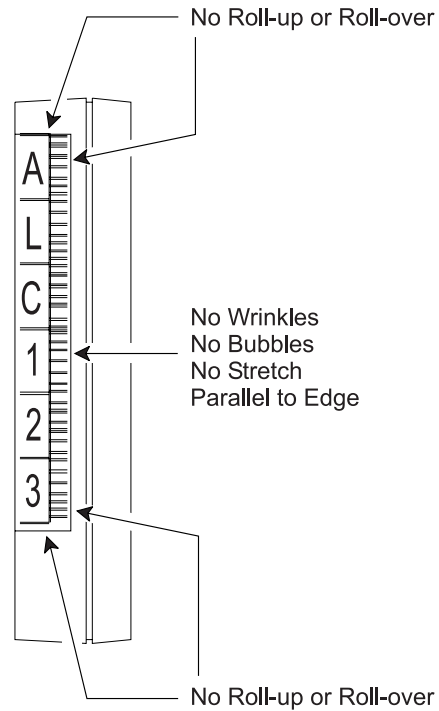
Figure 27. Cartridge Bar Code Label Guidelines

/   **Note:**   While Figure 27 shows only a 3490E/3590 bar code label, the guidelines
/   apply equally to a 3592 bar code label.

Do not place a new label over an existing label. Remove an old label by pulling it
slowly at a right angle to the cartridge case. Do not reuse a label.

No other labels can be placed on the same surface as the external volser cartridge
label. Labels on other surfaces of the cartridge must not interfere with the cartridge
accessor's gripper or the tape drives, and they should **not** be device-readable. If
they are, they may interfere with the ability of the vision system to read the volser
and the media-type label.

Cartridge Storage Cells

The names of the cartridge cell locations allow you to find the cartridges during Manual mode operation. The cell name consists of three values: a wall number, a column letter, and a row number. For example, Figure 28 shows cell location 2 A 1.
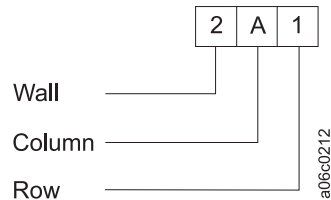
Figure 28. Cartridge Storage Cell Names

Figure 29 on page 35 shows the labeling of the cartridge storage cell.

Wall number   The even-numbered wall numbers **3** represent the walls on the front doors of the 3494. The odd-numbered wall numbers represent the walls on the rear of the 3494.

Column letters   The column letters **1** range from A to E. The letters start with A at the left of the frame and end with E at the right.

   Note: The L1x Frame has only four columns; therefore, the letter range is from A to D.

Row numbers   The row numbers **2** range from 1 to 20 or from 1 to 40, depending on the frame and the wall. The numbers start with 1 at the top of the frame and end at 40 for the lowest row.
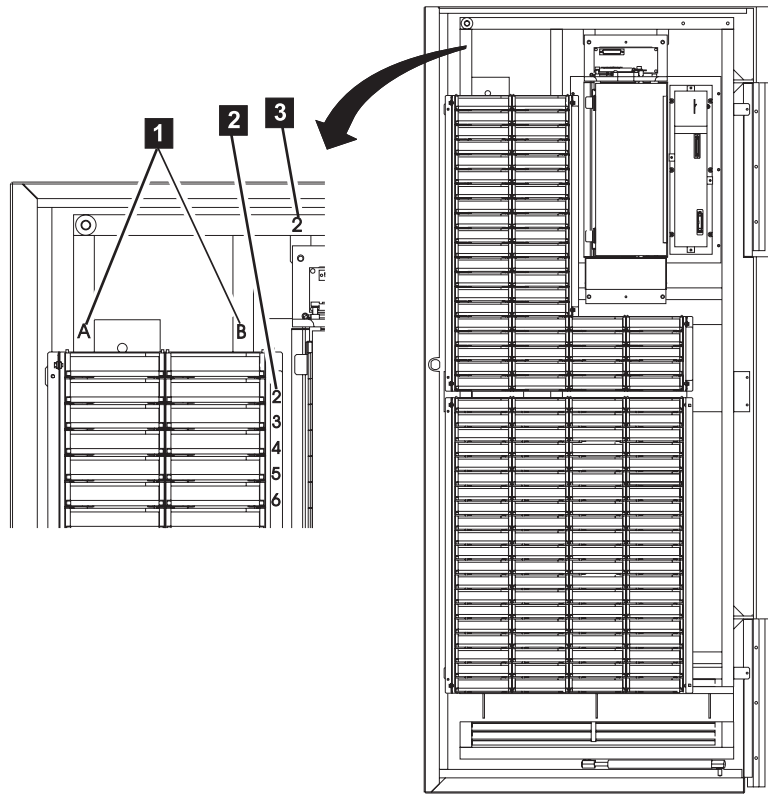
Figure 29. Cartridge Storage Cell Labeling

Reserved Cartridge Storage Cells

The 3494 reserves certain cells within the 3494 for functions that you do not control actively.

In other than the HA1 Frames, these locations are Error Recovery Cells 1 A 1 (if the optional Dual Gripper feature is installed, 1 A 3 instead of 1 A 1) and CE cartridge cell 1 A 20. If two drive types are present, CE cartridge cell 1 A 19 is also reserved. If three drive types are present, CE cartridge cell 1 A 19 and 1 A 18 are also reserved. These are used as error recovery cells and for service cartridges.

In the HA1 Frames, these locations are Error Recovery Cells 1 A 1 and 1 A 2, or, if the Dual Gripper feature is installed, 1 A 3 and 1 A 4. CE cartridge cells are stored in the service bays.

Cartridge Storage Capacity

Table 4 shows the cartridge capacity of each frame.

Table 4. 3494 Cartridge Capacity

Model or Frame	Without Dual Gripper	With Dual Gripper
L10, L12, L14, L22 Frame	240 (see notes 1, 4, 5, and 6)	216 (see notes 2, 4, 5, and 6)
S10 Frame	400®	360
D10 Frame (without 3490E Model CxA or F1A)	400	360
D10 Frame (with 3490E Model CxA or F1A)	300	270
D12 Frame	400	360
D12 Frame (without 3590 Model B1A, E1A, or H1A)	400	360
D12 Frame (with one or two 3590 Model B1A, E1A, or H1A)	335	305
D12 Frame (with RPQ), (with three or four 3590 Model B1A, E1A, or H1A)	290	260
D12 Frame (with RPQs), (with RPQ and five or six 3590 Model B1A, E1A, or H1A)	250	230
D22 Frame	400	360
D22 Frame (without 3592 Model J1A)	400	360
D22 Frame (with one to four 3592 Model J1As)	335	305
D22 Frame (with five to eight 3592 Model J1As)	290	260
D22 Frame (with nine to twelve 3592 Model J1As)	250	230
D14 Frame (without 3590 Model B1A, E1A, or H1A)	400	360
D14 Frame (with one or two 3590 Model B1A, E1A, or H1A)	345	305
D14 Frame (with RPQ and three or four 3590 Model B1A, E1A, or H1A)	305	275
D24 Frame (without 3592 Model J1A)	400	360
D24 Frame (with one to four 3592 Model J1As)	345	305
D24 Frame (with five to eight 3592 Model J1As)	305	275
VTS B16	400	360
B18, B10, B20 VTS, CX0 or CX1	0	0
HA1 Frames (service bays)	0	0

Table 4. 3494 Cartridge Capacity (continued)

Model or Frame	Without Dual Gripper	With Dual Gripper
Notes:		
1. Optional convenience I/O station features reduce the cartridge capacity by 30 cartridges (FC 5210) or 80 cartridges (FC 5230).		
2. With FC 5215 (Dual Gripper) installed, the convenience I/O station features reduce the cartridge capacity by 26 cartridges (FC 5210) or 72 cartridges (FC 5230).		
3. Selecting the high-capacity I/O facility reduces the cartridge capacity, depending on the options chosen (see "High-Capacity I/O Facility" on page 21).		
4. One cell is reserved for ejecting cartridges if a convenience I/O station feature is not installed and the high-capacity output facility is not defined.		
5. A maximum of two cells is reserved for certain service representative functions. With the HA1 Frames installed, there are no cells reserved in the L1x for service functions.		
6. One cell is reserved for error-recovery operations in configurations without the HA1 Frames. Two cells are reserved for error-recovery operations in configurations with the HA1 Frames.		

Library Manager

The Library Manager processes all requests and control functions in the 3494.

User Interface

The user interface enables you to obtain information about the operation of the 3494. It also instructs the Library Manager to perform specific tasks through the use of the Library Manager console (display and keyboard with its pointing device).

You can also access the Library Manager from a remote location. For information on how to do this, see Chapter 7, "Remote Library Manager Console Feature," on page 345 or "IBM TotalStorage 3494 Tape Library Specialist" on page 40.

Password Protection

Password protection for the level of authorization is optional. The user interface recognizes the following authorization levels:

General operator
> A general operator performs the day-to-day basic interactions with the 3494. This is limited generally to inquiries about the 3494 status or to perform cartridge insert and eject operations. A general operator has a limited level of authorization.

System administrator
> A system administrator is an operator with additional training on the management of both the 3494 and the data. The system administrator typically handles the initial installation of volumes into the 3494 and resolves problems with volumes during operation. The system administrator has authorization access to all functions of the 3494, except for those uniquely related to the service and repair of the 3494.

Service representative
> The service representative has full authorization access to all functions of the 3494.

If you choose to use password protection, the password can protect the following functions of the Library Manager:

- Service menu
- Inventory new storage
- Reinventory complete system
- Emergency power off (EPO) recovery
- Shutdown
- Keyboard and display lockup
- System administrator to unlock
- Unlock keyboard and display
- Service Access
- Cancel VTS Export and Import

Each time a user enters a part of the application that requires a password, then enters a password, a log entry is made at the Library Manager. Exiting a protected menu also creates a log entry. See "Change System Administrator Password" on page 290 for more information.

Database

The Library Manager creates and maintains a database that contains the following:

- The configuration of the 3494
- Physical location information for all the elements of the 3494 that the cartridge accessor services
- The inventory of the physical cartridge volumes and logical volumes that a VTS manages; also information about their use and current status
- The status of each 3490E, 3590, or 3592 device and virtual device

As operations progress through the library, the Library Manager updates the database dynamically on the disk drive to reflect the current status of the 3494.

HA1 Frames

If the HA1 Frames are installed, the right service bay contains a second Library Manager. Each Library Manager contains two hard (disk) drives: a primary disk and a secondary disk. Under normal operation, one Library Manager is the active Library Manager, and the other Library Manager is the standby Library Manager. The active Library Manager, on its primary disk, creates and updates the database dynamically to reflect the current status of each 3494. The secondary disk contains a backup of the database, which the Library Manager also updates dynamically to reflect the current status of the 3494.

If the active Library Manager fails, the standby Library Manager becomes the active Library Manager automatically and takes control of operations. A new backup database is then created on the active Library Manager's secondary disk. The new active Library Manager runs in degraded mode until the failing Library Manager is repaired. This allows continued operation of the 3494.

Database Information Available to a Host

The Library Manager maintains information in its database that a host may request. The form of the particular host request is dependent on the host environment. The following information is available through the host:

Category inventory data	Records for 100 volumes in the 3494 for the category specified, starting after the sequence number that the request specifies. If fewer than 100 volumes are in the category, the Library Manager returns all of the remaining records. Each record contains the current status and media type for a volume in the inventory.
Device data	Information about any particular device in the 3494. This information includes the device states, volser, and category of the mounted cartridge.
Expanded volume data	More detailed information about the current status and media type for a specific volume than the volume data information request. It does not provide physical location information for the volume.
Inventory volume count	The number of volumes in the 3494 for either the entire inventory or a specified category.
Inventory data	Records for 100 volumes in the 3494, starting after the volume that the request specifies. If fewer than 100 volumes remain in the 3494, the Library

Manager returns all of the remaining records. Each record contains the current status and media type for a volume in the inventory.

Library information data   The current operational status of the 3494 and basic 3494 configuration data with information on installed options.

Reserved category data   Information about the categories that have already been reserved in the 3494.

Statistical data   Information about the current work load and performance characteristics of the 3494.

Volume data   Information about the current status and media type of the volume specified.

Category attribute data   Information about the category attributes, for example, the name.

IBM TotalStorage 3494 Tape Library Specialist

The IBM TotalStorage 3494 Tape Library Specialist (Specialist) is a Web-based user interface to the Library Manager. Using the Specialist, you can access information such as current 3494 status and VTS statistics from your Web browser by connecting to the Web server on the Library Manager PC. The Web server serves HTML pages to a remote Web browser over your LAN connection or through the Remote Service Access connection over a modem for Service. For detailed information on the functions and features of the Tape Library Specialist, see "3494 Web Interfaces" on page 331.

The minimum requirements to use the Specialist are as follows:
- 64 MB of RAM
- Functional code of 524 or greater

The Specialist feature is already on your 3494. To enable it, simply go to the **Commands** drop-down menu in the Library Manager and select **Specialist (Web Server)**. Then, select **Enable/Disable** and enable the Specialist. Please see the Specialist (Web Server) section in Chapter 6. Advanced Operating Procedures for more information.

The Tape Library Specialist is not a replacement for the Remote Library Manager Console (see Chapter 7, "Remote Library Manager Console Feature," on page 345). The Tape Library Specialist allows multiple active server connections at the same time (service and several user connections). It supports English and Japanese.

Operational Modes and States

The 3494 operates in one of the following modes:
- Auto
- Pause
- Manual

The 3494 operates in one of the following operational states:
- Online
- Offline

For a detailed description of these operations, see Chapter 4, "Operational Modes, Operational States and Informational States," on page 85.

3590 Model A60 and 3592 Model J70 Controller Adjacent Frame Support

The Adjacent Frame Support feature allows up to ten 3590 tape drives or up to twelve 3592 tape drives to be attached to the same 3590 Model A60 Controller or 3592 Model J70 Controller. Previously, a maximum of four 3590 tape drives could be attached to the same 3590 Model A60 Controller. A D14 Frame must have four 3590 tape drives or a D24 Frame must have eight 3592 tape drives installed and attached to the 3590 Model A60 Controller or 3592 Model J70 Controller. The second frame can be one of the following:

- L12 Frame with up to two tape drives (3590) attached to a D14 Frame (see note)
- L22 Frame with up to four tape drives (3592) attached to a D24 Frame
- D12 Frame with up to six tape drives (3590) attached to a D14 Frame
- D22 Frame with up to four tape drives (3592) attached to a D24 Frame

Note: The second frame can be an L14 Frame if the L14 is taught as an L12. These tape drives can be attached to the 3590 Model A60 Controller or 3592 Model J70 Controller in the adjacent D14 Frame or D24 Frame.

This feature allows two frames to be "linked" together. The frames are "linked" during the teach operation, which the service representative performs during installation. The linked frames must be adjacent to one another.

Call Home Support

The Call Home function generates a service alert automatically when a problem occurs with one of the following units:

- B18, B10, or B20 VTS
- AX0 or VTC
- 3590 Model A50 or A60 Controller
- 3592 J70 Controller
- Library Manager, if attached to a 3590 Model A60 Controller, 3592 Model J70 Controller, or VTS that supports Call Home, or directly to a TotalStorage Master Console

Status information is transmitted to the IBM Support Center for problem evaluation; a service representative can be dispatched to the installation. The user may also initiate the Call Home process using the Library Manager operator panel for a problem with one of the listed units. Call Home allows the service alert to be sent to a pager service so that multiple people, including the operator, can be notified. The Call Home function is not active automatically. Your service representative can activate the function at the installation of the listed units. The service representative may also activate or deactivate the function through service menus.

Chapter 2. Controls and Indicators

This chapter describes the controls and indicators for the 3494.

You control the 3494 through the operator panel (**1** in Figure 30) on the front of the L Frame. A convenience I/O station feature **2** (if installed) is also on the front of the L Frame, next to the operator panel. The handles **3** for opening the doors on the front of the frames are located next to the door locks **4** . The Library Manager is in the rear of the L Frame (see Figure 33 on page 47). The tape subsystem controls are on the front of the drives, inside the L Frame and D Frame.

Note: The 3494 shipping group supplies two keys. Operators and service personnel use one key to open the front doors on the 3494. Service personnel use the other key to open the doors on the back of the 3494.
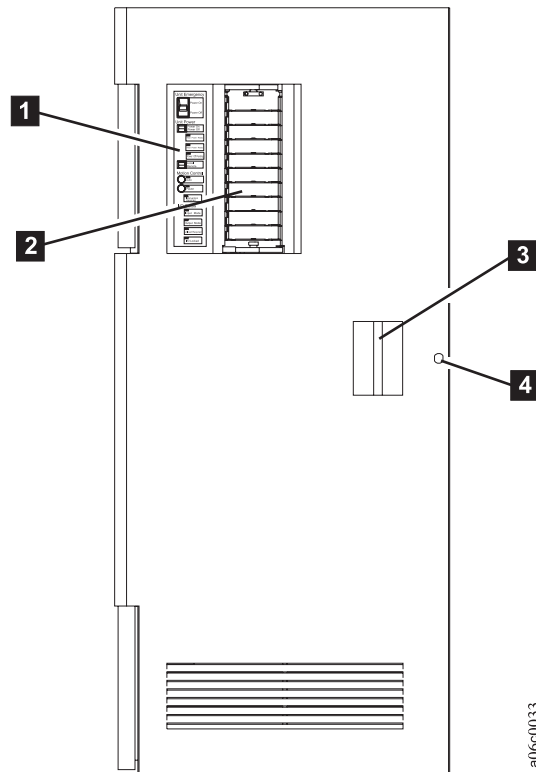
Figure 30. L1x Frame - Front Door

L Frame Operator Panel

The front door of the L Frame holds the operator panel. You control normal operation of the 3494 with this panel.

Power Controls and Power Status LEDs

See Figure 31 on page 45 for the locations of the power controls and power status LEDs.

1 Unit Emergency switch

Setting the Unit Emergency switch to **O** (OFF) powers off the 3494 immediately. Use this switch only in an emergency. Do not use it to power on or power off the 3494. Sudden removal of power in case of emergency may cause loss of data. The Unit Emergency switch must be in the **I** (ON) position to power on the 3494.

Notes:

1. If the 3494 has more than eight frames or has the optional HA1 Frames, a second Unit Emergency switch is located at the right end of the 3494. You can use either switch to power off the 3494 immediately.

2. Setting the Unit Emergency switches on the 3494 to **O** (OFF) does not power off the B18, B10, or B20 VTS, the CX0, CX1, VTCs, or the AX0s.

2 Unit Power switch

The Unit Power switch turns power on and off to the components inside the 3494. Use the Unit Power switch to power on and off the 3494 under normal conditions. Using the Unit Power switch to power off the 3494 allows the Library Manager, VTSs, controllers, and tape drives to shut down in an orderly manner.

3 Rack Power Ready LED

The Rack Power Ready light emitting diode (LED), when lit, indicates that ac power is on in the L1x Frame.

4 System Power Ready LED

The System Power Ready LED, when lit, indicates that ac power is on to the control units and drive units inside the 3494.

5 Power Off Pending LED

The Power Off Pending LED, when flashing, indicates that power to the 3494 is being turned off.

6 Local Remote switch

If the Local Remote Power feature is installed, the Local Remote switch allows the switches on the operator panel (Local) or an AS/400 or iSeries (Remote) to control the 3494's power. If the Local Remote Power feature is not installed, the Local Remote switch must be in the Local position.

Attention: If the Local Remote Power feature is not installed, pressing the Local Remote switch to the Remote position causes the 3494 to power off.

Motion Control Switches and Status LEDs

See Figure 31 for the locations of the motion control switches and status LEDs.

7 Auto mode switch and status LED

The Auto mode Motion Control switch allows you to place the 3494 into Auto mode. The Auto LED flashes during the mode transition and remains lit when in Auto mode. If the mode transition cannot be completed, the Intervention Required LED lights.

8 Pause mode switch and status LED

The Pause mode Motion Control switch allows you to place the 3494 into Pause mode. The Pause LED flashes during the mode transition and remains lit when in Pause mode. If the mode transition cannot be completed, the Intervention Required LED lights.

9 Intervention Required LED

The Intervention Required LED, when lit, indicates that operator intervention is required. See "Operator Intervention" on page 288 for instructions on performing operator interventions.
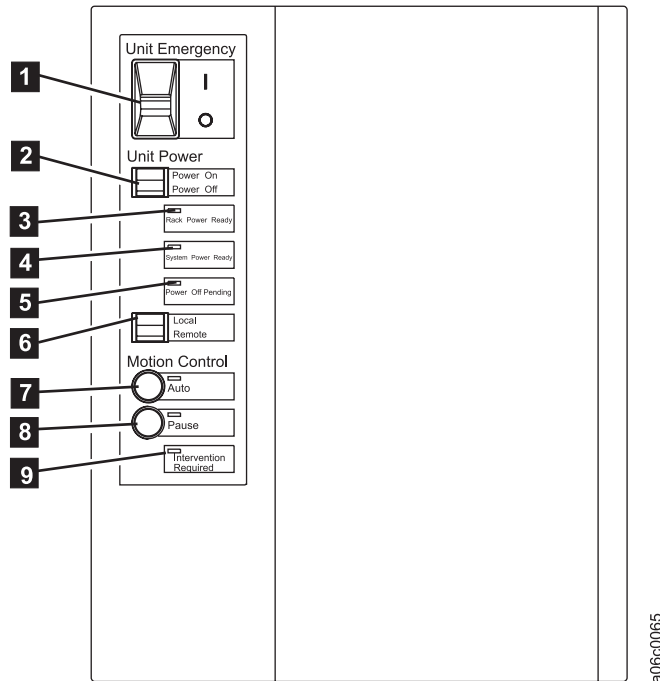
Figure 31. L Frame - Operator Panel without Convenience I/O Station Feature

Convenience I/O Station Status LEDs

If a convenience I/O station feature is installed on the 3494, four additional status LEDs are present on the operator panel. See Figure 32 for the locations of these I/O status LEDs.

1 **Input Mode status LED**

The Input Mode status LED, when lit, indicates that cartridges are in the convenience I/O station and that the station is in Input mode.

2 **Output Mode status LED**

The Output Mode status LED, when lit, indicates that cartridges are being ejected from the 3494 into the convenience I/O station.

3 **Unload Required status LED**

The Unload Required status LED, when lit, indicates that the convenience I/O station has ejected cartridges that need to be removed.

4 **I/O Locked status LED**

The I/O Locked status LED, when lit, indicates that the convenience I/O station is locked and is being used by the cartridge accessor.

5 **Convenience I/O Station Operation Tab**

The convenience I/O station operation tab is used to open the convenience I/O station door when the door is unlocked (when the I/O Locked status LED is not lit).
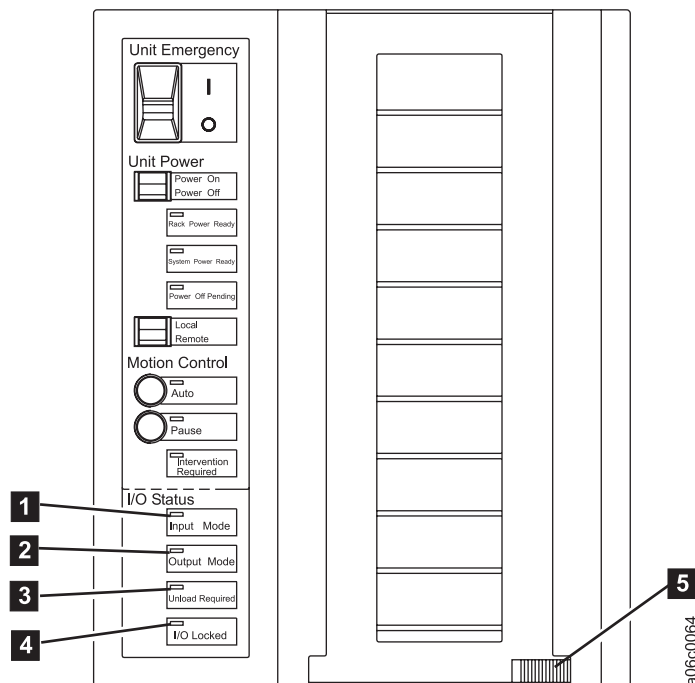
Figure 32. L Frame - Operator Panel with Convenience I/O Station Feature

Library Manager

The Library Manager display **1** (see Figure 33) and keyboard (with its pointing device) **2** are located in the rear of the L Frame. The Library Manager is used to perform system administrator activities and advanced operator activities. The brightness and contrast controls for the Library Manager display are located on the back of the display. An optional Remote Library Manager Console feature is also available for installing in a remote location in a LAN environment.

The Library Manager display is shut off by the operating system software when there has been no activity by the operator. This "snooze" function is provided to conserve power and increase the reliability of the display hardware. If the 3494 is powered on and the display is off, you can press any key on the keyboard to activate the display.

See "Selecting with the Pointing Device" on page 113 for a detailed description on using the pointing device. The optional HA1 Frames, service bay B, is similar in looks and function.
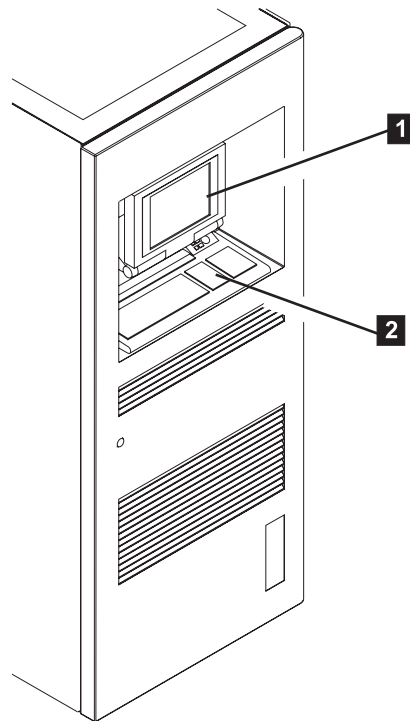
Figure 33. Library Manager

B16 VTS Controls

All control functions for the B16 VTS are integrated into the Library Manager (see Chapter 6, "Advanced Operating Procedures," on page 105).

B18, B10, B20 VTS Operator Panel

The rear door of the B18, B10, and B20 VTSs holds the operator panel.

Figure 34 shows the location of the power control on the operator panel of the B18, B10, and B20 VTSs.

1 **Unit Emergency switch**

Setting the Unit Emergency switch to the **O** (OFF) position powers off the B18, B10, or B20 VTS immediately. Use this switch only in an emergency. Do not use it to power on or power off the B18, B10, or B20 VTS. Sudden removal of power in case of emergency may cause the loss of data. The Unit Emergency switch must be in the **I** (ON) position to allow remote control of the Model B18, B10, or B20 VTS power by the associated 3494.

Note: Setting the Unit Emergency switch for the B18, B10, or B20 VTS to the **O** (OFF) position does not remove power from the associated 3494.
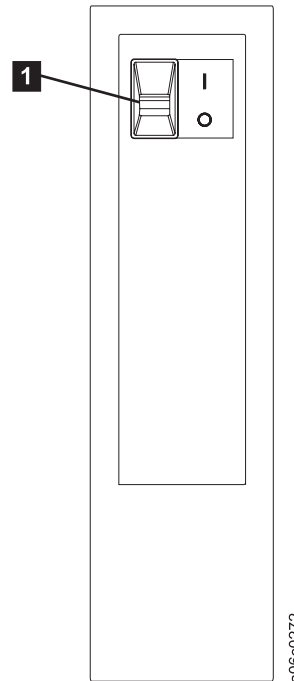
Figure 34. B18, B10, or B20 VTS - Operator Panel

B18, B10, B20 VTS Controls

All control functions for the B18, B10, and B20 VTSs, other than emergency power control, are integrated into the Library Manager. For more information, see Chapter 6, "Advanced Operating Procedures," on page 105. See " B18, B10, B20 VTS Operator Panel" for the Unit Emergency switch function.

CX0/CX1 Operator Panel

The rear door of the CX0/CX1 holds the operator panel.

Figure 35 shows the location of the power control on the operator panel of the CX0/CX1.

1 **Unit Emergency switch**

Setting the Unit Emergency switch to the **O** (OFF) position powers off the CX0/CX1 and all of its internal components immediately. Use this switch only in an emergency. Do not use it to power on or power off the AX0s or VTCs in the CX0/CX1. Sudden removal of power in an emergency may cause the loss of data. The Unit Emergency switch must be in the **I** (ON) position to allow the installed AX0s or VTCs to be powered on manually by service representatives.

Note: Setting the Unit Emergency switch for the CX0/CX1 to the **O** (OFF) position does not remove power from the other components of a PtP VTS configuration.
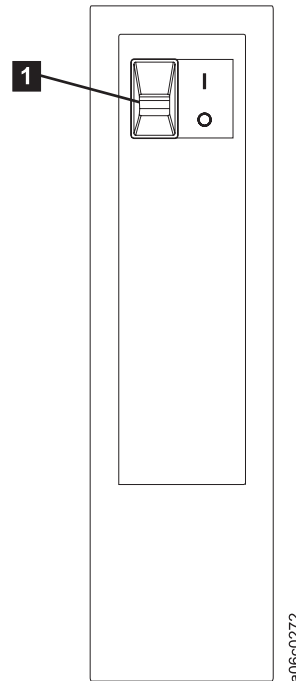
Figure 35. CX0/CX1 Auxiliary Frame - Operator Panel

3592 Model J1A Tape Subsystem Controls

The 3592 Model J1A front panel (Figure 36) is accessible by opening the drive access door of the frame that contains the tape subsystem. It is located on the front side of the drive.

Table 5.

1	Reflective fiducials	5	Reset button
2	Tape cartridge slot	6	LED power indicator
3	Non-reflective fiducial	7	8–character message display
4	Unload button		
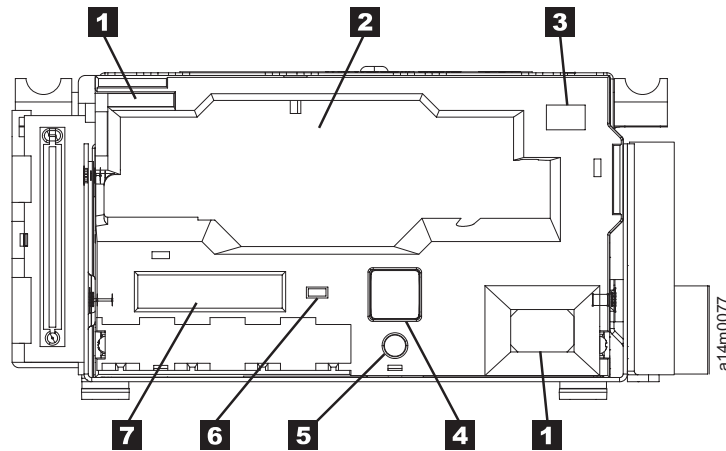
Figure 36. 3592 Model J1A - Front Panel

When 3592 tape subsystems are attached to the 3494, the following 3592 functions change:

Drive control
: The Library Manager controls the loading and the unloading of volumes. The 3592 tape subsystem communicates with the Library Manager to update the database with drive status and cartridge location information.

Message displays
: The Library Manager controls the display of messages to prevent the messages from getting out of synchronization with the Library Manager during Manual mode operations.

Attention interrupt
: The Library Manager can use the communication path to the 3590 Model A60 Controller or the 3592 Model J70 Controller to send information to the host.

For more information on 3592 controls and indicators, see the *IBM TotalStorage Enterprise Tape System 3592 Operator Guide*, GA32–0465.

3590 Model B1A, E1A, and H1A Tape Subsystem Controls

The 3590 Model B1A, E1A, or H1A operator panel (**1** in Figure 37) is accessible by opening the front door of the frame that contains the tape subsystem.
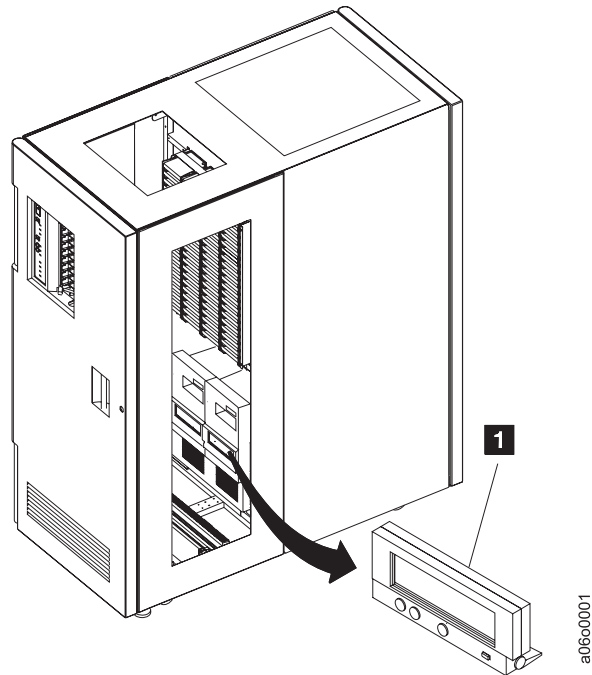
Figure 37. 3590 Model B1A, E1A, and H1A - Operator Panel

When 3590 tape subsystems are attached to the 3494, the following 3590 functions change:

Drive control
The Library Manager controls the loading and the unloading of volumes. The 3590 tape subsystem communicates with the Library Manager to update the database with drive status and cartridge location information.

Message displays
The Library Manager controls the display of messages to prevent the messages from getting out of synchronization with the Library Manager during Manual mode operations.

Attention interrupt
The Library Manager can use the communication path to the 3590 Model A00, A50, or A60 Controller to send information to the host.

For more information on 3590 controls and indicators, see the *IBM TotalStorage Enterprise Tape System 3590 Operator Guide*.

3490E Model C1A, C2A Tape Subsystem Controls

The 3490E Model CxA control unit and drive unit operator panels (**1** and **2** respectively in Figure 38) are accessible by opening the front door of the frame that contains the tape subsystem.

When 3490E subsystems are attached to the 3494, the following 3490E functions change:

Drive control The Library Manager controls the loading and the unloading of volumes. The 3490E tape subsystem communicates with the Library Manager to update the database with drive status and cartridge location information.

Message displays The Library Manager controls the display of messages to prevent the messages from getting out of synchronization with the Library Manager during Manual mode operations.

Attention interrupt The Library Manager can use the communication path to the 3490E subsystems to send information to the host.

For more information on 3490E Model CxA controls and indicators, see the *IBM 3490 Magnetic Tape Subsystem Enhanced Capability Models C10, C11, C1A, C22, and C2A Operator's Guide*.
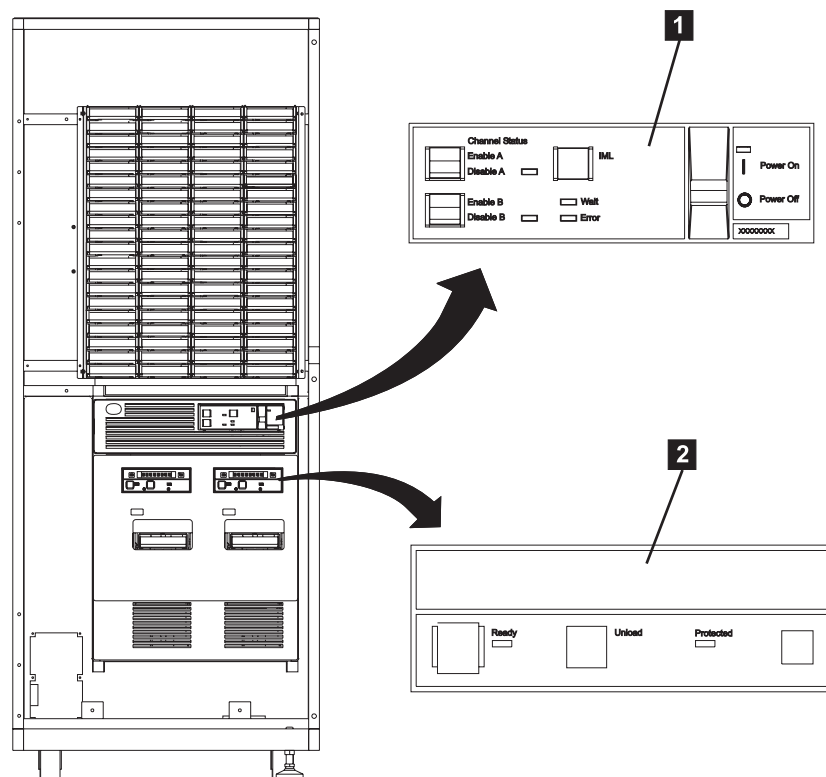
Figure 38. 3490E Model C1A, C2A - Controls and Indicators

3490E Model F1A Tape Subsystem Controls

The 3490E Model F1A operator panel (**1** in Figure 39) is accessible by opening the front door of the frame that contains the tape subsystem.

When 3490E subsystems are attached to the 3494, the following 3490E functions change:

Drive control   The Library Manager controls the loading and the unloading of volumes. The 3490E tape subsystem communicates with the Library Manager to update the database with drive status and cartridge location information.

Message displays   The Library Manager controls the display of messages to prevent the messages from getting out of synchronization with the Library Manager during Manual mode operations.

Attention interrupt   The Library Manager can use the communication path to the 3490E subsystems to send information to the host.

For more information on 3490E Model F1A controls and indicators, see the *IBM 3490E Tape Subsystem Models F01, F1A, F11, and FC0 Installation, Planning, and Operator's Guide*.
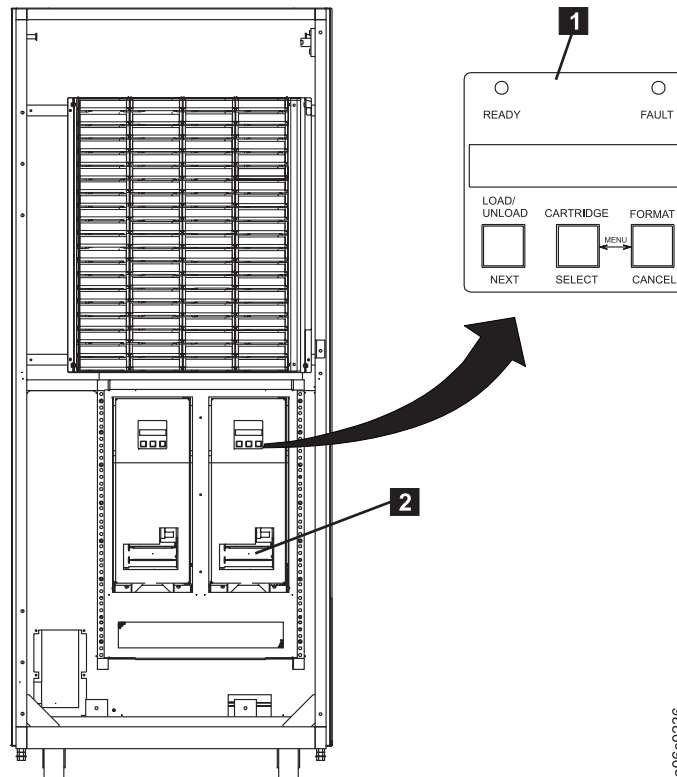
Figure 39. 3490E Model F1A - Controls and Indicators

Chapter 3. Operational Characteristics

This chapter describes the operational characteristics of the 3494.

3490E, 3590, and 3592 Tape Subsystem Operation

The 3494 controls the loading, unloading, and associated operations of the tape subsystem in the 3494. No operator attendance is required unless the 3494 cannot recover from a subsystem problem.

In addition to existing tape subsystem error recovery, the control unit and the Library Manager execute additional recovery procedures when the tape drive detects a load, unload, or tension loss failure.

Virtual Tape Server

The B16, B18, B10, and B20 VTSs provide higher utilization of tape technology than current tape controller permits. A VTS improves utilization without impacting the current operating system or independent software vendors. The subsystem combines the random access and high performance characteristics of disk storage with outboard hierarchical storage management and virtual tape drives. This provides significant reductions in the number of physical cartridges, tape drives, and automated libraries that are needed to store the tape data. The following are the key concepts of the subsystem architecture:

- Emulation of 32, 64, 128, or 256 tape drives (3490E-type)
- Tape volume cache
- Advanced Policy Management of the tape volume cache
- Maintaining data fragments from copied volumes
- Fast response for nonspecific mount requests
- Deletion of VTS logical volumes
- Deletion of expired VTS logical volume data
- Scratch stacked volumes
- 3494 integration
- ESCON, FICON, or SCSI host attachment
- Peer-to-Peer VTS (PtP VTS)

Emulation of 3490E-Type Tape Drives

From a host perspective, the VTS subsystem looks like two, four, eight, or sixteen 3490E control units, each with 16 tape drives. Each emulated drive is called a virtual tape drive. The subsystem handles all 3490 tape commands. Emulating a 3490E-type tape drive eliminates the need for host software support of a new type of tape drive in order to utilize the capacity of 3590-type tape drives. There is no direct relationship between a virtual tape drive and a real 3590 tape drive.

Data is written and read as if it is stored on a real Cartridge System Tape or an Enhanced Capacity Cartridge System Tape. However, within the subsystem, data is first stored on disks. All tape read and write commands are translated to read and write data records from or to disk storage. Tape marks are stored as special records on the disk storage as well. Volumes residing on disk storage are called virtual volumes.

The amount of data that is stored on a virtual volume is variable up to a maximum as determined by the media type selected. Two media types are emulated (standard Cartridge System Tape and Enhanced Capacity Cartridge System Tape). They can hold up to 400 MB or 800 MB of data, respectively, without data compression. With data compression provided by the B10 or B20 VTS or by the ESCON High Performance Option feature or the Extended High Performance Option feature of the B18 VTS, the actual host data stored on a virtual Cartridge System Tape or Enhanced Capacity Cartridge System Tape volume can be up to 1.2 GB or 2.4 GB, respectively (assuming a 3:1 compression).

All host interactions with data in a VTS are through virtual volumes and associated virtual tape drives; there is no direct access to the data on a physical cartridge or drive.

Tape Volume Cache

The size of the disk storage is large enough so more virtual volumes can be retained in it than just the ones currently associated with the virtual drives. After an application closes a virtual volume, if it was modified, a copy of it is made by the storage management software in the subsystem onto a physical tape. The virtual volume remains available on the disk storage until the space it occupies is needed to satisfy another mount request. Leaving the virtual volume in the disk storage allows for fast access to it during a subsequent request for the volume. The disk storage, and management of that space to keep volumes available after they are closed, is called the Tape Volume Cache. The performance for mounting of a volume that is in the tape volume cache is quicker than if a real physical volume is mounted. Disk storage, in effect, caches the tape volumes and provides for fast access.

Storage Management of the Tape Volume Cache

Storage management software in the subsystem manages the contents of the tape volume cache. Virtual tape volumes are copied from the tape volume cache to physical tape when the virtual volume has been closed, and they are recalled from tape to the tape volume cache when they are again requested to be mounted. The storage management software stacks multiple migrated files onto a tape, thereby utilizing the full physical tape storage capacity. DFSMS policy management provides users with the ability to control tape volume cache preferences for the retention of virtual volumes.

VTS Export and Import Overview

The following sections provide an overview of VTS Export and Import operations.

Export and Import Operations

Note: In a PtP VTS configuration, the Export and Import functions of FC 4000 (Advanced Function) or FC 4001–4004 (Advanced Policy Management) will be disabled.

The Export and Import operations provide a way to move logical volumes out of a VTS to physical cartridges called Exported Stacked Volumes and to return them to the same VTS or move them to another VTS. Lists of volumes for Export or Import operations are provided to a VTS on logical volumes called the Export List Volume or the Import List Volume, which are resident in the VTS. The Status File on the Export or Import List Volume provides status for each logical volume being processed. See Appendix B, "VTS Export and Import Advanced Function," on page 421 for information about preparing the Export or Import List Volume.

An emergency copy of a logical volume may be made by the VTS Exported Volume Read Utility (provided by DITTO/ESA for MVS) from an Exported Stacked Volume using a native 3590 tape drive in the VTS. The **J**- or **K**-type Exported Stacked Volume must not be inserted into a 3494 having a VTS with a volser range that allows the cartridge to become a VTS Stacked Volume and be rewritten. Also, adding VTS Stacked Volumes to your tape management system inventory can help prevent inadvertent use of an Exported Stacked Volume.

Import

The Import operation allows logical volumes that are stored on physical Exported Stacked Volumes to become logical volumes within a VTS. A specific volume or all volumes may be imported from Exported Stacked Volumes that have been entered into a 3494 through the convenience I/O station and have been moved to the Import category by an operator at the Library Manager console. Host console messages provide status on progress and completion of the Import operation.

Export

The Export operation allows data on logical volumes in a VTS to be removed from the VTS onto physical Exported Stacked Volumes. The list of volumes to be exported and a destination for each volume is provided by the host operator or tape management system. Logical volumes with the same destination are grouped on the same Exported Stacked Volume. This physical volume is then moved into a category that allows an operator at the Library Manager console to eject the cartridge through the convenience I/O station for storage outside the 3494 or movement to another 3494 to be imported into a VTS. Host console messages provide status on progress and success of the Export operation.

Notes:

1. Exported Stacked Volumes created on 3590 Model B1A tape drives that are associated with a VTS can be imported into VTS configurations that have 3590 Model B1A or E1A tape drives. Exported Stacked Volumes created on 3590 Model E1A tape drives cannot be imported using 3590 Model B1A tape drives.

2. Exported Stacked Volumes created on 3590 Model B1A or E1A tape drives can be imported into 3590 Model H1A configurations. However, Exported Stacked Volumes created on 3590 Model H1A tape drives cannot be imported into 3590 Model B1A and E1A configurations.

Advanced Policy Management

Included in the 3494 FC 4001–4004 Advanced Policy Management is a form of volume management called Advanced Policy Management. This gives you more control over how logical and physical volumes are managed within the subsystem so you can better utilize the resources of a VTS. This allows you to do the following:

- **Volume Grouping:** Allows you to control the grouping of virtual volumes together on 3590 media. Grouping can be controlled by DFSMS Automatic Class Selection or by storage administrator-defined defaults.

- **Local Tape Volume Duplexing:** Allows you to control the selective creation of a second tape copy of virtual volumes in a different storage pool than the primary copy. Dual copy is controlled by DFSMS Automatic Class Selection or by storage administrator-defined defaults.

- **Peer-to-Peer Selective Copy Mode:**Allows you to control the copy mode for each logical volume.

- **Tape Volume Cache Management:** Allows you to manage the residency of logical volumes in the Tape Volume Cache to maximize the probability of the needed volumes being resident in the Tape Volume Cache when requested.

/ • **Peer-to-Peer Selective Dual Copy:** Allows you to select which VTS in a PtP
/ VTS configuration shall be the I/O VTS and to choose whether or not written data
/ shall be copied to a second (that is, non-I/O) VTS.

The key elements of this feature are storage management constructs and storage
pools.

Storage Management Constructs

Storage management constructs are user-defined groupings used to define actions
for logical volumes. Each construct type can have a maximum of 256 names
including the default name. The default name is 8 blanks and is displayed on the
Library Manager and the Specialist as 8 dashes (-).

Each construct type has an 8 character name and a 70 character description.
These can be defined through the Library Manager (Manage Constructs and Pools)
or the Specialist (Manage Constructs).

How the construct names are assigned to a logical volume or set of volumes can
be used to provide creative volume grouping. For instance, two sets of volumes
assigned to two separate Storage Groups (primary storage pool) can be assigned
to the same Management Class (secondary storage pool). This allows a single
storage pool to be used as a secondary pool for volumes which have multiple
primary storage pools.

There are four storage construct types:
- Storage Group
- Management Class
- Storage Class
- Data Class

Storage Group

Used to define a primary storage pool for a logical volume. A primary
storage pool is where logical volumes assigned to the specific storage
group are to be written to. For example, logical volume LOG001 is assigned
to storage group ″BACKUP.″ Storage Group ″BACKUP″ is defined with a
Primary Storage Pool of 3. When LOG001 is written to a stacked volume it
will be written to a stacked volume that is in pool 3.

Multiple Storage Groups can define the same primary storage pool.

Valid Primary Storage Pools are 1 - 32.

Management Class

/ Used to define a secondary storage pool and a Peer-to-Peer Copy Mode
/ for a logical volume, and also to enable the Peer-to-Peer Selective Dual
/ Copy feature, if desired.

A secondary storage pool of zero (0) indicates a second copy is not made
for logical volumes assigned to the management class. If the management
class a logical volume is assigned to has a secondary storage pool of 1 -
32, a second copy of the volume is made onto a stacked volume in this
pool. For example, logical volume LOG001 is assigned to management
class ″DUPCOPY.″ Management Class ″DUPCOPY″ is defined with a
secondary storage pool of 4. The secondary copy of LOG001 is written to a
stacked volume that is in pool 4. Multiple Management Classes can define
the same secondary pool.

The Peer-to-Peer Copy Mode is used in the Peer-To-Peer VTS (PTP) environment only. For non-PTP environments this element is ignored. It controls when a logical volume is copied to the second Peer-to-Peer library. The options are as follows:

- **Immediate Copy Mode:** In this mode, when a host Rewind/Unload command is received, the copy operation begins. The copy operation is only performed by the Virtual Tape Controller (VTC) that received the Rewind/Unload command. When the copy operation completes, the VTC indicates that the Rewind/Unload is complete. Since the copy operation is executed during the command execution of the Rewind/Unload command, the job times for writing a logical volume is longer when compared to the same job on a non-PTP VTS.

- **Deferred Copy Mode:** In this mode, when a host Rewind/Unload command is received for a logical volume, a copy operation is queued to every VTC in the configuration. Once the operation is on at least one VTC copy queue, the VTC indicates that the Rewind/Unload is complete. The copy is then executed in the background as VTS activity permits by the first VTC that also has available resources for the copy.

- **VTC Defined:** Immediate or deferred as defined at the VTC. In a Geographically Dispersed Parallel Sysplex® (GDPS®) environment the VTC Defined mode should be selected. This will prevent the Management Class defined copy mode from overriding the host or VTC defined copy mode. Multiple Management Classes can define the same Peer-to-Peer Copy Mode.

- **No Copy:** Logical volumes are not copied to the second PtP VTS when this option is selected.

The PtP I/O VTS specification has three settings.

- **VTC Defined:** Selecting this option directs the VTC to select which VTS acts as the I/O VTS.

- **Dist. Library 0:** Selecting this option sets Distribution Library 0 (VTS 0) as the I/O VTS.

- **Dist. Library 1:** Selecting this option sets Distribution Library 1 (VTS 1) as the I/O VTS.

Note: The **No Copy** option for Peer-to-Peer Copy Mode and the PtP I/O VTS setting together comprise the PtP Selective Dual Copy feature. This feature helps minimize wasted bandwidth and storage by preventing useless information (such as a copy of production data used for testing updated applications or data generated during a disaster recovery test) from being copied to the non-I/O VTS.

Storage Class

Used to define the Tape Volume Cache (TVC) preference for a logical volume.

The Tape Volume Cache (TVC) preference level has 3 options.

- **Use the TVC preference as defined by the IART value specified by the host to the VTS.** Using this option eases the customer's migration from using the already implemented IART method to using the Storage Class construct to define the TVC preference levels. The Storage Class can be setup to use the IART defined value until the time the customer is ready to use the Storage Class construct.

- **Use TVC Preference Level 0.** Logical volumes associated with this preference level are fragmented (no longer resident) in the cache as

soon as they have been copied to a stacked volume (including secondary pool copies). They are not subject to the four minute delay between volume close and being eligible to be copied and have copy priority over volumes with other preferences. This option is useful for logical volumes that probably won't be recalled. Backup datasets are examples of this. The data will only be recalled in the event of a disaster.

- **Use TVC Preference Level 1.** Preference Level 1 will remove a logical volume from TVC if space needs to be freed in the TVC. This option is useful for data that has a high probability of being recalled.

Data Class
In the current implementation, the data class has no actions associated with it. However, all logical volumes are assigned to a data class.

Storage Pools

A storage pool contains VTS physical stacked volumes. Within a pool some of the volumes are scratch and some are private. The private volumes contain logical volumes with active data. Every VTS stacked volume is assigned to a storage pool.

Each VTS within a 3494 library has its own set of pools. There is a Common Scratch Pool (pool 0) which is a reserved pool containing only scratch stacked volumes. There are also 32 general purpose pools (pools 1-32)

How does the library determine which pool to copy a logical volume to for the primary copy? This is accomplished with the Storage Group Construct. Logical volumes are assigned to Storage Groups. A Storage Group points to a primary storage pool. When a logical volume is copied to tape, it is written to a stacked volume that is in the Storage Pool indicated in the Storage Group assigned to the logical volume.

How does the library determine which pool, if any, to copy a logical volume to for the secondary copy? This is accomplished using the Management Class construct. Logical volumes are assigned to a Management Class. A Management Class can point to a secondary storage pool. If the Management Class specifies a secondary storage pool of zero, a secondary copy of the logical volume isn't made. If the secondary pool specified by the Management Class is one of the general purpose pools (1-32) a secondary copy of the logical volume is made to a stacked volume in the specified pool.

If FC 4001–4004, Advanced Policy Management is not installed, the LM and VTS will use pools 0 and 1 under the covers. Pool 0 will be used for scratch stacked volumes and pool 1 will be used for stacked volumes containing active data.

Common Scratch Pool (Pool 00): The Common Scratch Pool (CSP) can be used by the 32 general purpose pools as a reserve from which scratch stacked volumes can be borrowed or taken from when they run out of scratch stacked volumes themselves. Pool properties determine whether a General Use pool can borrow volumes from the CSP. The CSP is pool 0 and contains only scratch stacked volumes. Stacked volumes in the CSP do not contain any active data.

32 General Use Pools (Pools 01 — 32): There are 32 General Use Pools per VTS. They are numbered 1 - 32. General use pools can contain both scratch stacked volumes and private stacked volumes. A general use pool can be set up to borrow or take scratch stacked volumes from the CSP if they run out of scratch stacked volumes. For example, pool 2 is setup to borrow volumes from the CSP. A logical volume needs to be copied to a stacked volume in pool 2 but there are no

more scratch stacked volumes in pool 2. A scratch stacked volume is transferred (borrowed) from the CSP by pool 2. The logical volume can now be copied to the newly borrowed stacked volume. The borrowed stacked volume is returned to the CSP when it is reclaimed since pool 2 is set up to return borrowed stacked volumes.

Bulk Volume Information Retrieval

This function allows an MVS host to request information about the logical volumes managed by a VTS, including PtP VTS configurations. The MVS host can retrieve information about the logical volumes currently in the VTS cache, the logical volume-to-physical volume mapping on the VTS backstore tapes, and data levels and validity flags from the VTS token database.

Maintaining Data Fragments from Copied Volumes

When the cache space occupied by a closed virtual tape volume is needed for other active virtual volumes, the data it represents is not removed completely. A fragment of the data is kept on disk storage. The data fragment includes information about the copied virtual volume so that it can be recalled and it also includes the first several records from the last use of the volume. Normally, the first few records on a tape contain a tape volume label, and enough data records are maintained to contain an IBM standard tape label plus any unique user label records.

Fast Response for Nonspecific Mount Requests

When a nonspecific mount is requested, the user application will write data from the beginning of tape, overwriting any existing data on the tape. The host can request a nonspecific mount in a 3494 by specifying a category instead of a specific volser in the mount request. The Library Manager then selects the next available volume assigned to the specified category to satisfy the host request. Within a VTS, the data fragment is used in conjunction with a mount from category request to provide very fast response times for nonspecific mounts. Categories used for nonspecific mounts are defined through the Library Manager as "Fast Ready" categories (see Figure 135 on page 216). When a mount request specifies a category defined as "Fast Ready", the mount is satisfied by accessing the data fragment in the tape volume cache associated with the virtual volume selected by the Library Manager to satisfy the request. No recall of the data from the previous usage of the volume is performed because the fragment contains the label information needed by the host tape management software to validate the use of the volume for a nonspecific mount request. The subsystem signals the host that the mount is complete when the fragment is accessed. The result is a very short mount response time because no physical movement or mounting of a cartridge is involved.

If a mount request specifies a category that has not been defined as "Fast Ready", the 3494 has no indication that the application intends to write from the beginning of the volume. It is likely that the selected virtual volume is not resident in the tape volume cache and must be recalled from physical tape.

Deletion of Virtual Tape Server Logical Volumes

Logical volumes in a VTS can be deleted only under the control of the attached hosts. A logical volume can be deleted only if it is in the Insert category or a category with a Fast Ready attribute set (see "Set VTS Category Attributes" on page 215). When a logical volume is deleted, it is removed from the 3494's inventory, and any data that was associated with the volume is deleted. A logical

volume that is in a Fast Ready category is deleted from a VTS by performing the following steps. (A logical volume that is in the Insert category is deleted from a VTS by performing step 2 only).

1. Assigning the logical volume to a category within the 3494 that has the Fast Ready attribute assigned. This is accomplished by the tape management system when the data associated with the volume reaches its expiration date and the volume is returned to the scratch pool.

2. Assigning the logical volume to an eject category. This can be done by asking that the volume be ejected from the 3494, using platform-specific 3494 control interfaces; for example, with MVS/ESA, OS/390, or z/OS, through the tape management interfaces, ISMF panels, or MVS, OS/390, or z/OS operator commands.

Note: When a logical volume has been deleted from the 3494, data on the volume is deleted and cannot be recovered.

Deletion of Expired Virtual Tape Server Logical Volume Data

Logical volumes in a VTS are stored on physical stacked volumes after the host closes the logical volume. After a period of time, data on a logical volume that is not intended for long term archive, is eventually expired through the host tape management system and the logical volume is placed in scratch status. Returning a logical volume to scratch does not change the status of the data associated with the volume from the VTS's point of view. The data on the physical stacked volume is considered valid from the VTS's point of view until the logical volume is rewritten or otherwise modified. This causes the VTS to continue managing the data as if it was still active, even though the user has actually scratched it. The benefit of having the VTS consider the expired data as valid is that if a mistake was made in returning a volume to scratch status, simply returning the volume to private status restores access to the data. This benefit does have a cost. These user expired logical volumes needlessly consume physical stacked volume resources, thus requiring more physical stacked volumes in a VTS. Also, since these volumes are still considered active, the time until a physical volume falls below the reclamation threshold is increased and potentially, expired data will be moved during a reclaim.

To provide for additional customer flexibility in how they want to manage the data in a VTS, an optional parameter can be specified that will cause the data associated with logical volumes that have been returned to scratch status to be deleted after a specific time period. This parameter, expire time, is specified through the Define Fast Ready Categories window (Figure 135 on page 216). The expire time provides a grace period where expired volumes can still be returned to private status. An expire time of zero (which is the default) can be specified meaning that the data is never to be deleted. A separate expire time can be set for each category defined as Fast Ready. Deletion of the data associated with a logical volume does not remove the volume from the library inventory. A control available on the service menu can be set to either enable or disable modification of the expire time parameter. If expire time modification is enabled, any change to the expire time causes the Library Manager to send a message to all attached hosts indicating what has been changed.

Note: Once the data associated with a logical volume has been deleted, it cannot be recovered.

When the expire time for a logical volume is reached and the data associated with the volume is deleted, this includes the data fragment in the Tape Volume Cache.

The next time the volume is used, the VTS creates the image of a re-initialized tape volume. The previous label area is no longer available.

Note: Before using an expire time value that is non-zero, the customer should check that their tape management system software can handle scratch volumes that have been re-initialized.

In using this function with a Peer-to-Peer VTS, there are additional operational considerations that must be included in determining the expire time settings for the function because of the manner in which the AX0s or VTCs select which VTS will be used in processing the I/O for a scratch mount. The I/O VTS selection criteria that applies here are:

- The AX0 or VTC will always select the VTS that has a valid version of a logical volume, independent of if it has been expired by the host (assigned to a scratch category).
- If both VTSs have a valid version, then the selection criteria is as follows:
  - If both VTSs have the volume in cache, then the preferred VTS will be selected.
  - If both VTSs do not have the volume in cache, then the preferred VTS will be selected.
  - If the needed volume is only in cache on the non-preferred VTS, then the non-preferred VTS will be selected.
- If a logical volume has been deleted from a VTS, it is no longer valid and that VTS cannot be selected for the I/O VTS.
- But, if the volume has been deleted from both VTSs, then the preferred VTS is selected, if specified, and the AX0 or VTC creates the volume as a newly initialized volume.

In setting up a Peer-to-Peer VTS and when using the delete expired volume data function, the following considerations apply depending on the I/O selection mode of operation.

- **For No Preference** Ensure that the non-zero expire time on both library managers is set to the same value. If not, the VTS that expires the data first will not be used for scratch mounts.
- **For Preferred VTS** Ensure that a non-zero expire time is set on both library managers and that the non-preferred VTS/Library is set to delete the data before the preferred VTS/Library.

Setting a non-zero expire time on only the preferred library or setting it to delete data before deletions on the non-preferred one can cause scratch mounts to use the non-preferred VTS for I/O. It is recommended that the data on the non-preferred VTS/Library be set to be expired a minimum of 48 hours ahead of the data on the preferred VTS. An additional amount should be added to account for the amount of time the VTSs are to be disconnected for a disaster recovery test. For example, if the maximum disconnected time for a test is 24 hours, then the setting on the preferred VTS/Library should be 72 hours more than the setting on the non-preferred VTS/Library.

Selecting the Hold option on the Define Fast Ready Categories window (Figure 135 on page 216) prevents a logical volume from being selected for mount processing or to be moved out of its assigned category until the expire time has elapsed or has been reset to zero.

Scratch Stacked Volumes

It is essential that sufficient scratch stacked volumes be available for use by a VTS for copying a virtual volume when the volume is closed. A warning is provided when the Free Storage Threshold cannot be met with the scratch stacked volumes that are available. See the VTS Management Policies window, shown in Figure 136 on page 217.

The Reclaim Threshold Percentage as entered in the VTS Management Policies window becomes important when the supply of scratch stacked volumes is low. The VTS Space Reclamation Algorithm may impact the VTS performance when it is necessary to reclaim expired space on stacked volumes. A high Reclaim Threshold Percentage requires that more active data be moved (using VTS resources) to free the stacked volume for scratch use. As a general rule, you should try not to exceed 30%–40% as a Reclaim Threshold Percentage. It is better to add additional stacked volumes than to increase this value. When there are less than ten scratch stacked volumes, the Inhibit Reclaim Schedule shown in the VTS Management Policies window, Figure 136 on page 217, is not in effect, and the VTS proceeds to reclaim space on stacked volumes until at least 15 scratch stacked volumes are available. For the Inhibit Reclaim Schedule to be in effect with non-invasive reclamation activity by the VTS, more than 50 scratch stacked volumes must be available. Reclamation activity may affect the performance of the host jobs that run on the VTS.

Integration with the 3494

A VTS must be associated with a 3494 library because the physical assets used by the subsystem are managed by the Library Manager in the 3494. The physical assets include the tape drives and the cartridges that are used for stacking logical volumes. The Library Manager provides several other key functions involving a VTS:

- Logical library partitioning
- Operator interface
- Logical volume inventory

Logical Library Partitioning

To support the product requirement that a VTS can coexist with current 3490 and native 3590 subsystems in the same 3494, the Library Manager partitions the physical library into logical libraries. This must be done because a VTS presents the image of 3490E-type tape drives and yet cannot read or write a real 3490 cartridge. By placing a VTS in its own logical library, host software is not able to attempt to allocate a VTS drive for a real 3490 mount and vice versa.

A logical library can contain **either** of the following subsystems:

- A single VTS
- Current® 3490 or native 3590 subsystems or 3592 subsystems

Each logical library has its own unique library sequence number and looks like a separate physical library to the hosts attached to the subsystems in that partition.

Note: Currently, up to two VTSs (only one of which may be a B16 VTS) are allowed in a physical library.

Operator Interface

The Library Manager console is used to perform the setup, management, and status functions needed to support a VTS.

Logical Volume Inventory

The database in the Library Manager is expanded to handle the large number of logical volumes that a VTS uses. There are also new operator functions that allow the addition of logical volumes by specifying a volume serial number range through the Library Manager console (see Figure 163 on page 245).

ESCON Host Attachment

The ESCON Host Attachment provides attachment for VTS Models B18, B10, and B20.

The VTS Model B18 can be configured with one of the following:
- two standard ESCON host channel attachments
- two or four enhanced ESCON host channel attachments (FC 3302 withdrawn)
- two or four Extended Performance ESCON Channel attachments (FC 3412)
- two enhanced ESCON host channel attachments and two Extended Performance ESCON Channel attachments

When the Performance Accelerator (FC 5236) is installed, the Extended Performance ESCON Channel attachments can be activated for four or eight ESCON channel attachments when the Peer-to-Peer Copy Base (FC 4010) is not installed. This can be done by ordering Activate Additional ESCON Channels (FC 3418). Each ESCON attachment supports 64 logical paths. With four adapters, including FC 3418s, 512 logical paths can be configured to a single B18 VTS.

The VTS Model B10 can be configured with up to four Extended Performance ESCON Channel attachments. Each ESCON attachment supports 64 logical paths. A Model B10, with its four ESCON attachments, supports up to 256 logical paths. All virtual drives are addressable through any attachment interface.

The VTS Model B20 can be configured with up to 16 Extended Performance ESCON Channel attachments. Each ESCON attachment supports 64 logical paths. A Model B20, with its 16 ESCON attachments, supports up to 1024 logical paths. All virtual drives are addressable through any attachment interface.

FICON Host Attachment

The FICON channel attachment features provides attachment for VTS Models B10 and B20. The VTS Model B10 or B20 attaches to native FICON channels in systems such as the IBM 9672 Enterprise G5 or G6 Servers and the zSeries® 800, 900, or 990 servers. Long and short wave attachments are provided and can be attached directly to a server or through a director. FICON attachment is provided by FC 3415 Long Wave® FICON Channel and FC 3416 Short Wave FICON Channel. FICON attachment features provide increased performance for VTS configurations, greater simplicity of configuration, and increased per channel bandwidth. They also extend the allowable server to VTS attachment distance up to 100 km.

If your level of microcode is greater than 2.28.700, your VTSs and Peer-to-Peer VTSs can be attached to 1 Gbps or 2 Gbps FICON channels. The VTS and VTC microcode will auto-negotiate with the channel and select the correct speed. If you want to override the auto-negotiation and force the subsystem to run at 1 Gbps speed, please contact an IBM service representative. An example of when this would be required is if you are using a 2 Gbps channel with a cable length that is only supported for 1 Gbps.

SCSI Host Attachment

The SCSI Host Attachment feature provides attachment to RS/6000, pSeries, Hewlett-Packard, Intel™, Sun, and Windows® servers. The sharing of a VTS among S/390®, zSeries, RS/6000, pSeries, Sun, Hewlett-Packard, and Windows servers requires assignment of virtual drive usage similar to stand alone tape drives. Because only one host system at a time can use a drive, the drive has to be dedicated to that host during processing.

For a detailed discussion on tape library sharing between S/390 or zSeries and SCSI hosts, including considerations about drive sharing, volume sharing, and related software implementation steps, see the *Guide to Sharing and Partitioning IBM Tape Library Dataservers*. The SCSI target addresses are discussed in the *IBM TotalStorage Enterprise Automated Tape Library (3494) Introduction and Planning Guide*.

Peer-to-Peer Virtual Tape Server

The PtP VTS is a configuration of multiple B18, B10, or B20 VTSs with their associated tape libraries and multiple AX0s or VTCs. The AX0s or VTCs are installed in one, two, three, or four CX0s/CX1s. The CX0/CX1 contains no other equipment.

The B18, B10, and B20 VTSs, the AX0s or VTCs, and their interconnections provide a single PtP VTS that the host system treats as a single VTS. The PtP VTS configuration provides a dual copy of data in newly created or updated tape volumes automatically. The PtP VTS stores a copy of the tape volume data in the two interconnected VTSs. This dual-volume copy functionality improves data availability and data recovery, while being transparent to user applications and host processor resources.

The PtP VTS provides a Web interface, the IBM TotalStorage Peer-to-Peer Virtual Tape Server Specialist, that allows you to connect to the Web server on the AX0 or VTCs to access information about the PtP VTS. Table 6 shows the types of information available through the Web interface of the Peer-to-Peer VTS Specialist. For more information, see "Peer-to-Peer VTS Specialist Features and Functions" on page 336.

Table 6. Accessing Peer-to-Peer VTS Specialist Web Information

Information Type	Reference
Home Page	"Welcome page" on page 337.
System Status	"Overall system status" on page 339.
Virtual Tape Controller Status	"Virtual tape controllers" on page 339.
VTS Status	"Virtual tape servers" on page 339.
Library Status	"Libraries" on page 339.
System Configuration	"Overall system configuration" on page 340.
Virtual Tape Controller Configuration	"Virtual tape controllers" on page 340.
VTS Configuration	"Virtual tape servers" on page 340.
Library Configuration	"Libraries" on page 340.
Current Drive Activity	"View current drive activity" on page 337.
Logical Volume Status	"View logical volume status" on page 337.
Logical Volume Status Results	"Logical volume status results" on page 337.

Table 6. Accessing Peer-to-Peer VTS Specialist Web Information (continued)

Information Type	Reference
Current Copy Workload	"View current copy workload" on page 338.
Access to Additional Information	"Access to Additional Information" on page 340.

Local and Remote Power Control

You control the local power by using a switch at the operator panel. See "Changing from Local to Remote Power" on page 96 and "Changing from Remote to Local Power" on page 97 for operating instructions.

Remote power control (a 3494 feature for attached AS/400 and iSeries) supports both local and remote power controls. When the 3494 is in local power mode, you can activate the power-on and the power-off sequences.

When the 3494 is in remote power mode, each host, through its AS/400 or iSeries system interface, can request that the power-on or power-off sequence be initiated. Any host requesting a power-on sequence causes the 3494 to power on unless the 3494 is already powered-on. Only the last host requesting the 3494 to power off initiates a power-off sequence.

Operator Involvement

During normal automated operation, no operator attendance is required except to add or to remove cartridges.

Operator assistance is required if an error or exception condition occurs from which the 3494 cannot recover on its own. Depending on the type of error or exception condition experienced, some or all of the 3494 operations are suspended until the problem is corrected. If an error occurs that prevents the movement of cartridges, the Library Manager suspends performing requests that require cartridge accessor movement. You can use the Library Manager or the Remote Library Manager Console (if the optional Remote Library Manager Console feature is installed) to identify the cause of the error. If you can correct the error, the 3494 may be placed in Pause mode, and the front doors may be opened to provide operator access. After you resolve the problem, you may return the 3494 to Auto mode.

If you cannot resolve the problem, you may start Manual mode operations in the 3494. When in Manual mode, the Library Manager instructs you to perform manual mount and demount operations until a service representative resolves the problem. After the problem is resolved, you can return the 3494 to Auto mode.

Note: When the HA1 Frame is installed, control switches over automatically to the hot standby component, and the failed component is marked unavailable. Concurrent maintenance can be performed to repair the failing unit. Operator involvement is needed only when a second failure occurs before the first failure is repaired.

System Administrator Involvement

Normal daily operations of the 3494 do not require any system administrator involvement. System administrator involvement may be required if an error condition occurs that you cannot resolve. A system administrator can obtain operational and performance information from the Library Manager or the Remote Library Manager Console (if the optional Remote Library Manager Console feature is installed) at any time.

The system administrator may also use the Library Manager or Remote Library Manager Console to search for cartridges in the 3494 that have problems with their external labels or cartridges that have been misplaced or have other problems that need to be corrected.

Note: The tasks performed by a system administrator are typically password protected to prevent unauthorized personnel from inadvertently or intentionally damaging the Library Manager database or other operations. Use of password protection is optional.

Error Detection and Reporting

When the 3494 is powered on, the Library Manager, the tape subsystems, and the VTSs perform power-on diagnostic tests. The 3494 performs real-time error detection, fault isolation, error reporting, and error recovery during normal operation.

In the event of a failure, the information is reported to the attached hosts for logging and possible host recovery actions. When appropriate, the 3494 drive support software posts host console messages in the control program to request operator-required actions or to present information for the operator. See Chapter 7, "Remote Library Manager Console Feature," on page 345.

Inventory Update

When Inventory Update is enabled and a door is opened, then closed, an inventory update is performed upon the return to Auto mode. This process checks all of the cartridge storage cells in the frames that had doors opened, and depending on the selection made during the teach process, may also check any frames adjacent to the frames that had doors opened.

Note: The drive feeds are also inventoried.

During an inventory update, processing of Audit and Eject operations are held until the update has been completed. Selected mounts and demounts are processed, depending on where the cartridge resides. No mounts or demounts are performed on cartridges that reside in a rack that must be verified in the Inventory Update operation until the inventory update is complete. The duration of the Inventory Update operation is affected by the number of database updates required and the number of mounts and demounts that are done concurrently with the inventory update.

When the 3494 is powered on, the **Disable Inventory Update** option is available in the Mode Selection window. This option, if selected, disables the inventory update during a cold start of the 3494 and speeds up the process of bringing the 3494 online. Selecting the **Disable Inventory Update** option in the Mode Selection window does not disable inventory update during normal operation.

The **Disable Inventory Update** option is available under the **Inventory** option in the Commands window. This option disables the Inventory Update process on a cold start of the 3494 during normal operations and speeds up the process of changing modes after the doors on the 3494 are opened.

Note: The **Disable Inventory Update** option is not recommended for users who open the 3494 doors to add and to remove cartridges because **no changes in the 3494 inventory are noted until an Inventory Update is performed**. If cartridge inserts and ejects are handled through the convenience I/O station or the high-capacity I/O facility, then running with Inventory Update disabled speeds operation. When the doors have been opened, you can select the **Partial Inventory Update** option under the **Inventory** option in the Commands window; this provides the most flexibility.

The **Enable Inventory Update** option is also available under the **Inventory** option in the Commands window. This option allows you to enable the Inventory Update process. An inventory update would then be done on all doors at initialization and following Manual mode and to all doors opened during the transition from Pause mode to Auto mode.

Inventory update determines if any cartridges have been added, removed, or moved, and the Library Manager updates the cartridge inventory. During an inventory update, one of the three following activities takes place:

- If a cartridge is found in its expected location, no update takes place.
- If a cartridge is found that is not in the inventory, the inventory is updated, with volser added to the Insert category.
- If a cartridge in the inventory is not found, it is placed in the manually ejected category.
- If an unlabeled cartridge is found, the cartridge is ejected from the library unless the unlabeled cartridge was inserted by using the Unlabeled Tape facility and the unlabeled cartridge is found in its home cell.

  See "Insert Unlabeled Cartridges" on page 271 for information regarding the use of unlabeled cartridges.

Volume Categories

The host can associate volumes into logical groupings in the 3494. A logical grouping is called a category, which the Library Manager identifies by a hexadecimal number from 0000 to FFFF. Table 7 on page 70 shows the assignment of the categories.

The Library Manager maintains the order in which volumes are added to a category. The volumes chosen from a category are managed by a first-in, first-out (FIFO) rule. However, if during the choosing of a volume from a category, the next volume is in use, inaccessible, or misplaced, the volume is skipped, and the next available volume is chosen.

Note: For logical volumes in a "Fast Ready" category, an odd or even volser selection algorithm is used to maximize VTS performance.

Table 7. Volume Categories

Category (in hex)	Name	Definition
0000	Null	Set when the 3494 command specifies that the category already associated with the volume is to be used, or the command does not specify a category. Using the Null category does not affect the volume's order within the category it is assigned to. When logical volumes are inserted using the operator panel, they are also added to the FF00 category (see "Manage Logical Volumes" on page 243).
0001 to FEFF	General programming use	The host control program assigns volumes to these categories.
Note: Categories FF00 to FFFE are reserved for hardware functions.		
FF00	Insert	Set when a tape volume is added to the inventory. The 3494 reads the external label on the volume, creates an inventory entry for the volume, and assigns the volume to this category. When one or more volumes are assigned to this category, the attached hosts are notified. When logical volumes are inserted using the operator panel, they are also added to this category (see "Manage Logical Volumes" on page 243).
FF01	VTS Insert	Set when a stacked tape volume associated with a VTS is added to the inventory. The 3494 reads the external label on the volume, creates an inventory entry for the volume, uses the volser ranges to associate the volume with a VTS, and assigns the volume to this category. When one or more volumes are assigned to this category, the associated VTS is notified.
FF03	VTS Scratch	The VTS assigns stacked volumes that are scratch in the VTS to this category. This category is not used if licensed internal code is 527 or higher.
FF04	VTS Private	The VTS assigns stacked volumes that are private in the VTS to this category. If licensed internal code is 527 or higher, this category also includes scratch stacked volumes.
FF05, FF06	VTS disaster recovery	The VTS uses these categories during disaster recovery operations.
FF07	—	Reserved
FF08	VTS read-only recovery	FF08 is reserved for use by the VTS. The VTS read-only recovery process will place volumes in this category when it cannot recover all the active data from the physical volume.
FF09–FF0F	—	Reserved

Table 7. Volume Categories (continued)

Category (in hex)	Name	Definition
FF10	Convenience eject	Set when the Library Manager accepts an eject request. The volume becomes eject pending, and the 3494 queues the volume to be moved to the convenience I/O station. When the cartridge accessor delivers the volume to the convenience I/O station, it is deleted from the inventory. Logical volumes can be ejected if they are in the Insert category or in a category defined as "Fast Ready", and they are not in use. When a logical volume is ejected, it is deleted from the inventory.
FF11	Bulk eject	Set when a Library Manager accepts an eject request. The volume becomes eject pending, and the 3494 queues the volume to be moved to the high-capacity output facility. When the cartridge accessor delivers the volume to the output rack, it is deleted from the inventory. Logical volumes can be ejected if they are in the Insert category or in a category defined as "Fast Ready", and they are not in use. When a logical volume is ejected, it is deleted from the inventory.
FF12	Export-Pending	At the start of Export operation processing, the VTS assigns the logical volumes to be exported to this category so attached hosts cannot access them. If the Export operation is cancelled or fails, any logical volumes assigned to this category are reassigned to the category they were in before the Export operation. When a logical volume is assigned to this category, the original category information is preserved.
FF13	Exported	When a group of logical volumes to be exported has been placed on a stacked volume and all processing for that stacked volume is completed, the VTS assigns the logical volumes to this category.
FF14	Import	Stacked volumes that contain logical volumes to import into the VTS are assigned to this category. When they are first added to the 3494 through the convenience I/O station, the Library Manager places them in the Unassigned category automatically. Before starting the Import operation, the operator must move these volumes manually into the Import category using the **Manage Unassigned Volumes** window, shown in Figure 138 on page 221.
FF15	Import-Pending	As part of the Import operation, the VTS assigns the logical volumes being imported to this category. If the Import operation is cancelled or fails, any logical volumes assigned to this category are deleted from the 3494 inventory.

Table 7. Volume Categories (continued)

Category (in hex)	Name	Definition
FF16	Unassigned	When the convenience I/O station is in Import mode, the Library Manager assigns **J**- and **K**-type cartridges to this category. Volumes remain in this category until the operator assigns them to either the Import category or the Insert category, or selects to eject them. The Library Manager assigns volumes to this category when they are input using the convenience I/O station. They are assigned to this category if the 3494 contains one or more VTSs that are capable of Export and Import operations.
FF17	Export-Hold	The VTS assigns Exported Stacked Volumes to this category. This is a "limbo" category where export volumes are placed when the Export operation is completed. The operator uses the **Manage Export-Hold Volumes** window, shown in Figure 141 on page 224, to cause volumes in this category to be ejected.
FF18–FF1F	—	Reserved
FF20	Corrupted token	Volume with corrupted tokens (PtP VTS usage only). Set when the PtP VTSs cannot determine from the tokens which volume is the most up-to-date.
FF21–FFF3	—	Reserved
FFF4	Cleaner Volume, 3592 Only	Assigned to this category when the Library Manager identifies the cleaner volumes. The Library Manager recognizes cleaner volumes when their volser matches a mask set up by the operator through the Library Manager console (see "Cleaner Volume Masks" on page 259). The host does not have a record of volumes in this category. Volumes in this category are not reported in inventory data in response to a request from the host. The vision system uses the media-type label to determine that a cleaner cartridge is a 3592 type.
FFF5	Service volume, 3592 only	Set when the Library Manager detects that a volume has a unique service volser. Volsers that fit the mask CE xxx (where xxx represents any valid volser characters) are service volumes. The embedded blank makes these labels unique from user volumes. Normally, service cartridges have volsers with the prefix CE (for example, CE 099). The specific cell location is predefined. The host does not have a record of a volume in the service volume category. The volumes in this category are not reported in inventory data in response to a request from the host.

Table 7. Volume Categories (continued)

Category (in hex)	Name	Definition
FFF6	Service volume, 3590 only	Set when the Library Manager detects that a volume has a unique service volser. Volsers that fit the mask CE xxx (where xxx represents any valid volser characters) are service volumes. The embedded blank makes these labels unique from user volumes. Normally, service cartridges have volsers with the prefix CE (for example, CE 099). The specific cell location is predefined. The host does not have a record of a volume in the service volume category. The volumes in this category are not reported in inventory data in response to a request from the host.
FFF7	Mount from input station	Volumes to be used in a mount from the input station operation are placed in this category during the operation.
FFF8	—	Reserved
FFF9	Service volume, 3490E only	Set when the Library Manager detects that a volume has a unique service volser. Volsers that fit the mask CE xxx (where xxx represents any valid volser characters) are service volumes. The embedded blank makes these labels unique from user volumes. Normally, service cartridges have volsers with the prefix CE (for example, CE 099). The specific cell location is predefined. The host does not have a record of a volume in the service volume category. The volumes in this category are not reported in inventory data in response to a request from the host.
FFFA	Manually ejected	Assigned to this category if the cartridge that was in the inventory is not found.
FFFB– FFFC	—	Reserved
FFFD	Cleaner volume (3590 use only)	Assigned to this category when the Library Manager identifies the cleaner volumes. The Library Manager recognizes cleaner volumes when their volser matches a mask set up by the operator through the Library Manager console (see "Cleaner Volume Masks" on page 259). The host does not have a record of volumes in this category. Volumes in this category are not reported in inventory data in response to a request from the host. The vision system uses the media-type label to determine that a cleaner cartridge is a 3590 type.
FFFE	Cleaner volume (3490E use only)	Assigned to this category when the Library Manager identifies the cleaner volumes. The Library Manager recognizes cleaner volumes when their volser matches a mask set up by the operator through the Library Manager console (see "Cleaner Volume Masks" on page 259). The host does not have a record of volumes in this category. Volumes in this category are not reported in inventory data in response to a request from the host. The vision system uses the media-type label to determine that a cleaner cartridge is a 3490 type.

Table 7. Volume Categories (continued)

Category (in hex)	Name	Definition
FFFF	Volser specific	The control program assigns volumes to this category. Any tape mount request to this category must be for a specific volser, not based on the category.

Physical Volume States

A volume is in the inventory if an entry (in the inventory) for the volser is in the database. The following states are associated with a physical volume:

Inaccessible A volume is in the Library Manager inventory but is currently in a location that the cartridge accessor cannot access.

Misplaced A volume is in the inventory, and the Library Manager determines that it is not in the position that the inventory indicates.

Mounted A volume is mounted currently on a drive, or a mount was accepted for the volume.

Unreadable The vision system read a defective external bar code label on a volume, or the volume does not have an external label. If the vision system is not operational, this state is not modified.

Manual mode The volume required movement when the 3494 was in Manual mode. The volume is flagged in the inventory as a Manual mode volume until it is moved successfully or audited in Auto mode or during an inventory update.

Logical Volume States

A volume is in the inventory if an entry (in the inventory) for the volser is in the database. The following state is associated with a logical volume:

Mounted   A volume is mounted currently on a drive, or a mount was accepted for the volume.

Physical Volser Validity Checking

As a physical cartridge is added to the 3494 inventory, the Library Manager checks the volser to ensure that it is readable, is not already in the inventory, and is not otherwise invalid.

The convenience I/O station is in either Import mode or Insert mode, depending upon the capabilities of the VTSs in the 3494 and the configuration of the 3494.

The convenience I/O station is in Import mode when the 3494 has at least one VTS that is capable of Export and Import operations and this mode was not deselected.

The convenience I/O station is in Insert mode when the 3494 does not have a VTS that is capable of Export and Import operations.

The mode of the convenience I/O station is stored so that the Library Manager "remembers" the mode across shutdowns. When the mode is determined, the stored mode is used each time the Library Manager initializes. The mode changes if the configuration changes or if the VTS capabilities change.

When the convenience I/O station is in Import mode, the 3494 adds any **J**- or **K**-type cartridges to the database in the Unassigned category. Using the **Manage Unassigned Volumes** window, shown in Figure 138 on page 221, you can assign the volumes in the Unassigned category to the Import category, assign volumes to the appropriate Insert category and partition based on the volser ranges, or eject a volume.

If any volser character is unreadable or invalid (not A–Z, 0–9, or blank), the volser is not added to the inventory. The cartridge is ejected to an I/O station. A volume notification message is sent to all attached hosts indicating that a volume remains in the I/O station with an unreadable or invalid label. If this happens, you must determine why the volser is unreadable and correct the label before trying to reinsert the cartridge.

If the vision system cannot determine the cartridge media type, the volser does not fit into an established volser range, and a default media type is not defined, the cartridge is ejected to an I/O station.

When a volser that is already in the inventory is inserted into the convenience I/O station (a possible duplicate volser), an audit is performed. If the volser is a duplicate, the cartridge is ejected to the convenience I/O station. If the volser is not a duplicate, the cartridge from the convenience I/O station is left in the new home cell.

If the *misplaced* or *inaccessible* volume indicators are set in the database, they are reset and a notification is sent to all attached hosts that indicates that the volume was found or made accessible again. Also, if the *volume was used during Manual mode* indicator was set, it is reset.

A notification that describes the results of the audit is sent to all attached hosts.

Note: A service volume found in the convenience I/O station causes a validity check because its volser contains an invalid character: an embedded blank. A service volume must, instead, be placed in the cell reserved for it in the L1x Frame. It also may be inserted using a special service volume insert process available in Service mode.

Logical Volser Validity Checking

When logical volumes are inserted into the 3494 (see "Manage Logical Volumes" on page 243), the Library Manager checks the volser range values for validity.

The Insert Logical Volumes function is not performed under any of the following conditions:
- The volser range characters are invalid (not A–Z or 0–9).
- There are fewer than six characters in the volser.
- The two volsers entered are not in the same format.

The corresponding characters in each volser must both be either alphabetic or numeric. For example, AAA998 and AAB114 are in the same format, but AA9998 and AAB114 are not.

Logical volume volsers must be unique within a physical library. If a volser already exists in the database for any logical library (non-VTS or VTS), the logical volume is not inserted. The Library Manager then attempts to insert the next logical volume.

Command Priorities in the Queue

The Library Manager manages the operations queue with a set of priority levels. The Library Manager places operation requests in the queue in priorities from 0–9. A command priority of 0 is the highest priority, and a command priority of 9 is the lowest priority. The priorities are established so that mount requests take precedence over any other operation, except for operations that must be executed on a priority basis. Therefore, priority level 0 is reserved for internally generated operations, while host requests start with priority level 1.

Higher priority operations are taken from the queue first. Within a priority level, operations are taken first-in, first-out (FIFO). The order may be shuffled if commands are requeued because something, such as an I/O station, may be busy.

Priority Levels

Table 8 shows the priority levels, the operations in each level, and the operations that you can promote to priority 2. The highest priority to which you can promote a queued operation is priority 2.

Note: If a priority 3 operation is in the queue for a specified period of time, it is promoted automatically to a priority 2. This prevents higher priority operations from "blocking out" priority 3 mounts.

Table 8. Command Queue Priorities

Priority	Operations	Promotable
0	Inventory update	—
1	• Mount from input station operations • Mount cleaner cartridge • Export • Import	—
2	• Promoted by operator • Logical Mount - category or specific	—
3	• Mount specific volser • Mount from category	Yes
4	• Move cartridge from input station • Unlabeled tape operations • Eject volser	Yes
5	Audit volser	Yes
6	Reserved	—
7	Demount	Yes
8	Reserved	—
9	Offline command	—

For details on Mount Operations, Demount Operations, and Audit Operations, see "Host-Initiated Operations" on page 78.

Operations

The 3494 performs host-initiated and stand alone operations.

Host-Initiated Operations

The following are host-initiated operations:

- Mount operations
- Demount operations
- Eject operations
- Audit operations
- Export operations
- Import operations

Mount Operations

Host-initiated mount operations result in the 3494 performing either a physical or logical mount. The drive address to which the mount is issued determines whether the host-initiated mount is physical or logical. When the mount is issued to a drive address within a VTS, the 3494 performs a logical mount operation. For all other drive addresses, the 3494 performs a physical mount operation.

The Library Manager directs the cartridge accessor to move a physical volume from its current location to the specified drive. The following are the types of mount operations:

Mount specific   The mount request specifies the specific volser to be mounted.

Mount from category   The volser to be mounted is picked from the specified category in the mount request.

Physical mount operations result in a volume being placed in a drive and the drive loading the volume. The cartridge accessor performs physical mounts.

The VTS performs mounts for logical volumes. They may or may not require a physical mount.

Logical mount operations result in a virtual volume being made available to the host through a virtual tape drive. The following are the types of logical mount operations:

Fast Ready Mount   The host requested a category mount, and the category was designated as a "Fast Ready" category. This type of mount selects a volser from the specified category and logically mounts it on the virtual tape drive. An odd or even volser selection algorithm is used to maximize VTS performance. No recall of the data from the previous use of the volser from physical tape is performed.

Cache Mount   The host requested a specific volser, and the virtual volume for that volser is resident in the tape volume cache. No recall of data from a physical tape is performed.

Physical Mount Required   The host requested a specific volser or specified a category that was not designated as a "Fast Ready" category. The volser needed to satisfy the mount

operation is not resident in the tape volume cache and must be recalled from the physical tape. The Library Manager directs the cartridge accessor to move the required physical volume to a tape drive that the VTS manages so that the recall operation can be performed.

Demount Operations

The 3494 performs a physical demount operation whenever a volume is unloaded from a physical tape drive. A similar operation occurs for the virtual tape drives within a VTS. When a virtual volume is unloaded from a virtual tape drive, a logical demount operation is performed.

The following are two types of demount operations:

- A demount was requested, and the volume is currently at the tape drive.

  For a physical demount, this operation is used to move a volume from a tape drive to a storage cell. When the volume is placed in the storage cell, the demount is considered complete.

  For a logical demount, this operation updates the status of the virtual volume in the Library Manager database to indicate that it is no longer mounted. No physical movement of a volume is involved.

- A demount was requested, but the volume has not been mounted.

  This operation is used to cancel a mount operation that has not been started. The library recognizes that because a demount request was received for a mount that has not occurred, the host must not want the mount. Therefore, the two requests cancel each other.

Eject Operations

An eject operation results in a physical cartridge being placed in a cell of an output facility in the 3494. The type of output facility may be either the convenience I/O station or the high-capacity output facility. The host specifies the type of facility as part of the eject request. An eject request is considered complete when the specified cartridge is placed in the cell of an output station. On completion, the specified volume is removed from the Library Manager inventory.

Logical volumes that a VTS manages cannot be ejected unless they are assigned to the Insert category or to a category designated as "Fast Ready". Any host request to eject a logical volume not in the Insert category or in a "Fast Ready" category will fail. An ejected logical volume is removed from the Library Manager inventory.

Audit Operations

An audit uses the vision system to ensure that the physical cartridge associated with the volser specified in the request is physically in the 3494 where expected. If the volser specified in the request is a physical volume that is in the Library Manager's inventory, the audit operation checks the external label of the cartridge in the storage cell specified in the Library Manager database. It must match what is in the database. If the volume is mounted on a tape drive, the audit is held until the volume is demounted and returned to its storage cell.

If the volser specified is a logical volume in the Library Manager's inventory, the Library Manager determines the physical volume on which the logical volume resides and performs an audit of that physical volume. The audit operation is successful if the physical volume is found in the expected storage cell or if it is mounted currently on a physical drive in the VTS.

An audit operation for a volser that has been placed in an output facility fails because the volser is no longer in the Library Manager's inventory.

Audit operations are queued in the Library Manager and have a lower execution priority than mounts. An audit operation is complete when validation of the location of the specified volser has been attempted and the host has been notified of the success or failure of the validation.

Import Operations

The Import operation allows one or more logical volumes from Exported Stacked Volumes to be copied into a VTS. The Exported Stacked Volumes must be inserted into the 3494 by using the convenience I/O station. A list of logical volumes to be imported must be provided as described in Appendix B, "VTS Export and Import Advanced Function," on page 421. When the Import operation completes, Exported Stacked Volumes remain in the Import category. You can use the Manage Import Volumes window for further disposition of the volumes (see Figure 139 on page 222).

Export Operations

The Export operation allows logical volumes within a VTS to be copied to physical Exported Stacked Volumes that can be removed from a 3494. The logical volumes are deleted from the VTS and are no longer accessible in the VTS. A destination for each logical volume may be specified in order to create one or more Exported Stacked Volumes for a destination. Before executing the Export operation, it is necessary to provide a list of logical volumes to be exported as described in Appendix B, "VTS Export and Import Advanced Function," on page 421. Exported Stacked Volumes may be ejected from the Export-Hold category by using the Manage Export-Hold Volumes window (see Figure 141 on page 224).

Stand-Alone Operations

When a host cannot send mount commands to the 3494, the 3494 may perform stand alone operations by using stand alone software. Some examples are as follows:

Stand alone dump　　　　　The host must receive an initial program load (IPL) from tape, then dump the host memory contents to a separate tape. The tape may be mounted later under the control of a host.

Stand alone restore　　　　The host must receive an IPL with a function to restore the contents of DASD volumes from data that is stored on the tape volumes. After the DASD volumes are restored, the host system may receive an IPL with restored DASD volumes.

The two types of stand alone operations are:

Using automatic cartridge loader mode

The tape drives in the 3494 do not have automatic cartridge loaders. However, the 3494 allows the automatic mounting of the next cartridge of a predefined sequential set in a specified 3494 tape drive. The 3494 supports the following:

- The assignment of cartridges to a special category
- The assignment of a specified drive for restricted use with the special category

- The ending of the restricted usage of a tape drive

Mounting transient tape cartridges

> **Note:** A convenience I/O station feature must be installed to take advantage of this function.
>
> The 3494 Mount from Input Station function supports special usage of the convenience I/O station for the use of transient cartridges that are not part of the 3494 inventory. In this special-use mode, cartridges in the convenience I/O station are mounted sequentially, used (read or written), demounted, and returned to the convenience I/O station. This function is available as an option in the Setup Stand alone Device window under the **Stand alone device...** option in the Commands window.

See "Stand-Alone Device" on page 267 for more information on stand alone operations.

Initial Cartridge Installation

Physical cartridges may be loaded into the 3494 after the hardware installation is complete. The loading of physical cartridges can occur before the teach and inventory operations. Logical volumes can be inserted after a teach operation. The following types of cartridges may be loaded:

User volumes
: User volumes are the initial set of data and scratch volumes to be automated. Cartridges may be added to the 3494 up to the maximum number of available storage cells.

Cleaner volumes
: One cleaner volume should be installed for each frame that contains a tape subsystem. The cleaner cartridge type depends on what media the tape subsystem uses. The cleaner cartridges may be placed in any available cell.

> **Note:** The external volser must match the mask value that is provided, or the inventory operation treats the cleaner cartridge as a normal user volume.

Service volume
: The service representative installs one to three service volumes, depending on the 3494 configuration.

Logical volumes
: If a VTS is installed, logical volumes are inserted into the 3494 by using the Manage Logical Volumes window (see Figure 163 on page 245).

Stacked volumes   If a VTS is installed, the cartridges that it uses to store and manage logical volumes cannot be loaded into the 3494 without performing the following first:

- Performing an initial teach of the 3494.
- Setting up one or more volser ranges that identify the stacked volumes that the VTS will manage. See "Volser Ranges for Media Types" on page 209 for a description of how to enter the volser ranges.

Cartridge Placement

When you place cartridges into the 3494, you can improve 3494 performance by following these guidelines:

- During initial loading of cartridges, cluster the cartridges around the tape subsystems in which they will be used.
- For Inventory Update Inserts, place cartridges as near as possible to the tape subsystems on which you intend to issue mounts for those volumes.
- Place cartridges to be used as stacked volumes for a particular VTS in cells close to those drives associated with the VTS.

Initial Volume Inventory Upload

After the 3494 completes all the initialization operations (including teach and inventory) and enters the Online state for the first time, the host software requests an upload of the volume inventory. The information from the Library Manager database is uploaded to the attached hosts before host applications can use the 3494.

The process to upload the information requires no operator action.

Host Operation Control

The host operation control of the 3494 is operating system-dependent. Because the 3494 operates under a variety of host operating systems, you must be familiar with the operating system for your 3494 and the required protocol.

For more information about the host operating systems, see the *IBM TotalStorage Enterprise Automated Tape Library (3494) Introduction and Planning Guide* and "Related Information" on page xxii.

Actions to Avoid when Operating a 3494

This section contains two lists of actions to avoid when operating a 3494. The first list ("Things You Should Never Do") is the most important, because these actions can cause serious problems. The second list ("Things You Should Avoid Doing" on page 84) is also important, but these actions are corrected more readily and cause problems of a less serious nature.

Things You Should Never Do

This section contains a list of actions that you should **never** do when operating a 3494. Failure to follow these recommendations causes serious problems, including severe performance degradation:

- Never remove cartridges from tape drives unless the Library Manager tells you to do so. Moving a cartridge can cause it to be marked as misplaced or inaccessible. The Library Manager clears the drive automatically while in Auto mode. Here are some cases where the Library Manager instructs you to clear the drive:

  – An operator intervention indicates that a drive failure has occurred. You should remove the cartridge from the specified drive.

  – A reinventory of the complete system has been requested. Remove all cartridges from the drives and place them in empty cells. The reinventory operation scans all cells and recreates the inventory database.

  – If the library is being used in Manual mode and a mount is requested for a drive that has a cartridge in its feed slot, the cartridge should be removed from the drive so the mount can be performed. On returning to Auto mode, cartridges that are already loaded in the drives or in the feed slot should be left in place.

- Never insert more cartridges into empty cells than there are free cells indicated in the Operational Status window. This is because cartridges that are loaded currently on drives must have a cell available when they are unloaded from the drive.

- Never insert cartridges into empty cells or move cartridges around in the 3494 unless the Inventory Update function is enabled. Unless these cells are scanned on returning to Auto mode, the Library Manager cannot determine the cartridges that have been added or moved.

- Never fail to save the logical volumes associated with a VTS during a Reinventory Complete System unless they truly need to be deleted.

- Never leave Manual mode until mounts that were started (cartridges that were physically placed in the feed slot of a drive) have been cleared from the Manual Mode window.

- Never place Exported Stacked Volumes in the high-capacity I/O facility or into free cells. This would cause them to be inserted as scratch volumes, and the data on them would be lost permanently.

- Never load a drive without the Library Manager telling you to do so (which occurs only in Manual mode). If you need to load a cartridge without entering it into the library database, use the Mount From Input Station function.

- Never move an Exported Stacked Volume intended for use by the VTS Exported Volume Read Utility (provided by DITTO/ESA for MVS) with a native 3590 tape drive into the Insert category **without** checking the volser ranges. The cartridge becomes a VTS Stacked Volume if it is in the volser range for a VTS and will be rewritten by VTS use. See "Using the Convenience I/O Station Import Mode" on page 99.

Things You Should Avoid Doing

This section contains a list of actions you should avoid when operating a 3494 but whose consequences are less serious than those in the preceding list. Failure to follow these recommendations may still cause significant performance degradation:

- Avoid leaving the convenience I/O station door open. After several minutes this results in an operator intervention being sent to the host indicating that the convenience I/O station door is open.

- Avoid running with the 3494 completely full. Running with a full 3494 makes it impossible to insert any more cartridges into the 3494. It also causes cartridges to be left in the I/O stations (convenience and high-capacity). It may also hinder recovery of misplaced or inaccessible cartridges, which would have to be recovered through the error recovery cell one at a time.

- Avoid running large database searches (for instance, searching for all volsers in the 3494) from the Database window while the 3494 is busy. This can tie up the database and cause performance degradation.

- Avoid opening the enclosure doors without first pausing the cartridge accessors.

- Avoid any continuous action which causes a window to continuously use the LM hard drive.

Chapter 4. Operational Modes, Operational States and Informational States

This chapter describes the operational modes, operational states, and informational states of the 3494.

The following mode and states define the current status of the Library Manager:
- Operational mode
- Operational state
- Informational state

The operational mode and state information are available through the Library Manager console. If the optional remote Library Manager console feature is installed, they are also available through the remote Library Manager console. To view this information, do the following:

1. Select the **Status** option in the Operator window.
2. Select the **System summary...** option in the Status window.

Note: If the display is blank, press any key on the keyboard to activate the display.

Operational Modes

The 3494 operates in one of the following modes:

Auto Mode

In this mode, the cartridge accessor is operational. The Library Manager manages all commands under host program control or from the Library Manager console. The front doors of the 3494 must be closed to operate in Auto mode.

Pause Mode

In this mode, the processing of Mount, Demount, Eject, and Audit requests are suspended. The 3494 enters this mode automatically when a failure prevents automatic operation or when instructed from the Library Manager console or the operator panel. This mode allows you to open the front doors on the 3494 to correct an intervention condition, to insert cartridges into the 3494, or to remove cartridges from the High-Capacity Output Facility. All host requests for Mount, Demount, Eject, and Audit operations are queued until the 3494 returns to Auto mode. Mount and Demount for logical drives only can be performed during this time (Pause Online).

When you change the mode from Auto to Pause, the Library Manager instructs the cartridge accessor to park. If an error condition occurs, the Library Manager removes power immediately from the cartridge accessor and suspends any operations in progress.

Manual Mode

When you select this mode, the Library Manager parks the cartridge accessor in the home position, if possible. If necessary, you may move the cartridge accessor to gain access to a cartridge or drive. The Library Manager provides you with instructions to perform tasks that it normally performs automatically. This mode allows you to perform 3494 tasks (for example, mounting and ejecting) until you can return the 3494 to Auto mode.

Additional Operational Modes in the Model HA1 Environment

In a 3494 with the HA1 Frames attached, one Library Manager is active, and the other is standby. Figure 40 shows the window for the active Library Manager. Figure 41 shows the window for the standby Library Manager.

```
 System Summary                                                          □ □
 Help
 Operational mode....: Auto              Overall system..: OK
 Library Manager.....: Online            Standby LM......: Enabled
 Direct attach ports.: 0123              Active Accessor.: A
 CU ports (RTIC 0x)..: 4                 Standby Accessor: Available
 CU ports (RTIC 1x)..:                   Accessor........: OK
 CU ports (LAN  2x)..: 0123456789ABCDEF    Gripper.......: OK
 CU ports (LAN  3x)..: 0123456789ABCD       Vision........: OK
 CU ports (LAN  4x)..:                      Power.........: OK
 CU ports (LAN  5x)..:                      Port..........: OK
 Host LAN ports......: -                 3494 Specialist.: Enabled
 Convenience I/O.....: Empty             Intervention....: None
   Mode..............: Insert            Dual Path Conc..: Not installed
 High capacity status: Not installed     Peer-to-Peer....: VTS1, VTS2
 High capacity rack..:
 Inventory update....: Disabled
 Enclosure doors.....: Closed
```

Figure 40. Active Library Manager Window

```
 3494 Tape Library Dataserver - B
 Mode   Status   Queues   Database   Commands   Options   Help



                              ┌────────────────┐
                              │  This is the   │
                              │   Standby      │
                              │   Library      │
                              │   Manager.     │
                              └────────────────┘
```
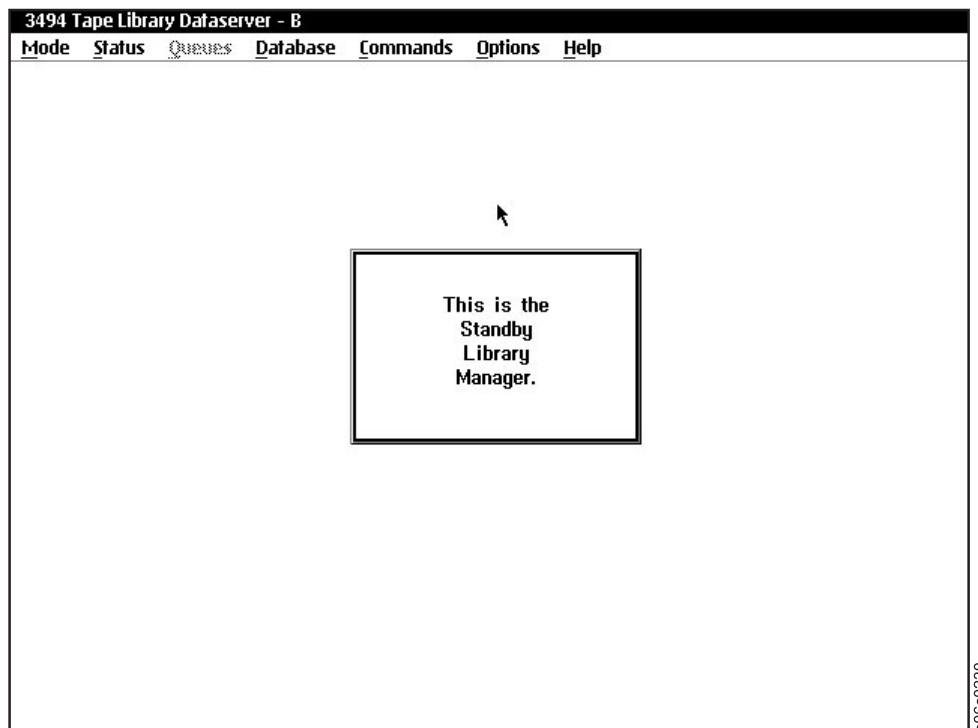
Figure 41. Standby Library Manager Window

Home-Cell Mode

The 3494 operates in either fixed home-cell or floating home-cell mode. The service representative makes the home-cell mode selection during the teach process, as follows:

Fixed home-cell
> Fixed home-cell mode assigns each physical cartridge to a fixed storage cell location when it enters the 3494. It is always returned to the same location after it is used.

Floating home-cell
> A physical cartridge is put into a cartridge cell location that optimizes performance.

Note: When in Manual mode, the 3494 operates in fixed home-cell mode regardless of the home-cell mode specified during installation.

Operational States

The 3494 operates in one of the following operational states:

Library Manager Initialization

The 3494 starts the Library Manager application, power-on and interface verification tests, Library Manager database verification, and restarts error recovery (if applicable).

Initialization Complete

The 3494 starts the Library Manager application and determines the operational mode and state. The availability conditions of the components and whether the 3494 is taught and inventoried determine the mode and state. If the 3494 is taught and inventoried, the Library Manager waits for one of the following conditions:

- An operator instruction to proceed to an operational mode and operational state.
- A time-out interval expires. This causes the 3494 to go to the default operational mode and operational state that the availability conditions of the 3494 components set.

Online State

In this state, the Library Manager accepts and processes host commands.

Offline State

In this state, the Library Manager does not accept or process host commands. The Library Manager processes commands that it received before entering the Offline state.

Operations performed while the 3494 is in the Offline state, such as inventory, do not report errors to the host. The Library Manager console displays messages that may occur during offline operations. If the Remote Library Manager Console feature is installed, the Remote Library Manager Console also displays such messages.

Shutdown Pending

The Library Manager closes and exits the Library Manager application.

Library Manager Switchover in Progress

When the HA1 Frames are installed, this condition occurs when the active and standby Library Managers switch roles. This can occur on a failure or by your request. The Library Manager is in this state until the switchover completes.

Note: You must resubmit any tape job that aborted (including those that use logical drives of a Virtual Tape Server [VTS]) and reissue failed in-process tape operations. You may have to restart any Library Manager console operations that you were performing, including VTS-related operations.

Accessor Switchover in Progress

When the HA1 Frames are installed, this condition occurs when the active and standby accessors switch roles. This can occur on a failure or by your request. The 3494 is in this state until the switchover completes.

Dual Active Accessor Status

When the Dual Active Accessors feature is installed, it may be enabled or disabled. Figure 42 shows the window for the transition into Dual Active Accessor mode. Figure 43 shows the window for the transition out of Dual Active Accessor mode. Each of these windows is shown until the transition is complete.
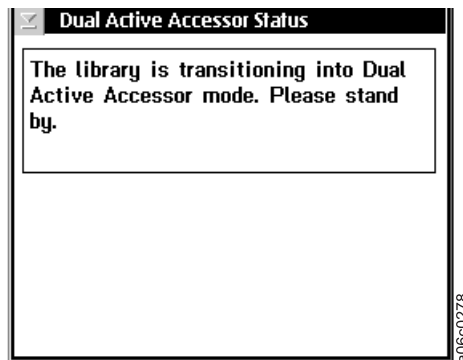
Figure 42. Dual Active Accessor Status – Enabling
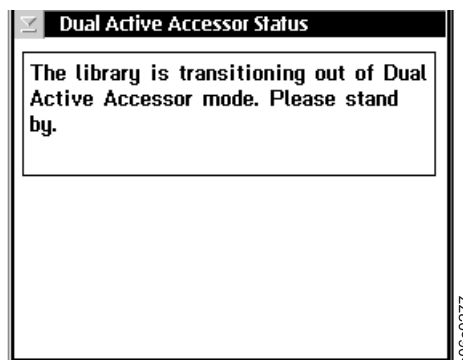
Figure 43. Dual Active Accessor Status – Disabling

Informational States

In addition to the operational states, the following informational states further define the state of the 3494 (one or more of which can occur at the same time):

Degraded operation
Indicates that a component of the 3494 is unavailable (except 3490E, 3590, 3592 and VTSs). When the HA1 Frames or the Dual Active Accessors feature are installed, this includes the ability of the standby Library Manager or the standby accessor to take over in the event of a failure.

Safety interlocks open
> Indicates that an interlock (front door) on the safety circuit is open.

Vision system non-operational
> Indicates that the vision system has failed and cannot read the external volume labels on the cartridges.

Intervention required
> Indicates that you must correct a condition in the 3494.

Library Manager check-1 condition
> Indicates that the Library Manager has detected an unrecoverable condition that does not allow continued execution of host requests. If the HA1 Frames are installed, the Library Manager will attempt to re-initialize or will switch to the standby Library Manager to correct the problem.

All storage cells full
> Indicates that all of the customer storage cells in the 3494 have cartridges assigned to them.

Out of cleaner volumes
> Indicates that a clean operation is required; however, there are no usable cleaner volumes of the correct media type in the 3494.
>
> **Note:** This informational state is entered in a mixed tape drive system (3490E, 3590, 3592), if any type of cleaner cartridge is missing.

Dual write disabled
> Indicates that the process that keeps the secondary database in synchronization with the primary database is not running. This is normal if the second hard drive feature that provides a secondary database is not installed.

Relationship between Operational Modes and States

When you request an operational mode or state change, the 3494 must perform some steps before it completes the change. During this transition period, the immediate mode or state of the 3494 is *mode pending* or *state pending*. For example, if the 3494 is in the Online state and you make a request to enter the Offline state, the immediate operational state is *Offline Pending*. The System Summary window on the Library Manager console indicates whether the mode or state is pending. Sometimes the change between the modes and the states occurs quickly, and the pending status is displayed briefly.

Operational Mode Transitions

The 3494 is in only one operational mode at any one time.

When the Library Manager requests a change in operational mode, it displays a window that allows you to confirm the mode change request.

Note: If the HA1 Frames are installed, this applies to the active 3494.

Pause Mode to Auto Mode

You can use either the operator panel (see "Changing to Auto Mode" on page 96) or the Library Manager to request a change to Auto mode. Either way you generate the request, the Library Manager checks the status of the 3494.

When you use the Library Manager to request a change from Pause mode to Auto mode, the following actions occur:

1. The Library Manager checks the status of the interface to the cartridge accessor. If it is not available, a window indicates that the cartridge accessor interface is unavailable. You can cancel the request to change to Auto mode.

2. The Library Manager checks the cartridge accessor status. If it is not available because of a previous failure, the Library Manager tests the accessor to determine if it can be made available. If it can be made available, the Library Manager attempts the transition to Auto mode. If the Library Manager detects a hardware problem, the 3494 returns to Pause mode, and a window indicates that the cartridge accessor is unavailable. You can cancel the request to change to Auto mode.

3. The Library Manager checks the power status of the cartridge accessor. If power is not on, a window indicates the fault and prompts you to close all safety interlocks.

4. If the HA1 Frames are installed, the Library Manager determines the accessor that will be the active accessor, based on the previous state. If both are available, the preferred accessor is the local accessor. If both are not available, a window is displayed. You can cancel the request to change to Auto mode.

5. The Pause Mode window closes.

6. The Auto LED on the operator panel flashes until the transition is complete, then stays lit. The Auto Pending window (Figure 44) indicates that the 3494 is changing from Pause mode to Auto mode. **Emergency Motion Off recovery is in progress** will appear in the window for a short time during this transition. When Emergency Motion Off Recovery is complete, the window closes.
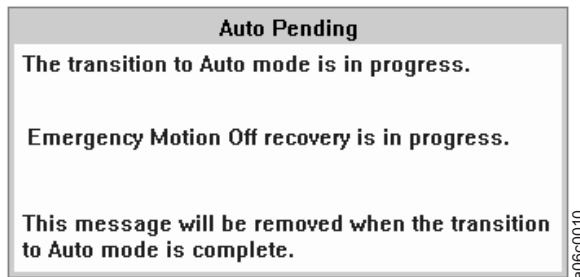
Figure 44. Auto Pending Window

7. The 3494 enters Auto mode.

8. The Library Manager sends an attention message to all attached hosts, indicating that the state of the 3494 has changed.

Auto Mode to Pause Mode (No Error)

You can use either the operator panel (see "Changing to Pause Mode" on page 96) or the Library Manager to request a change to Pause mode. Either way you generate the request, the Library Manager checks the status of the 3494.

When you use the Library Manager to request a change from Auto mode to Pause mode, the following actions occur:

1. The Pause Pending window indicates that the change to Pause mode is in progress and that the cartridge accessor is being parked. The Pause LED on the operator panel flashes until the transition is complete, then stays lit. The border of the Pause Pending window alternates between its highlighted and

non-highlighted color. This provides a visual indication that the 3494 is still in Pause Pending mode. The Library Manager also beeps five times.

2. The Library Manager updates the System Summary window to indicate that the operational mode is Pause Pending.

3. The Library Manager instructs the cartridge accessor to move to its park location after completing the operations in progress.

4. The cartridge accessor notifies the Library Manager that it is in its park location.

5. The Library Manager removes power from the cartridge accessor.

6. The Library Manager enters Pause mode and sends an attention message to all attached hosts, indicating that the state of the 3494 has changed.

7. The Pause Pending window is removed, and the System Summary window indicates that the operational mode is Pause and that power is off.

8. The Pause Mode window is displayed, which instructs you to wait while the cartridge accessor is being parked. If the cartridge accessor cannot be parked or if the status of its power is unknown, the window includes this information.

Auto Mode to Pause Mode (Error: ESTOP)

If the Library Manager detects a severe error or condition, and the error or condition is such that it is not possible to continue automated operation, the Library Manager enters Pause mode. It removes power immediately from the cartridge accessor and stops any operations in progress. When the Library Manager enters Pause mode, it sends an attention message to all attached hosts, indicating that the state of the 3494 has changed. The state-change message and an associated unsolicited unit check indicates the error recovery action (ERA).

The Pause Mode window directs you to open the 3494. In most cases, the Library Manager cannot park the cartridge accessor.

Pause Pending to Force Pause

If the Library Manager is stuck in Pause Pending Mode and you need access to the enclosure, you must use the Library Manager to request a change from Pause Pending mode to Force Pause (see "Force Pause" on page 122). After selecting the **Pause ...** option, wait at least 20 minutes for the transition to complete. If the 3494 is still in Pause Pending mode after 20 minutes, you can use the Library Manager to transition from Pause Pending to Force Pause.

Pause Mode to Manual Mode

You must use the Library Manager to request a change from Pause mode to Manual mode (see "Using Manual Mode" on page 320). The Library Manager performs no specific operations during the change from Pause mode to Manual mode. As the 3494 enters Manual mode, the Library Manager sends an attention message to all attached hosts, indicating that the 3494 is now in Manual mode.

The operational status is changed to Manual. If the cartridge accessor cannot be parked or if the status of its power is unknown, the Manual Mode window includes this information.

Manual Mode to Pause Mode

You must use the Library Manager to request a change from Manual mode to Pause mode. During the change from Manual mode to Pause mode, the following actions occur:

1. Operations that were fetched from the operations queue, but which you have not confirmed as executed, are returned to the operations queue for execution when the 3494 returns to Auto mode.

2. The Library Manager enters Pause mode and sends an attention message to all attached hosts, indicating that the state of the 3494 has changed.

Auto Mode to Manual Mode

When you select Manual mode while the 3494 is in Auto mode, the 3494 performs the operations required to move to Pause mode, then to move to Manual mode. All windows indicate that the 3494 is in Manual Pending, even as it is moving through Pause mode. Also, the Library Manager sends an attention message only when the 3494 enters Manual mode, not for the intermediate Pause mode. During the change from Auto mode to Manual mode, the following actions occur:

1. A Manual Pending window is displayed indicating that the change to Manual mode is in progress and that the cartridge accessor is being parked.

2. The System Summary window is displayed indicating that the operational mode is Manual Pending.

3. The Library Manager and the cartridge accessor perform the operations necessary to park the cartridge accessor and remove its power (see "Auto Mode to Pause Mode (No Error)" on page 90).

4. The 3494 completes the change to Manual mode (see "Pause Mode to Manual Mode" on page 91).

5. The Library Manager sends an attention message to all attached hosts, indicating that the state of the 3494 has changed.

Manual Mode to Auto Mode

You must use the Library Manager to request a change from Manual mode to Auto mode. The 3494 performs the operations to move to Pause mode, then to move to Auto mode. All windows indicate that the 3494 is in Auto Pending as it is moving through Pause mode. Also, the Library Manager sends an attention message only when the 3494 enters Auto mode, not for the intermediate Pause mode. During the change from Manual mode to Auto mode, the following actions occur:

1. The System Summary window indicates that the operational mode is Auto Pending.

2. The 3494 completes the change to Pause mode as described in "Manual Mode to Pause Mode" on page 91.

3. The 3494 completes the change to Auto mode as described in "Pause Mode to Auto Mode" on page 89.

4. The Library Manager sends an attention message to all attached hosts, indicating that the state of the 3494 has changed.

Initialization State to Auto, Pause, or Manual Mode

During the initialization-complete state, the Library Manager determines which operational mode to enter. It examines the database and the state of the cartridge accessor power to make the determination. When the Library Manager has made the determination, the change to the selected mode occurs. The steps that are taken during the transition are the same as an operator request when the 3494 is in Pause mode and Offline state.

Operational State Transitions

The 3494 is in only one operational state at any time.

Shutdown Pending State to Shutdown State

During this change, the Library Manager application is exited.

Shutdown State to Library Manager Initialization State

This change occurs when the Library Manager controller is powered on or when a severe error occurs.

Library Manager Initialization State to Initialization Complete State

After the Library Manager starts the main process of the Library Manager application, the 3494 enters the Initialization Complete state. The 3494 takes no actions during this change.

Offline State to Online State

Either you or the Library Manager can initiate the request to enter the Online state. In either case, the following actions occur during the transition:

1. The Library Manager examines the database to determine if both the teach and the inventory operations have completed. The 3494 cannot enter the Online state unless they have completed.

2. The Library Manager examines the status of the interfaces to the tape subsystems and host systems to determine whether any interfaces are initialized with the Library Manager. If at least one of the tape subsystems interfaces is initialized and the associated control unit is Online to the Library Manager, the 3494 enters the Online state and notifies all attached hosts. If no interfaces are initialized, the 3494 enters the Online state but does not send a notification.

3. If a VTS is installed, the Library Manager checks for defined "Fast Ready" categories. If it finds none, a message stating that "Fast Ready" categories should be defined is displayed for one minute or until you select **OK**. Notify your system administrator if you see this message.

Online State to Offline State

You initiate a request to enter the Offline state. After you request it, the transition must complete before you can request a transition to the Online state. The following actions occur during the change to the Offline state:

1. The Library Manager sends a message to all attached hosts indicating that the 3494 is entering the Offline state. The control units, VTSs, and the Library Manager will fail any later host requests for 3494 functions.

2. The 3494 processes all host requests that the Library Manager accepted and queued before the request to enter the Offline state. The Library Manager provides responses to the requesting host as appropriate.

3. The Library Manager completes all internal commands that were queued before the request to enter the Offline state. If it detects errors, it sends appropriate messages to all attached hosts.

4. After the Library Manager completes all queued commands and sends responses, the 3494 enters the Offline state.

Notes:

1. The change from the Online to the Offline state can take more than ten minutes if a High-Capacity Output operation started before the request to go to the Offline state. The 3494 needs this time to move the cartridges to the High-Capacity Output Facility from the storage cells. If a High-Capacity

operation is in progress, you are prompted to cancel the operation. If you do not cancel the High-Capacity operation, the Library Manager cancels the Offline request.

2. If an Export or Import operation is in progress, you cannot request a change from the Online state to the Offline state. The 3494 will display a pop-up message alerting you to do one of the following:

- Wait for the operation to complete.
- Cancel the operation from the host.
- Cancel the operation by selecting **Cancel VTS Export/Import** from the Commands/System Management pull-down menu.

Figure 60 on page 126 shows the pop-up message with these three options.

Initialization Complete State to Online or Offline State

During the Initialization Complete state, the Library Manager determines which operational state to enter. It makes the determination by examining the database. The steps taken during the transition are the same as for an operator request as described in "Offline State to Online State" on page 93 or "Online State to Offline State" on page 93.

Offline State to Shutdown Pending State

A request to enter the Shutdown Pending state is made through an operator request. The 3494 takes no actions during this change.

Informational State Transitions

One or more informational states may be active at any time in the 3494. When the 3494 enters or leaves an informational state while in the Online state, the Library Manager notifies all attached hosts. Most of the states are a condition in the 3494, and the 3494 performs no actions during the change into or out of the state.

The following describe any additional actions that occur during the change into or out of a state:

Degraded
When a component of the 3494 becomes available, the Library Manager determines whether any other components are unavailable. If all components are now available, the 3494 leaves the degraded state.

Safety interlock open
When a safety interlock (front door) is open, the Library Manager examines the condition of the 3494 to determine whether the interlock opening was expected or unexpected. If the opening was unexpected, the 3494 is forced into Pause mode.

Intervention required
When you correct a condition requiring intervention, the Library Manager determines whether any other intervention requirements exist. If none exist, the 3494 leaves the Intervention Required state.

Library Manager check-1 condition
The Library Manager detects an unrecoverable condition that does not allow it to continue processing host requests. It attempts to re-initialize to correct the problem.

Chapter 5. Basic Operating Procedures

This chapter describes the basic operating procedures for the 3494. Table 9 shows the basic operating procedures that you can perform by using the operator panel on the front door of the L Frame.

Table 9. Quick Reference to Basic Operating Procedures

Task	Procedure
Powering on the 3494	"Powering On the 3494."
Powering off the 3494	"Powering Off the 3494" on page 96.
Changing to Pause mode	"Changing to Pause Mode" on page 96.
Changing to Auto mode	"Changing to Auto Mode" on page 96.
Changing from local to remote power	"Changing from Local to Remote Power" on page 96.
Changing from remote to local power	"Changing from Remote to Local Power" on page 97.
Inserting cartridges	"Inserting Cartridges" on page 97.
Removing ejected cartridges	"Removing Ejected Cartridges" on page 102.

Powering On the 3494

Perform the following steps to power on 3494:

1. Set the Unit Emergency switch on the operator panel to the I (ON) position (if it is not already in the ON position).

   Notes:
   a. The 3494 must be powered off and remain off for 30 seconds before you attempt to power on the 3494 again. The 3494 needs the 30 second wait to allow the 3490E tape subsystem sufficient time to initialize properly.
   b. If the 3494 has more than eight frames, or if the HA1 Frames is installed, both Unit Emergency switches must be set to the I (ON) position. The second switch is located at the right end of the 3494 (when facing the cartridge access doors).
   c. If the 3494 has a B18, B10, or B20 VTS, set the Unit Emergency switch on the B18, B10, or B20 to the I (ON) position.

2. Press the Unit Power switch on the operator panel to the Power On position.

   Notes:
   a. If the Local Remote Power feature is installed and the Local Remote power switch is in the Remote position, the Unit Power switch cannot power on the 3494.
   b. When the Rack Power Ready and the System Power Ready LEDs are lit, the power to the 3494 is on.
   c. If the 3494 is attached to an AS/400 or iSeries, ensure that the Media Library Device Driver (MLDD) is initialized.

3. Ensure that all tape drives are varied online to the appropriate host.

Powering Off the 3494

Perform the following steps to power off the 3494:

1. Ensure that all tape drives are varied offline to the appropriate host.
2. Press the Unit Power switch on the operator panel to the Power Off position.

   Note: If the Local Remote power switch is in the Local position, the Unit Power switch can power off the 3494.

3. Observe the Power Off Pending LED on the operator panel. The LED flashes until the 3494 is powered off.

   If the 3494 has a VTS, the system can take up to 20 minutes to shut down. When the shutdown completes, the 3494 (including the B18, B10, and B20 VTSs, if installed) is powered-off.

   Note: In an emergency, you can power off the 3494 immediately by using the Unit Emergency switch either on the operator panel or at the right end of the 3494. The second switch, at the right end, is provided if the 3494 has more than eight frames or if the HA1 Frames is installed.

   Attention: Using the Unit Emergency switch for immediate power off can cause database problems or check disk (CHKDSK) problems with the Library Manager or the VTS controller. The Unit Emergency switch does not power off the B18, B10, or B20 VTSs, but the associated tape drives will have power removed.

Changing to Pause Mode

Perform the following steps to change to Pause mode:

1. Press the Pause button on the operator panel.
2. Observe the Pause LED on the operator panel. The LED flashes until the 3494 is in Pause mode. When the 3494 is in Pause mode, the Pause LED stays lit.

   Note: The Auto LED stays lit until the 3494 enters Pause mode.

Changing to Auto Mode

Perform the following steps to change to Auto mode:

1. Press the Auto button on the operator panel.
2. Observe the Auto LED on the operator panel. The LED flashes until the 3494 is in Auto mode. When the 3494 is in Auto mode, the Auto LED stays lit.

   Note: The Pause LED stays lit until the 3494 enters Auto mode.

Changing from Local to Remote Power

If the Local Remote Power feature is installed, change to remote power by pressing the Local Remote power switch to the Remote position.

If the Local Remote Power feature is not installed, the Local Remote power switch must be in the Local position.

Attention: If the Local Remote Power feature is not installed, pressing the Local Remote power switch to the Remote position powers off the 3494.

Changing from Remote to Local Power

If the Local Remote Power feature is installed, change to local power by pressing the Local Remote power switch to the Local position.

Attention: If the Unit Power switch is in the Power Off position, pressing the Local Remote power switch to the Local position powers off the 3494.

Inserting Cartridges

See the following sources for ways to insert cartridges into the 3494:
- "Initial Cartridge Installation" on page 81.
- "Using Empty Cartridge Cells to Insert Cartridges."
- "Using the Convenience I/O Station to Insert Cartridges" on page 98.
- "Using the High-Capacity I/O Facility to Insert Cartridges" on page 101.

Notes:

1. The teach process defined the type of I/O facility available to you.
2. Ensure that there are enough available cells for the cartridges you are inserting. Use the Operational Status window (Figure 80 on page 138) to check the number of empty storage cells in the 3494.

Inserting stacked volumes for a VTS requires that one or more volser ranges have been set up for the VTS before you insert the stacked volumes (see Figure 130 on page 211).

Insert logical volumes for a VTS by using the Manage Logical Volumes window (see Figure 163 on page 245).

Using Empty Cartridge Cells to Insert Cartridges

Attention: Never place Exported Stacked Volumes into free cells. This allows the 3494 to overwrite the data on them.

Perform the following steps to use empty cartridge cells to insert cartridges:

1. Place the library in Pause mode by pressing the Pause mode Motion Control switch on the operator panel.
2. When the Pause mode LED is lit, unlock and open the front door on any frame.
3. Insert the cartridges into any empty cartridge storage cells, except error recovery cell locations 1 A 1 (1 A 3 instead of 1 A 1 if the Dual Gripper feature is installed), 1 A 20, 1 A 19 (if you are using two service volumes), 1 A 18 (if you are using three service volumes) and the high-capacity output facility cells. See "Cartridge Placement" on page 82 for cartridge placement guidelines.

   Notes:

   a. The error recovery cell locations for an HA1 Frames single gripper unit are 1 A 1 and 1 A 2. The error recovery cell locations for a HA1 Frames dual gripper unit are 1 A 3 and 1 A 4. On all HA1 Frames, the service bays store the service volumes.
   b. If no convenience I/O station and no high-capacity I/O facility defined, then cell 2 A 1 is reserved for ejects.

      c. You must insert the cartridges into the cartridge storage cells so that the leader block is on the right and the volser label is visible (see Figure 22 on page 24).

4. Close and lock the front door.

5. Press the Auto mode Motion Control switch on the operator panel.

> **Note:** If Inventory Update is not **enabled**, select the **Perform Inventory Update (Full)** option under the **Inventory** option in the Commands window (see "Using the Commands Window" on page 195). This adds the newly inserted cartridges to the Library Manager database and sends messages to the hosts. You may also select the **Perform Inventory Update (Partial)** option. You are shown the doors that have been opened since the last inventory. You may select or deselect frames to reinventory. The Library Manager holds all other 3494 activity until the inventory update is complete (approximately four minutes per frame being inventoried).

If the HA1 Frames is installed, **do not** insert cartridges into the service bays, because the 3494 **cannot** access them.

Using the Convenience I/O Station to Insert Cartridges

During normal automatic operation, you may insert cartridges into the 3494 by using the optional convenience I/O station and performing the following steps:

Note: Figure 45 on page 99 shows the optional 10-cartridge convenience I/O station. Figure 46 on page 101 shows the optional 30-cartridge convenience I/O station. If the 30-cartridge convenience I/O station is installed, the operation remains the same, but there are two operator doors. The upper operator door **1** provides access to the upper ten cartridge cells. The lower operator door **2** provides access to the lower 20 cartridge cells. (Both doors open together.)

1. Check the status of the convenience I/O station on the operator panel. If the Output Mode status LED and the Unload Required status LED are not lit on the operator panel, continue with step 2.

   If the Output Mode status LED or the Unload Required status LED is lit on the operator panel, open the convenience I/O station door and remove all the cartridges in the convenience I/O station.

2. Insert the cartridges (**2** in Figure 45 on page 99) that you want to add to the 3494 into the convenience I/O station **1** with the cutoff corner (and leader block) to the left and the external label facing to the **inside** of the convenience I/O station. Shut the convenience I/O station door.

   The Input Mode status LED lights and stays lit until the 3494 has stored all the cartridges that you inserted into the convenience I/O station.

3. Repeat these steps until you have inserted all of the cartridges.

Convenience I/O Mode

The convenience I/O station is in either Import mode or Insert mode, depending upon the capabilities of the VTSs in the 3494 and the configuration of the 3494 (see Figure 54 on page 119). The convenience I/O station is in Import mode when the 3494 has at least one VTS that is capable of Export and Import operations. The convenience I/O station is in Insert mode when the 3494 does not have a VTS that is capable of Export and Import operations.

The mode of the convenience I/O station is stored so that the Library Manager "remembers" the mode across shutdowns. When the mode is determined, the stored mode is used each time the Library Manager initializes. The mode changes if the configuration changes or the VTS capabilities change. The System Summary window (Figure 54 on page 119) shows the **Convenience I/O Mode** of Import or Insert.
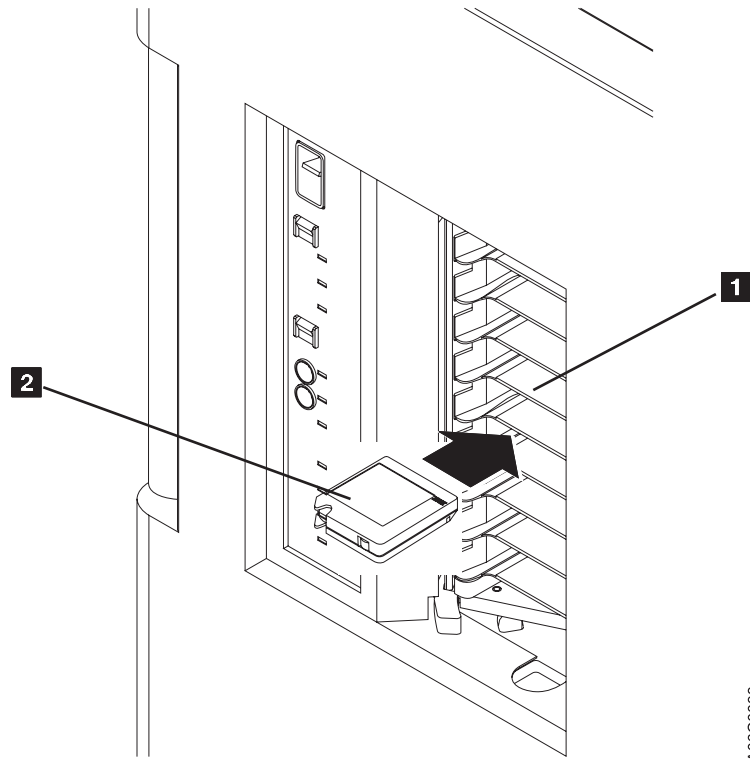
Figure 45. Inserting Cartridges in the Convenience I/O Station

Using the Convenience I/O Station Import Mode

When you insert **J**- or **K**-type cartridges into the convenience I/O station while it is in Import mode, the Library Manager adds them to the Unassigned category. Exported Stacked Volumes are **J**- or **K**-type cartridges that contain logical volumes that were exported from a VTS. In order to import logical volumes, you must move those cartridges that are Exported Stacked Volumes into the Import category of the 3494 after inputting them into the 3494. To use the convenience I/O station in Import mode, you must perform the following steps:

1. Input cartridges into the 3494 through the convenience I/O station as described previously.

2. If any cartridges are **J**- or **K**-type, , observe the Manage Unassigned Volumes window (Figure 138 on page 221), which opens automatically. This window shows all **J**-type and **K**-type cartridges in the Unassigned category. **1**- and **E**-type cartridges have been input in the Insert category of the 3494 and are not shown.

3. Exported Stacked Volumes in the Unassigned category that are used for an Import operation must be moved into the Import category using the Manage Unassigned Volumes window.

4. You must move **J**-type and **K**-type cartridges that you want to use as stacked volumes in a VTS into the Insert category. The Manage Unassigned Volumes window provides this capability as well as the **Volser ranges** push button for

validating the ranges that have been defined for physical volumes. The Library Manager inserts **J**-type and **K**-type cartridges that are not in a VTS range of stacked volumes for native 3590 drives to use.

5. You must move **J**-type and **K**-type cartridges that you intend for use by native 3590 drives into the Insert category. The **Volser ranges** push button allows validation of physical stacked volume ranges to ensure that native 3590 cartridges do not become VTS stacked volumes.

CAUTION:
When inserting a J-type or K-type cartridge that is an Exported Stacked Volume intended for use by the VTS Exported Volume Read Utility (provided by DITTO/ESA for MVS, OS/390, and z/OS) with a native 3590 tape drive, you must modify the volser range to prevent the cartridge from becoming a VTS Stacked Volume.

6. "Category Recovery" on page 451 provides instructions for recovery from errors that are made when moving cartridges from the Unassigned category.

Note: You will be using the convenience I/O station for the following volumes:

- Exported Stacked Volumes that you want to import
- VTS stacked volumes
- **J**- and **K**-type cartridges for use by native 3590 drives

You can simplify the task of moving volumes from the Unassigned category into the Import or Insert category. Try to schedule insertion of these **J**- type and **K**-type cartridges that have different usage at different times.
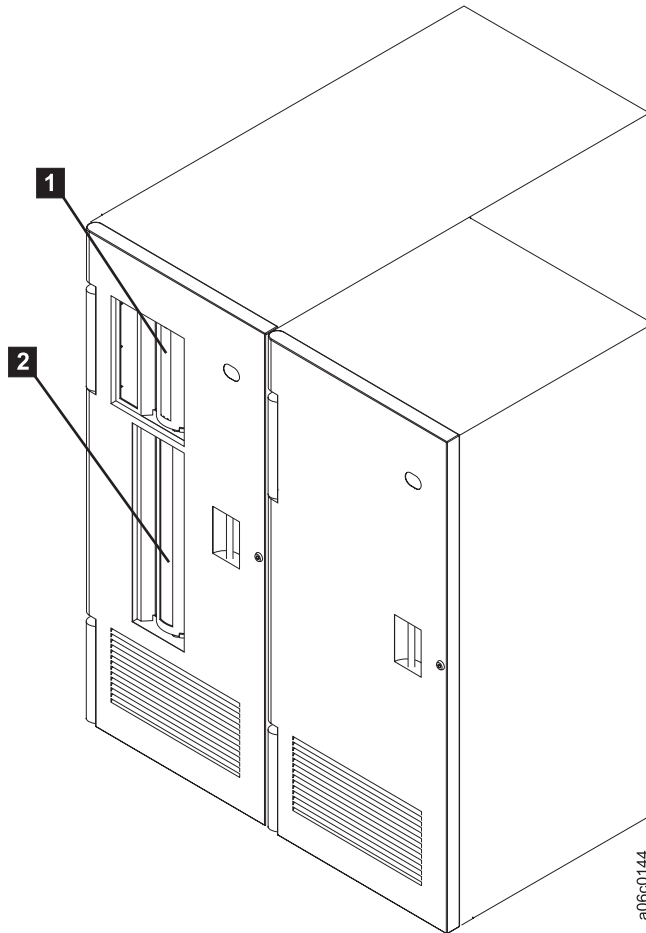
Figure 46. Optional 30 Cartridge Convenience I/O Station

Using the High-Capacity I/O Facility to Insert Cartridges

Attention: Never place Exported Stacked Volumes into the high-capacity I/O facility. This allows the 3494 to overwrite the data on them.

The 3494 scans the defined facility on the first transition to Auto mode. This scan occurs on any transition to Auto mode if the door associated with the frame containing the facility has been opened. The scan is performed in these cases regardless of the state of Inventory Update (enabled or disabled).

Following the scan of the facility, all 3494 activity is restored (mounts, demounts, convenience I/O). Volsers to be inserted are added to the database, and the host is notified. When the category has changed, the volsers may be mounted directly from the high-capacity area.

New volsers found in the facility are inserted, and those already existing in the facility remain ejected. Volsers are inserted from the facility in a top-to-bottom and right-to-left sequence (E 01 to A xx). Volsers are ejected to the facility in a top-to-bottom and left-to-right sequence (A 01 to E xx). The physical movement of the cartridge is scheduled with regular 3494 activity. You may change the priority on a particular insert operation to complete movement faster.

Configuring the high-capacity I/O facility is done during a teach operation under the Teach window in Service mode.

Note: There should be enough free cells in the 3494 to hold the cartridges that must be moved when the high-capacity I/O facility is configured. When the facility is moved to a new location, both the old location rack and the new location rack are scanned.

Removing Ejected Cartridges

You may remove ejected cartridges from the 3494 in the following ways:
- By removing an ejected cartridge from the single-cell output facility
- By removing an ejected cartridge from the high-capacity output facility or high-capacity I/O facility
- By removing an ejected cartridge from the convenience I/O station

Notes:
1. The type of I/O facility available to you was defined during installation of the 3494.
2. Avoid removing cartridges manually from 3494 cells. Have the host eject them to an I/O facility.

Removing an Ejected Cartridge from the Single-Cell Output Facility

Perform the following steps to remove an ejected cartridge from the single-cell output facility:
1. Press the Pause button on the operator panel.
2. Observe the Pause mode status LED on the operator panel. The LED flashes until the 3494 is in Pause mode, then stays lit.
3. Unlock and open the L Frame front door and retrieve the ejected cartridge from the single-cell output facility at location 2 A 1 (or location 2 A 3 if the Dual Gripper feature is installed).
4. Shut and lock the L Frame door.
5. Press the Auto mode button on the operator panel.
6. Observe the Auto mode status LED on the operator panel. The LED flashes until the 3494 is in Auto mode, then stays lit.

Note: If the HA1 Frames is installed, the output facility still uses cells in the L Frame. The cells in the service bays are not available to the 3494.

Removing Ejected Cartridges from the High-Capacity Output Facility

Perform the following steps to remove ejected cartridges from the high-capacity output facility:
1. Press the Pause button on the operator panel.
2. Observe the Pause mode status LED on the operator panel. The LED flashes until the 3494 is in Pause mode, then stays lit.
3. Unlock and open the L Frame front door and retrieve the ejected cartridges from the area defined as the high-capacity output facility.
4. Shut and lock the L Frame door.
5. Press the Auto mode button on the operator panel.
6. Observe the Auto mode status LED on the operator panel. The LED flashes until the 3494 is in Auto mode, then stays lit.

Note: If the HA1 Frames is installed, the output facility still uses cells in the L Frame. The cells in the service bays are not available to the 3494.

Removing Ejected Cartridges from the High-Capacity I/O Facility

Perform the following steps to remove ejected cartridges from the high-capacity I/O facility:

1. Press the Pause button on the operator panel.
2. Observe the Pause mode status LED on the operator panel. The LED flashes until the 3494 is in Pause mode, then stays lit.
3. Unlock and open the frame door that contains the high-capacity I/O facility and retrieve the ejected cartridges from the area defined as the high-capacity I/O facility.
4. Shut and lock the frame door.
5. Press the Auto mode button on the operator panel.
6. Observe the Auto mode status LED on the operator panel. The LED flashes until the 3494 is in Auto mode, then stays lit.

Note: If the HA1 Frames is installed, the output facility still uses cells in the L1x Frame. The cells in the service bays are not available to the 3494.

Removing Ejected Cartridges from the Convenience I/O Station

Note: In the following procedure, the term ″3592 cartridges″ refers collectively to the following cartridges:
- **JA** - Enterprise Tape Cartridge
- **JJ** - Enterprise Economy Tape Cartridge
- **JR** - Enterprise Economy WORM Tape Cartridge
- **JW** - Enterprise WORM Tape Cartridge

Perform the following steps to remove ejected cartridges from the convenience I/O station:

1. Observe the Output mode status LED on the operator panel. If the LED is lit, the convenience I/O station contains ejected cartridges.
2. Open the convenience I/O station door and remove all the cartridges.
3. Shut the convenience I/O station door.

Note: The convenience I/O station receives ejected cartridges of all types. You should expect a mix of **1**-type, **E**-type, **J**-type, **K**-type, and 3592 cartridges. No order relation exists. **J**-type, **K**-type, and 3592 cartridges may be any of the following volumes:
- Newly created Exported Stacked Volumes from the Export-Hold category
- Exported Stacked Volumes that were used in an Import operation from the Import category
- VTS stacked volumes being ejected
- Native 3590 cartridges being ejected by a host
- Native 3592 cartridges being ejected by a host

Site operations management of time periods for Export and Import operations can minimize the mix of cartridges in the convenience I/O station.

Chapter 6. Advanced Operating Procedures

This chapter describes the advanced operating procedures for the 3494.

Quick Reference to Library Manager Advanced Operating Procedures

Table 10 shows the advanced operating procedures you can perform by using the Library Manager at the rear of the 3494.

Table 10. Quick Reference to Library Manager Advanced Operating Procedures

Task	Reference
Using the Library Manager	"Using the Library Manager" on page 109.
Selecting options with the Library Manager	"Making Library Manager Selections" on page 112.
Selecting options with a keyboard	"Selecting with the Keyboard" on page 112.
Selecting options with a pointing device	"Selecting with the Pointing Device" on page 113.
Using the Help window	"Using the Help Window" on page 115.
Using the Help search	"Help Search" on page 117.
Using the Help action bar	"Help Action Bar" on page 117.
Using the function keys	"Library Manager Function Keys" on page 118.
Using the Operator menu	"Using the Operator Menu" on page 119.
Using the Mode window	"Using the Mode Window" on page 120.
Selecting Auto mode	"Auto" on page 121.
Selecting Pause mode	"Pause" on page 121.
Selecting Manual mode	"Manual" on page 122.
Selecting the Online state	"Online" on page 122.
Selecting the Offline state	"Offline" on page 124.
Using the Service menu option	"Service Menu" on page 126.
Switching the active Library Manager to standby	"Switch Active Library to Standby" on page 127.
Switching the active accessor to standby	"Switch Active Accessor to Standby" on page 129.
Enabling dual active accessors	"Enable Dual Active Accessors" on page 130.
Disabling dual active accessors	"Disable Dual Active Accessors" on page 130.
Using the Shutdown option	"Shutdown" on page 131.
Using the Status window	"Using the Status Window" on page 136.
Using the Operational Status option	"Operational Status" on page 138.
Using the Component Availability Status option	"Component Availability Status" on page 141.
Using the VTS Status option	"Using the VTS Status Window" on page 144.
Using the Performance Statistics option	"Performance Statistics" on page 146.
Displaying accessor mounts per hour	"Accessor Mounts Per Hour" on page 148.

Table 10. Quick Reference to Library Manager Advanced Operating Procedures (continued)

Task	Reference
Using the VTS Active Data option	"VTS Active Data" on page 149.
Using the VTS Data Flow option	"VTS Data Flow" on page 151.
Using the VTS Mount Hit Data option	"VTS Mount Hit Data" on page 152.
Using the VTS Physical Device Mount History option	"VTS Physical Device Mount History" on page 154.
Using the VTS Logical Mounts per Hour option	"VTS Logical Mounts Per Hour" on page 155.
Using the VTS Active Data Distribution option	"VTS Active Data Distribution" on page 156.
Using the System Summary window	"Using the System Summary Window" on page 158.
Requesting LAN host status	"LAN Host Status" on page 163.
Displaying the dual active accessor boundary	"Dual Accessor Zones" on page 164.
Using the Queues window	"Using the Queues Window" on page 165.
Using the Database window	"Using the Database Window" on page 169.
Searching the database for volsers, categories, devices	"Search Database for Volsers, Categories, Devices" on page 170.
Using the Search Entry Field option	"Search Criteria" on page 170.
Using the Flag option	"Volser Flags" on page 172.
Using the Search Results option	"Search Results" on page 173.
Using the Displaying Search Results option	"Displaying Search Results" on page 174.
Searching the database for volsers, constructs, pools	"Search Database for Volsers, Constructs, Pools" on page 175.
Using the Search Entry Field option.	"Search Criteria" on page 175.
Using the Search Results option.	"Search Results" on page 179.
Using the Displaying Search Results option.	"Displaying Search Results" on page 180.
Using the List Database Volumes option	"List Database Volumes" on page 181.
Finding a logical volume's home	"Find A Logical Volume's Home" on page 186.
Using the Stacked Volume Map option	"Stacked Volume Map" on page 189.
Using the Rebuild Database Statistics option	"Rebuild Database Statistics" on page 192.
Using the Commands window	"Using the Commands Window" on page 195.
Scheduling drive cleaning	"Schedule Cleaning" on page 201.
Ejecting a cleaner cartridge	"Eject a Cleaner Cartridge" on page 204.
Changing cleaner masks	"Set Cleaner Masks" on page 205.
Sending a message to a host console	"Send Message to Host Consoles" on page 206.
Adding a message to the transaction log	"Add Message to Transaction Log" on page 206.
Promoting a command in the queue	"Promote a Command in the Queue" on page 208.

Table 10. Quick Reference to Library Manager Advanced Operating Procedures (continued)

Task	Reference
Setting volser ranges	"Volser Ranges for Media Types" on page 209.
Deleting logical volumes	"Delete Logical Volumes" on page 213
Ejecting stacked volumes	"Eject A Stacked Volume" on page 214.
Setting VTS category attributes	"Set VTS Category Attributes" on page 215.
Setting VTS management policies	"VTS Management Policies" on page 217.
Managing unassigned volumes	"Manage Unassigned Volumes" on page 220.
Managing import volumes	"Manage Import Volumes" on page 222.
Managing insert volumes	"Manage Insert Volumes" on page 223.
Managing export-hold volumes	"Manage Export-Hold Volumes" on page 224.
Canceling export/import	"Cancel VTS Export/Import" on page 225.
Manage constructs and pools	"Manage Constructs and Pools" on page 225.
Manage storage groups	"Manage Storage Groups" on page 226.
Manage management classes	"Manage Management Classes" on page 228.
Manage storage classes	"Manage Storage Classes" on page 231.
Manage data classes	"Manage Data Classes" on page 233.
Modify stacked volume pool properties	"Stacked Volume Pool Properties" on page 235.
Move/eject stacked volumes	"Move/Eject Stacked Volumes" on page 237.
View move/eject stacked volumes status	"Move/Eject Stacked Volumes (Status)" on page 242.
Insert logical volumes or change existing logical volumes	"Manage Logical Volumes" on page 243.
Inventorying new storage or re-inventorying the complete system	"Inventory New Storage or Re-inventory Complete System" on page 255.
Disabling the inventory update	"Disable Inventory Update" on page 264.
Enabling the inventory update	"Enable Inventory Update" on page 265.
Performing the inventory update (full)	"Perform Inventory Update (Full)" on page 265.
Performing the inventory update (partial)	"Perform Inventory Update (Partial)" on page 266.
Setting up a standalone device	"Stand-Alone Device" on page 267.
Resetting a standalone device	"Reset Stand-Alone Device" on page 270.
Checking the status of a standalone device	"Stand-Alone Device Status" on page 271.
Inserting unlabeled cartridges	"Insert Unlabeled Cartridges" on page 271.
Adding a LAN host	"Add LAN Host to Library" on page 274.
Deleting a LAN host	"Delete LAN Host from Library" on page 280.
Updating LAN host information	"Update LAN Host Information" on page 281.
Changing LAN host information	"Change LAN Host Information" on page 282.
Requesting LAN host information	"Library LAN Information" on page 287.

Table 10. Quick Reference to Library Manager Advanced Operating Procedures (continued)

Task	Reference
Performing operator interventions	"Operator Intervention" on page 288.
Changing the system administrator password	"Change System Administrator Password" on page 290.
Enabling or disabling service access	"Service Access" on page 291.
Monitoring Library Manager events	"Monitoring Library Manager Events" on page 292.
Using the Library Manager's SNMP features	"Using SNMP Features" on page 293.
Selecting SNMP trap types	"Selecting SNMP Trap Types" on page 293.
Changing SNMP trap destinations	"Configuring SNMP Trap Destinations" on page 293.
Starting SNMP	"Starting SNMP" on page 296.
Stopping SNMP	"Stopping SNMP" on page 297.
Sending a TESTM trap	"Sending TESTM Messages" on page 297.
Sending a "Call Home" request to a subsystem	"Call Home" on page 314.
Enabling or disabling the Web Server function	"Specialist (Web Server)" on page 315.
Using the Options window	"Using the Options Window" on page 320.
Using Manual mode	"Using Manual Mode" on page 320.
Starting Manual mode	"Starting Manual Mode" on page 321.
Operating in Manual mode	"Operating in Manual Mode" on page 322.
Mounting cartridges in Manual mode	"Mounting Cartridges" on page 324.
Demounting cartridges in Manual mode	"Demounting Cartridges" on page 325.
Inserting cartridges in Manual mode	"Inserting Cartridges" on page 325.
Ejecting cartridges in Manual mode	"Ejecting Cartridges" on page 328.
Reviewing unknown volume locations in Manual mode	"Reviewing Unknown Volume Locations" on page 328.
Handling error processing in Manual mode	"Error Processing" on page 329.
Locating and identifying home-cell locations in Manual mode	"Locating and Identifying Home-Cell Locations" on page 330.
Ending Manual mode	"Ending Manual Mode" on page 331.
Using the Specialist	"Specialist Features and Functions" on page 332.
Using the Peer-to-Peer VTS Specialist	"Peer-to-Peer VTS Specialist Features and Functions" on page 336.
Removing a cartridge from the gripper	"Cartridge Removal from the Gripper" on page 342.
Using the keyboard template	"Using the Keyboard Template" on page 343.
Using the Remote Library Manager Console	Chapter 7, "Remote Library Manager Console Feature," on page 345.

Using the Library Manager

The Library Manager display contains one Operator menu. The Operator menu contains all the functions needed at the operator level. You access additional menus and windows through the Operator menu.

Note: The **Service menu...** option in the Mode window allows access to functions that service personnel use.

Within the Library Manager application, the primary visual and interactive components are as follows:
- windows
- icons
- free-moving pointing device
- various controls to select windows, size windows, select options, and initiate actions

Not all windows contain all the items described. Figure 47 shows these key components, and the text describes the uses of these components.

Note: The windows shown are examples and may not be exactly the same as the windows on your Library Manager display.
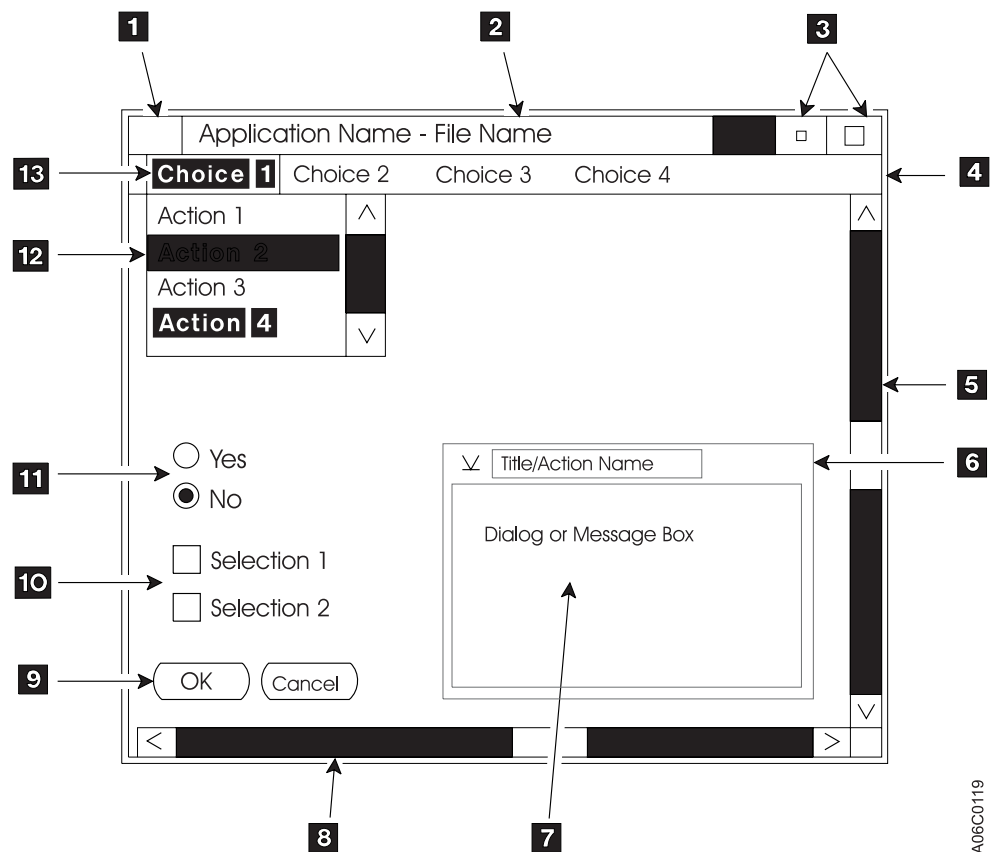
Figure 47. Operator Menu Controls

1 System Menu Icon   When you select this horizontal line with one click of the pointing device, a window with an expanded list of options opens (see Figure 48 on page 110).

Double-clicking this icon closes the window that contains the System Menu icon. See "Selecting with the Pointing Device" on page 113 for explanations of selecting with a pointing device.
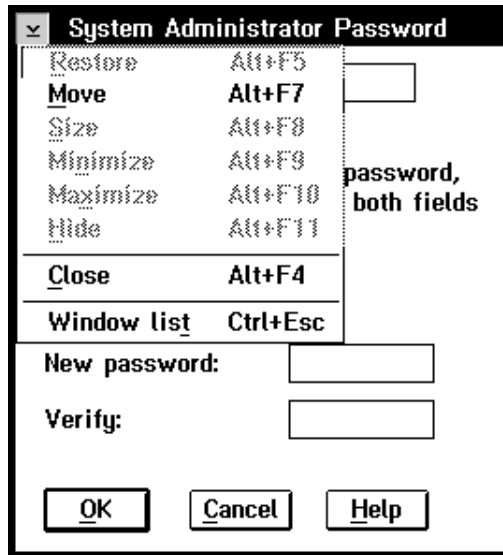
Figure 48. System Menu

2 **Title Bar**
This area, at the top of each window, contains the window title.

Note: By holding down the pointing device button on the title bar, you can drag (move) the entire window to a different location on the screen. See "Selecting with the Pointing Device" on page 113 for instructions to operate the pointing device.

3 **Window-Sizing Icons**
You can use the window-sizing icons to change the windows in the following ways:

*   Enlarge (maximize) the window to the full size of the screen (large square)
*   Restore the window to its original size (small square with brackets)
*   Minimize (to an icon) the selected window (small square) and place a predefined icon near the bottom of the screen

    To restore the window to the screen, double-click the icon.

Note: The window-sizing icons, for a particular window, may be hidden if one or more additional windows are expanded to cover the desired window. You can close the overlaying windows to gain access to the desired window, or you can select any part of the desired window.

4	**Sizeable-Window Border**	By using the pointing device, you can move a vertical border in or out to decrease or increase the width of the window. You can move a horizontal border up or down to decrease or increase the height of the window.
5	**Vertical Scroll Bar**	You can use the scroll bars to move additional, unseen information into view on the screen. By selecting the up or down scroll bar arrows, you can move current information vertically off the screen. You can also scroll new information vertically on to the screen.

The bold (dark-colored) portions of the scroll bars show whether, and how much, information is available for display. Typically, these areas are not bold. They are of a lighter color than the slider box. A slider box (the unshaded part of the scroll bar) shows the position and the size of the visible information in relation to the information that is available. As the window is scrolled, bold bars change size to reflect the amount of information available for display in both directions. If no slider box is shown, all available information is visible.

6	**Non-Sizeable-Window Border**	
		You cannot use a non-sizeable window border to increase or decrease the size of the window.
7	**Window or Message Box**	Windows and message boxes open when the application needs additional information, or when information displays. Windows and message boxes can also include radio buttons, check boxes, and push buttons to allow you to respond to an application.
8	**Horizontal Scroll Bar**	You can use the scroll bars to move additional, unseen information into view on the screen. By selecting the left or the right scroll bar arrows, you can move current information horizontally off the screen. You can also scroll new information horizontally on to the screen. The bold (dark-colored) portions of the scroll bars show whether, and how much, information is available for display. Typically, these areas are not bold. They are of a lighter color than the slider box. As the window is scrolled, bold bars change size to reflect the amount of information available for display in both directions.
9	**Push Buttons**	Push buttons allow you to select a particular action, which occurs immediately. The ellipsis (...) following a menu item indicates that a window will open if you select that item.
10	**Check Boxes**	A check box is a two-part control consisting of a square box and text. Unlike radio buttons, you can select one or more check boxes. To select a check box, place the pointing device in the box and click.

The box is marked with a ✔ to show that you selected it. Click the box again to cancel the selection.

11 Radio Buttons

Radio buttons allow you to select between two or more possible responses or actions. Only one selection is allowed within any set of radio buttons. If you make a second selection, the first selection is canceled. The action that the radio button selects typically occurs after you make all screen selections and select a push button to initiate the actions.

12 Menu

Menus are an expansion of an action bar item. The menu opens when you select the corresponding action bar item. The ellipsis (...) following an option item indicates that a window will open if you select that item. A right-pointing triangle (▶) at the right of an option indicates that this option has suboptions. Click on the option to open a window that allows you to select a suboption.

Click the desired action to highlight the item. If a line item is reduced in contrast (dimmer) from the other items (Action 2 in Figure 47 on page 109), you cannot select that item.

13 Action Bar

The action bar is the primary window containing keywords that, when selected, cause another window to open.

Click the desired action to highlight the item. If a line item is not available, then the item is not selectable.

Making Library Manager Selections

You can make selections from the action bar of the Operator menu, with choices from menus, or by active radio buttons, check boxes, and push buttons. Although you can use either the keyboard or the pointing device to make your selections, the pointing device is the preferred method for ease of use.

Selecting with the Keyboard

You can use the keyboard to select options instead of using the pointing device by performing the following steps:

1. Activate the Operator (or main) menu action bar by pressing **Ctrl + F10**.
2. Highlight the item by using one of the following methods:
   - Use the cursor arrow keys to highlight the desired item.
   - Key in the underlined letter of the desired item, which is usually the first letter in the item.
3. Press the **Enter** key.

   The window for the selected item then opens.
4. Press the **Esc** key to return to the Operator menu action bar.
5. Press the **Esc** key a second time to deactivate the Operator menu action bar.

Figure 49 on page 114 shows the commonly used keys.

Note: Some actions prompt for confirmation before actual selection occurs. You typically confirm an action by pressing the Enter key or by selecting an OK or a Yes push button.

Selecting with the Pointing Device

Two types of pointing devices are available. Figure 49 on page 114 shows the trackball pointing device. The trackpoint pointing device is a red button in the middle of the keyboard, as shown in Figure 50 on page 114. You can use the pointing devices to select options on the display. You can take actions by using the accompanying buttons.

Trackball Pointing Device

To select objects by using the trackball pointing device, perform the following steps:

1. Rotate the ball **5** to position the pointer on the object.
2. Press and quickly release button **1** . This action selects an object and is known as "clicking an object."
3. Press and quickly release button **1** twice to initiate the selected object. This action is known as "double-clicking an object."

To select and move an object on the screen, perform the following steps:

1. Rotate the ball **5** to position the pointer on the object.
2. Click the object by using button **2** or **4** to select and lock the pointer on the object.
3. Rotate the ball to move the object. This action is known as "dragging an object."
4. Release the object by pressing either button.

   Note: You may also move the object using an alternate method. Hold down button **1** or button **3** while moving the ball, then release it when the object is positioned as desired.
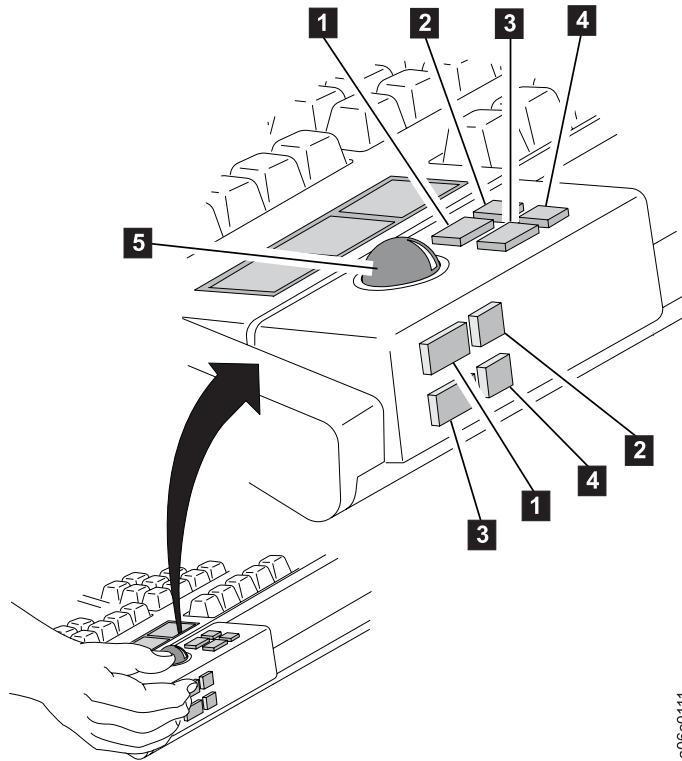
Figure 49. Trackball Pointing Device

Track Pointer Keyboard

To select objects by using the track pointer keyboard, perform the following steps:

1. Gently press the track point (**3** in Figure 50) in the direction you desire the pointer to move and position the pointer on the object.

2. Press and quickly release button **1** in Figure 50. This action selects an object and is known as "clicking an object."

3. Press and quickly release button **1** in Figure 50 twice to initiate the selected item. This action is known as "double-clicking an object."
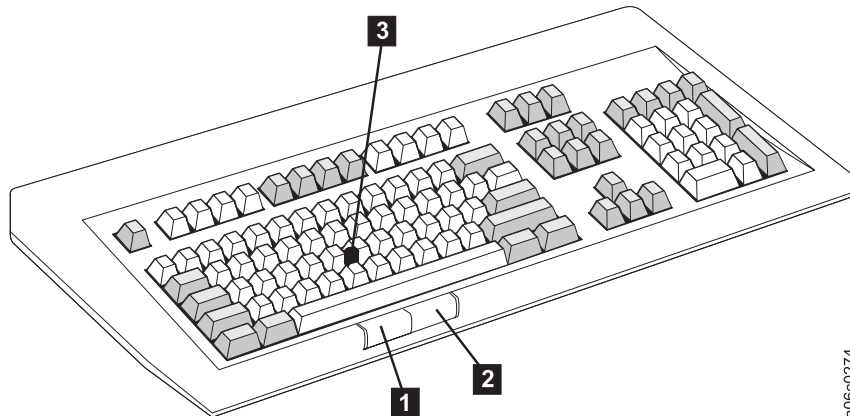
Figure 50. Track Pointer Keyboard

To select and move an object on the screen, perform the following steps:

1. Gently press the trackpoint (**3** in Figure 50 on page 114) to position the pointer on the object.

2. Press and hold down button **1** in Figure 50 on page 114.

3. Gently press the trackpoint (**3** in Figure 50 on page 114) to move the object. This action is known as "dragging an object."

4. Release the object by releasing button **1** .

Note: Button **2** in Figure 50 on page 114 is not used.

Using the Help Window

The Help facility provides additional information for using the various items in the windows. To get help for an action bar item, menu item, or window, use the pointing device to click the Help action bar item. You can also highlight the field or item from the keyboard and press F1 to display help. The Help window that opens gives a brief description of the item or field.

A Help option is available on the action bar of the Operator menu. You can select this option in the same way as any other option. Figure 51 shows the Help window.
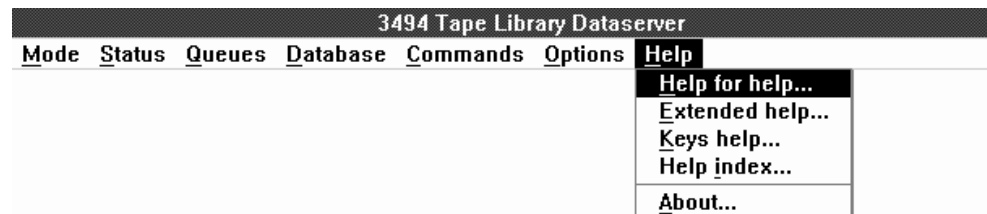
Figure 51. Help Window

The Help window includes the following additional options:

Help for help...	Explains the content and how to use the other Help choices.
Extended help...	Provides general information about the Operator menu. Click **Extended help...** in the Help window (or select and press Enter). You can also press F2 from within a Help window.
Keys help...	Displays a list of key assignments available. Click **Keys help...** in the Help window (or select and press Enter). You can also press F9 from within a Help window.
Help index...	Provides an alphabetic list of items along with a search capability of all the Help information in the application (see Figure 52 on page 116). You can press F11 or Shift+F1 from within a Help window to view this list.
About...	Displays the copyright notice and version of the Library Manager and the version of the operating system.
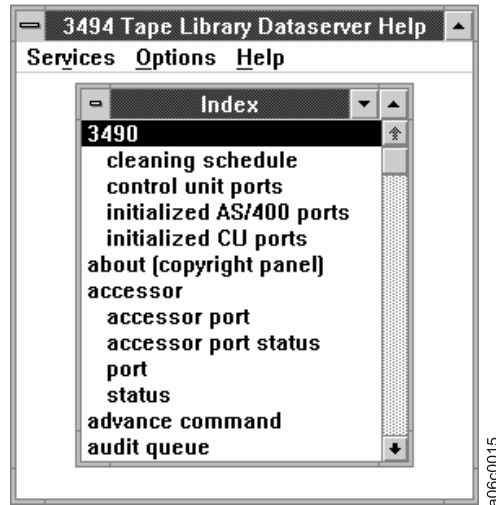
Figure 52. Help Index Window

Help Search

To search the list of Help topics, perform the following steps:

1. Select the **Search** option in the Services window (or select and press Enter).

   Note: The Services window is available under any of the Help windows.

2. Type the word or phrase in the **Search** field (case is ignored).

3. Select the desired search pattern, for example, the **Index** radio button. Use the tab keys on the keyboard to move between radio buttons and push button groups. Then, highlight the desired search pattern by using the cursor arrow keys.

4. Click the **Search** option (or select and press Enter).

Help Action Bar

The following Help action bar options are always available:

Services   Search through the Help windows.

Options   Expand or contract the list of available Help windows or display the list of Help windows you have viewed during the session.

Help   Provide help to use the Help facility.

If you select the **Contents** option in the Options window, the Contents window opens. This window lists all the available Help topics. A plus sign (+) next to a topic indicates that additional entries are available for that topic. Click the plus sign to see the complete list. If you are using a keyboard, press the up arrow (↑) or down arrow (↓) key to highlight the topic. Then, press the **+** key.

Highlighted words and phrases indicate that Help is available for that topic. Highlighting can be words in reverse text (text with white letters on a black background) or words that are set off in a different color. To select, move the pointing device arrow to the reverse text topic and double-click. See "Selecting with the Pointing Device" on page 113 for instructions to use the pointing device to select options. To select an option from the keyboard, tab to the highlighted word and press Enter. See "Selecting with the Keyboard" on page 112 for instructions to use the keyboard to select options.

If you want to view a topic, double-click the topic (or select and press Enter). After you select a topic, the information for that topic displays in a window. The topic title is at the top of the window to remind you of the topic that you are viewing.

To close a Help window, press the **Esc** key. If a previous Help topic is available, it is displayed. If not, the previous window opens.

To exit the Help facility without viewing previous Help topics, do any of the following:

- Select the **Close** option in the System Menu window.
- Press **Ctrl+F4**.
- Press **Alt+F4**.
- Press **Esc**
- Double-click the System Menu icon.

Note: When a + joins two keys, for example, Ctrl+F4, press and hold Ctrl, press F4, then release F4 and Ctrl.

You can also move the pointing device arrow to the – sign in the upper left corner of the Help window and double-click with the pointing device button. See "Selecting with the Pointing Device" on page 113 for instructions to use the pointing device to select options.

Library Manager Function Keys

The following function keys are available for use with the Library Manager:

F1	Displays the Help window.
F2	Displays extended Help (general Help information) from within the Help window displayed currently.
F3	Initiates shutdown procedures.
F9	Displays a list of keys from within any Help window.
F10	Activates the window action bar.
F11 or Shift+F1	Displays the Help index from within any Help window.
Ctrl+F10	Activates the Operator menu action bar.
Ctrl+PgUp	Displays the text to the left of the window.
Ctrl+PgDn	Displays the text to the right of the window.
Alt+F4	Closes the window.
Alt+F5	Restores the window to its original size.
Alt+F7	Moves the window.
Alt+F8	Sizes the window.
Alt+F9	Minimizes the window on the display.
Alt+F10	Maximizes (enlarges) the window.
Alt+Spacebar	Cycles between the application window and the selected window.
Shift+F10	Displays information about the Help facility.
Shift+Esc	Cycles between the application window and the selected window.
Shift+Tab	Moves the cursor to the left among a group of choices.
Tab	Moves the cursor to the right among a group of choices.
Arrows	Moves the cursor among selectable choices.
End	Causes the last selectable option in the window to be highlighted (ready for selection).
Esc	Cancels a window or a system menu.
Home	Causes the first selectable option in the window to be highlighted (ready for selection).
PgDn	Scrolls down one window.
PgUp	Scrolls up one window.

Underlined letter	Permits simplified keyboard selection by using only a single letter for an action bar or a window item.

Using the Operator Menu

The Operator menu (Figure 53) opens after one of the following occurs:

- The Library Manager is powered on.
- The Copyright window opens.
- The Auto mode and Online state process has completed.

Figure 53. Operator Menu

The Operator menu window consists of a title bar, an action bar, and initially, the System Summary window (Figure 54).
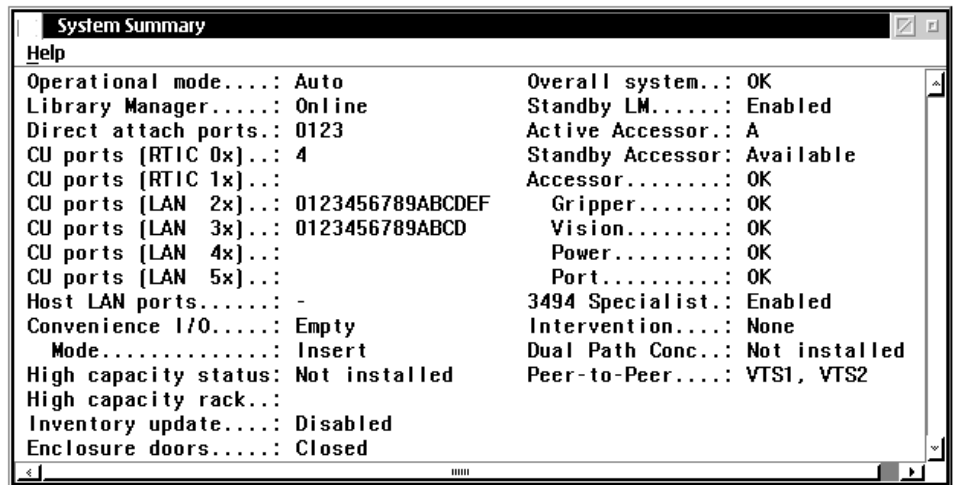
Figure 54. System Summary Window

You can select any of the action bar items on the Operator menu. When you select one of the action bar items, a window opens with additional information or options, as follows:

Selection	Menu Options
Mode	Allows selection of an operational mode and state (see "Using the Mode Window" on page 120).
Status	Displays subsystem status and statistics (see "Using the Status Window" on page 136).
Queues	Displays the contents of the command queues (see "Using the Queues Window" on page 165).
Database	Provides database search procedures for volumes (see "Using the Database Window" on page 169).

Commands	Provides operator commands and allows responses to intervention-required conditions (see "Using the Commands Window" on page 195)
Options	Provides various subsystem options (see "Using the Options Window" on page 320).
Help	Provides general Help (see "Using the Help Window" on page 115).

See "Library Manager Function Keys" on page 118 for a listing of the keys associated with the Operator menu.

Using the Mode Window

Use the Mode window (Figure 55) to change the operating mode of the 3494. The Mode window shows the current operating mode and state of the 3494 by showing bullets next to appropriate line items. When you select a new mode or state, the bullets move to the new line items.
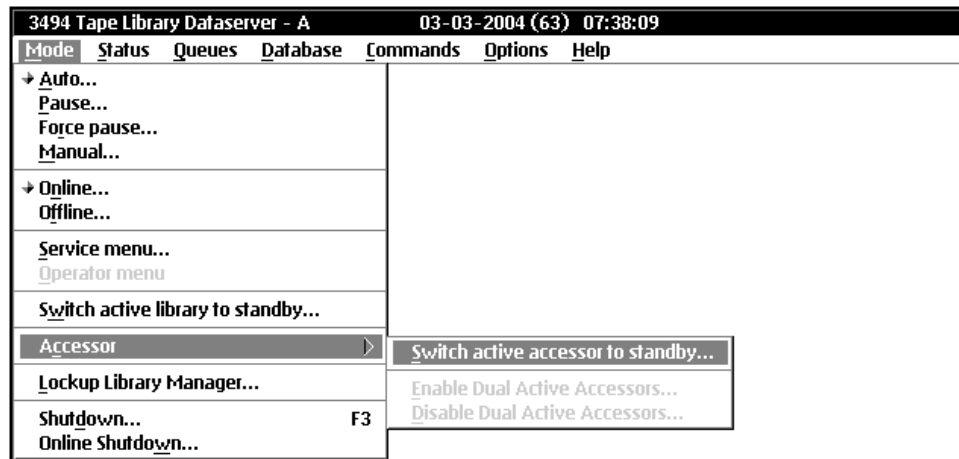
Figure 55. Mode Window

The following options are available in the Mode window:

Auto...	Selects automated operation (see "Auto" on page 121).
Pause...	Pauses cartridge accessor motion (see "Pause" on page 121).
Force pause...	Releases the 3494 from Pause Pending mode (see "Force Pause" on page 122).
Manual...	Places the 3494 in Manual mode (see "Manual" on page 122).
Online...	Allows the 3494 to accept host commands (see "Online" on page 122).
Offline...	Causes the 3494 to reject host commands (see "Offline" on page 124).
Service menu...	Displays the Service menu (see "Service Menu" on page 126).
Operator menu	Causes the Operator menu to open when in Service mode.

Switch active library to standby...

Allows you to switch the active Library Manager manually to be the standby Library Manager.

Accessor

Allows you to switch the active accessor manually to be the standby accessor, enable dual active accessors, or disable dual active accessors.

Lockup Library Manager...

Locks keyboard and display to system administrator password.

Shutdown...

Causes the library to enter the shutdown process (see "Shutdown" on page 131).

Online Shutdown...

/
/
/

Causes the library to enter the shutdown process while in Auto or Manual mode and in the Online state (see "Online Shutdown" on page 132).

Auto

Select the **Auto...** option for automated operations. After confirmation of your Auto mode selection, the Library Manager sends all motion commands to the cartridge accessor controller.

You are prompted to confirm your selection. The confirmation step allows you to explore the list of options before you confirm your selection.

If you select Auto mode while in Pause mode, cartridge accessor motion is again enabled. If you select Auto mode while in Manual mode, then all commands queued for Manual mode are requeued. They are requeued for the cartridge accessor and the cartridge accessor's motion is enabled. The icon preceding the **Auto...** option indicates that you selected Auto mode.

When the LM is powered on and the initialization code executes successfully, Auto mode starts automatically after a two-minute delay unless the user intervenes. You or a service representative may want to prevent the Library Manager from going online and into Auto mode automatically. A window opens (after the IBM logo panel display times out) that allows you to press Enter and continue directly into Auto mode and Online state or to select one of the following modes and states:

• Auto mode and Offline state
• Pause mode and Online state
• Pause mode and Offline state
• Manual mode and Online state
• Manual mode and Offline state

See Figure 56 on page 123 for the Initial Mode/State Selection window.

Note: Auto mode and Online state is the default without user intervention.

Pause

Select the **Pause...** option for the cartridge accessor to move to its park position in the service area after finishing the operation in progress. Note that several commands may have to complete before the 3494 enters Pause mode. You are then prompted to confirm your selection. The icon preceding the **Pause...** option indicates that you selected Pause mode.

The Library Manager continues to accept commands from the host. The commands are either performed (immediate non-motion, non-mount commands) or queued (motion commands) if the 3494 is online.

The System Summary window contains the operational mode status. It displays **Pause Pending** from the time you select the **Pause...** option to the time the cartridge accessor stops. When the cartridge accessor stops, the System Summary window displays **Pause**.

Use Pause mode when you want to stop all cartridge accessor motion in an orderly manner (usually to open a front door).

To resume cartridge accessor motion, select the **Auto...** option in the Mode window.

Note: If you are in Pause mode and you want to go to the Offline state, you must go to either Auto mode or Manual mode. From either of these modes (selected in the Pause/Offline Pending window), you can complete the transition to the Offline state. This process allows the library to handle all pending host commands before going to the Offline state.

Force Pause

Select the **Force Pause...** option when you need access to the enclosure, but the 3494 seems to be stuck in Pause Pending mode.

Perform the following to release the 3494 from Pause Pending mode:

1. After you have selected the **Pause...** option, wait at least 20 minutes for the transition to complete. If the 3494 is still in Pause Pending mode after 20 minutes, continue with step 2.
2. Open any library enclosure door. If the 3494 is still in Pause Pending mode after 1 minute, continue with step 3.
3. Select the **Force Pause...** option.

Manual

Select the **Manual...** option when the cartridge accessor is out of service. In Manual mode, the Library Manager console displays all mount and eject requests. The display also shows the cartridge volser, the 3494 drive number, and the location of the cartridge.

When selected, the mode changes from Auto or Pause mode to Manual mode. You are prompted to confirm your selection. The icon preceding the **Manual...** option indicates that you selected Manual mode. The cartridge accessor is parked in the home position automatically. The Library Manager then directs motion commands to the Manual mode window instead of to the cartridge accessor.

See "Using Manual Mode" on page 320 for a complete description of the Manual mode operating procedure.

Online

Selecting the **Online...** option causes the LM to send a message to all attached 3490E, 3590, and VTSs indicating the LM is online. If you select the **Online...** option and the Library Manager is already online, your selection is ignored. No messages are sent to the attached control units. The window indicates **Online Pending** while the Library Manager is in the process of going online.

You are prompted to confirm your selection. The icon preceding the **Online...** option indicates that you selected the Online state.

After the LM is powered on and the initialization code executes successfully, Auto mode and Online state start automatically after a two-minute delay unless the user intervenes. You or a service representative may want to prevent the Library Manager from going online and into Auto mode automatically. A window opens (after the IBM logo panel display times out) that allows you to press Enter and continue into Auto mode and Online state or to select an option. Options that are not selectable are disabled (not available). See Figure 56.
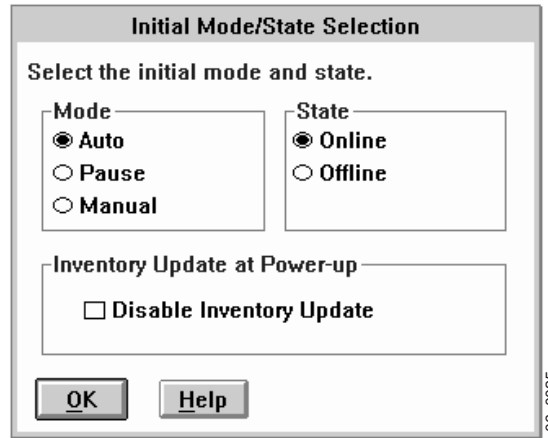
Figure 56. Initial Mode/State Selection Window

While in the Online state, the Library Manager is capable of receiving, queueing, and executing commands from attached hosts.

Whenever the Library Manager is brought online, it checks for "Fast Ready" categories. If the 3494 has a VTS installed and there are no "Fast Ready" categories defined, a warning message is displayed (see Figure 57 on page 124). The message simply warns that at least one "Fast Ready" category should be defined. If you do not select the **OK** push button, the warning message is removed automatically after one minute. If a VTS is not installed or there are "Fast Ready" categories defined, no warning message is displayed. See "Set VTS Category Attributes" on page 215 for information on setting "Fast Ready" categories.

Note: If you see this message, notify your system administrator.
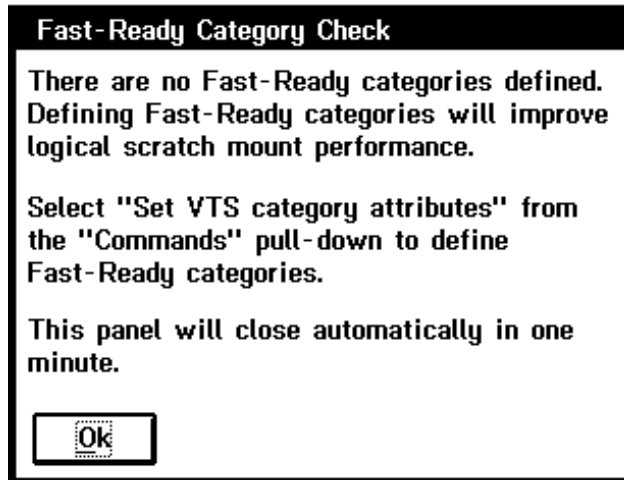
Figure 57. Fast-Ready Category Check Window

Offline

Select the **Offline...** option for the cartridge accessor to complete all queued requests. No additional requests are accepted. During the processing of queued requests, the 3494 is in the Offline Pending state. If you select the **Offline...** option and the Library Manager is already offline, your selection is ignored. No messages are sent to the attached control units. The window indicates **Offline Pending** while the Library Manager is in the process of going offline.

You are prompted to confirm your selection. The icon preceding the **Offline...** option indicates that you selected the Offline state.

/   If VTSs are configured, the message shown in Figure 59 on page 125 is displayed,
/   alerting you to do one of the following actions:
/   •   Respond **Yes** if all VTSs are offline.
/   •   Respond **No** to cancel offline processing and take the VTSs offline first.

The Offline Request window (Figure 58 on page 125) instructs you to
•   Vary the 3494 offline
•   Resolve any intervention-required conditions
•   Put any PtP VTSs in Service Preparation state
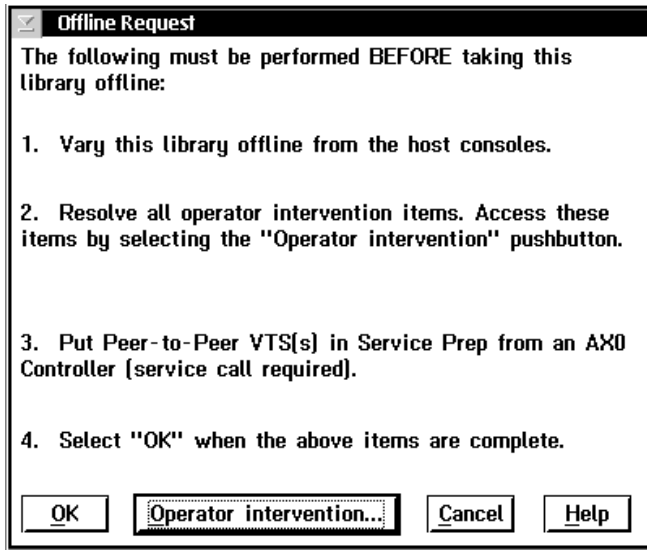
Figure 58. Offline Request Window
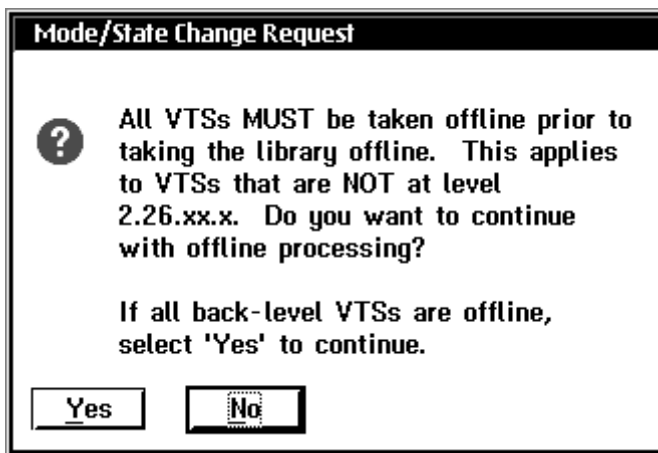
Figure 59. Mode/State Change Request Window — VTS

If an Export or an Import operation is in progress, the Library Manager cannot go to the Offline state. If you attempt to do this, the message shown in Figure 60 on page 126 is displayed, alerting you to do one of the following actions:

- Wait for the operation to complete.
- Cancel the operation from the host.
- Cancel the operation by selecting the **Cancel VTS Export/Import** option under the **System Management** option in the Commands window.
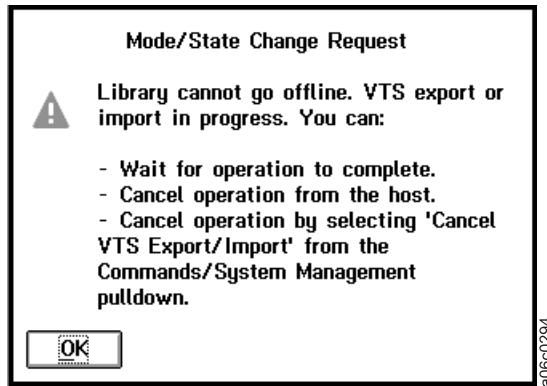
Figure 60. Mode/State Change Request Window

If no intervention-required conditions exist, the instruction is reduced in contrast (dimmer) from other items.

The Offline Request window has the following push buttons:

OK
This option continues the Offline process.

Operator intervention...
If enabled, this option takes you to the Operator Intervention window.

Cancel
This option cancels the Offline request and leaves the 3494 in the Online state.

Help
This option provides additional information to aid you in the Offline process.

/
/
A message window indicating that the Library Manager is going offline is displayed, and a message is also sent to all attached hosts indicating that the Library Manager is going offline. When the Library Manager is offline, maintenance activity can be performed, or the Library Manager can be powered off after shutdown is selected (see "Shutdown" on page 131).

Service Menu

The **Service menu...** option allows the service representative, or an operator with service level authorization, access to additional service functions. This menu is active only when the Operator menu is present.

Typically, Service mode is password protected. The password protection option can be selected during installation. Figure 61 shows the Service mode notice that is displayed when Service mode is accessed and is not password protected.
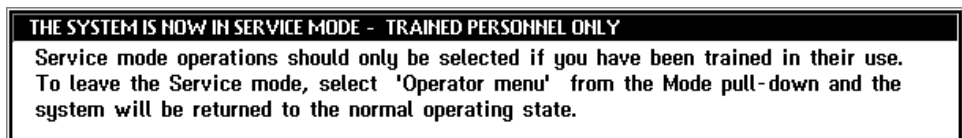
Figure 61. Service Mode Notice

Switch Active Library to Standby

Note: This option is available only when the HA1 Frames is installed and the standby Library Manager is enabled.

The **Switch active library to standby...** option allows you to switch the active Library Manager manually to become the standby Library Manager. There are two ways to process the switchover.

1. With the Library Manager in Offline state and in Pause mode.

2. With the Library Manager in Online state and in either Auto or Manual mode.

The Library Manager may prompt you for the system administrator password (Figure 62).

Figure 62. System Administrator Password Window

The Library Manager then asks you for confirmation before continuing with the switchover (Figure 63).
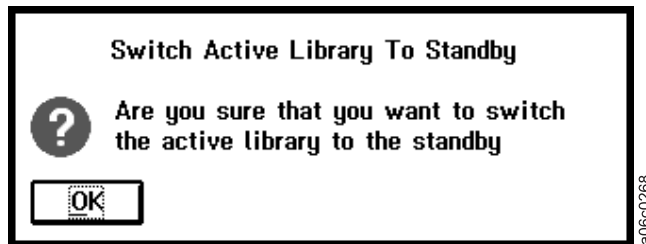
Figure 63. Library Switchover Confirmation Window

Offline/Pause Switchover: This switch may take up to ten minutes to complete. Transforming to the Offline states will prevent future host commands and all pending commands from the queue will be completed before completing Pause mode. This allows a smoother Library Manager switchover.

Online/Auto-Manual Switchover: This switch may take up to ten minutes to complete after existing commands are completed. It is referred to as an Online switchover. You must be in the Online state and either in the Auto or Manual mode. If an Online switch is selected, all incoming commands are rejected except for ADSM commands. ADSM commands will continue to be accepted until either there

are no more commands coming in and the Library Manager has started the switchover or a 30 minute timer was set and has expired.

You will be prompted by the Library Manager to provide an action for the message shown in Figure 64:

- Respond **Yes** if you want the Library Manager to automatically start the Online switchover process after 30 minutes regardless of there being commands in the queue.
- Respond **No** if you want the Library Manager to wait until the queue is empty before proceeding with the Online Switchover.
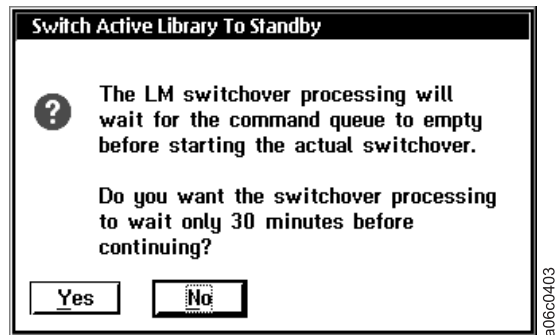
Figure 64. Switch Active Library to Standby Verification Window

A status window is displayed (Figure 65) and will provide information regarding elapsed time, number of commands in the queue at the start of the switchover request and the number of current commands in the queue. You may, at any time before the switchover has started, select to turn On or Off the 30 minute timer, Cancel the switchover, or Display the queue.
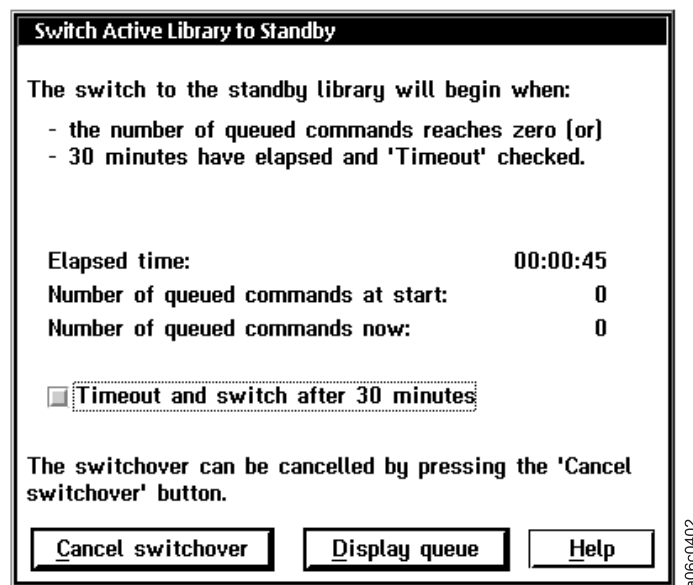
Figure 65. Switch Active Library to Standby Status Window

If the 30 minute timer was set and expired prior to the queue emptying, a Library Manager Check1 is initiated to start the switchover process. If the timer was not set, the Library Manager will begin an Online Switchover once the command queue is empty.

During the switchover, the Library Manager displays the Switching window (Figure 66).

This Library
Manager is
switching from
Standby to
Active, please
stand by.
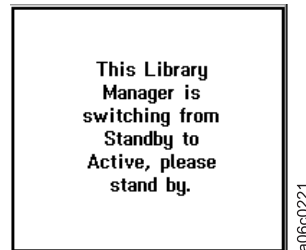
Figure 66. Switching Window

When the System Status window opens, the switchover is complete.

Accessor

The following sections describe the actions you can take that involve the cartridge accessor.

Switch Active Accessor to Standby:

Note: This option is available only when the HA1 Frames is installed.

The **Switch active accessor to standby...** option allows you to switch the active accessor manually to become the standby accessor. When selected, the Library Manager asks you for confirmation before continuing with the switchover (see Figure 67).

Switch Active Accessor To Standby

Are you sure that you want to switch
the active accessor to the standby
accessor?

OK
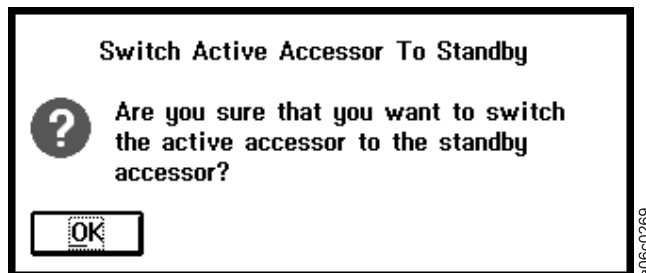
Figure 67. Accessor Switchover Confirmation Window

During the switchover, the Library Manager displays the Switch Active Accessor to Standby window (Figure 68 on page 130) and changes from Auto mode to Pause mode. The Library Manager changes back to Auto mode when the switchover is complete.

Figure 68. Switch Active Accessor to Standby Window

Enable Dual Active Accessors:

Note: This option is available only when the Dual Active Accessors feature is installed.

The **Enable Dual Active Accessors...** option allows you to enable the Dual Active Accessors feature manually. When selected, the Library Manager opens the Dual Active Accessor Status window (Figure 69).
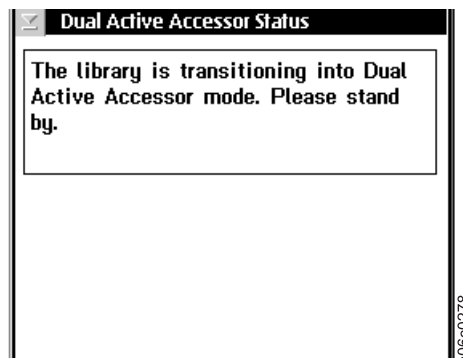
Figure 69. Dual Active Accessor Status Window - Enabling

Disable Dual Active Accessors:

Note: This option is available only when the Dual Active Accessors feature is installed.

The **Disable Dual Active Accessors...** option allows you to disable the Dual Active Accessors feature manually. When selected, the Library Manager opens the Mark Accessor Active window (Figure 70 on page 131).
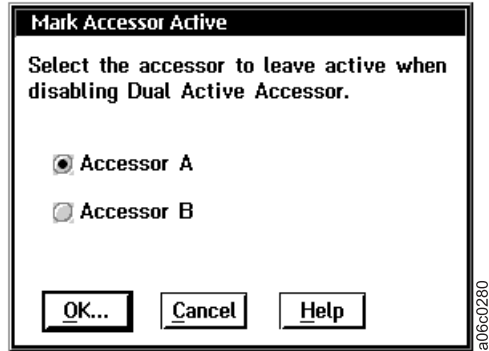
Figure 70. Mark Accessor Active Window

When you select an accessor to leave active, the Library Manager opens the Dual Active Accessor Status window (Figure 71).
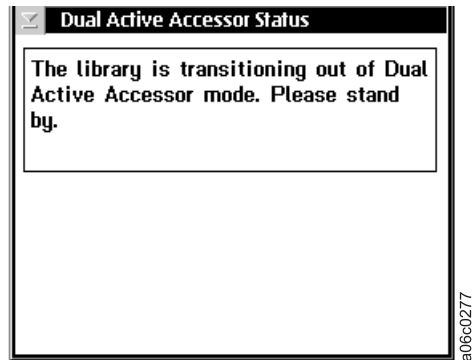
Figure 71. Dual Active Accessor Status Window - Disabling

Lockup Library Manager

The **Lockup Library Manager...** option locks the keyboard and display until you enter the system administrator's password.

Shutdown

The **Shutdown...** option is only available when the Library Manager is in the Offline state and in Pause mode. This option prepares the Library Manager for the power-off procedure. When the option is selected, the volume database stops, files close, and the Library Manager program ends. The system administrator password is required to initiate the shutdown procedures if the password option is chosen. See "Change System Administrator Password" on page 290 for instructions to set the system administrator password.

Select the **Shutdown...** option in the Mode window or press **F3** to cause the System Administrator Password window (Figure 72 on page 132) to open.

Note: This window opens only if the password option is chosen.

Figure 72. System Administrator Password Window

If you select the **Cancel** option, the shutdown request ends, and the window closes. If you enter a valid password and select **OK**, an **Are you sure?** query is displayed. If you select **No**, the shutdown request ends. If you select **Yes**, the 3494 Tape Library Dataserver Shutdown window (Figure 73) opens.
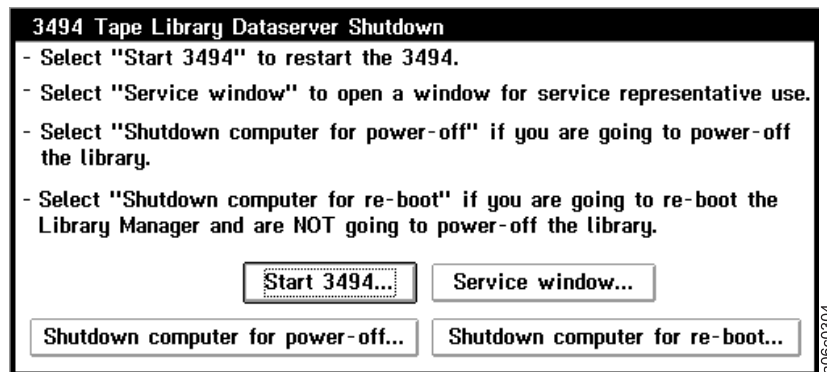
Figure 73. 3494 Tape Library Dataserver Shutdown Window

Online Shutdown

The **Online Shutdown...** option allows you to initiate a Library Manager shutdown while in either Auto or Manual mode and in the Online state. If no items are pending in the command queue, the shutdown initiates immediately. If items are pending in the command queue, the shutdown will not initiate until the queue is empty.

Selecting the **Online Shutdown...** option from the Mode window opens Shutdown Request Window 1, shown in Figure 74 on page 133.
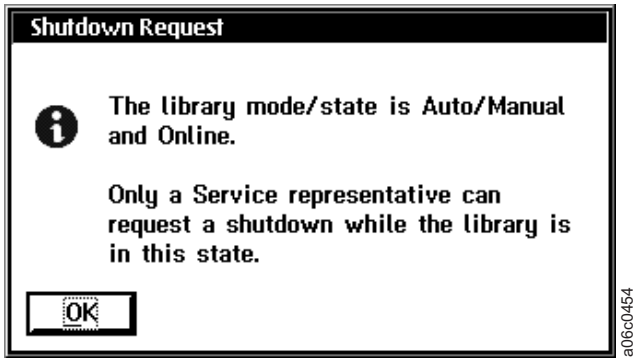
Figure 74. Shutdown Request Window 1

/   If you select **OK** and the password option is selected, the Library Manager will
/   prompt you for the system administrator password (Figure 75).
/

Figure 75. System Administrator Password Window

/   After entering the current password (if the password option is selected) or after
/   selecting **OK** in Shutdown Request Window 1, Shutdown Request Window 2
/   (Figure 76 on page 134) opens.
/
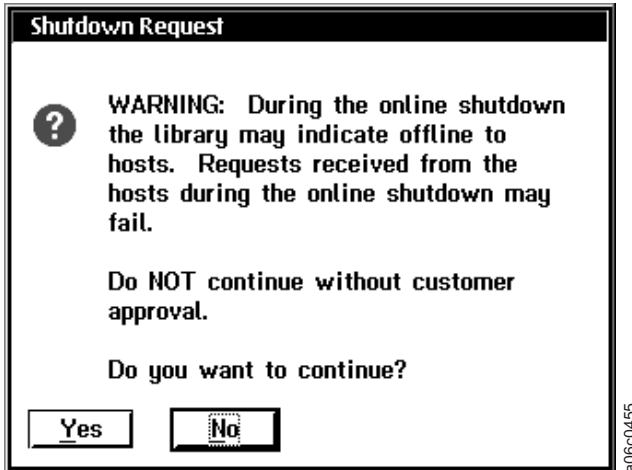
Figure 76. Shutdown Request Window 2

/ Selecting **Yes** continues the shutdown operation. Selecting **No** cancels the
/ shutdown operation. If you select **Yes**, the Library Shutdown window shown in
/ Figure 77 opens.
/
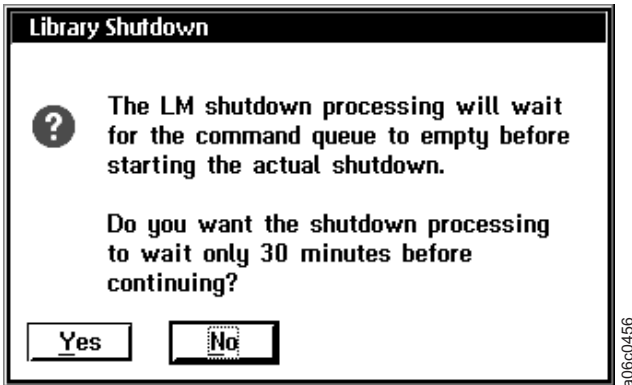
Figure 77. Library Shutdown Window

/ • Select **Yes** if you want the Library Manager to automatically start the shutdown
/ process after thirty minutes whether or not the command queue is empty.
/ • Select **No** if you want the Library Manager to wait until the command queue is
/ empty before proceeding with the shutdown operation.

/ The Shutdown Library Manager window (Figure 78 on page 135) opens. This
/ window displays the time elapsed since the shutdown request and the number of
/ commands in the command queue both currently and when the shutdown request
/ was initiated. You can at any time before the shutdown starts perform the following
/ actions:
/ • turn the thirty-minute timer on and off
/ • cancel the shutdown
/ • display a list of commands in the queue
/
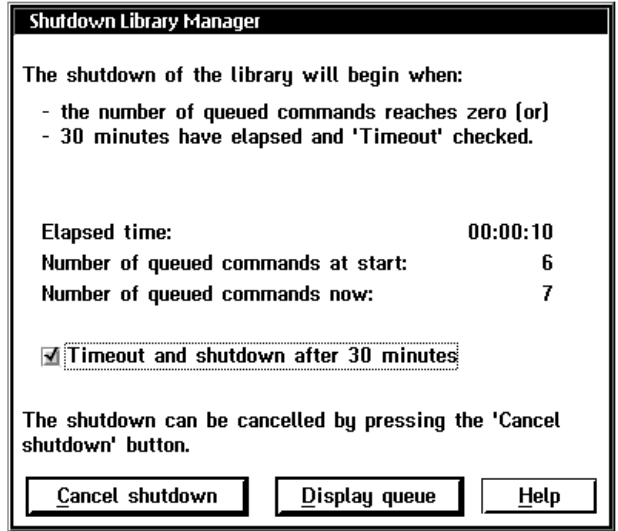
Figure 78. Shutdown Library Manager Window

Using the Status Window

Use the Status window (Figure 79) to display the status of the 3494.

Figure 79. Status Window

The following options are available in the Status window:

Operational status...   Displays the status (see "Operational Status" on page 138).

Component availability status...
                                    Displays the status (see "Component Availability Status" on page 141).

Performance statistics...   Displays statistics (see "Performance Statistics" on page 146).

Accessor mounts per hour...   Displays mounts per hour for each accessor (see Figure 88 on page 148).

VTS x   Allows selection of the following for each VTS, where x denotes the VTS number:

    VTS x Status...
                                    Displays the status of each VTS configured in the 3494 (see "Using the VTS Status Window" on page 144).

    VTS x Active data...
                                    Displays VTS active data statistics (see "VTS Active Data" on page 149).

    VTS x Data flow...
                                    Displays VTS data flow statistics (see "VTS Data Flow" on page 151).

    VTS x Mount hit data...
                                    Displays VTS mount hit data (see "VTS Mount Hit Data" on page 152).

    VTS x Physical device mount history...
                                    Displays VTS physical device mount history (see "VTS Physical Device Mount History" on page 154).

    VTS x Logical mounts per hour...
                                    Displays VTS logical mounts per hour statistics (see "VTS Logical Mounts Per Hour" on page 155).

VTS x Active data distribution...
>   Displays VTS active data distribution
>   statistics (see "VTS Active Data
>   Distribution" on page 156).

System summary...   Displays subsystem status (see "Using the System
                               Summary Window" on page 158).

LAN Status...   Displays LAN status (see "LAN Host Status" on
                               page 163).

Dual LAN Switch ...   Displays VTSs/A60s that are capable of Dual Path
                               Concentrator. Also enables the Dual Path
                               Concentrator function on the 3494 Library Manager.
                               (see "Dual Path Concentrator" on page 164).
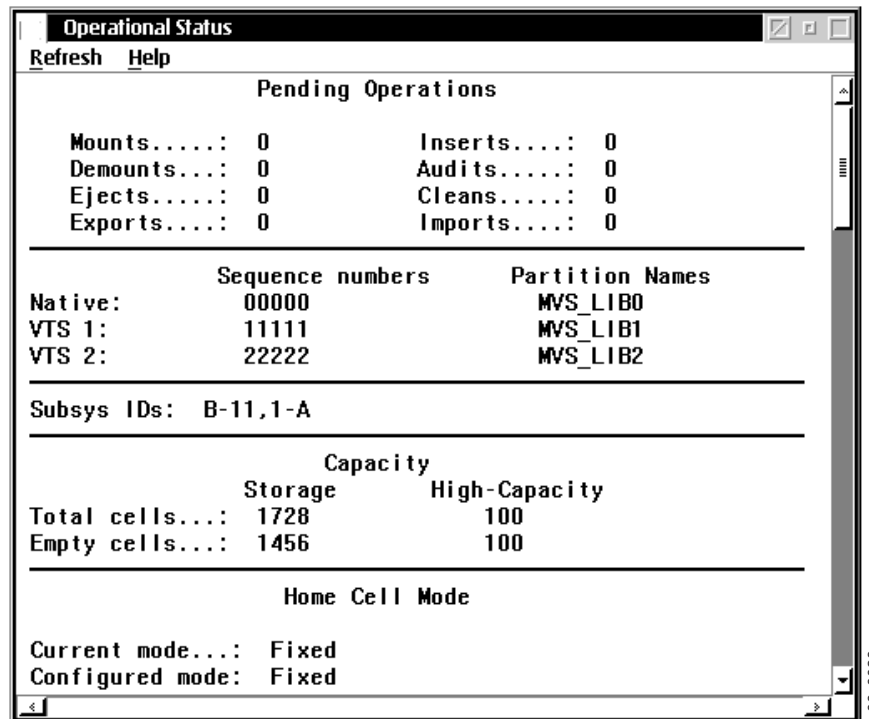
Dual accessor zones...   Displays frames that each accessor services (see
                               Figure 99 on page 165).

Operational Status

Figure 80 shows the top portion of the Operational Status window.

Note: You can view operational status from the Specialist (see "Specialist Features and Functions" on page 332).

```
┌─────────────────────────────────────────────────────────────┐
│ ▌ Operational Status                                    ☑ □ □│
│ Refresh   Help                                               │
│                    Pending Operations                      ▲ │
│                                                            ▤ │
│     Mounts.....:  0           Inserts....:  0                │
│     Demounts...:  0           Audits.....:  0                │
│     Ejects.....:  0           Cleans.....:  0                │
│     Exports....:  0           Imports....:  0                │
│   ──────────────────────────────────────────────────────    │
│            Sequence numbers        Partition Names           │
│   Native:          00000               MVS_LIB0              │
│   VTS 1:           11111               MVS_LIB1              │
│   VTS 2:           22222               MVS_LIB2              │
│   ──────────────────────────────────────────────────────    │
│   Subsys IDs:  B-11,1-A                                      │
│   ──────────────────────────────────────────────────────    │
│                       Capacity                               │
│                  Storage        High-Capacity                │
│   Total cells...:  1728              100                     │
│   Empty cells...:  1456              100                     │
│   ──────────────────────────────────────────────────────    │
│                     Home Cell Mode                           │
│                                                              │
│   Current mode...:  Fixed                                  ▼ │
│   Configured mode:  Fixed                                    │
│ ◄                                                       ► │
└─────────────────────────────────────────────────────────────┘
```

Figure 80. (Part 1 of 4) Operational Status Window

Pending Operations shows the number of pending operations for the following requests:
- Mounts and demounts
- Ejects and inserts
- Audits
- Cleans
- Exports
- Imports

When an operation is pending, it is in progress, queued, or blocked. If you need more specific information about a pending operation, select the appropriate queue (see "Using the Queues Window" on page 165).

Sequence numbers shows the unique identification numbers for each logical library within the physical 3494. Numbers are displayed for non-VTS libraries and for each VTS library that exists in the 3494. The customer assigns these numbers (known as Library ID by host software), and they are set during the Teach operation.

Partition Names shows the unique names for the 3494 partitions. They are also known as **Distributed Library Names**; the Web server displays them. The service

representative defines these names in a Teach screen named Update Library Definitions. If they have not been defined, **Not Defined** is displayed.

Subsys IDs shows the unique identification numbers for the tape subsystems installed in the library. The host software uses this information to determine the configuration.

Capacity shows the total and empty number of storage cells in the library. It also shows the total and empty number of high-capacity output facility cells.

Home Cell Mode shows where the accessor returns a cartridge after processing. In **Fixed** mode, the cartridge is returned to the cell from which it was retrieved originally. In **Floating** mode, the cartridge is returned to a cell that the Library Manager determines.

Figure 81 shows the next portion of the Operational Status window.
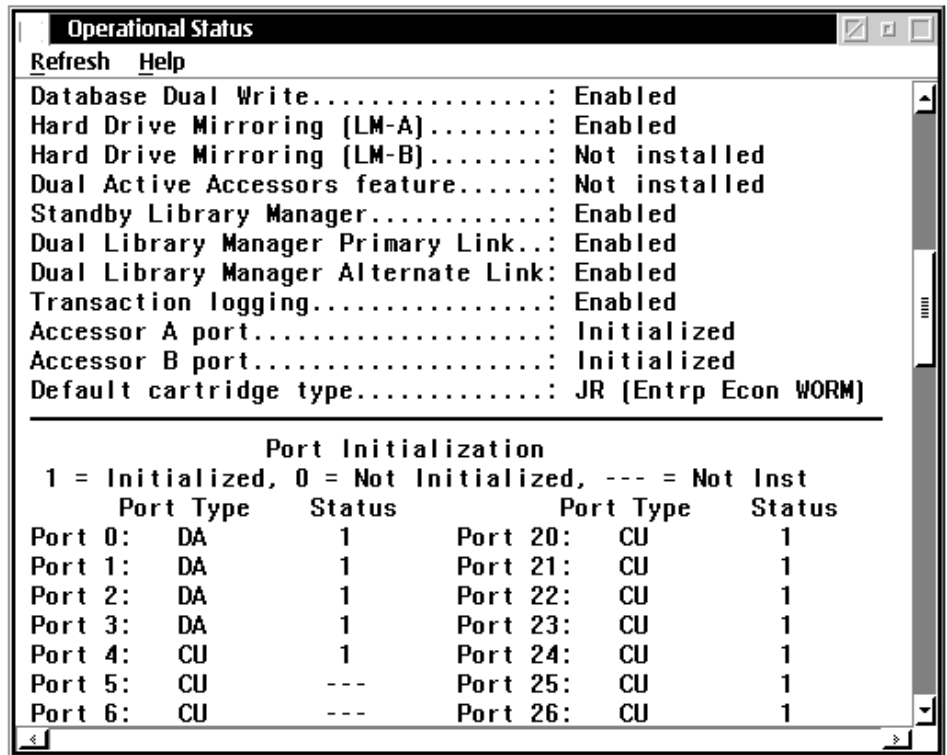
Figure 81. (Part 2 of 4) Operational Status Window

Database Dual Write shows whether the Database Dual Write function is enabled. It indicates **Disabled**, **Enabled**, or **Not installed**.

Hard Drive Mirroring (LM-A) or **(LM-B)** shows the status of mirroring. It indicates **Disabled**, **Enabled**, **Failed**, or **Not installed**.

Dual Active Accessors feature shows the status of the Dual Active Accessors feature. It indicates **Disabled**, **Enabled**, or **Not installed**.

Standby Library Manager shows the status of the standby Library Manager. It indicates **Enabled**, **Disabled**, **Pending** (waiting for a database copy to complete), or **Code Update** (shut down for a code update by service personnel).

Dual Library Manager Primary Link shows the status of the primary communication path between the two Library Managers. It indicates **Enabled**, **Disabled**, or **Not Installed**.

Dual Library Manager Alternate Link shows the status of the secondary communication path between the two Library Managers. It indicates **Enabled**, **Disabled**, or **Not Installed**.

Transaction logging shows the status of transaction logging. It indicates **Disabled** or **Enabled**.

Accessor A port and **Accessor B port** show the status of the accessor port initialization. They indicate **Initialized**, **Not initialized**, **Not installed**, **Not taught**, or **Not available**.

Default cartridge type shows the default cartridge type. The options are **1**, **E**, **J**, **K,** or **None**.

Port Initialization shows the status of the tape subsystem control unit ports and direct-attached ports. It indicates whether a port is a Direct Attached (DA) or a Control Unit (CU) port. It indicates **Initialized**, **Not Initialized**, or **Not Installed**.

Figure 82 and Figure 83 on page 141 show the bottom portion of the Operational Status window.

Figure 82. (Part 3 of 4) Operational Status Window

```
┌─────────────────────────────────────────────────────────────────────┐
│ │  Operational Status                                      ☑ □ □      │
│ Refresh   Help                                                        │
├───────────────────────────────────────────────────────────────────┬─┤
│ Port 1D:   CU          - - -        Port 3D:   CU            1     │▲│
│ Port 1E:   CU          - - -        Port 3E:   CU          - - -   │ │
│ Port 1F:   CU          - - -        Port 3F:   CU          - - -   │ │
│                                     Port 40:   CU          - - -   │ │
│                                     Port 41:   CU          - - -   │ │
│                                     Port 42:   CU          - - -   │ │
│                                     Port 43:   CU          - - -   │ │
│                                     Port 44:   CU          - - -   │ │
│                                     Port 45:   CU          - - -   │ │
│                                     Port 46:   CU          - - -   │ │
│                                     Port 47:   CU          - - -   │ │
│                                     Port 48:   CU          - - -   │ │
│                                     Port 49:   CU          - - -   │ │
│                                     Port 4A:   CU          - - -   │ │
│                                     Port 4B:   CU          - - -   │ │
│                                     Port 4C:   CU          - - -   │ │
│                                     Port 4D:   CU          - - -   │▓│
│                                     Port 4E:   CU          - - -   │ │
│                                     Port 4F:   CU          - - -   │ │
│                                     Port 50:   CU          - - -   │ │
│                                     Port 51:   CU          - - -   │▼│
│                                     Port 52:   CU          - - -   │ │
├─┬───────────────────────────────────────────────────────────────┬─┤
│◄│                                                                 │►│
└─┴───────────────────────────────────────────────────────────────┴─┘
```
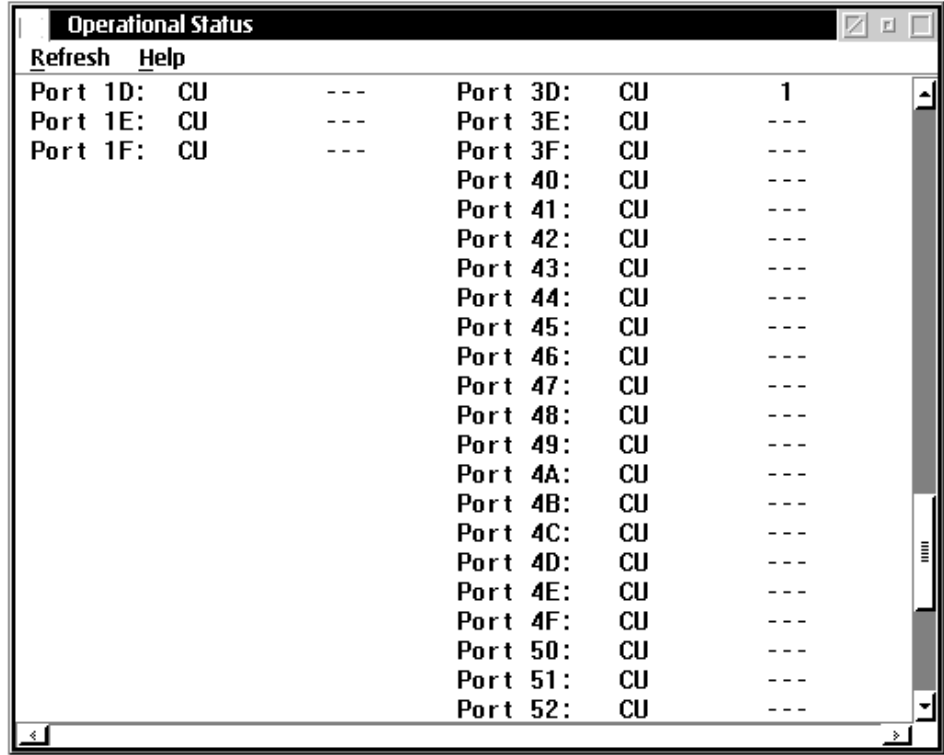
Figure 83. (Part 4 of 4) Operational Status Window

The Operational Status window has the following available on its action bar:

Refresh   Refreshes or updates the contents of the window immediately. The
               window is refreshed periodically; however, clicking the pointing
               device in the selection area of the window causes an immediate
               update of the window.

Help   Provides help about the Operational Status window.

To close the Operational Status window, select the **Close** option on the System
Menu icon (upper-left corner of the window).

Component Availability Status

The Library Manager keeps track of the components that are available so that it can
make the best use of the available hardware when processing commands. When a
component fails, the component is marked unavailable for use automatically. The
LM does not use the component until it is marked available through the Service
menu on the LM console.

You can display the availability status of all the 3494 components on the Library
Manager console. Availability information is kept in the Library Manager database
so that it is not lost if the Library Manager is shut down.

Drives can be marked on the Library Manager as available or unavailable. If a drive
is available, it is available to the cartridge accessor. If the drive is marked
unavailable, the drive is not available to the cartridge accessor.

Note: Device availability or unavailability is independent of the drive status (online
or offline) with the host.

A drive is marked unavailable when something prevents the cartridge accessor from going to that drive (for example, when the drive is being serviced). Even if no host requests are made for the drive, the Library Manager may try to clean a drive if it is available.

Device availability is not checked when host requests are received and validated. It is not checked because the drive availability can change between the time the command is accepted and the time the request is executed. If a host request is accepted and the required drive is marked as unavailable when it is time to execute the request, the request fails. Conversely, if the required drive is unavailable at request acceptance but is made available before the request executes, the request completes normally.

The Component Availability Status window (see Figure 84) displays information about the availability of the components in the 3494 system. The following are the main sections of the Component Availability Status window:

- Convenience I/O Availability
- Accessor Availability
- Control Unit Port and Device Availability

Note: You can view component availability status from the Specialist (see "Specialist Features and Functions" on page 332).


```
Component Availability
Convenience I/O Availability:

Convenience I/O                          Available

Accessor Availability:                   Accessor A            Accessor B

Accessor                                 Available             Not installed
Gripper 1                                Available             Not installed
Gripper 2                                Not installed         Not installed
Vision System                            Available             Not installed


Control Unit Port / Device Availability:     ['*' unavailable, '-' not installed]
Frame   Model   VTS   Port   LAN/RTIC   Devices
1>2     L12-2          04     R         100  101
2<1     D14-4          04     R         200  201  202  203
3       D12-4   B10    11     L         300  301  302  303
-       VIRT    B10    12     L         A00  A01  A02  A03  A04  A05  A06  A07
                                        A08  A09  A0A  A0B  A0C  A0D  A0E  A0F
-       VIRT    B10    13     L         A10  A11  A12  A13  A14  A15  A16  A17
                                        A18  A19  A1A  A1B  A1C  A1D  A1E  A1F
4       D14-3          14     L         400  401  402

   Cancel                        Refresh                       Help
```

Figure 84. Component Availability Status Window

Convenience I/O Availability shows the status of the convenience I/O station. It indicates **Available**, **Not available**, or **Not installed**.

Accessor Availability shows the status of the cartridge accessor components.

- **Accessor** shows the status of the cartridge accessors. It indicates **Available**, **Not available**, or **Not installed**
- **Gripper 1** shows the status of Gripper 1. It indicates **Available**, **Not available**, or **Not installed**

- **Gripper 2** shows the status of Gripper 2. It indicates **Available**, **Not available**, or **Not installed**
- **Vision System** shows the status of the Vision System. It indicates **Available**, **Not available**, or **Not installed**

Control Unit Port / Device Availability shows the control unit ports associated with tape subsystems. It lists the ports by frame number, starting with the leftmost (lowest number) frame. It does not list host ports.

- **Frame** shows the library frame where this port is located. If the frames are linked (adjacent frames), then the two frame numbers will be displayed with either a (**>**) or (**<**) separating them. This arrow points in the direction of the linked frame. If the port number displayed is associated with a virtual device subsystem for a LAN-attached B18, B10, or B20 VTS, there is no associated 3494 frame. In this case, it indicates a dash (**-**).
- **Model** shows the frame type that was selected during the Teach operation. If the port number displayed is associated with VTS virtual devices, then it indicates **VIRT**.
- **VTS** shows the VTS type for ports that are associated with a VTS. It indicates **B16, B18, B10,** or **B20**.
- **Port** shows the port number associated with this tape subsystem. If the port status is **Available**, then there is no indicator immediately after the port number. If the port status is **unavailable**, then there is an asterisk (*****) immediately after the port number. If the port status is **not installed**, then there is a dash (**-**) immediately after the port number.
- **LAN/RTIC** shows how the port is attached. It indicates **L** if the port is LAN-attached. It indicates **R** if the port is RTIC-attached.
- **Devices** shows a list of the devices (physical or virtual) that are associated with this port (tape subsystem). If there are more than eight devices on this tape subsystem, then a second line of devices is displayed. If the device status is **Available**, then there is no indicator immediately after the device number. If the device status is **Not available**, then there is an asterisk (*****) immediately after the device number. If the device status is **Not installed**, then there is a dash (**-**) immediately after the device number.

The Component Availability Status window has the following push buttons:

Cancel   Closes the Component Availability Status window.

Refresh   Refreshes the Component Availability Status window. The window refreshes automatically if a change of availability occurs in the library.

Help   Provides help about the Component Availability Status window.

Using the VTS Status Window

The VTS Status window (Figure 85) displays information about the status of each individual VTS installed in the 3494.

Note: You can view VTS status from the Specialist (see "Specialist Features and Functions" on page 332).
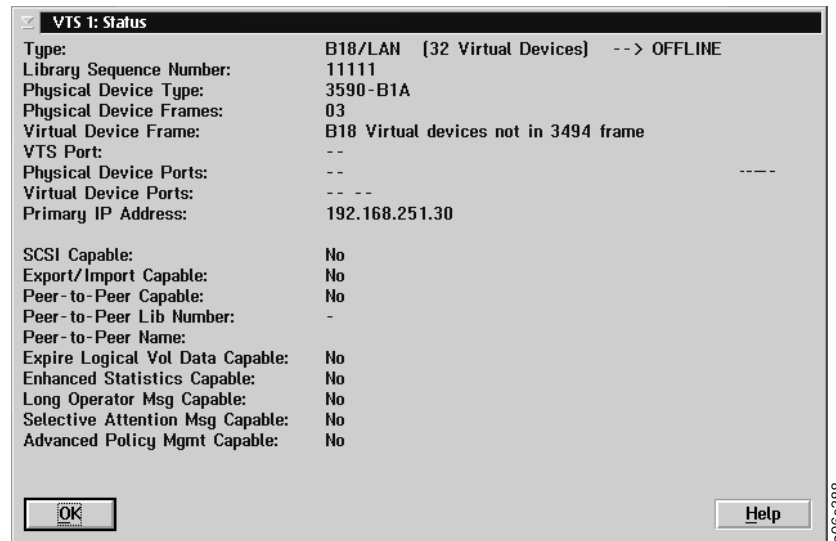
Figure 85. VTS Status Window

Type shows the type of VTS and its connection to the 3494. It indicates **B16**, **B18**, **B10**, or **B20** and attachment type **ARTIC** or **LAN**, as well as the number of virtual devices.

Library Sequence Number shows the library sequence number of this VTS.

Physical Device Type shows the type of physical device. It indicates either 3590 Model B1A, 3590 Model E1A, or 3590 Model H1A.

Physical Device Frames shows the numbers of the frames that contain the physical devices that this VTS uses.

Virtual Device Frame shows the number of the frame that contains the VTS processor. For a B16 VTS, it indicates the frame number. For a B18, B10, or B20 VTS, it indicates **Bxx Virtual devices not in 3494 frame**. This is because theVTS processor is in a frame that is not attached to the library frames.

VTS Port shows the port that the Library Manager uses to communicate with the VTS. For a B16 VTS, it indicates **ARTIC port 0**. For a B18, B10, or B20 VTS, it indicates the LAN port number, which typically starts at 0x10. If the Library Manager has initialized with the port, it indicates the port's number. If it is not initialized, it indicates a dash (**-**).

Physical Device Ports shows the ports that the Library Manager uses to communicate with the physical devices associated with the VTS. For a B16 VTS, it indicates one port for each physical drive. For a B18, B10, or B20 VTS, it indicates

the one port that communicates with all of the VTS physical drives. If the Library Manager has initialized with a port(s), it indicates the port number. If it is not initialized, it indicates a dash (**-**).

Virtual Device Ports shows the ports that the Library Manager uses to communicate with the virtual devices associated with the VTS. There is one port for each virtual subsystem of 16 drives. A B16 VTS has two virtual subsystems. A B18, B10, or B20 VTS can have between two and 16 virtual subsystems. If the Library Manager has initialized with a port, it indicates the port's number. If it is not initialized, it indicates a dash (**-**).

Primary IP Address shows the Library Manager's Internet Protocol (IP) address with which the VTS processor communicates with the Library Manager. It is displayed only for a B18, B10, or B20 VTS.

SCSI Capable shows if the VTS has the SCSI Host Attachment feature. It indicates **Yes** or **No**.

Export/Import Capable shows if the VTS is capable of Export and Import operations. It indicates **Yes** or **No**. Your service representative can disable the Export/Import capability by using a service window function.

Peer-to-Peer Capable shows if the VTS has been identified as being part of a PtP VTS. It indicates **Yes** or **No**. Your service representative can assign this capability during a service action. If an asterisk (*****) follows the **Yes** or **No**, the assigned capability conflicts with the capability information that the VTS passed to the Library Manager. **Yes *** indicates that the VTS has been identified as being part of a PtP VTS. However, the VTS has either not yet sent this information to the Library Manager or sent the capability as **No**. **No *** indicates that the VTS has **not** been identified as being part of a PtP VTS. However, the VTS sent capability information to the Library Manager that indicates that it **is** part of a PtP VTS. This may be a temporary condition, but if this conflict indicator persists, contact your service representative.

Peer-to-Peer Lib Number shows the PtP library number assigned during a service action. It indicates **1** or **2**. The User Interface PtP VTS has a value of **1** and is displayed as **1-User Interface**. A dash is displayed if not part of PtP.

Peer-to-Peer Name shows the PtP Composite Library name. It indicates a name from one to 30 characters long. However, it must be unique within each library because it identifies the members of a PtP VTS. A blank is displayed if not part of PtP.

Expire Logical Vol Data Capable shows if the VTS has been identified as being capable of expiring logical volume data. It indicates **Yes** or **No**.

Enhanced Statistics Capable shows if the VTS has been identified as being capable of displaying enhanced performance statistics. It indicates **Yes** or **No**.

Long Operator Msg Capable shows if the VTS has been identified as being capable of sending long operator messages to host. It indicates **Yes** or **No**.

Selective Attention Msg Capable shows if the VTS has been identified as being capable of allowing you to select which attention messages are displayed. It indicates **Yes** or **No**.

Advanced Policy Mgmt Capable shows if the VTS has been identified as being capable of advanced policy management (FC 4001, 4002, 4003, or 4004 is installed). It indicates **Yes** or **No**.

The VTS Status window has the following push buttons:

OK   Closes the VTS Status window.

Help   Provides help about the VTS Status window.

Performance Statistics

Note: You can view performance statistics from the Specialist (see "Specialist Features and Functions" on page 332).

The Performance Statistics window (Figure 86 on page 147 and Figure 87 on page 147) displays the following statistics for the 3494. These statistics reflect activity involving physical volumes in the library. Commands involving VTS logical volumes are not part of these statistics.

- The number of physical mounts for the previous seven days
- The number of physical mounts for the previous 24 hours
- The number of physical mounts per hour for the previous 24 hours
- The average physical mount time for the previous 24 hours
- The number of physical ejects for the previous 24 hours
- The number of physical inserts for the previous 24 hours
- The number of physical audits for the previous 24 hours
- The peak number of physical mounts per hour for the previous 24 hours
- The time when peak physical mounts per hour occurred
- The number of physical mounts during the last hour
- The number of physical demounts during the last hour
- The number of physical ejects during the last hour
- The number of physical inserts during the last hour
- A graph showing the number of physical mounts per hour during the previous 24 hours

Hourly statistics are calculated on the hour (7:00, 8:00, and so on).
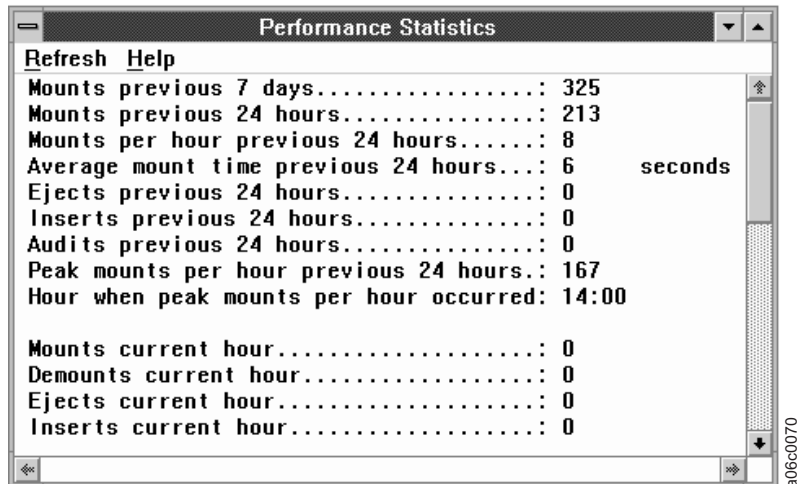
Figure 86. (Part 1 of 2) Performance Statistics Window
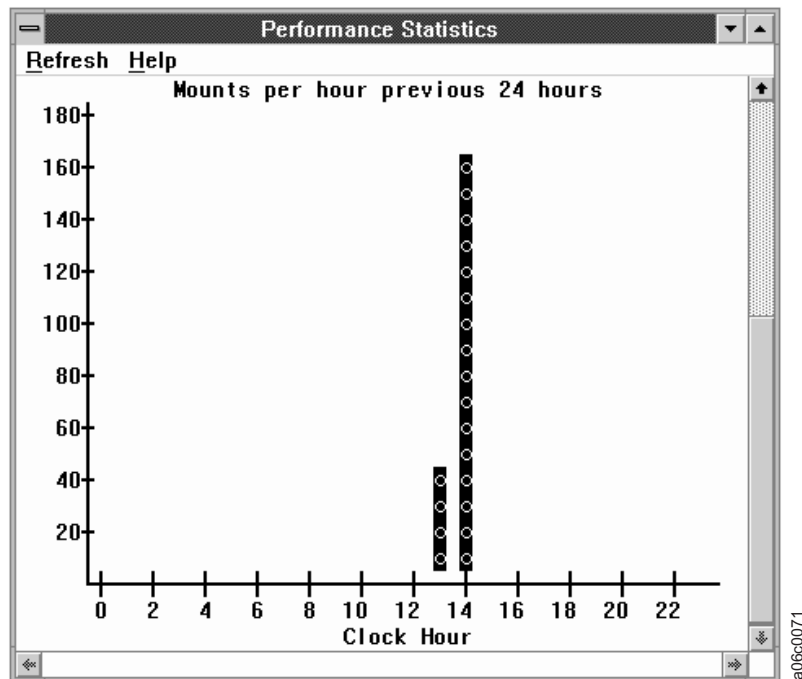
Figure 87. (Part 2 of 2) Performance Statistics Window

The Performance Statistics window has the following available on its action bar:

Refresh   Refreshes or updates the contents of the window immediately instead of periodically (about every 30 seconds). You can also click the pointing device in the client area of the window.

Help   Provides help about the Performance Statistics window.

To close the Performance Statistics window, select the **Close** option on the System Menu icon (upper-left corner of the window).

Accessor Mounts Per Hour

Note: You can view accessor mounts per hour from the Specialist (see "Specialist Features and Functions" on page 332).

The Accessor Mounts per Hour window (Figure 88) displays a graph showing the number of mounts per hour for each accessor. Data is displayed for the previous 24 hours. An asterisk (*) for Accessor A and a diamond (♦) for Accessor B designate the current hour's data.
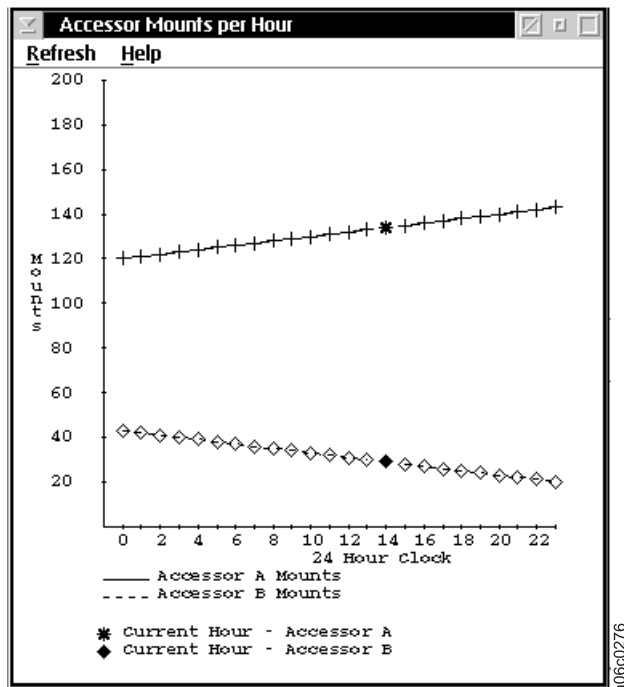
Figure 88. Accessor Mounts Per Hour Window

The Accessor Mounts per Hour window has the following available on its action bar:

Refresh   Refreshes or updates the contents of the window immediately. You can also click the pointing device in the client area of the window.

Help   Provides help about the Accessor Mounts per Hour window.

To close the Accessor Mounts per Hour window, select the **Close** option on the System Menu icon (upper-left corner of the window).

VTS Active Data

Note: You can view VTS active data from the Specialist (see "Specialist Features and Functions" on page 332).

The VTS Active Data window (Figure 89) displays a graph showing the amount of active data, amount of free storage, maximum active data, and a free storage alarm level for the stacked volumes in a VTS. The data stored on stacked volumes is from the tape volume cache and may be compressed when the VTS has the ESCON High Performance Option feature or the Extended High Performance Option feature. Therefore, the graphs do not represent actual host data bytes but the compressed volume sizes as stored in the tape volume cache. A separate graph is available for each VTS in the 3494. Data is displayed for the previous 29 days as of midnight and for the current day on an hourly snapshot.
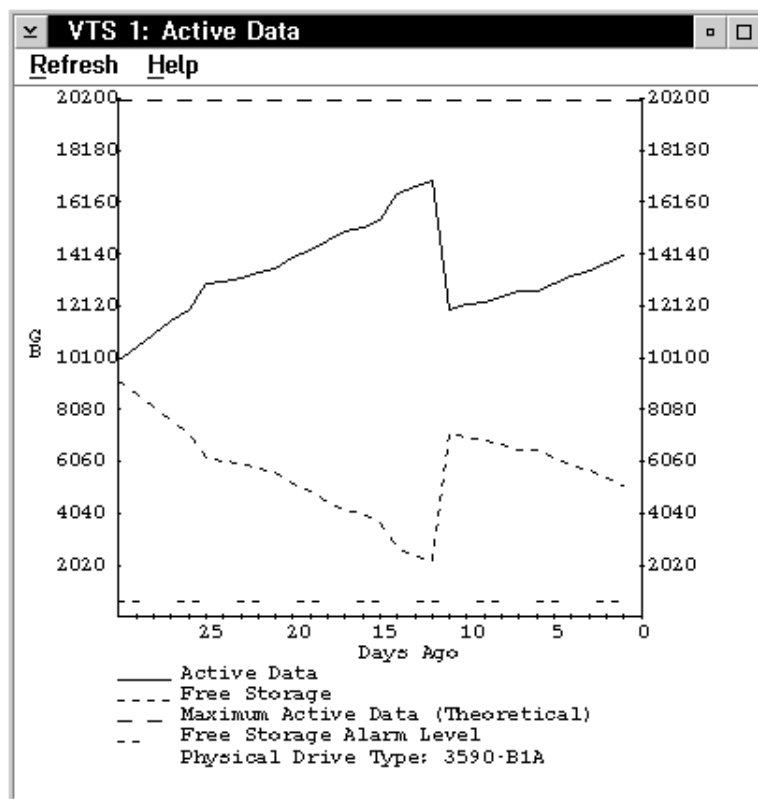
Figure 89. VTS Active Data Window

Active Data is the total size, as stored in the tape volume cache, of all active logical volumes that have been copied to stacked volumes. Virtual volumes that exist in the tape volume cache but have not been copied to tape are not included. The graph includes invalidated copies of logical volumes (duplicate volumes that the reconciliation process did not delete from the active volume list).

Maximum Active Data is the total capacity of all stacked volumes that have been inserted in the VTS. For the B16 VTS, the Maximum Active Data is a theoretical value computed by assuming that stacked volumes are filled with data compressed at a 2:1 ratio. The B18, B10, and B20 VTSs use the actual compression ratio for all data copied from the TVC to full stacked volumes to calculate the Maximum Active Data. Because data received from enhanced ESCON host attachments was

compressed previously into the TVC, no further compression to the stacked volume from the tape volume cache occurs for the B18, B10, and B20 VTSs. Note that invalidated copies of logical volumes reduce the amount of active data you can store on the stacked volumes.

Free Storage is the total capacity of all empty stacked volumes in the 3494 calculated by using a compression ratio as described previously for Maximum Active Data. This calculation does not include partially filled stacked volumes. Free Storage gives an indication of how much data from the tape volume cache can be added to stacked volumes currently in the VTS.

Free Storage Alarm Level is a threshold to warn you when to add more stacked volumes to the VTS. If the number of empty stacked volumes available is less than the number of stacked volumes required to store the amount of tape volume cache data that the Free Storage Threshold (GB) specifies, the Library Manager signals an intervention required condition to notify you to add more stacked volumes. You can modify the Free Storage Alarm Level with the **Free Storage Threshold (GB)** field in the Library Manager's VTS Management Policies window (see "VTS Management Policies" on page 217).

Physical Drive Type: Maximum Active Data, Free Storage, and the Free Storage Alarm Level are determined based on the tape drive type (3590 Model B1A, E1A, or H1A) associated with the VTS.

The VTS Active Data window has the following available on its action bar:

Refresh   Refreshes or updates the contents of the window immediately. You can also click the pointing device in the client area of the window.

Help   Provides help about the VTS Active Data window.

To close the VTS Active Data window, select the **Close** option on the System Menu icon (upper-left corner of the window).

VTS Data Flow

Note: You can view VTS data flow from the Specialist (see "Specialist Features and Functions" on page 332).

The VTS Data Flow window (Figure 90) displays a graph showing the amount of data written to and read from the channel. A separate graph is available for each VTS in the library. Data is displayed for the previous 24 hours. A diamond-shaped (♦) marker designates the current hour's data.
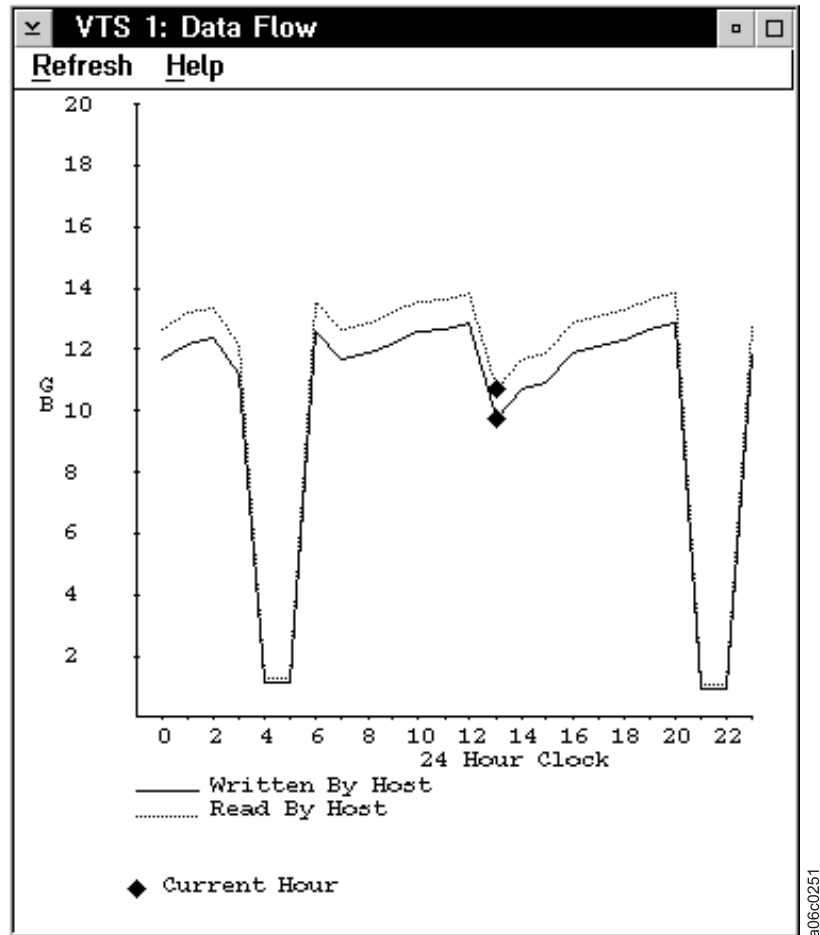
Figure 90. VTS Data Flow Window

The VTS Data Flow window has the following available on its action bar:

Refresh   Refreshes or updates the contents of the window immediately. You can also click the pointing device in the client area of the window.

Help   Provides help about the VTS Data Flow window.

To close the VTS Data Flow window, select the **Close** option on the System Menu icon (upper-left corner of the window).

VTS Mount Hit Data

Note: You can view VTS mount hit data from the Specialist (see "Specialist Features and Functions" on page 332).

The VTS Mount Hit Data window (Figure 91 on page 153) displays a graph showing how logical mounts have been accomplished as a percent of the total mounts for an hour. The three types are: Fast Ready, Cache Hit, and logical mounts requiring a recall or a cache miss. A separate graph is available for each VTS in the 3494. Data is displayed for the previous 24 hours. A diamond-shaped (♦) marker designates the current hour's data.

A Fast Ready Hit is a mount that the host requested where the category of the volser was designated as a "Fast Ready" category. This type of mount does not require any recall of data from tape. This is the fastest type of mount.

A Cache Hit is a mount where the volume to be mounted still resides within the VTS cache. This type of mount does not require any recall of data from tape.

A Physical Mount Required means that a stacked volume needed to be mounted and data read from it to satisfy the logical mount request. This is the slowest type of mount. This is also known as a cache miss.

The graph displays three lines, one for each type of mount, as a percentage of the total number of mounts for an hour.
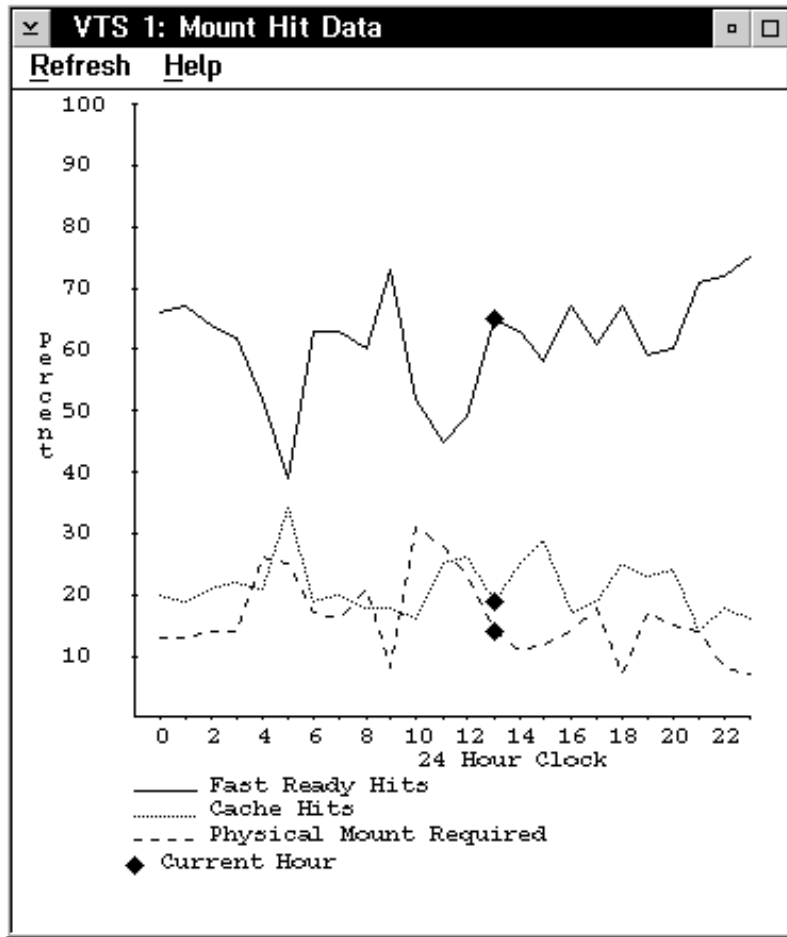
Figure 91. VTS Mount Hit Data Window

The VTS Mount Hit Data window has the following available on its action bar:

Refresh   Refreshes or updates the contents of the window immediately. You can also click the pointing device in the client area of the window.

Help   Provides help about the VTS Mount Hit Data window.

To close the VTS Mount Hit Data window, select the **Close** option on the System Menu icon (upper-left corner of the window).

VTS Physical Device Mount History

Note: You can view VTS physical device mount history from the Specialist (see "Specialist Features and Functions" on page 332).

The VTS Physical Device Mount History window (Figure 92) displays a graph showing the minimum, average, and maximum number of physical drives used at one time to mount stacked volumes. A separate graph is available for each VTS in the 3494. Data is displayed for the previous 24 hours. A diamond-shaped (♦) marker designates the current hour's data.

This data can be used to determine if there are a sufficient number of physical drives to handle the mount work load. It can also be used to determine if the mount work load should be shifted such that the mounts requiring a recall (mounting of a stacked volume) be redistributed to other times of the day.
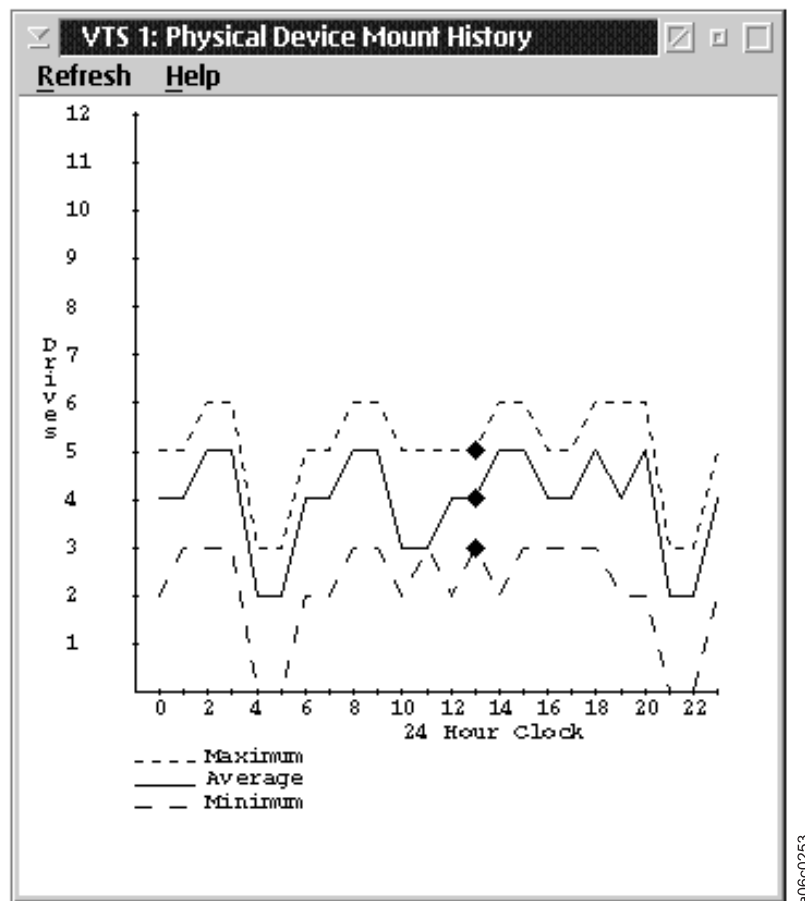
Figure 92. VTS Physical Device Mount History Window

The VTS Physical Device Mount History window has the following available on its action bar:

Refresh Refreshes or updates the contents of the window immediately. You can also click the pointing device in the client area of the window.

Help Provides help about the VTS Physical Device Mount History window.

To close the VTS Physical Device Mount History window, select the **Close** option in the System Menu icon (upper-left corner of the window).

VTS Logical Mounts Per Hour

Note: You can view VTS logical mounts per hour from the Specialist (see "Specialist Features and Functions" on page 332).

The VTS Logical Mounts Per Hour window (Figure 93) displays a graph showing the number of logical mounts per hour. A separate graph is available for each VTS in the 3494. Data is displayed for the previous 24 hours. A diamond-shaped (♦) marker designates the current hour's data.
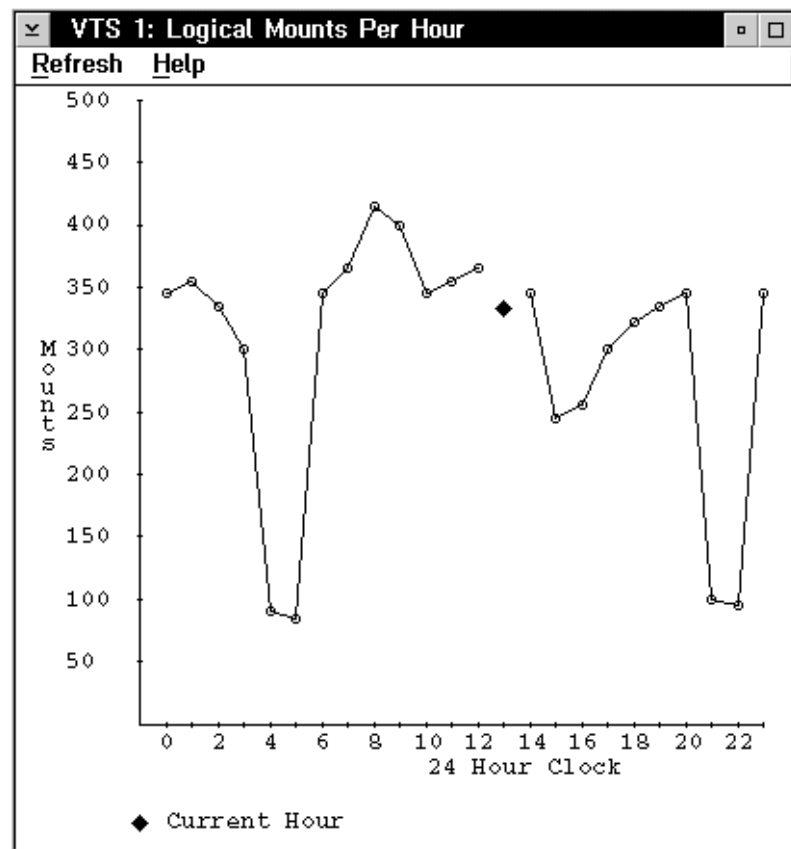
Figure 93. VTS Logical Mounts Per Hour Window

The VTS Logical Mounts Per Hour window has the following available on its action bar:

Refresh   Refreshes or updates the contents of the window immediately. You can also click the pointing device in the client area of the window.

Help   Provides help about the VTS Logical Mounts Per Hour window.

To close the VTS Logical Mounts Per Hour window, select the **Close** option in the System Menu icon (upper-left corner of the window).

VTS Active Data Distribution

Note: You can view VTS active data distribution from the Specialist (see "Specialist Features and Functions" on page 332).

The VTS Active Data Distribution windows display graphs showing the distribution of active data on stacked volumes. Separate graphs are available for each VTS in the 3494. If the VTS is Advanced Policy Management capable, data can be displayed for all pools (Figure 94) or for a specific pool (Figure 95 on page 157). If the VTS is not Advanced Policy Management capable, data is displayed for all pools. Data is displayed in 5% increments. The first data point shows the number of volumes that contain 0%–5% active data, the second data point shows the number of volumes containing 6%–10%, and so on.
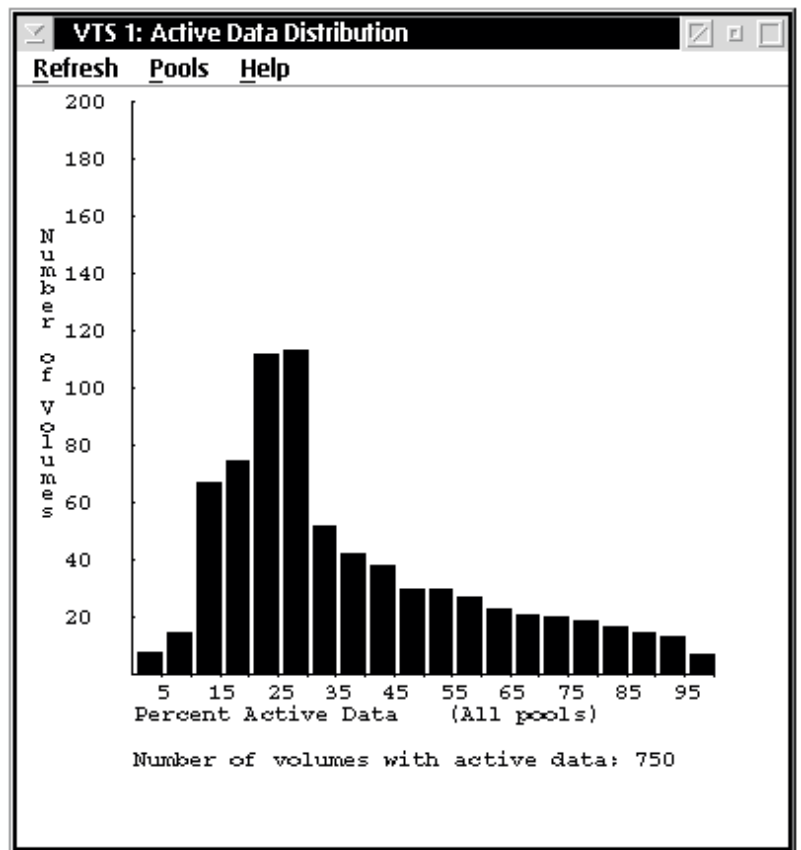
Figure 94. VTS Active Data Distribution (All Pools)
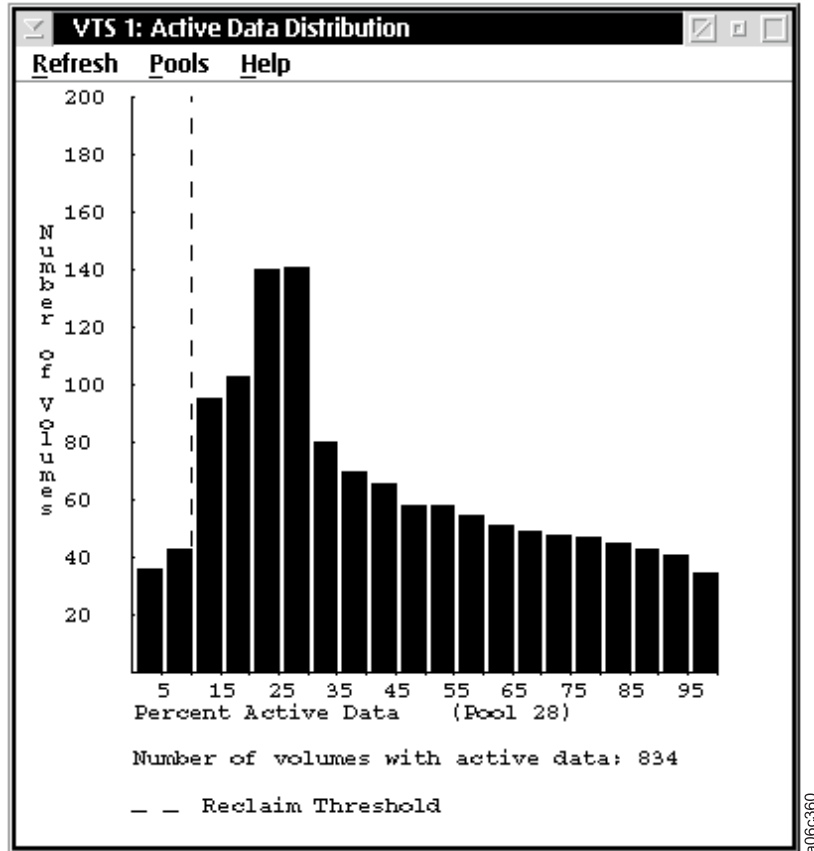
Figure 95. VTS Active Data Distribution (Specific Pool)

The VTS Active Data Distribution window has the following available on its action bar:

Refresh　　　　Refreshes or updates the contents of the window immediately. You can also click the pointing device in the client area of the window.

Pools　　　　Shows active data distribution by pool. This menu item is disabled (grayed out) if the VTS is not Advanced Policy Management capable.

Help　　　　Provides help about the VTS Active Data Distribution window.

To close the VTS Active Data Distribution window, select the **Close** option in the System Menu icon (upper-left corner of the window).

Using the System Summary Window

Note: You can view system summary from the Specialist (see "Specialist Features and Functions" on page 332).

The System Summary window (Figure 96) provides an overview of important 3494 information.

```
┌─────────────────────────────────────────────────────────────────────────┐
│ │ System Summary                                                   ▨ □ │
│ Help                                                                      │
│ Operational mode....: Auto          Overall system..: OK              ▲  │
│ Library Manager.....: Online         Standby LM......: Enabled           │
│ Direct attach ports.: 0123           Active Accessor.: A                 │
│ CU ports (RTIC 0x)..: 4              Standby Accessor: Available          │
│ CU ports (RTIC 1x)..:                Accessor........: OK                 │
│ CU ports (LAN  2x)..: 0123456789ABCDEF  Gripper.......: OK                │
│ CU ports (LAN  3x)..: 0123456789ABCD     Vision........: OK               │
│ CU ports (LAN  4x)..:                    Power.........: OK               │
│ CU ports (LAN  5x)..:                    Port..........: OK               │
│ Host LAN ports......: -              3494 Specialist.: Enabled            │
│ Convenience I/O.....: Empty          Intervention....: None               │
│   Mode..............: Insert         Dual Path Conc..: Not installed      │
│ High capacity status: Not installed  Peer-to-Peer....: VTS1, VTS2         │
│ High capacity rack..:                                                     │
│ Inventory update....: Disabled                                        ▼  │
│ Enclosure doors.....: Closed                                             │
│ ◄                            ▬▬▬▬▬▬                              ■ ►    │
└─────────────────────────────────────────────────────────────────────────┘
```

Figure 96. System Summary Window

Operational mode shows the subsystem mode. It indicates **Auto**, **Auto Pending**, **Pause**, **Pause Pending**, **Manual**, or **Manual Pending**. See "Using the Mode Window" on page 120 for an explanation of the operational modes.

Library Manager shows the state of the Library Manager. It indicates **Online Pending**, **Online**, **Offline Pending**, or **Offline** to the attached tape control units. See "Using the Mode Window" on page 120 for an explanation of the Online and Offline states.

Direct attach ports shows the direct-attached host ports that are initialized. It indicates a port's number if that port is initialized. A **-** indicates that the port is not initialized, and **Blank** indicates that the port is not installed. Each installed port is shown from left to right (0–3 or 8–B).

CU ports (RTIC 0x) shows the serial control unit (CU) ports that are initialized. It indicates a port's number if that port is initialized. A **-** indicates that the port is not initialized, and **Blank** indicates that the port is not installed. Each installed port is shown from left to right (0–F depending on port configuration). These are the RTIC ports associated with the first two RTIC cards.

CU ports (RTIC 1x) shows the serial control unit (CU) ports that are initialized. It indicates a port's number if that port is initialized. A **-** indicates that the port is not initialized, and **Blank** indicates that the port is not installed. Each installed port is shown from left to right (0–F depending on port configuration). These are the RTIC ports associated with the third and fourth RTIC cards.

CU ports (LAN 2x) shows the LAN-attached control unit (CU) ports that are initialized. It indicates a port's number if that port is initialized. A **-** indicates that the

port is not initialized, and **Blank** indicates that the port is not installed. Each installed port is shown from left to right (0–F depending on port configuration).

CU ports (LAN 3x) shows the LAN-attached control unit (CU) ports that are initialized. It indicates a port's number if that port is initialized. A **-** indicates that the port is not initialized, and **Blank** indicates that the port is not installed. Each installed port is shown from left to right (0–F depending on port configuration).

CU ports (LAN 4x) shows the LAN-attached control unit (CU) ports that are initialized. It indicates a port's number if that port is initialized. A **-** indicates that the port is not initialized, and **Blank** indicates that the port is not installed. Each installed port is shown from left to right (0–F depending on port configuration).

/   **CU ports (LAN 5x)** shows the LAN-attached control unit (CU) ports that are
/   initialized. It indicates a port's number if that port is initialized. A **-** indicates that the
/   port is not initialized, and **Blank** indicates that the port is not installed. Each
/   installed port is shown from left to right (0–F depending on port configuration).

Host LAN ports shows the total number of initialized LAN-attached host ports. It indicates **Not initialized** if no LAN-attached host ports are initialized. A **-** indicates that no LAN host ports are initialized.

Convenience I/O shows the state of the convenience I/O station. It indicates **Not installed**, **Not available**, **Empty**, **Volumes present**, **Opened**, or **Unknown**.

Convenience I/O Mode shows the mode setting for the convenience I/O station:
- **Insert** indicates that the convenience I/O station is in Insert mode.
- **Import** indicates that the convenience I/O station is in Import mode (you can disable Export/Import capability by using a service Utilities window option).
- **Unknown** indicates that the convenience I/O station mode is unknown.
- **Blank** indicates that the convenience I/O station is not installed.

High capacity output or I/O status shows the status of the high-capacity facility:
- **Not inventoried** indicates that an inventory operation must be performed before the number of empty cartridge storage cells is known.
- **x cells empty** indicates that the high-capacity operation is complete. It also shows the number of empty cells that remain available in the high-capacity facility.
- **Failed** indicates that a high-capacity operation was canceled by the operator.
- **Canceled** indicates that you canceled the operation.
- **In Progress** indicates that either an inventory update that includes the high-capacity rack is in progress or a **High-Capacity only** Inventory Update is in progress.
- **Percent Complete** indicates the progress of the high-capacity facility operation.
- **Blank** indicates that the 3494 has not been taught.
- **Not installed** indicates that the high-capacity facility was not defined when the 3494 was taught.

High capacity rack shows the rack that contains either the high-capacity output facility or the high-capacity I/O facility. **Blank** indicates that the facility is not installed.

Inventory update shows the operational status of Inventory Update:

- **Disabled** indicates that Inventory Update is not performed.
- **Not started** indicates that an Inventory Update operation has not been performed since the 3494 was initialized.
- **Failed** indicates that the Inventory Update operation failed.
- **Canceled** indicates that the Inventory Update operation was canceled.
- **In progress** indicates that the Inventory Update operation is in progress.
- **Percent Complete** indicates the progress of the Inventory Update operation.
- **Completed** indicates that the Inventory Update operation has completed. An inventory update status window opens during the Inventory Update operation. See "Perform Inventory Update (Partial)" on page 266.
- **Blank** indicates that the 3494 has not been taught.

Enclosure doors shows the status of the enclosure doors
- **Closed** indicates that the front doors are closed.
- **Open** indicates that a front door is open.

Overall system shows the overall subsystem status:
- **OK** indicates that the subsystem is functional.
- **Degraded** indicates that part of the subsystem failed, but the subsystem can function in a degraded manner.

For additional information, select **Operational status...** and **Component availability status...** in the Status window (see "Operational Status" on page 138).

Standby LM shows the status of the standby Library Manager:
- **Enabled** indicates that the standby LM is functional.
- **Disabled** indicates that the standby LM is not functional and causes the overall system to report **Degraded**.
- **Not installed** indicates that the standby LM feature is not installed.
- **Degraded** indicates that the standby LM has lost one of its communication links with the active LM.

Active Accessor shows the accessor that is active:
- **A** indicates that accessor A is active.
- **B** indicates that accessor B is active.
- **None** indicates that no accessor is active currently (both are unavailable).
- **Both** indicates that both accessors are active currently on a 3494 with the Dual Active Accessors feature installed.

Standby Accessor shows the status of the standby accessor:
- **Available** indicates that the standby accessor can be used if an accessor switchover occurs.
- **Service Mode** indicates that the accessor is unavailable while being serviced.
- **Not available** indicates that the accessor has components marked unavailable that make it unusable.
- **Not installed** indicates that the second accessor is not installed.
- **Not Taught** indicates that the accessor has not completed a successful Teach operation, thus making it unusable.
- **Blank** indicates that both accessors are active.

Accessor shows the status of the cartridge accessor:

- **OK** indicates that the cartridge accessor is functional.
- **Failed** indicates that the cartridge accessor failed and cannot function.
- **Degraded** indicates that an accessor component has failed, but the accessor can continue to function in a degraded manner.

Gripper shows the status of the gripper:

- **OK** indicates that the installed gripper on the cartridge accessor is functional.
- **Degraded** indicates that one of two grippers failed on the cartridge accessor.
- **Failed** indicates that the gripper failed, and the cartridge accessor is unavailable for use.

If the HA1 Frames is installed, **Gripper** shows the status for both accessors:

- **OK** indicates that the grippers on both accessors are functional.
- **Degraded** indicates that one of the grippers has failed on either the active or the standby accessor. If dual grippers are installed, **Degraded** indicates that one, two, or three of the grippers have failed.
- **Failed** indicates that all the grippers have failed.

Vision shows the status of the vision system:

- **OK** indicates that the vision system is functional.
- **Failed** indicates that the vision system failed.

If the HA1 Frames is installed, **Vision** shows the status of the vision system on both cartridge accessors:

- **OK** indicates that both vision systems are functional.
- **Degraded** indicates that one of the vision systems has failed.
- **Failed** indicates that all vision systems have failed.

Power shows the status of power for the cartridge accessor:

- **OK** indicates that power is enabled to the cartridge accessor.
- **Power is Off** indicates that power is disabled to the cartridge accessor.

If the HA1 Frames is installed, the **Power** shows the status of power for both cartridge accessors:

- **OK** indicates that power is enabled to both cartridge accessors.
- **Power is off** indicates that power is disabled to both cartridge accessors.
- **Degraded** indicates that power is disabled on one of the cartridge accessors. This is OK if power was turned off to one accessor and the system has not yet transitioned to Auto mode.

Port shows the status of the communication port between the cartridge accessor controller and the Library Manager:

- **OK** indicates that communication on this port is established and is active.
- **Not initialized** indicates that communication on this port is not established or is lost.
- **Not installed** indicates that installation is not complete.

If HA1 Frames are installed, the port status shows the status for both cartridge accessors:

- **OK** indicates that communication on this port is established and is active for both cartridge accessors.
- **Not initialized** indicates that communication on this port is not established or is lost for both cartridge accessors.
- **Degraded** indicates that communication on this port is established and is active for one of the cartridge accessors.

3494 Specialist shows the status of the Specialist (Web server):
- **Not available** indicates that the Specialist is not active. System restraints prevent the Specialist from being activated.
- **Enabled** indicates that the Specialist is active and enabled.
- **Disabled** indicates that the Specialist is active but disabled. You can enable or disable the Specialist from the Commands window (see "Using the Commands Window" on page 195).

Intervention shows whether you need to perform any operator-intervention operations:
- **None** indicates that no intervention-required conditions exist in the 3494.
- **Required** indicates that one or more intervention-required conditions exist in the library (see "Operator Intervention" on page 288).

Dual Path Concentrator indicates the status of the dual path concentrator for the active Library Manager:
- **Not Installed** indicates that dual path concentrator hardware is not installed.
- **Enabled** indicates that dual path concentrator hardware is installed and that both the primary and the alternate concentrators are operational.
- **Primary failed** indicates that dual path concentrator hardware is installed but the primary concentrator has failed.
- **Alternate failed** indicates that dual path concentrator hardware is installed but the alternate concentrator has failed.
- **Both failed** indicates that dual path concentrator hardware is installed but both the primary and the alternate concentrators have failed.

Peer-to-Peer indicates whether or not any VTSs connected to the library are taught or configured as PtP VTSs:
- **Not Installed** indicates that no connected VTSs are PtP- configured.
- **VTS1** indicates that VTS1 is PtP-configured.
- **VTS2** indicates that VTS2 is PtP-configured.
- **VTS1, VTS2** indicates that both VTS1 and VTS2 are PtP-configured.
- **Unknown** indicates that the library's PtP configuration status is unknown due to a system error.

The System Summary window has the following available on its action bar:
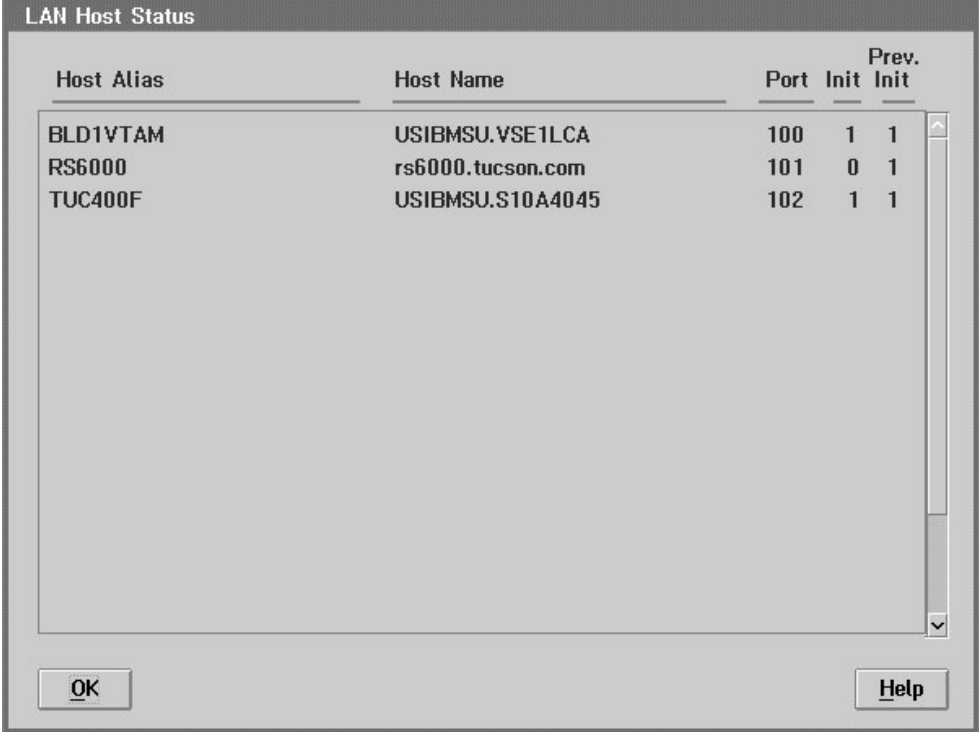
Help   Provides help about the System Summary window.

To close the System Summary window, select the **Close** option on the System Menu icon (upper-left corner of the window).

LAN Host Status

The LAN Host Status window (Figure 97) provides information on the status of the hosts attached to the 3494 through a LAN.

Note: You can view LAN host status from the Specialist (see "Specialist Features and Functions" on page 332).

Figure 97. LAN Host Status Window

Host Alias   This field lists the aliases of the LAN-attached hosts. The alias for a host is a nickname that you supply for that host. If this field is blank, no alias has been set up for this host.

Host Name   This field lists the names of all the hosts that are configured with the 3494 through LANs.

For TCP/IP hosts, the Host Name is the Hostname defined in the TCP/IP network. In Figure 97, **rs6000.tucson.com** is a TCP/IP Hostname.

For APPC and APPC/VTAM hosts, the Host Name is a combination of the Host Network ID and the Host Location Name. For example, if the Host Network ID is **USIBMSU**, and the Host Location Name is **S10A4045**, then the Host Name is **USIBMSU.S10A4045**.

Port   The Library Manager assigns a LAN port number to each LAN-attached host. The LAN port number is

displayed in this field as a hexadecimal number, and service personnel use it in problem determination.

Init

This field indicates if the LAN port is initialized:

- 0 indicates that the LAN is not initialized.
- 1 indicates that the LAN is initialized.

Prev. Init (Previously Initialized)

This field indicates if the Library Manager has been initialized previously with this host through a LAN:

- 0 indicates that the Library Manager has not yet been initialized with this host.
- 1 indicates that the Library Manager is initialized or was initialized previously with this host.

The LAN Host Status window has the following push buttons:

OK   Closes the LAN Host Status window.

Help   Provides help about the LAN Host Status window.

Dual Path Concentrator

The Dual Path Concentrator window displays a list of devices that are Dual Path Concentrator capable. From this window, you can also enable/disable the Dual Path Concentrator function on the 3494 Library Manager.
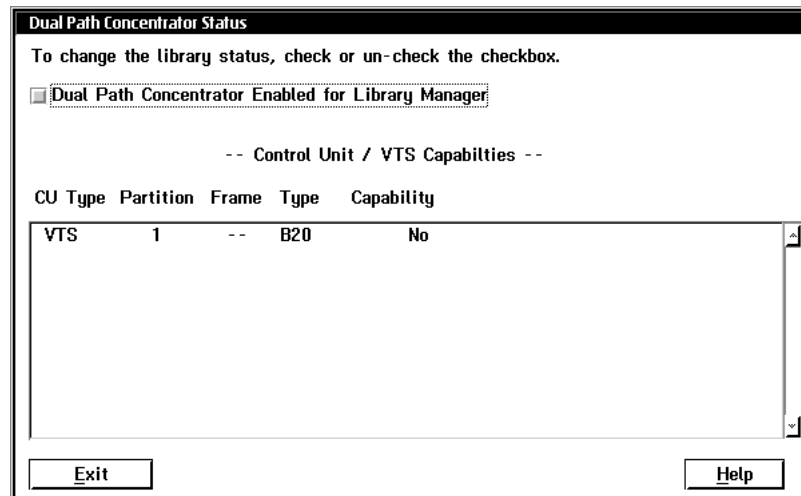
Figure 98. Dual Path Concentrator Status

To enable or disable the Dual Path Concentrator Function on the Library Manager, mark or unmark the checkbox.

Dual Accessor Zones

Note: You can view dual accessor zones from the Specialist (see "Specialist Features and Functions" on page 332).

The Dual Accessor Zones window (Figure 99) displays a diagram showing the string of frames that make up the 3494. It also has indicators that show the frames that each accessor services. **Boundary** is the frame number of the frame that is currently serving as the zone boundary between Accessor A's work zone and Accessor B's work zone. **Mode** is the boundary mode (**fixed** or **float**). **Fixed** means the boundary is fixed and does not change based on activity. **Float** means that the boundary changes automatically based on activity to balance the accessor work load. The default mode is **float**.
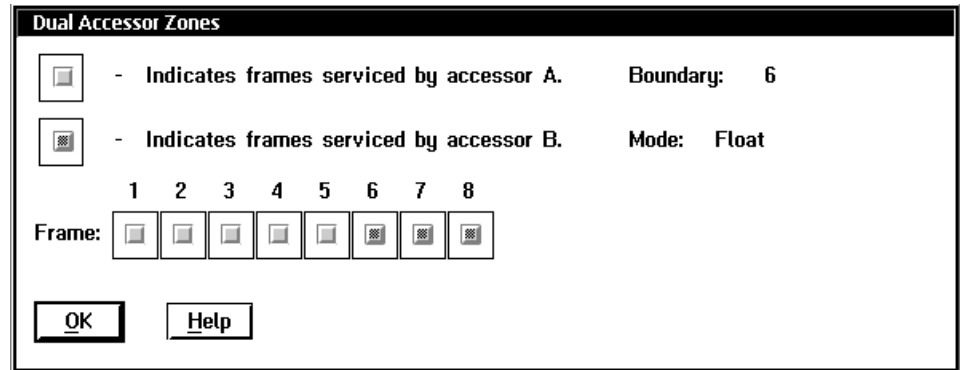
Figure 99. Dual Accessor Zones Window

The Dual Accessor Zones window has the following push buttons:

OK   Closes the Dual Accessor Zones window.

Help   Provides help about the Dual Accessor Zones window.

Using the Queues Window

The Queues window (Figure 100 on page 166) allows you to display the various types of requests that are in progress or waiting to be performed.
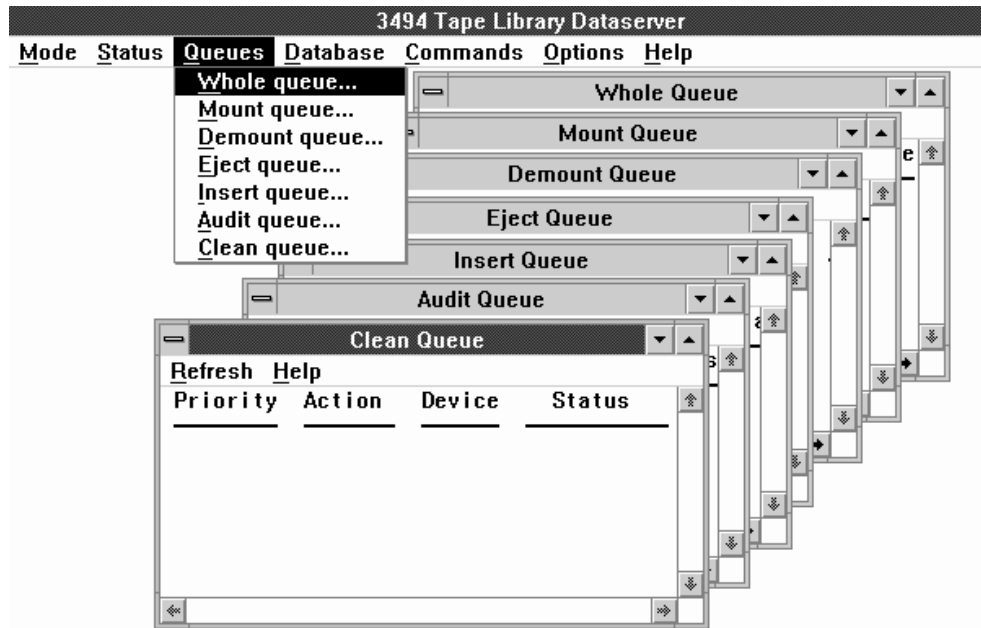
Figure 100. Queues Window Menu

Select any item on this window to display a moveable, sizeable, scrollable window containing the requested information. In each case, the window has an action bar option to update the information in the window.

The following options are available in the Queues window:

Whole queue...	Displays all the requests in the request queue.
Mount queue...	Displays all the mount operations in the request queue.
Demount queue...	Displays all the demount operations in the request queue.
Eject queue...	Displays all the eject operations in the request queue.
Insert queue...	Displays all the insert operations in the request queue.
Audit queue...	Displays all the audit operations in the request queue.
Clean queue...	Displays all the clean operations in the request queue.
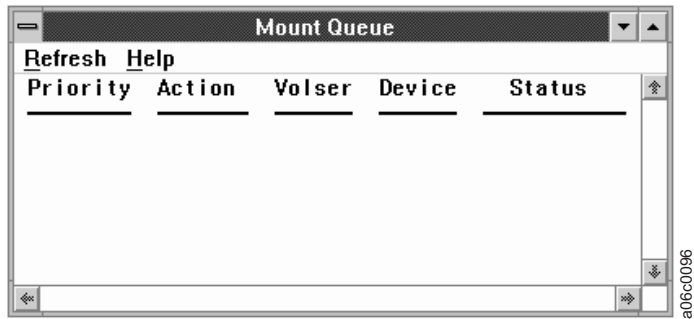
Figure 101. Mount Queue Window

The queue windows, for example, Mount Queue (Figure 101), contain the following information for each operation in the queue:

Priority The priority group into which the operation was placed.

Action The name of the request.

Volser The volser associated with the operation. If no volser is identified, the field is blank. The Clean Queue entry does not require a volser field.

Device The device identifier associated with the operation. If no device is identified, the field is blank. The Eject, Insert, and Audit queues do not require a device field.

Status The current status of the operation:

  Queued The operation is waiting for action.

  In Progress The operation is being executed currently.

  Blocked The operation is waiting for another operation to complete execution before the blocked operation can start. No operator action is needed.

Additional info
  This column only appears in the Whole Queue window. Information in this column further defines the value in the Status column.

Use the Whole Queue window to determine why a 3494 operation is not completing an operation as expected.

Note: You can view the Whole Queues window from the Specialist (see "Specialist Features and Functions" on page 332).

/

```
+--------------------------------------------------------------------+
|  Whole Queue                                               ☑ □ □   |
| Refresh  Help                                                      |
| Priority   Action    Volser Device    Status     Additional Info  |
| ----------------------------------------------------------------   |
|       3    Mount      S1J002   281   In progress Waiting for ready |
|       3    Mount      NBJ001   480   In progress In transit        |
|       7    Demount    NB1091   180   In progress Waiting for unload|
|       7    Demount    NB1002   181   Queued      Waiting for unload |
|                                                                    |
|                                                                    |
|                                                                    |
|                                                                    |
|                                                                    |
| ◀                                  ⠿⠿⠿⠿                      ▶     |
+--------------------------------------------------------------------+
```

/
/   *Figure 102. Whole Queue Window*
/

Each queue window has the following available on its action bar:

Refresh   Refreshes or updates the contents of the window immediately instead of periodically.

Help   Provides help about the queue window that is open.

To close a queue window, select the **Close** option on the System Menu icon in the upper-left corner of the window.

Using the Database Window

Use the Database window (Figure 103) to view selected volumes based on the specified search criteria.
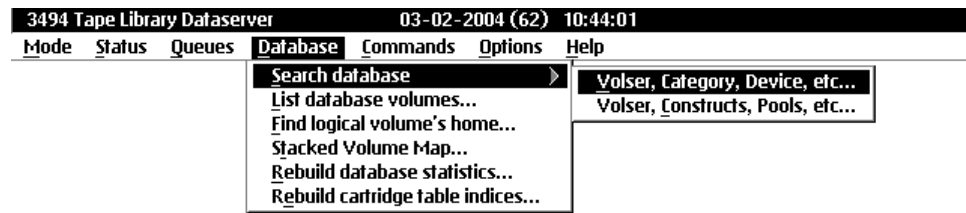
Figure 103. Database Window

The following options are available in the Database window:

Search database

Volser, Category, Device, etc.
Allows a search of the volume database based on search criteria (see "Search Database for Volsers, Categories, Devices" on page 170).

Volser, Constructs, Pools, etc.
Allows a search of the volume database based on search criteria (see "Search Database for Volsers, Constructs, Pools" on page 175).

List database volumes... Used to output a customized database search to a flat file on a diskette or to the C: drive (see "List Database Volumes" on page 181). The 3494 must be offline to use this option.

Find logical volume's home...
Used to determine the physical volume that a logical volume resides on (see "Find A Logical Volume's Home" on page 186).

Stacked Volume Map... Used to output to diskette a map of logical volumes that reside on a stacked volume (see "Stacked Volume Map" on page 189).

Rebuild database statistics...
Used to rebuild database statistics when 3494 performance becomes degraded (see "Rebuild Database Statistics" on page 192).

Rebuild cartridge table indices...
Used to rebuild cartridge table indices when 3494 performance becomes degraded (see "Rebuild Cartridge Table Indices" on page 193).

Search Database for Volsers, Categories, Devices

Note: You can view the Search Database for Volsers, Constructs, Pools window from the Specialist (see "Specialist Features and Functions" on page 332).

The Search Database for Volsers, Categories, Devices window (Figure 104) allows a search of the volume database for specific volumes, based on search criteria. The more search criteria used, the more restrictive the search.

```
Search Database for Volumes
 Search criteria
                        Volser Flags               Media Type
 Volser:    [        ]
                    Yes  No  Ignore                [              ][v]
 Category:  [        ]
                    (o)  (o)  (o)  Misplaced         Expire Time
 Device:    [   ][v]
                    (o)  (o)  (o)  Unreadable       [              ][v]
                    (o)  (o)  (o)  Mounted
       [  Search  ]  (o)  (o)  (o)  Inaccessible
                    (o)  (o)  (o)  Manual mode      Records found:     3272

 Volser  M.T. Cat.   Cat. Order  Flags   Device   Cell   Home   Mts  Expire
 J00001   J   FF00       40       00000           06A01  06A01   0   Not Set
 J00002   J   FF00       39       00000           06A02  06A02   0   Not Set
 J00003   J   FF00       38       00000           06A03  06A03   0   Not Set
 J00004   J   FF00       37       00000           06A04  06A04   0   Not Set
 J00005   J   FF00       36       00000           06A05  06A05   0   Not Set
 J00006   J   FF00       35       00000           06A06  06A06   0   Not Set
 J00007   J   FF00       34       00000           06A07  06A07   0   Not Set
 J00008   J   FF00       33       00000           06A08  06A08   0   Not Set
 J00009   J   FF00       32       00000           06A09  06A09   0   Not Set
 J00010   J   FF00       31       00000           06A10  06A10   0   Not Set

 [ Top ]  [Bottom]   [ Next 100 ]  [ Previous 100 ]   [Cancel]  [Help]
```

a06c0147

Figure 104. Search Database for Volsers, Categories, Devices Window

Search Criteria

The following options can be included in the search criteria:

Volser Enter the volser used in the search. The volser consists of one to six alphanumeric characters that match the cartridge label. A wild card (pattern-matching) character can be included where ? or _ indicates one character and * or % indicates multiple characters.

Category Enter the category used in the search. A category is a logical grouping of cartridges for a specific use. The categories are 0000 to FFFF, must contain four hexadecimal characters, and cannot contain wild card characters. The following are predefined categories:

FF00 Insert

FF01 VTS Insert

FF03 VTS Scratch (not used if licensed internal code is 527 or higher)

FF04 VTS Private (includes Scratch Stacked if licensed internal code is 527 or higher)

FF05 VTS Disaster Recovery

FF06 VTS Disaster Recovery

FF08	VTS Read-Only Recovery	
FF09	Temporary Eject	
FF10	Convenience Eject	
FF11	Bulk Eject	
FF12	Export-Pending	
FF13	Exported	
FF14	Import	
FF15	Import-Pending	
FF16	Unassigned	
FF17	Export Hold	
FF20	Corrupted Token	
/	**FFF4**	Clean Volser (3592)
/	**FFF5**	Service Volser (3592)
FFF6	Service Volser (3590)	
FFF7	Mount from Input Station	
FFF9	Service Volser (3490E)	
FFFA	Manually Ejected	
FFFD	Cleaner Volser (3590)	
FFFE	Cleaner Volser (3490E)	
FFFF	Volser Specific	

Device
Either press Enter or select the device used in the search. A device is represented by a three-digit tape device identifier. Select the ▾ to get a list of valid device identifiers. Single and multiple character wild cards are valid.

Media Type
Select the correct media types for the type of tape drives and associated logical library installed in the 3494.

1 - CST (non-VTS)	Cartridge System Tape in a non-VTS logical library
E - ECCST (non-VTS)	Enhanced Capacity Cartridge System Tape in a non-VTS logical library
J - HPCT (non-VTS)	High Performance Cartridge Tape in a non-VTS logical library
K - EHPCT (non-VTS)	Extended High Performance Cartridge Tape in a non-VTS logical library
JA - ETC (non-VTS)	Enterprise Cartridge in non-VTS logical library
JJ - EETC (non-VTS)	Enterprise Economy Tape Cartridge
JR - EEWTC (non-VTS)	Enterprise Economy WORM Tape Cartridge

/	**JW - EWTC (non-VTS)**	Enterprise WORM Tape Cartridge
	1 - CST (VTS 1)	Logical Cartridge System Tape in VTS 1 logical library
	E - ECCST (VTS 1)	Logical Enhanced Capacity Cartridge System Tape in VTS 1 logical library
	J - HPCT (VTS 1)	High Performance Cartridge Tape in VTS 1 logical library
	K - EHPCT (VTS 1)	Extended High Performance Cartridge Tape in VTS 1 logical library
	1 - CST (VTS 2)	Logical Cartridge System Tape in VTS 2 logical library
	E - ECCST (VTS 2)	Logical Enhanced Capacity Cartridge System Tape in VTS 2 logical library
	J - HPCT (VTS 2)	High Performance Cartridge Tape in VTS 2 logical library
	K - EHPCT (VTS 2)	Extended High Performance Cartridge Tape in VTS 2 logical library
	?	Unknown. This is an actual media type that is no longer used. The option is available for backward compatibility.
	Don't Care	Do not use media type as a search criterion.

Expire Time   Logical volume expiration times can be included in the search criteria. Select the ▾ to get a list of search examples. A suffix qualifier to denote minutes (M), hours (H), days (D), or weeks (W) can be entered. If a number without a suffix qualifier is entered, the default is hours. The following are examples of expire times:

- 3M=3 minutes
- 27H=27 hours
- 1D=1 day
- 2W=2 weeks
- 4=4 hours

Volser Flags   The following volser flag options can be included in the search criteria:

	Misplaced	The cartridge location is unknown. A volser specified in a 3494 request is not in the 3494 where expected.
	Unreadable	The vision system cannot read the cartridge volser (bar code label).
	Mounted	The cartridge is mounted or being mounted on a drive.
	Inaccessible	The cartridge accessor cannot

access the cartridge. A volser specified in a 3494 request is in the 3494, but the cartridge accessor cannot access it because of a problem with either the cartridge or the cell that contains the cartridge.

Manual mode You handled the cartridge during Manual mode processing.

The following are possible values for each volser flag:

Yes Search for volumes to which this flag applies.

No Search for volumes to which this flag does not apply.

Ignore Search for volumes without regard for this flag.

Search Start the search by using the search criteria entered.

Search Results

A list displays the results of the search. The display list can contain up to 100 records at one time. The vertical scroll bar in the display list can be used to scroll through 100 records. If you find more than 100 records, use the **Next 100** and **Prev 100** push buttons to display the additional records. Each record contains the following information:

Volser The volume serial number of the cartridge

M.T. The media type of the cartridge:

1 Cartridge System Tape in non-VTS logical library

E Enhanced Capacity Cartridge System Tape in non-VTS logical library

J High Performance Cartridge Tape in non-VTS logical library

K Extended High Performance Cartridge Tape in non-VTS logical library

JA Enterprise Tape Cartridge in non-VTS logical library

JJ Enterprise Economy Tape Cartridge in non-VTS logical library

JR Enterprise Economy WORM Tape Cartridge in non-VTS logical library

JW Enterprise WORM Tape Cartridge in non-VTS logical library

1-1 Logical Cartridge System Tape in VTS 1 logical library

E-1 Logical Enhanced Capacity Cartridge System Tape in VTS 1 logical library

J-1 Stacked High Performance Cartridge Tape in VTS 1 logical library

K-1 Stacked Extended High Performance Cartridge Tape in VTS 1 logical library

1-2 Logical Cartridge System Tape in VTS 2 logical library

E-2	Logical Enhanced Capacity Cartridge System Tape in VTS 2 logical library
J-2	Stacked High Performance Cartridge Tape in VTS 2 logical library
K-2	Stacked Extended High Performance Cartridge Tape in VTS 2 logical library
?	Unknown
Cat.	The category represented by four digits that identify the group of volumes or a predefined category
Cat. Order	The position of the cartridge in the category
Flags	The status of the flags

Note: For service volumes, the status of the volumes is not reflected in the flags.

Figure 105 shows a summary of the flag values.
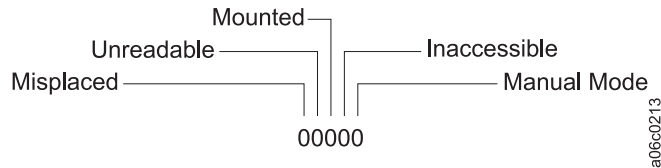
Figure 105. Status Flags

Device	The tape device identifier if the cartridge is mounted
Cell	The storage cell that contains the cartridge
Home	The cartridge home-cell location
Mts	The total number of times that the cartridge has been mounted
Expire	The amount of time until the 3494 expires the logical volume data.

Note: The library expires logical volume data once an hour, on the half-hour (that is, 00:30, 01:30, 02:30, and so on to 23:30).

Expire is expressed in minutes (M), hours (H), days (D), or weeks (W). If the expire time is expressed in minutes, then it shows the time remaining until the next hourly expiration. If no expire time is defined, then it indicates **Not Set**. If the logical volume data has already expired, then it indicates **Expired**. If the Hold option is enabled, then ″-H″ is appended to the expire time.

Displaying Search Results

The Search Database for Volumes window has the following push buttons:

Top	Displays the first database records found that match the search criteria.
Bottom	Displays the last database records found that match the search criteria.
Next 100	If more than 100 records are found, display the next 100 records in the list box. If fewer than 100 records are found, this control is disabled.

Previous 100	If more than 100 records are found, display the previous 100 records in the display list. If fewer than 100 records are found, this control is disabled.
Cancel	Closes the Search Database for Volumes window.
Help	Provides help about the Search Database for Volumes window.

Search Database for Volsers, Constructs, Pools

/
/
Note: You can view the Search Database for Volsers, Constructs, Pools window from the Specialist (see "Specialist Features and Functions" on page 332).

The Search Database for Volsers, Constructs, Pools window (Figure 106) allows a search of the volume database for specific volumes, based on search criteria. The more search criteria used, the more restrictive the search.

Figure 106. Search Database for Volsers, Constructs, Pools Window

Search Criteria

The following options can be included in the search criteria:

Volser	Enter the volser used in the search. The volser consists of one to six alphanumeric characters that match the cartridge label. A wild card (pattern-matching) character can be included, where ? or _ indicates one character and * or % indicates multiple characters.
Category	Enter the category used in the search. A category is a logical grouping of cartridges for a specific use. The categories are 0000 to FFFF, must contain four hexadecimal characters, and cannot contain wild card characters. The following are predefined categories:

FF00	Insert
FF01	VTS Insert
FF03	VTS Scratch (not used if licensed internal code is 527 or higher)

FF04	VTS Private (includes Scratch Stacked if licensed internal code is 527 or higher)
FF05	VTS Disaster Recovery
FF06	VTS Disaster Recovery
FF08	VTS Read-Only Recovery
FF09	Temporary Eject
FF10	Convenience Eject
FF11	Bulk Eject
FF12	Export-Pending
FF13	Exported
FF14	Import
FF15	Import-Pending
FF16	Unassigned
FF17	Export Hold
FF20	Corrupted Token
FFF4	Clean Volser (3592)
FFF5	Service Volser (3592)
FFF6	Service Volser (3590)
FFF7	Mount from Input Station
FFF9	Service Volser (3490E)
FFFA	Manually Ejected
FFFD	Cleaner Volser (3590)
FFFE	Cleaner Volser (3490E)
FFFF	Volser Specific

Storage Group
Select a storage group to be used in the search. Storage groups are defined by a one to eight alphanumeric character name. Select ″Don't Care″ if there is no preference.

Management Class
Select a management class to be used in the search. Management classes are defined by a one to eight alphanumeric character name. Select ″Don't Care″ if there is no preference.

Storage Class
Select a storage class to be used in the search. Storage classes are defined by a one to eight alphanumeric character name. Select ″Don't Care″ if there is no preference.

Data Class Select a data class used in the search. Data classes are defined by a one to eight alphanumeric character name. Select ″Don't Care″ if there is no preference.

Current Pool Select a current storage pool to be used in the search. The current pool can be between 0 and 32. This is only used for stacked volumes.

Home Pool   Select a home storage pool to be used in the search. The home storage pool can be between 0 and 32. This is only used for stacked volumes.

Media   Select the correct media types for the type of tape drives and associated logical library installed in the 3494.

1 - NonVTS   Cartridge System Tape in a non-VTS logical library

E - NonVTS   Enhanced Capacity Cartridge System Tape in a non-VTS logical library

1, E - NonVTS   Cartridge System Tape and Enhanced Capacity Cartridge System Tape in a non-VTS logical library

J - NonVTS   High Performance Cartridge Tape in a non-VTS logical library

K - NonVTS   Extended High Performance Cartridge Tape in a non-VTS logical library

J, K - NonVTS   High Performance Cartridge Tape and Extended High Performance Cartridge Tape in a non-VTS logical library

JA - NonVTS   Enterprise Tape Cartridge in non-VTS logical library

/
/   **JJ - NonVTS**   Enterprise Economy Tape Cartridge in non-VTS logical library

/
/   **JR - NonVTS**   Enterprise Economy WORM Tape Cartridge in non-VTS logical library

/
/   **JW - NonVTS**   Enterprise WORM Tape Cartridge in non-VTS logical library

All - NonVTS   Cartridge System Tape, Enhanced Capacity Cartridge System Tape, High Performance Cartridge Tape, and Extended High Performance Cartridge Tape in a non-VTS logical library

1 - VTS1   Logical Cartridge System Tape in VTS 1 logical library

E - VTS1   Logical Enhanced Capacity Cartridge System Tape in VTS 1 logical library

1, E - VTS1   Logical Cartridge System Tape and Logical Enhanced Capacity Cartridge System Tape in VTS 1 logical library

J - VTS1   High Performance Cartridge Tape in VTS 1 logical library

K - VTS1	Extended High Performance Cartridge Tape in VTS 1 logical library
J, K - VTS1	High Performance Cartridge Tape and Extended High Performance Cartridge Tape in VTS 1 logical library
All - VTS1	Logical Cartridge System Tape, Logical Enhanced Capacity Cartridge System Tape, High Performance Cartridge Tape, and Extended High Performance Cartridge Tape in VTS 1 logical library
1 - VTS2	Logical Cartridge System Tape in VTS 2 logical library
E - VTS2	Logical Enhanced Capacity Cartridge System Tape in VTS 2 logical library
1, E - VTS2	Logical Cartridge System Tape and Logical Enhanced Capacity Cartridge System Tape in VTS 2 logical library
J - VTS2	High Performance Cartridge Tape in VTS 2 logical library
K - VTS2	Extended High Performance Cartridge Tape in VTS 2 logical library
J, K- VTS2	High Performance Cartridge Tape and Extended High Performance Cartridge Tape in VTS 2 logical library
All - VTS2	Logical Cartridge System Tape, Logical Enhanced Capacity Cartridge System Tape, High Performance Cartridge Tape, and Extended High Performance Cartridge Tape in VTS 2 logical library
1 - VTS1, VTS2	Logical Cartridge System Tape in VTS 1 and VTS 2 logical libraries
E - VTS1, VTS2	Logical Enhanced Capacity Cartridge System Tape in VTS 1 and VTS 2 logical libraries
1, E - VTS1, VTS2	Logical Cartridge System Tape and Logical Enhanced Capacity Cartridge System Tape in VTS 1 and VTS 2 logical libraries

J - VTS1, VTS2	High Performance Cartridge Tape in VTS 1 and VTS 2 logical libraries
K - VTS1, VTS2	Extended High Performance Cartridge Tape in VTS 1 and VTS 2 logical libraries
J, K - VTS1, VTS2	High Performance Cartridge Tape and Extended High Performance Cartridge Tape in VTS 1 and VTS 2 logical libraries
All - VTS1, VTS2	Logical Cartridge System Tape, Logical Enhanced Capacity Cartridge System Tape, High Performance Cartridge Tape, and Extended High Performance Cartridge Tape in VTS 1 and VTS 2 logical libraries
?	Unknown. This is an actual media type that is no longer used. The option is available for backward compatibility.
Don't Care	Do not use media type as a search criterion.

Search   Start the search by using the search criteria entered.

Search Results

A list displays the results of the search. The display list can contain up to 100 records at one time. The vertical scroll bar in the display list can be used to scroll through 100 records. If you find more than 100 records, use the **Next 100** and **Prev 100** push buttons to display the additional records. Each record contains the following information:

Volser   The volume serial number of the cartridge

Category   The category represented by four digits that identify the group of volumes or a predefined category.

M.T.   The media type of the cartridge:

1	Cartridge System Tape in non-VTS logical library
E	Enhanced Capacity Cartridge System Tape in non-VTS logical library
J	High Performance Cartridge Tape in non-VTS logical library
K	Extended High Performance Cartridge Tape in non-VTS logical library
JA	Enterprise Tape Cartridge in non-VTS logical library
JJ	Enterprise Economy Tape Cartridge in non-VTS logical library
JR	Enterprise Economy WORM Tape Cartridge in non-VTS logical library
JW	Enterprise WORM Tape Cartridge in non-VTS logical library

1-1	Logical Cartridge System Tape in VTS 1 logical library
E-1	Logical Enhanced Capacity Cartridge System Tape in VTS 1 logical library
J-1	Stacked High Performance Cartridge Tape in VTS 1 logical library
K-1	Stacked Extended High Performance Cartridge Tape in VTS 1 logical library
1-2	Logical Cartridge System Tape in VTS 2 logical library
E-2	Logical Enhanced Capacity Cartridge System Tape in VTS 2 logical library
J-2	Stacked High Performance Cartridge Tape in VTS 2 logical library
K-2	Stacked Extended High Performance Cartridge Tape in VTS 2 logical library
?	Unknown
StorGroup	The storage group to which the volser is assigned. The storage group is used for volume pooling and to set the primary storage pool.
MgmtClass	The management class to which the volser is assigned. The management class is used for volume duplexing. Allows assignment of peer-to-peer copy control parameters and secondary storage pool.
StorClass	The storage class to which the volser is assigned. The storage class is used for tape volume cache management.
DataClass	The data class to which the volser is assigned. The data class is used for future use.
CurrPool	The storage pool that contains the Volser for Stacked Only. Indicates the storage pool in which the stacked volume is currently for Stacked Only.
HomePool	The Volser Home Pool location for Stacked Only. Indicates the stacked volume's home pool. May be the same as current pool. If it is different, it indicates the volume is borrowed or will be moved to this pool as a result of a pool move operation.

Displaying Search Results

The Search Database for Volumes window has the following push buttons:

Top	Displays the first database records found that match the search criteria.
Bottom	Displays the last database records found that match the search criteria.
Next 100	If more than 100 records are found, display the next 100 records in the list box. If fewer than 100 records are found, this control is disabled.
Previous 100	If more than 100 records are found, display the previous 100 records in the display list. If fewer than 100 records are found, this control is disabled.

| **Cancel** | Closes the Search Database for Volumes window. |
| **Help** | Provides help about the Search Database for Volumes window. |

List Database Volumes

/
/
/   **Note:** This feature is available on the Specialist (see "Specialist Features and Functions" on page 332) as "Search database" under "Administer library manager."

The List Database Volumes window (Figure 107) allows you to create an output file containing a customized listing of selected database columns. The output file is a flat file that can be output to a selectable file name on a diskette or to C:\LM\LISTDB.LST.

The 3494 must be in the Offline state for this operation.
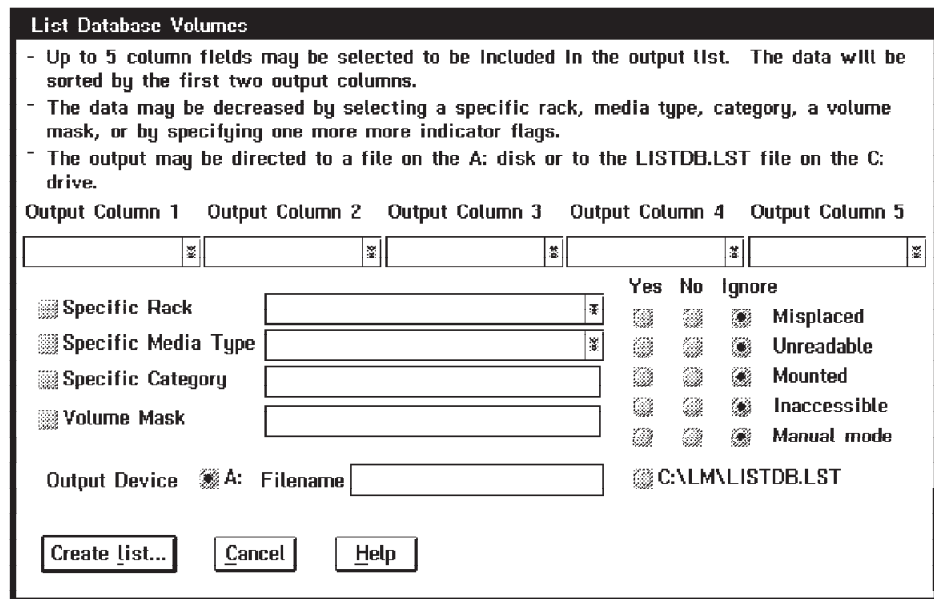
Figure 107. List Database Volumes Window

During the output process, **** **OPERATION IN PROGRESS** **** is displayed.

Specify the list output contents on the output columns using the five **Output Column** list controls. Each list contains the following options:

None	List nothing for this column.
Volser	List the volser.
Cell	List the volume's current rack, column, and row.
Home	List the volume's home rack, column, and row.
Category	List the volume's category in hexadecimal form.
Category Order	List the volume's category order in decimal form.
Media Type	List the volume's media type. The media type describes the physical cartridge characteristics as

well as the logical library that the volume is associated with as follows:

1   CST, Cartridge System Tape for non-VTS logical library

E   ECCST, Enhanced Capacity Cartridge System Tape for non-VTS logical library

J   HPCT, High Performance Cartridge Tape for non-VTS logical library

K   EHPCT, Extended High Performance Cartridge Tape for non-VTS logical library

JA   ETC, Enterprise Tape Cartridge for non-VTS logical library

JJ   EETC, Enterprise Economy Tape Cartridge for non-VTS logical library

JR   EEWTC, Enterprise Economy WORM Tape Cartridge for non-VTS logical library

JJ   EwTC, Enterprise WORM Tape Cartridge for non-VTS logical library

1-1   CST, Logical Cartridge System Tape for VTS 1 logical library

E-1   ECCST, Logical Enhanced Capacity Cartridge System Tape for VTS 1 logical library

J-1   HPCT, High Performance Cartridge Tape for VTS 1 logical library

K-1   EHPCT, Extended High Performance Cartridge Tape for VTS 1 logical library

1-2   CST, Logical Cartridge System Tape for VTS 2 logical library

E-2   ECCST, Enhanced Capacity Cartridge System Tape for VTS 2 logical library

J-2   HPCT, High Performance Cartridge Tape for VTS 2 logical library

K-2   EHPCT, Extended High Performance Cartridge Tape for VTS 2 logical library

Mount Date   List the last date the volume was mounted or inserted.

Mounts   List the number of times the volume has been mounted.

Misplaced   List if the volume is misplaced.

Zero (0) indicates that the volume is not misplaced. One (1) indicates that the volume is misplaced.

Unreadable   List if the volume's label is unreadable.

	Zero (0) indicates that the volume's label is readable. One (1) indicates that the volume's label is unreadable.
Mounted	List if the volume is mounted.
	Zero (0) indicates that the volume is not mounted. One (1) indicates that the volume is mounted.
Inaccessible	List if the volume is inaccessible.
	Zero (0) indicates that the volume is accessible. One (1) indicates that the volume is inaccessible.
Manual mode	List if the volume was moved during Manual mode.
	Zero (0) indicates that the volume was not moved during Manual mode. One (1) indicates that the volume was moved during Manual mode.
Expire time	Lists the logical volume data's expire time, if an expire time has been defined.
	Expire time is expressed in minutes (M), hours (H), days (D), or weeks (W). If no expire time is defined, then it indicates **Not Set**. If the logical volume data has already expired, then it indicates **Expired**.

Up to five output columns can be selected to include in the output list. The data is sorted by the first two output columns. The first column takes precedence over the second column.

The amount of data contained in the list can be decreased by narrowing certain list criteria. One or more of the following can be used to refine the data retrieved:

Specific Rack	Select this check box if the list output should include only volumes from a particular rack. Use the associated list to select the rack to which to limit the output. The list contains all of the racks in the 3494.
Specific Media Type	Select this check box if the list output should include only volumes of a certain media type. Use the associated list to select the media type to which to limit the output. The media type describes the physical characteristics of the cartridge as well as the logical library with which the volume is associated. The library sequence number is shown next to each media type (xxxxx). Some or all of the following options are available based on the number and type of logical libraries:

- 1 - CST (Non-VTS xxxxx)
- E - ECCST (Non-VTS xxxxx)
- J - HPCT (Non-VTS xxxxx)
- K - EHPCT (Non-VTS xxxxx)
- JA-ETC (Non-VTS xxxxx)
- JJ-EETC (Non-VTS xxxxx)
- JR-EEWTC (Non-VTS xxxxx)
- JW-EWTC (Non-VTS xxxxx)

- 1 - CST (VTS 1 xxxxx)
- E - ECCST (VTS 1 xxxxx)
- J - HPCT (VTS 1 xxxxx)
- K - EHPCT (VTS 1 xxxxx)
- 1 - CST (VTS 2 xxxxx)
- E - ECCST (VTS 2 xxxxx)
- J - HPCT (VTS 2 xxxxx)
- K - EHPCT (VTS 2 xxxxx)

Specific Category   Select this check box if the list output should include only volumes with a specific category. Use the associated entry field to enter the desired category. The category must be entered as a four-digit hexadecimal number.

Volume Mask   Select this check box if the list output should include only volumes that match the volume mask. Use the associated entry field to enter the one- to six-character volume mask. A wild card (pattern-matching) character can be included where ? or _ indicates one character and * or % indicates multiple characters.

Flags   Select the desired flag buttons if the list should include only volumes with certain flags set or cleared. Each flag can be set to one of three possible settings by clicking the associated button.

The flags can be one of the following options:
- *Yes*

    The flag's condition applies to this volume (list volumes to which this flag applies).
- *No*

    The flag's condition does not apply to this volume (list volumes to which this flag does not apply).
- *Ignore*

    List volumes with the flags set to any value (list volumes without regard to the state of the flag).

You can select the following flags:
- Misplaced
- Unreadable
- Mounted
- Inaccessible
- Manual mode

The output listing can be created on the A: diskette drive or on the C: drive. Select the desired device button. If you select the A: drive, you can enter a filename. The filename can be up to 79 characters long. If you select the C: drive, the output is sent to C:\LM\LISTDB.LST.

The output listing consists of the following:

- The date and time
- The selection criteria
- Column headings describing the contents of each column
- The selected data
- Total number of records listed

If the output listing spans multiple diskettes, the selection criteria are not repeated.

Various messages can be displayed during or at the end of the list database operation. The following are possible messages:

- **Insert a formatted disk into Drive A: Select OK to begin the operation.**

  Displayed initially when the output listing is being directed to the A: drive.

- **Insert another formatted disk into Drive A: Select OK to begin the operation.**

  Displayed if the output listing is large enough that it spans multiple diskettes.

- **The List Database Volumes operation completed successfully.**

  The output listing has been created, and the operation is complete.

- **The List Database Volumes operation failed.**

  The operation failed due to an internal error, try again.

- **The disk is write-protected. Insert another disk into Drive A: Select OK to retry the operation.**

  The diskette is write-protected. Insert a diskette that is not write-protected and try again.

- **The disk in the A: Drive is full. Insert another formatted disk into Drive A: Select OK to begin the operation.**

  Displayed if the A: drive for output was selected and there is not enough room on the diskette to fit the output listing.

- **The disk in the A: Drive is not formatted. Insert another formatted disk into Drive A: Select OK to begin the operation.**

  The diskette is not formatted. Insert a formatted diskette and try again.

- **The operation could not be completed because the C: Drive is full.**

  Displayed if the C: drive for output was selected and there is not enough room on the drive to fit the output listing.

- **A disk error occurred attempting the List Database Volumes operation.**

  The operation failed due to a disk error. Insert another diskette and try again.

The following are examples of using the List Database Volumes function:

- To find all misplaced volumes in rack 3 and display their locations, perform the following steps:
    1. Select **Volser** for **Output Column 1**.
    2. Select **Home** for **Output Column 2**.
    3. Select **Cell** for **Output Column 3**.
    4. Select the **Specific Rack** check box.
    5. Select rack **3** in the associated list.
    6. Select the **Yes** button associated with **Misplaced**.
    7. If **A:** was selected, select the desired **Output Device** button and enter the **Filename**.
    8. If **A:** was selected, insert a non-write-protected diskette in the A: drive.

9. Select the **Create list...** push button. An Operation In Progress message is displayed during the list operation.

10. When the operation is complete, a completion message is displayed.

- To find all volumes starting with BCD in rack 4 and display their locations and category, perform the following steps:

    1. Select **Volser** for **Output Column 1**.

    2. Select **Category** for **Output Column 2**.

    3. Select **Home** for **Output Column 3**.

    4. Select **Cell** for **Output Column 4**.

    5. Select the **Specific Rack** check box.

    6. Select rack **4** in the associated list.

    7. Select the **Volume Mask** check box.

    8. Enter **BCD*** in the Volume Mask entry field.

    9. If **A:** was selected, select the desired **Output Device** button, then enter the **Filename**.

    10. If **A:** was selected, insert a non-write-protected diskette in the A: drive.

    11. Select the **Create list...** push button. An Operation In Progress message is displayed during the list operation.

    12. When the operation is complete, a completion message is displayed.

The List Database Volumes window has the following push buttons:

Create list...   Initiates the List Database Volumes operation.

Cancel   Closes the List Database Volumes window.

Help   Provides help about the List Database Volumes window.

Find A Logical Volume's Home

Note: You can view the Find A Logical Volume's Home window from the Specialist (see "Specialist Features and Functions" on page 332).

The Find A Logical Volume's Home window (Figure 108 on page 187) allows you to determine the stacked volume or volumes on which a logical volume resides.
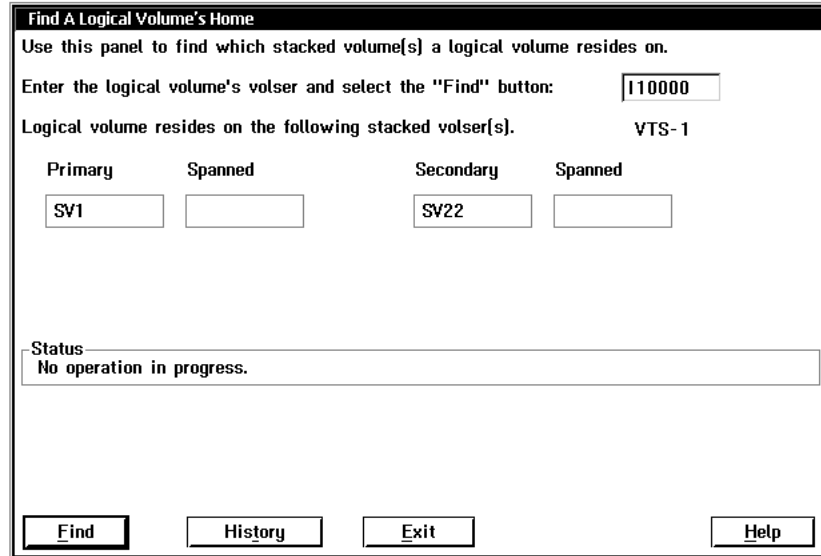
Figure 108. Find A Logical Volume's Home Window

Enter the logical volume's volser in the **Enter the logical volume's volser ...** field, then select the **Find** push button. A "Search in progress" message is displayed while the search is occurring. The appropriate VTS is interrogated for where the logical volume resides.

If the search is successful and the logical volume does reside on a stacked volume, data is displayed. The following information can be displayed in the window:

Primary
       The primary physical volume that contains the specified logical volume.

Spanned
       If the logical volume does not fit entirely on the primary stacked volume, the remainder of the data is written to this spanned primary stacked volume. The data that makes up the requested logical volume has been split between the primary stacked volume and the primary spanned volume.

Secondary
       If a secondary copy of a logical volume has been made (as defined by the volume's management class), this is the physical volume that contains the secondary copy of the logical volume. A logical volume can only have a secondary copy if Advanced Policy Management is installed and enabled and the volume's management class indicates a secondary copy should be made.

Spanned
       If the logical volume does not fit entirely on the secondary stacked volume, the remainder of the data is written to this spanned secondary stacked volume. The data that makes up the requested logical volume has been split between the secondary stacked volume and the secondary spanned volume.

If the search is not successful, messages are displayed that describe why the search failed.

The Find A Logical Volume's Home window has the following push buttons:

Find   Initiates the search for the logical volume's home.

History   Displays previous requests to Find a Logical Volume's home. The requests are displayed in a separate screen:

Figure 109. Find A Logical Volume's Home History Table

Select an entry in the history table to display details. The details will be displayed in a separate screen:

Figure 110. Find A Logical Volume's Home History Details

Exit   Closes the Find A Logical Volume's Home window.

Help   Provides help about the Find A Logical Volume's Home window.

Stacked Volume Map

/
/

Note: You can view the Stacked Volume Map window from the Specialist (see "Specialist Features and Functions" on page 332).

The Stacked Volume Map window (Figure 112 on page 190) allows you to obtain a map of logical volumes that reside on a stacked volume, place it on the hard drive and then copy it to a diskette. This function is available only if a VTS is installed in the 3494.

Initially, a message will pop up to inform you of the two-part process of requesting a stacked volume map.
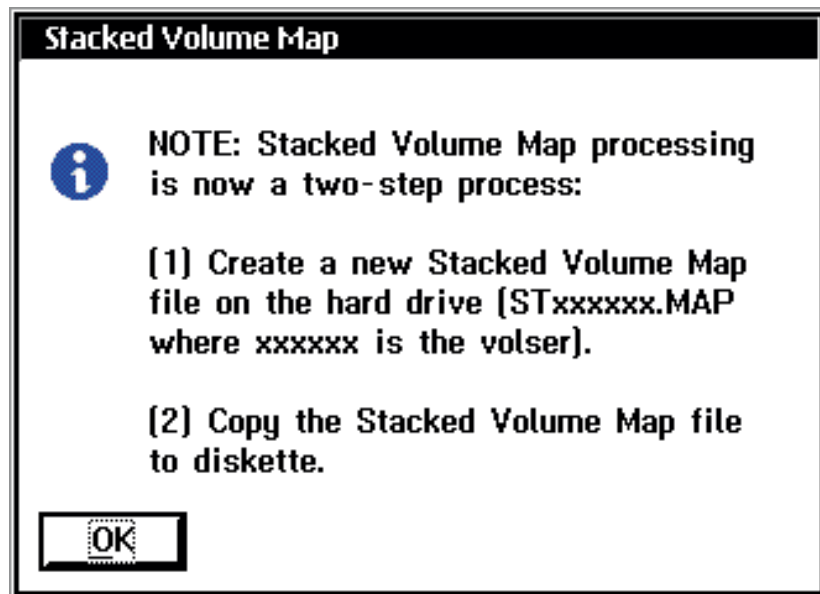
Figure 111. Stacked Volume Map Initial Message Popup

Click "OK" and the following screen will appear:
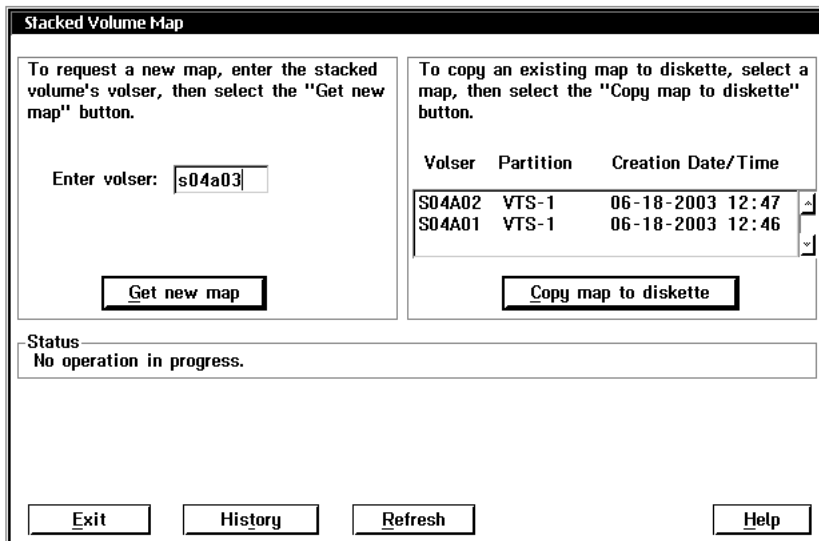
Figure 112. Stacked Volume Map Window

Enter the stacked volume's volser in the **Enter volser:** field, then select the **Get new map** push button. A "Search in progress" message is displayed while the search is occurring. The appropriate VTS is interrogated for the map of the stacked volume.

The logical volumes are retrieved 100 at a time from the appropriate VTS. When the complete map is received successfully, a message is displayed.

If the search is not successful, messages are displayed that describe why the search failed.

The stacked volume map is stored on the hard drive in a file named **STxxxxxx.MAP**, where **xxxxxx** is the stacked volume VOLID. The new map will be displayed in the list of existing maps.

To copy the map to a diskette, insert a blank, formatted diskette in the A: drive. Select the new map from the list and select the **Copy map to diskette** push button.

The output file is in the following format:

```
Version: 00001
Time and Date of Map: 13:40:24 08/26/2001
Library Sequence Number: 12345
Customer ID: IBM Global Services
Stacked Volser: BAR010
Number of Logicals: 120
LOG000
LOG010
LOG234
.
.
.
LOG465 SPAN
```

If a logical volume spans two stacked volumes, the word **SPAN** is displayed next to the volser.

The Stacked Volume Map window has the following push buttons:

Get new map   Initiates the search for logical volumes.

Copy map to diskette
Copies the selected map to a diskette.

Exit   Closes the Stacked Volume Map window.

History   Displays previous requests to Stacked Volume Map. The requests are displayed in a separate screen:


```
 Stacked Volume Map
                        - History Table -

To view the details for an entry, double click on that entry or highlight the entry and press
'Details'.

Action        Volser  Partition  NumLogVols  Status     User ID   Date           Time

GetNewMap     S04A02   VTS-1      000101      Complete   LMOP      06-18-2003 12:47
GetNewMap     S04A02   VTS-1                  Started    LMOP      06-18-2003 12:46
GetNewMap     S04A01   VTS-1      000000      Complete   LMOP      06-18-2003 12:46
GetNewMap     S04A01   VTS-1                  Started    LMOP      06-18-2003 12:46



       Details           Refresh            Exit             Help
```

Figure 113. Stacked Volume Map History Table

Select an entry in the history table to display details. The details will be displayed in a separate screen:


```
 Stacked Volume Map
            - History Table Details -

Date:                 06-18-2003
Time:                 12:47
User ID:              LMOP
Status:               Complete
Action:               GetNewMap
Stacked Volume:       S04A02
Partition:            VTS-1
Num of Log Vols:      000101

-Message-
 The action completed successfully.




       Exit                Help
```

Figure 114. Stacked Volume Map History Details

Refresh   Refreshes the list of map files that are located on the hard disk, and the status line.

Help   Provides help about the Stacked Volume Map window.

Rebuild Database Statistics

The **Rebuild database statistics...** option allows you to rebuild the database statistics when the 3494 performance becomes degraded due to database performance issues.

To start the rebuild process, select the **Rebuild database statistics...** option. The Library Manager may first prompt you for the system administrator password (Figure 115).

Figure 115. System Administrator Password Window

The Library Manager then opens a Database Maintenance Utilities window (Figure 116), indicating that the rebuild initiated successfully. Select **OK** to close the window.
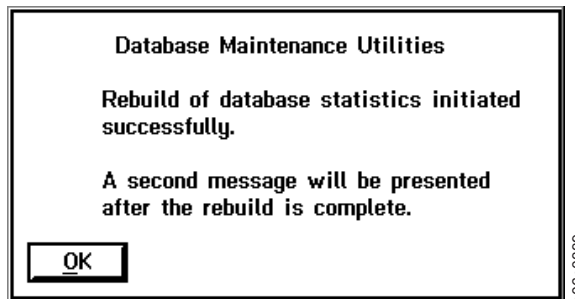
Figure 116. Database Maintenance Utilities Window - Initiated

When the rebuild operation is complete, a Database Maintenance Utilities window (Figure 117 on page 193) opens, indicating that the rebuild completed successfully. Select **OK** to close the window.
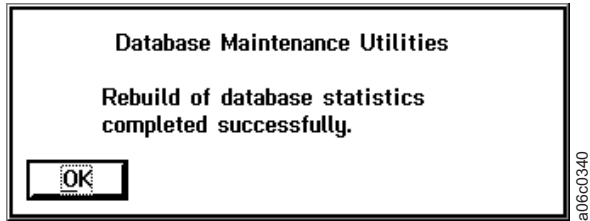
Figure 117. Database Maintenance Utilities Window - Completed

Rebuild Cartridge Table Indices

The **Rebuild cartridge table indices...** option allows you to restore cartridge table indices when the 3494 performance becomes degraded due to database performance issues.

To start the rebuild process, select the **Rebuild cartridge table indices...** option. The Library Manager may first prompt you for the system administrator password (Figure 118).

Figure 118. System Administrator Password Window

The Library Manager then opens a Database Maintenance Utilities window (Figure 119 on page 194), asking you to verify the request. Select **Yes** to close the window and to initiate the rebuild operation.
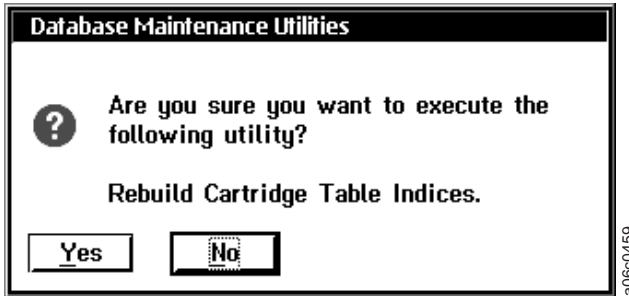
Figure 119. Database Maintenance Utilities Window 1 - Rebuild Cartridge Table Indices

/   When the rebuild operation initiates, another Database Maintenance Utilities window
/   (Figure 120) opens, indicating that the rebuild has successfully initiated. Select **OK**
/   to close the window.
/
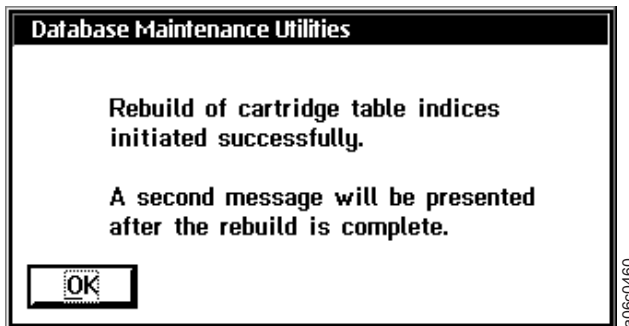
Figure 120. Database Maintenance Utilities Window 2 - Rebuild Cartridge Table Indices

/   When the rebuild operation is complete, a third Database Maintenance Utilities
/   window (Figure 121) opens, indicating that the rebuild completed successfully.
/   Select **OK** to close the window.
/
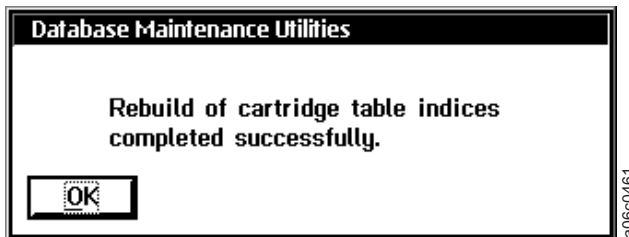
Figure 121. Database Maintenance Utilities Window 3 - Rebuild Cartridge Table Indices

Using the Commands Window

Use the Commands window (Figure 122) to work with the 3494 commands.

Figure 122. Commands Window

The following options are available in the Commands window:

Cleaning   Allows you to select the following options:

    Schedule Cleaning

        Schedule the cleaning of the tape drives based on time or usage (see "Schedule Cleaning" on page 201).

    Eject a Cleaner Cartridge

        Eject a selected cleaner cartridge (see "Eject a Cleaner Cartridge" on page 204).

    Cleaner Masks

        Change cleaner masks (see "Set Cleaner Masks" on page 205).

Send message to host consoles...

        Opens a window where you can enter a message (70 characters maximum). The message is then sent to all the hosts (see "Send Message to Host Consoles" on page 206).

Add message to transaction log...

        Opens a window where you can directly add a message (70 characters maximum) to the transaction log (see "Add Message to Transaction Log" on page 206).

Promote a command in the queue...

        Opens a window where you can select one or more requests in the command queue to be promoted (see "Promote a Command in the Queue" on page 208).

System management

Allows you to select the following:

Volser ranges for media types

This window allows you to enter up to 50 or 256 volser ranges and associated media types. The volser ranges are used to help determine a volser's media type when it is inserted into the 3494 (see "Volser Ranges for Media Types" on page 209). Volser ranges are used only for physical volumes.

Delete Logical Volumes

This window allows you to delete logical volumes that are in the Insert category (see "Delete Logical Volumes" on page 213).

Eject A Stacked Volume

This window allows a VTS stacked volume to be ejected from the 3494 (see "Eject A Stacked Volume" on page 214).

Set VTS Category Attributes

This window allows you to set a category to a "Fast Ready" category and to set an expire time for logical volumes assigned to fast ready categories. (see "Set VTS Category Attributes" on page 215).

Set VTS Management Policies

This window allows you to enter the Inhibit Reclaim Schedule, the Reclaim Threshold Percentage, and the Free Storage Threshold (see "VTS Management Policies" on page 217).

Manage Unassigned Volumes

This window allows you to move **J**- and **K**-type physical volumes from the Unassigned category to the Import or Insert category or eject the volumes from the 3494 (see "Manage Unassigned Volumes" on page 220).

Manage Import Volumes

This window allows you to move **J**- and **K**-type physical volumes from the Import category to the Insert category or to eject the volumes from the 3494 (see "Manage Import Volumes" on page 222).

Manage Insert Volumes

This window allows you to reevaluate the physical volumes in the Insert category for 3590 native use or eject the volumes from the 3494 (see "Manage Insert Volumes" on page 223).

Manage Export-Hold volumes

This window allows you to move Exported Stacked Volumes in the Export-hold

category to the Import category or eject the Exported Stacked Volumes from the 3494 (see "Manage Export-Hold Volumes" on page 224).

Cancel VTS Export/Import
This window allows you to send a cancel request for an in-progress Export or Import operation (see "Cancel VTS Export/Import" on page 225).

Manage Constructs and Pools
This window allows you to do the following:
- Manage Storage Groups (see "Manage Storage Groups" on page 226)
- Manage Management Classes (see "Manage Management Classes" on page 228)
- Manage Storage Classes (see "Manage Storage Classes" on page 231)
- Manage Data Classes (see "Manage Data Classes" on page 233)

Stacked Volume Pool Properties
This window allows you to modify stacked volume pool properties (see "Stacked Volume Pool Properties" on page 235).

Move/Eject Stacked Volumes
This window allows you to move and eject stacked volumes (see "Move/Eject Stacked Volumes" on page 237).

Move/Eject Stacked Volumes Status
This window allows you to view the status of move/eject requests for the VTS (see "Move/Eject Stacked Volumes (Status)" on page 242).

Manage Logical Volumes
This window allows two operations:
- Insert new logical volumes into a VTS
- Change existing logical volumes

See "Manage Logical Volumes" on page 243.

Display VTS Export/Import Volumes
This window allows you to display the physical volumes in the Unassigned, Import, or Export-Hold categories (see Figure 176 on page 256).

Manage 3592 Devices
These are RAS functions for 3592 devices only.

Get VPD
This window allows a general operator to view the Vital Product Data for the 3592 tape devices.

Set VPD
This window allows a service representative to alter Vital Product Data of your 3592 tape devices.

VPD Summary/Load Code
This window allows a system administrator to view a summary of the Vital Product Data and load drive code from the Library Manager to the 3592 drive.

Dump Processing
This window allows a service representative to get the current drive dump or logs from a single device or force a dump.

Verify Fix Diagnostics
This window allows a service representative to perform tests that verify device functionality.

Inventory
Allows you to select the following:

Inventory new storage or reinventory complete system
Start an inventory of any storage components that the 3494 has not inventoried previously or start an inventory of all storage components (see "Inventory New Storage or Re-inventory Complete System" on page 255). This is typically a system administrator function that is password-protected.

Disable inventory update
Disables inventory update allowing doors to be opened and closed without performing inventory update (see "Disable Inventory Update" on page 264).

Enable inventory update
Enables inventory update to take place whenever the 3494 system is returned to Auto mode and Online state after an enclosure door is opened and closed (see "Enable Inventory Update" on page 265).

Perform inventory update (full)
Performs an immediate inventory update. This option is available only if the 3494 is in the Auto mode and Online state (see "Perform Inventory Update (Full)" on page 265).

Perform inventory update (partial)
Performs an inventory on only the frames on which the doors have been opened and possibly the frames to either side of the door that was opened. This option is available only if the 3494 is in the Auto

mode and Online state (see "Perform Inventory Update (Partial)" on page 266).

Standalone device...   Allows you to select the following options:

Setup standalone device
Sets up special standalone 3494 functions (see "Stand-Alone Device" on page 267).

Reset standalone device
Resets standalone devices (see "Reset Stand-Alone Device" on page 270).

Stand-alone device status
Provides status for standalone devices (see "Stand-Alone Device Status" on page 271).

Insert Unlabeled Cartridges...
Opens the Insert Unlabeled Cartridges window, which allows you to insert unlabeled cartridges into the 3494 (see "Insert Unlabeled Cartridges" on page 271).

LAN options   Allows you to select the following:

Add LAN host
See "Add LAN Host to Library" on page 274.

Delete LAN host
See "Delete LAN Host from Library" on page 280.

Update LAN host information
See "Update LAN Host Information" on page 281.

LM LAN information
See "Library LAN Information" on page 287.

Operator intervention... Displays the intervention-required conditions. You can specify the items where action was taken (see "Operator Intervention" on page 288).

Change system administrator password
Opens a window that allows you to change the system administrator's password (see "Change System Administrator Password" on page 290).

Service access   Allows you to select the following:

Enable service access
Provides the ability to access the Library Managers through a modem connection when installed (see "Service Access" on page 291).

Disable service access
Prevents the ability to access the Library Managers through a modem connection if installed (see "Service Access" on page 291).

SNMP options   Allows you to select the following:

Start SNMP
Provides the ability to start the SNMP
messaging process (see "Monitoring Library
Manager Events" on page 292).

Stop SNMP
Provides the ability to stop the SNMP
messaging process (see "Monitoring Library
Manager Events" on page 292).

Change SNMP trap destinations
Provides the ability to add and delete the
SNMP trap destinations for SNMP trap
messages (see "Monitoring Library
Manager Events" on page 292).

Select SNMP trap types
Provides the ability to select the SNMP trap
type of messages to be sent to an SNMP
monitoring station (see "Monitoring Library
Manager Events" on page 292).

Send TESTM trap
Provides the ability to send test messages
to SNMP monitoring stations (see
"Monitoring Library Manager Events" on
page 292).

Call home...   Opens a window that allows you to send a "Call
Home" request to a subsystem (see "Call Home" on
page 314).

Specialist (Web Server)

Settings ...
Provides the ability to administer passwords
for the Specialist function and
enable/disable access to various panels on
the Specialist (see "Specialist (Web
Server)" on page 315).

Enable/Disable
Provides the ability to enable or disable the
Specialist function (see "Specialist (Web
Server)" on page 315).

Note: If the **Specialist (Web Server)** option is
grayed out, the Library Manager operating
system either is not at the correct level or
does not have enough memory. In these
conditions, you cannot enable and start the
Specialist.

Cleaning

The **Cleaning** option allows you to select the following operations:

- Schedule cleaning
- Eject a cleaner cartridge
- Set cleaner masks

Schedule Cleaning

From the Clean Schedule, you can schedule automatic cleaning of the tape drives based on time or usage. Also, the 3490E or 3590 control units can request a cleaning based on tape drive performance.

Attention: Special care must be taken to ensure that the 3590 H1A drives are receiving cleaner cartridges. More so than for B1A or E1A drives, failure to use the cleaner cartridge at the appropriate times will result in permanent damage to the H1A drive's read/write head. A persistent ″CLEAN″ message displayed on the drive's message display should be investigated as a cleaning failure.

3490E or 3590 Device Cleaning

The Library Manager manages device cleaning in the 3494. During installation of the 3494 and at any other time, you can establish a cleaning schedule by selecting the Commands pulldown in the Operator menu, then selecting the **Schedule Cleaning** option in the Cleaning window. You can then specify one of the following cleaning schedules:

Time of Week The drives are cleaned at specific times and days during a week. This sets up a cleaning based on time.

Usage The drives are cleaned after a specified number of mounts on a per-drive basis.

The operator settings do not affect the cleaning that tape drive performance causes. The control unit examines tape drive performance to determine if a drive requires cleaning. When the control unit determines that a drive requires cleaning, the control unit informs the Library Manager to place a clean operation in the operations queue.

When the clean operation is executed, the next cleaner volume is selected from the appropriate cleaner-volume category and mounted on the drive. When the volume is unloaded after the clean operation, the host systems are notified that a cleaning operation completed.

Cleaner Cartridge Replacement at End-of-Life

Cleaner cartridges are ejected automatically from the 3494 when they are used the maximum number of times specified in the Clean Schedule window.

When the number of mounts of a cleaner cartridge equals the number of allowed uses, that cartridge is ejected automatically and placed in the convenience I/O station. All attached hosts are notified that a cleaner cartridge was ejected from the 3494. If the 3494 is out of cleaner cartridges and a drive requires cleaning, all attached hosts are notified that the 3494 is out of cleaner cartridges. Operator intervention is posted on the Library Manager console.

You can specify a value for the maximum uses of a cleaner cartridge before it is ejected from the 3494. For 3490E drives, the default is 200, and the maximum allowed is 500. For 3590 drives, the recommended usage is 100.

Errors related to the handling of a cleaner cartridge are not reported to the host; the Library Manager logs them.

3592 Device Cleaning

The 3592 drive uses advanced technology to determine when it needs to be cleaned and to know when a 3592 cleaner cartridge has reached its maximum number of uses. Because of this there are no entries for ″Maximum cleaner usage″ and ″Usage clean″ for the 3592 drive. The 3592 will request the 3494 clean it when it determines that it is necessary. Also, the 3592 cleaner cartridge keeps track of the number of times it has been used. The 3592 drive reads this information from the cleaner and automatically requests the cleaner be ejected if its maximum number of mounts has been reached. A consequence of this is that a cleaner that has reached its maximum number of uses cannot be reused.

Clean Schedule

The Clean Schedule window (Figure 124 on page 203 and Figure 123) allows you to schedule cleaning of the tape drives by either time or usage.
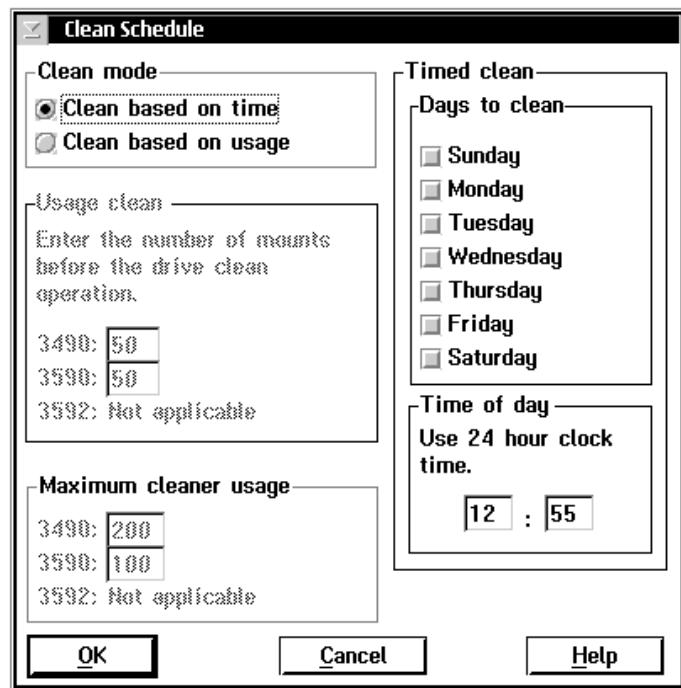
Figure 123. Clean Schedule Window — Timed Clean
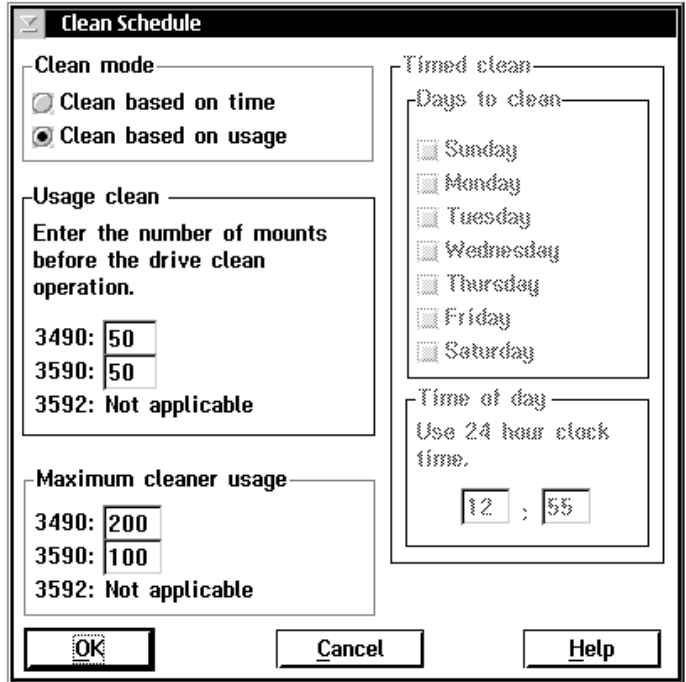
Figure 124. Clean Schedule Window — Usage Clean

The Clean Schedule window has the following controls:

Clean based on time   This button selects the **Timed clean** area of the window for entering time parameters. Select the **Days to clean** and **Time of day** fields.

Clean based on usage   This button selects the **Usage clean** area of the window for entering numbers. Specify drive cleaning in the **Enter the number of mounts before the drive clean operation** field.

The Clean Schedule window has the following options:

Usage clean   Specify that tape drives are cleaned after a certain number of mounts on a per-drive basis. The default is 500.

Days to clean   Specify the days during a week when cleaning is to be initiated.

Time of day   Specify the time of the day when cleaning is to be started. Enter the time of day in the fields provided based on a 24-hour clock; for example, 16:00 is 4:00 PM.

Maximum cleaner usage
For both time- and usage-based cleans, you must enter a maximum cleaner usage. Change the maximum number of times that cleaner cartridges are used before they are ejected automatically from the 3494. For 3490E, the default is 200, and the maximum allowed is 500. For 3590, the recommended usage maximum is 100.

The Clean Schedule window has the following push buttons:

OK   Sets the new clean schedule.

Cancel   Closes the Clean Schedule window without changing the cleaning schedule.

Help   Provides help about the Clean Schedule window.

The cleaning schedule is stored in the Library Manager database. When the cleaning schedule is changed, the tape drive's usage-based clean counter is reset to zero.

Eject a Cleaner Cartridge

The Eject a Cleaner Cartridge window (Figure 125) allows you to select a cleaner cartridge in the 3494, then eject the selected cleaner cartridge from the 3494.
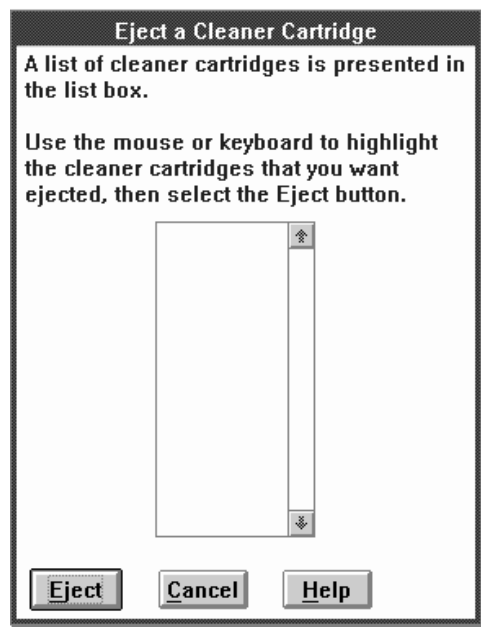
Figure 125. Eject a Cleaner Cartridge Window

The list box presents a list of cleaner cartridges.

Use the pointing device or the keyboard to highlight the cleaner cartridges that you want to eject, then select the **Eject** push button.

The Eject a Cleaner Cartridge window has the following push buttons:

Eject   Ejects the selected cleaner cartridge from the 3494.

Cancel   Closes the Eject a Cleaner Cartridge window.

Help   Provides help about the Eject a Cleaner Cartridge window.

Set Cleaner Masks

Note: You can view cleaner masks from the Specialist (see "Specialist Features and Functions" on page 332).

The Cleaner Masks window (Figure 126) allows the entry of cleaner masks.

You must set at least one of the masks (for example, CLN***). The CLN prefix is not a requirement. You can use any valid volser. See "Cleaner Volume Masks" on page 259 for additional information.

Note: When you select the **Cleaner masks** option in the Cleaning window, the following rules apply to the changing of the masks:

- A cleaner mask cannot match the volser of any data cartridge in the 3494. You must either enter a different cleaner mask or eject all data cartridges in the 3494 that match the cleaner mask before using the mask.
- You cannot delete a cleaner mask when there are cleaner cartridges in the 3494 that match this mask. You must either retain this cleaner mask or eject all cleaner cartridges that match this mask before deleting the mask.

These rules do not apply when you change the masks as part of a full inventory operation.

Figure 126. Cleaner Masks Window

The Cleaner Masks window has the following push buttons:

OK   Checks masks and saves.

Cancel   Closes the Cleaner Masks window without saving any changes.

Help   Provides help about the Cleaner Masks window.

Send Message to Host Consoles

The Host Message window (Figure 127) allows you to enter up to 70 characters to be sent to all attached hosts. The Library Manager must be online for this option. If not, an error message is displayed, indicating that the 3494 must be online.

The acknowledgment **Message has been sent to all attached hosts** indicates that the broadcast was processed.
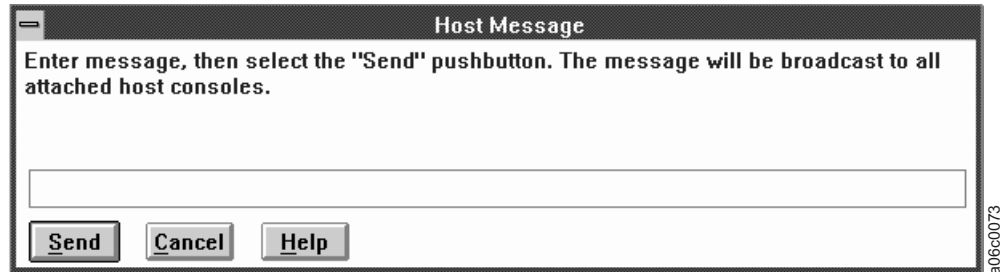
Figure 127. Host Message Window

The Host Message window has the following push buttons:

Send   Sends the message to all attached hosts.

Cancel   Closes the Host Message window.

Help   Provides help about the Host Message window.

Add Message to Transaction Log

When you select the **Add message to transaction log ...** option in the Commands window, the Add Message to Transaction Log window (Figure 128) opens.
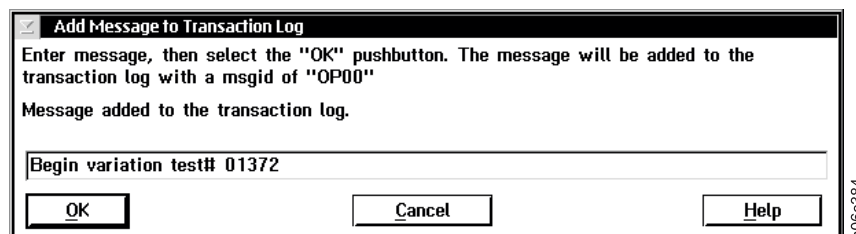
Figure 128. Add Message to Transaction Log Window

This panel allows the Operator or Service Representative to add a message to the transaction log. The text of the message can consist of any characters. Enter a message, then select the **OK**. The message will be added to the transaction log with a message ID of **OP00**.

There are many possible uses for this function. It can be used to indicate a problem has occurred or to indicate the beginning and end of a Library Manager test.

The Add Message to Transaction Log Command window has the following push buttons:

OK   The entered message text will be added to the transaction log.

Cancel   Close the panel.

Help   Display the help panel.

Promote a Command in the Queue

Note: You can view the Command queue from the Specialist (see "Specialist Features and Functions" on page 332).

When you select the **Promote a command in the queue...** option in the Commands window, the Promote Command window (Figure 129) opens.
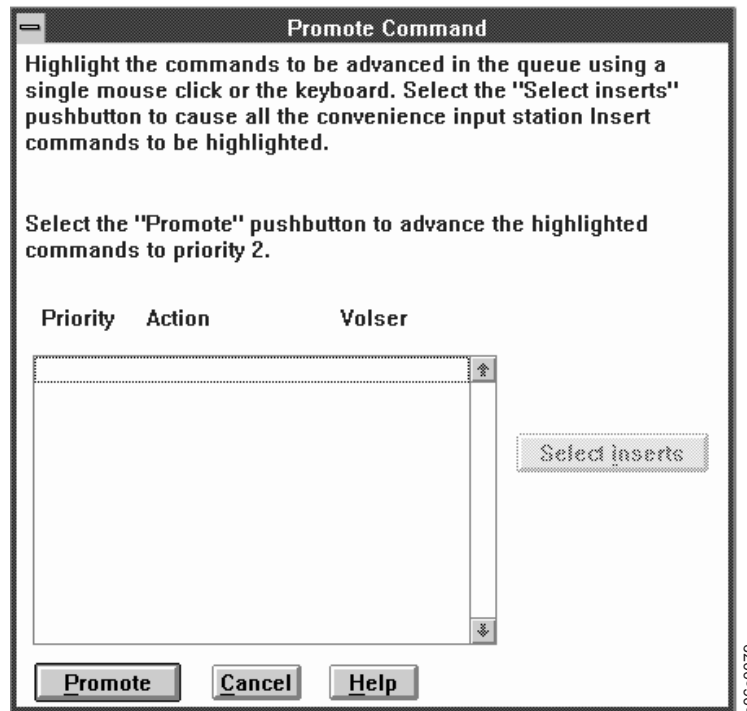
Figure 129. Promote Command Window

The list box in the window shows the commands in the command queue. For each command, the priority and volser, if applicable, are shown. The commands are shown in priority order with the highest priority command at the top of the list. You can select commands that you want to promote by highlighting. If you select a command for promotion and the command is already in progress, the command is not promoted. The list box is updated automatically when a command is promoted.

The Promote Command window has the following push buttons:

Select inserts   Highlights all Insert commands for volumes entered through the convenience I/O station.

Promote   Promotes all highlighted commands to the top of the priority 2 queue.

Cancel   Closes the Promote Command window. Any promoted commands stay promoted.

Help   Provides help about the Promote Commands window.

System Management

The **System Management** option allows the following operations:

- Volser ranges for media types
- Delete logical volumes
- Eject a stacked volume
- Set VTS category attributes
- Set VTS management policies
- Manage unassigned volumes
- Manage import volumes
- Manage insert volumes
- Manage export-hold volumes
- Cancel VTS export/import
- Display export/import volumes
- Manage constructs and pools
    - Manage storage groups
    - Manage management classes
    - Manage storage classes
    - Manage data classes
    - Stacked volume pool properties
    - Move/Eject stacked volumes
    - Move/Eject stacked volumes — Status
    - Manage Logical Volumes
    - Transfer LM Administrative Data
- Manage 3592 devices
    - Get Drive VPD
    - Set Drive VPD
    - Get Drive VPD Summary/Load Code
    - Get/Force Drive Dump
    - Verify Fix Diagnostics

Volser Ranges for Media Types

Note: You can view and modify volser ranges from the Specialist (see "Specialist Features and Functions" on page 332).

The Volser Ranges window (Figure 130 on page 211) allows you to enter up to 50 or 256 volser ranges and associated media types. The volser ranges are used to help determine a physical volume's media type when it is inserted into the 3494. It is also used to assign stacked physical volumes to storage pools when they are inserted. When a range is added or modified, the system combines overlapping ranges with the same media type automatically and checks for range conflicts.

When a volser range changes, the media types and storage pools for existing volumes in the 3494 do not change. Volumes inserted subsequently reflect the new set of ranges and associated media types and storage pools. A volser range cannot conflict with existing volsers of a different media type.

A volume's media type is determined by using the following rules:

- The media type that the vision system returns is used as a first choice.
- If the media type returned is for a **J**- or **K**-type cartridge and there is more than one logical library in the physical library, the volser ranges are used to determine the logical library to which the volume is assigned.
- If the vision system cannot determine a volume's media type, the volser ranges are used. If the volume being inserted is within one of the ranges, the range's associated media type is used. The search of the ranges is an inclusive search.
- If the volser does not fall into one of the ranges, the system uses the default media type defined during the Teach process to determine the media type.
- If there is no default media type, the volume is ejected, and an operator intervention is set.

To add a range, enter the two volsers in the **From** and **To** fields, select a media type, select a home pool (if it is a stacked volume range) then select the **Add / Modify** push button.

To expand a range, double-click the range, expand the volsers, select the media type, select the home pool (if it is a stacked volume range), then select the **Add / Modify** push button.

To delete a range, double-click the range, then select the **Delete** push button.

To determine if a volser is in a range, enter the volser in the **From** entry field, then select the **Volser in range?** push button.

To query the number of volsers in a range, highlight the range in the list box, then select the **Total volsers in range** push button.

The Volser Ranges window has the following controls:

From and To entry fields	The volser entry fields must contain six characters. The characters can be letters, numerals, or a space. The two volsers must be entered in the same format. Corresponding characters in each volser must both be either alphabetic or both be numeric. For example, AAA998 and AAB004 are of the same form, but AA9998 and AAB004 are not.
	The volsers that fall within a range are determined as follows: the volser range is increased such that alphabetic characters are increased alphabetically, and numeric characters are increased numerically. For example, volser range ABC000–ABD999 would result in a range of 2,000 volsers (ABC000–ABC999 and ABD000–ABD999).
Media type list box	A selectable list of media types. Highlight the desired media type for the range.
Home pool	A selectable list of home pools (0 through 32). This field only applies to stacked physical volume ranges and is ignored for native volume ranges. Highlight the desired home pool. For native volser ranges, select 0.
Volser ranges list box	A scrollable list of the volser ranges. Highlighting a range causes the volsers and media type to be

displayed in the entry fields and the media type list box. Highlight a range before selecting the **Delete range...** push button.
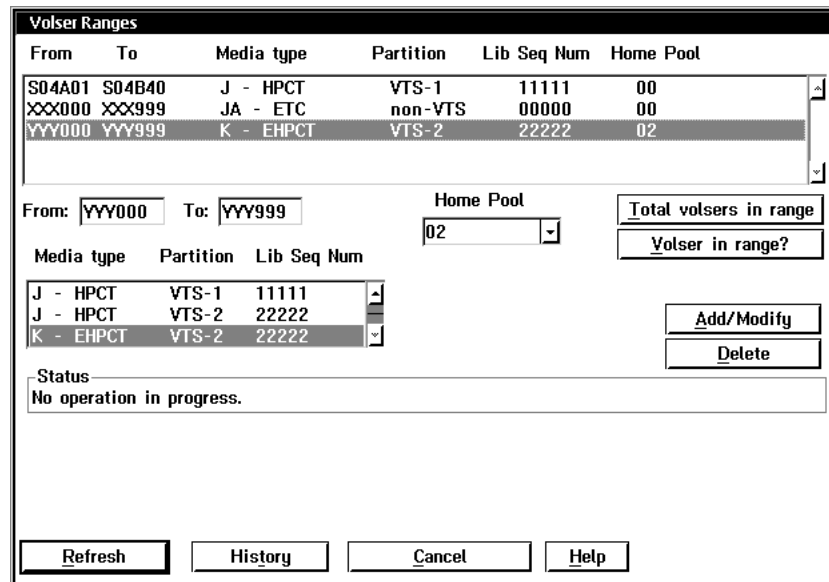
Figure 130. Volser Ranges Window

The Volser Ranges window has the following push buttons:

Total volsers in range   Computes the number of physical volumes that are within a highlighted range.

Volser in range?   Checks to determine if the volser entered in the **From:** entry field is in a defined range. If so, the range is highlighted in the list box.

Add / Modify   Adds or modifies a range. The volsers entered, the media type selected, and the home pool selected are used to add or modify a range. If there is a problem with the new or modified range, an error message is displayed.

Delete   Deletes the highlighted range from the list of ranges. You are prompted to confirm the Delete Range operation. Select **Yes** to perform the Delete Range operation. Select **No** to cancel the Delete Range operation.

Refresh   Refreshes the Volser Ranges window.

History   Displays previous requests to Volser Ranges. The requests are displayed in a separate screen:
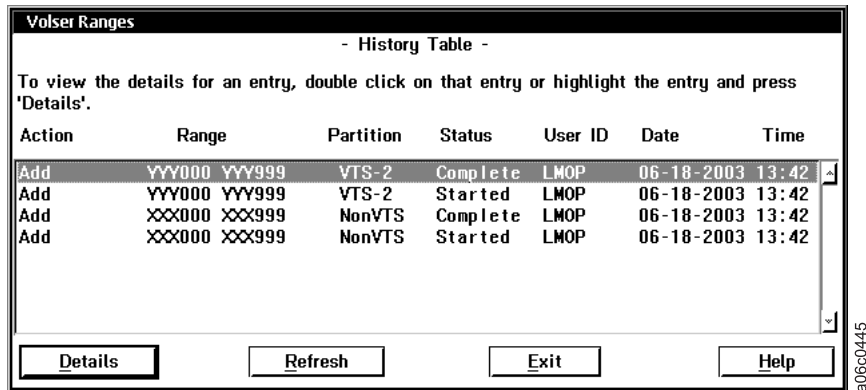
Figure 131. Volser Ranges History Table

Select an entry in the history table to display details. The details will be displayed in a separate screen:
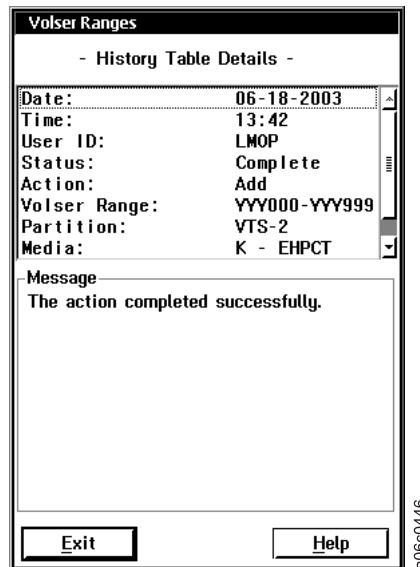
Figure 132. Volser Ranges History Details

Cancel
Closes the Volser Ranges window. All changes to the ranges are saved.

Help
Provides help about the Volser Ranges window.

Delete Logical Volumes

The Delete Logical Volumes window (Figure 133 on page 214) allows you to delete logical volumes that have not been checked into a host's tape management system. You can use this window to delete only logical volumes that are in the Insert category.

Note: You can delete logical volumes that the host has moved from the Insert category only with host commands.

CAUTION:
Consult your system administrator to ensure that host insert processing is complete prior to deleting logical volumes that the host has moved from the Insert category.

The Delete Logical Volumes window lists the numbers of the logical volumes that are in the Insert category for each VTS. You may choose from the following Delete operations:

- To delete a single logical volume for a VTS, perform the following steps:
    1. In the first entry field, enter the volser of the logical volume. Leave the second entry field blank.
    2. Click the button for the VTS that the logical volume is associated with.
    3. Select the **Delete...** push button to start the Delete operation. A message box allows you to confirm your selection.
- To delete a range of logical volumes for a VTS, perform the following steps:
    1. In the first entry field, enter the volser of the first logical volume in the range.
    2. In the second entry field, enter the volser of the last logical volume in the range.
    3. Click the button for the VTS that the logical volumes are associated with.
    4. Select the **Delete...** push button to start the Delete operation. A message box allows you to confirm your selection.
- To delete all the logical volumes in the insert category for a VTS, perform the following steps:
    1. Select the check box labeled **Delete ALL logical volumes in the Insert category for a VTS**.
    2. Click the button for the VTS that the logical volumes are associated with.
    3. Select the **Delete...** push button to start the Delete operation. A message box allows you to confirm your selection.

The Delete Logical Volumes window has the following controls:

Volser entry fields The volser entry fields must contain six alphanumeric characters. The two volsers must be entered in the same format. Corresponding characters in each volser must both be either alphabetic or both be numeric. For example, AAA998 and AAB004 are of the same form, but AA9998 and AAB004 are not.

The volser is increased such that alphabetic characters are increased alphabetically, and numeric characters are increased numerically. For example, volser range ABC000–ABD999 would result in 2,000 volsers (ABC000–ABC999 and ABD000–ABD999).

VTS Library buttons   These buttons allow you to select the VTS from which the logical volumes will be deleted. Buttons are displayed only for the number of VTSs installed. The buttons may be disabled if no logical volumes are in the Insert category.
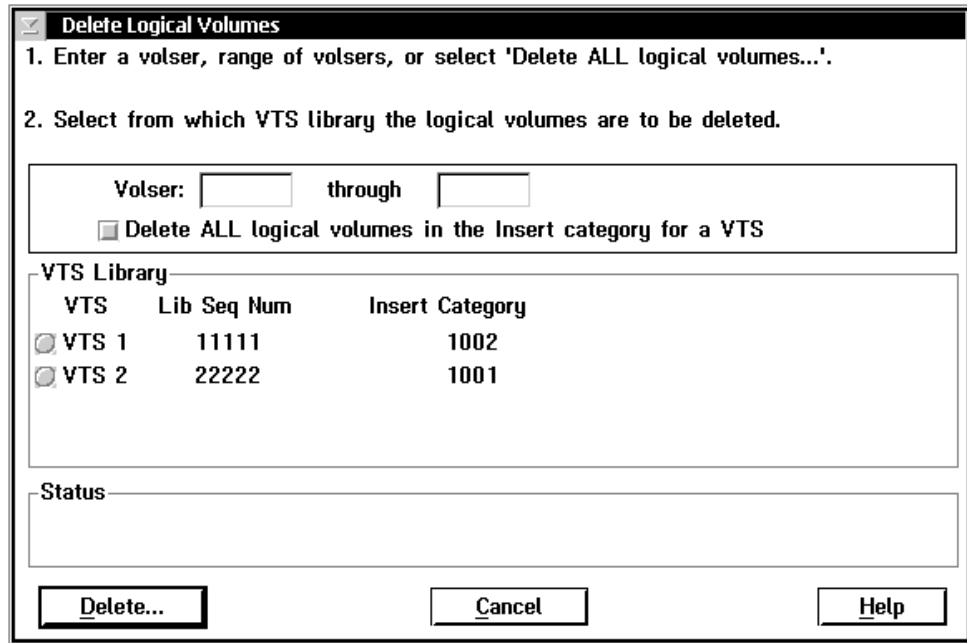
Figure 133. Delete Logical Volumes Window

The Delete Logical Volumes window has the following push buttons:

Delete...   Initiates the Delete Logical Volumes operation. You are prompted to confirm the operation. Select **Yes** to continue the Delete operation. Select **No** to cancel the Delete operation.

Cancel   Closes the Delete Logical Volumes window. If a Delete operation is in progress, you are prompted to confirm the cancellation. Select **Yes** to cancel the Delete operation. Select **No** to continue with the Delete operation. You can cancel an in-progress Delete operation at any time.

Help   Provides help about the Delete Logical Volumes window.

Eject A Stacked Volume

The Eject A Stacked Volume window (Figure 134 on page 215) allows you to eject a stacked volume from the 3494. Enter the stacked volume's volser, then select the **Eject...** push button. The list box displays the stacked volumes that are currently in the process of being ejected.

When an Eject Stacked Volume operation is initiated, a request is sent to the associated VTS to eject the stacked volume. The VTS then copies any active data from the stacked volume to other stacked volumes. When all active data has been removed, the VTS initiates the eject of the now-empty stacked volume. This process can take a long time.

Notes:

1. If the Library Manager is busy, the VTS is busy, and the stacked volume being ejected contains many active data files, the eject process may take a VERY long time (up to several hours).

2. Only one eject of a stacked volume can be in-progress for each VTS. If more than one is attempted, an error message results.

3. Exported Stacked Volumes (those in the Unassigned, Import, or Export-Hold categories) cannot be ejected using this window. If you attempt this, an error message results.
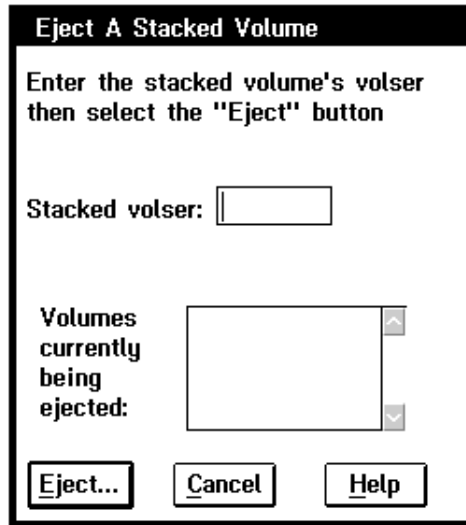
Figure 134. Eject A Stacked Volume Window

The Eject A Stacked Volume window has the following push buttons:

Eject...   Initiates the Eject Stacked Volume operation. You are prompted to confirm the Eject operation. Select **Yes** to continue the Eject operation. Select **No** to cancel the Eject operation.

                     Note: If the volume selected is in a VTS at code level 2.26.1.0 or higher and the Library Manager is at code 527.00 or higher, you will be directed to use the Move/Eject Stacked Volumes panel instead. The Move/Eject Stacked Volumes panel allows a range of volumes to be ejected. See "Move/Eject Stacked Volumes" on page 237.

Cancel   Closes the Eject A Stacked Volume window. All changes are saved.

Help   Provides help about the Eject A Stacked Volume window.

Set VTS Category Attributes

Note: You can view VTS category attributes from the Specialist (see "Specialist Features and Functions" on page 332).

The Set VTS Category Attributes window (Figure 135 on page 216) allows you to define categories as "Fast Ready" categories and associate an expire time for the category. A "Fast Ready" category means that the Library Manager can order

category mounts from this category without recalling data from a stacked volume. This enables quick mount times because the mount request does not require a recall.

To define a "Fast Ready" category, enter the four-digit hexadecimal category number, select the desired VTS (and expire time, if desired), and select the **Add/Modify category** push button.

To associate an expire time for the category, define the category. Then, enter a number in the Expire Time field and select its associated unit. For example, if you wanted the expire time associated with the category to be six hours, you would enter "6" and select "hours." Select the **Add/Modify category** push button

To delete a category from the "Fast Ready" category list, highlight the category in the list box, then select the **Delete category...** push button.

Expire Time

The Library Manager and the VTS use this time to expire logical volume data for logical volumes in the defined "Fast-Ready" category. The minimum expire time is 24 hours. The maximum expire time is 32 767 hours (approximately 194 weeks). You can enter the expire time in hours, days, or weeks.

If zero is entered or if no entry is made in this field, the logical volumes will not be expired.

/   **Hold**   Selecting the Hold option prevents a logical volume from being selected for
/   mount processing or to be moved out of its assigned category until the
/   expire time has elapsed or has been reset to zero.
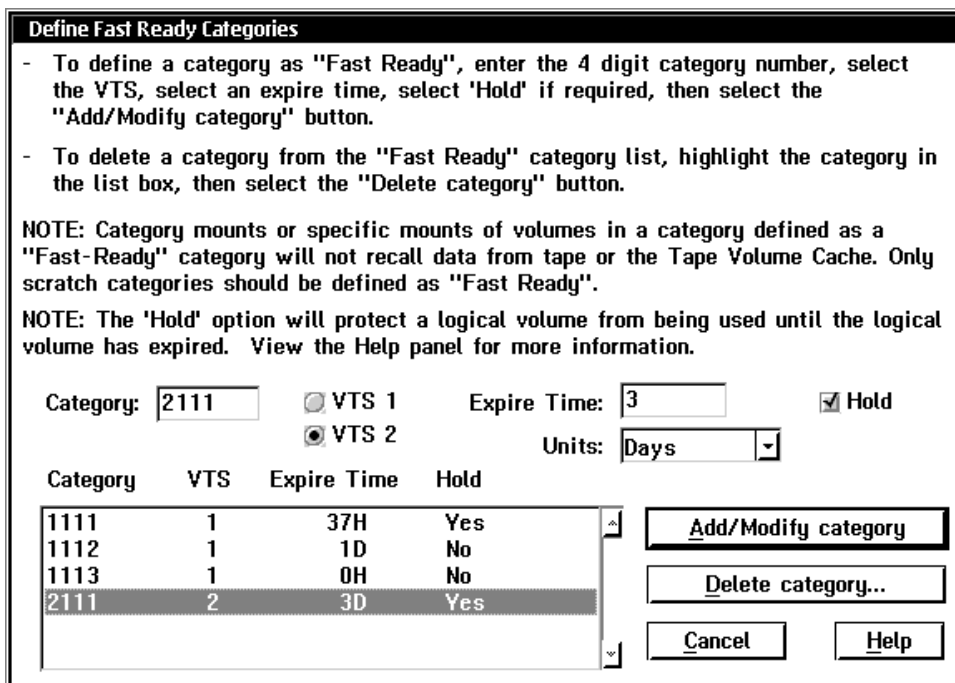
Figure 135. Set VTS Category Attributes Window

The Set VTS Category Attributes window has the following push buttons:

Add/Modify category

> Adds or modifies the entered category to the selected VTS's "Fast Ready" category list along with its associated expire time.

Delete category...

> Deletes the highlighted category from the associated VTS's "Fast Ready" category list. The library prompts you to confirm the Delete operation. Select **Yes** to continue the Delete operation. Select **No** to cancel the Delete operation.

Cancel   Closes the Set VTS Category Attributes window.

Help   Provides help about the Set VTS Category Attributes window.

VTS Management Policies

> **Note:** You can view VTS management policies from the Specialist (see "Specialist Features and Functions" on page 332).

The VTS Management Policies window (Figure 136) allows you to set the Inhibit Reclaim Schedule, the Reclaim Threshold Percentage, and the Free Storage Thresholds (GB).

Figure 136. VTS Management Policies Window

The *Inhibit Reclaim Schedule* defines when the VTS should not perform reclaim operations. Reclaim operations require physical drives. This means that drives are used for reclaim operations at the same time others are used to recall data to satisfy mount requests. During times of heavy mount activity it may be desirable to make all of the physical drives available for recall operations. If these periods of heavy mount activity are predictable, you can use the Inhibit Reclaim Schedule to inhibit reclaim operations for the heavy mount activity periods. You can add up to 14 entries to the schedule.

When there are less than ten scratch stacked volumes available in the VTS, the Inhibit Reclaim Schedule is ignored. For the Inhibit Reclaim Schedule to be in effect with non-invasive reclamation activity by the VTS, more than 50 scratch stacked volumes must be available.

Five lists and a set of check boxes are used to set up an inhibit reclaim entry. The lists contain the following options:

- **Day of week**

  Sunday through Saturday or Every day. If you select the **Every day** option, the **Start Time** and **Duration** you enter apply to every day of the week.

- **Start Time - Hour and Minute**

  The start hour and minute for the inhibit. A 24-hour clock is used where 00 in the hour field means midnight.

- **Duration - Hours and Minutes**

  The number of hours and minutes that the inhibit reclaim should remain in effect. You can specify up to 167 hours and 59 minutes (seven days minus one minute). Specifying the maximum essentially always inhibits reclaim.

- Check boxes to indicate the VTS to which to apply the schedule.

Add an entry to the inhibit reclaim schedule by selecting a day of week, a start time, and the duration. Then select the **Add** push button.

Delete an entry by highlighting it in the list box, then selecting the **Delete** push button.

The *Reclaim Threshold Percentage* identifies when a stacked volume is to be made available for reclamation. Each stacked volume has some amount of active data and some amount of inactive (no longer needed) data. If the percentage of active data is less than the percentage specified in this window, the stacked volume is available to go through reclamation. During the reclamation process all of the active data from the original stacked volume is moved to another stacked volume. After all active data is moved from the original stacked volume, it is set to scratch. This makes it available for reuse.

The Reclaim Threshold Percentage is set at 10% initially. We recommend that you start with this value and raise it slowly by 5% increments, as necessary. As a general rule, try not to exceed 30%–40%. It is better to add additional stacked volumes than to increase this value. The higher this number is, the longer it takes the VTS to reclaim a stacked volume because more data must be copied from one stacked volume to another stacked volume. The Active Data Distribution bar graph assists you in setting this number. See "VTS Active Data Distribution" on page 156 for information about displaying the window. The Reclaim Threshold Percentage can be set for all pools or, if the VTS is Advanced Policy Management capable, for each individual pool. To set the Reclaim Threshold Percentage, select a percentage from the pulldown next to the VTS. If the VTS is Advanced Policy Management capable, select the push button ″VTS x - Assign Percentages″ to bring up the VTS Management Policies (VTS x) window (shown in Figure 137 on page 219).
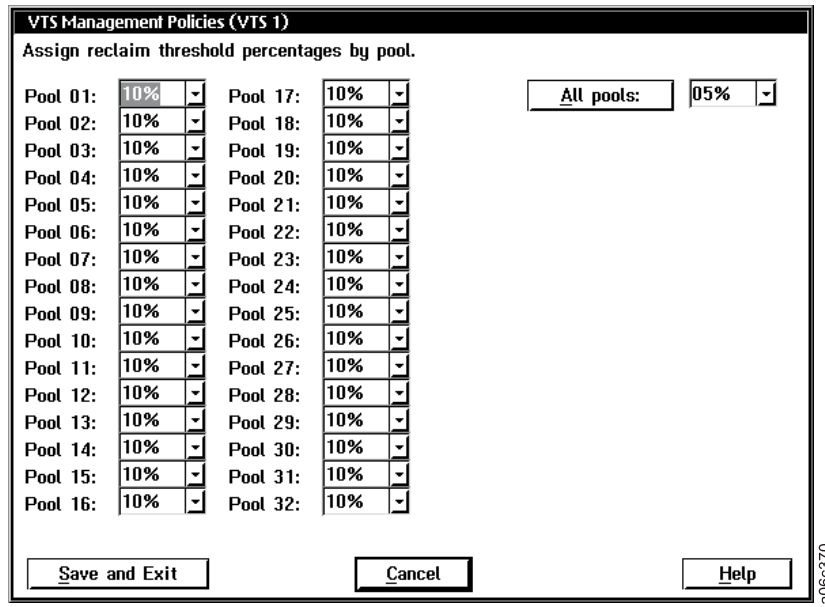
Figure 137. VTS Management Policies Window (by Pools)

The *Free Storage Threshold (GB)* provides a warning when the VTS is running low on free storage, the capacity of all the empty stacked volumes in the VTS. A threshold is provided for each VTS installed in the library and is entered in GB. The default value is 600 GB. The VTS Active Data window (Figure 89 on page 149) displays the Free Storage Threshold as the Free Storage Alarm Level. If the free storage drops below the threshold (alarm level), the Library Manager signals an intervention-required condition to notify you to add more stacked volumes.

The number of stacked volumes required to store the Free Storage Threshold GB specified in the VTS Management Policies window is dependent on the compression of data when writing from the tape volume cache to the stacked volume and the model of 3590 tape drive associated with the VTS (Model B1A, E1A, or H1A). The B18, B10, and B20 VTSs with enhanced ESCON host attachments provide compression into the tape volume cache. Therefore, further compression when writing to the stacked volume is unlikely, and the capacity of a J media stacked volume is approximately 10 GB for 3590 Model B1A drives, 20 GB for 3590 Model E1A drives, 30 GB for 3590 Model H1A drives. The capacity for a K media stacked volume is approximately 20 GB for 3590 Model B1A drives, 40 GB for 3590 Model E1A drives, and 60 GB for 3590 Model H1A drives. The earlier B16 VTS relied on the compression capability of the 3590 drives to store approximately 20 GB of tape volume cache data, assuming a compression ratio of 2:1.

Note: Very repetitive data may allow data compression to achieve greater stacked volume capacity.

Table 11 on page 220 provides examples of values for the Free Storage Threshold that result in an Intervention Required alarm when the number of scratch stacked volumes is less than required to contain the threshold free storage GB specified.

Table 11. Free Storage Threshold

Free Storage Threshold (GB) for J-Type Cartridges					
			Scratch Stacked Volumes		
VTS Model	3590 Tape Drive Model	Data Compression Feature	10	30	50
B16	B1A	not available	200 GB	600 GB	1000 GB
B18	B1A	none	200 GB	600 GB	1000 GB
B18	E1A	none	400 GB	1200 GB	2000 GB
B18	H1A	none	600 GB	1800 GB	3000 GB
B18	B1A	3200 or 3400	100 GB	300 GB	500 GB
B18	E1A	3200 or 3400	200 GB	600 GB	1000 GB
B18	H1A	3200 or 3400	300 GB	900 GB	1500 GB
B10	B1A	included	100 GB	300 GB	500 GB
B10	E1A	included	200 GB	600 GB	1000 GB
B10	H1A	included	300 GB	900 GB	1500 GB
B20	B1A	included	100 GB	300 GB	500 GB
B20	E1A	included	200 GB	600 GB	1000 GB
B20	H1A	included	300 GB	900 GB	1500 GB
Note: For free storage threshold GB for **K**-type cartridges, multiply the values by two.					

When only ten scratch stacked volumes are available, the VTS performance may be affected by reclamation, because the Inhibit Reclaim Schedule is ignored. Reclamation is necessary to provide stacked volumes for copying data from the tape volume cache. However, when more than 50 scratch stacked volumes are available, reclamation is non-invasive and occurs only when allowed by the Inhibit Reclaim Schedule. A balance of performance, excessive host messages, and additional cartridge expense may be achieved by using a Free Storage Threshold (GB) representative of 30 stacked volumes.

The VTS Management Policies window has the following push buttons:

Add   Adds an entry to the Inhibit Reclaim Schedule.

Delete   Deletes an entry from the Inhibit Reclaim Schedule.

Save   Closes the VTS Management Policies window and saves all the changes made to the Inhibit Reclaim Schedule, the Reclaim Threshold Percentage, and the Free Storage Threshold (GB).

Cancel   Closes the VTS Management Policies window without saving any of the changes.

Help   Provides help about the VTS Management Policies window.

Manage Unassigned Volumes

The Manage Unassigned Volumes window (Figure 138 on page 221) opens automatically under the following conditions:

- When the 3494 is in Import mode
- When you have input volumes of **J**- or **K**-type media into the 3494 through the convenience I/O station

This window allows you to move Exported Stacked Volumes in the Unassigned category to the Import category. This is an essential step during a VTS Import operation. You can also move other physical volumes (**J**- and **K**-type) to the Insert category or eject them. The Unassigned volumes are displayed in the list box titled **Unassigned**.
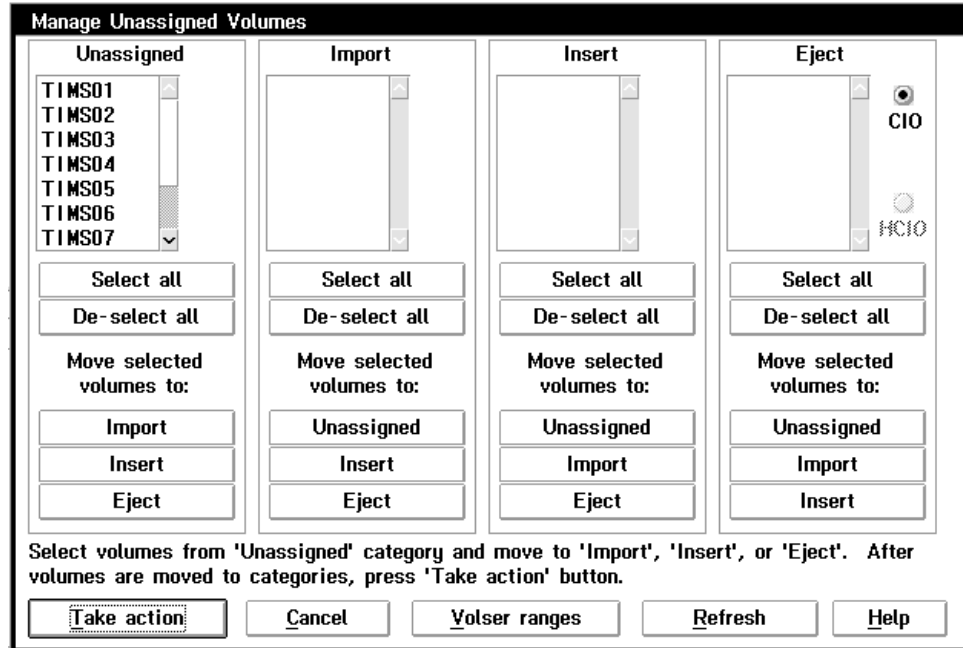
Figure 138. Manage Unassigned Volumes Window

The Manage Unassigned Volumes window has the following push buttons:

Select all   Selects all volumes within the current list box.

De-select all   Deselects all volumes within the current list box.

Unassigned   Moves the selected volumes to the Unassigned category list box.

Import   Moves the selected volumes to the Import category list box.

Insert   Moves the selected volumes to the Insert category list box.

Eject   Moves the selected volumes to the Eject category list box.

Take action   Confirms and activates a request to move volumes to the selected category.

Cancel   Closes the Manage Unassigned Volumes window without saving any of the changes.

Volser ranges Opens the Volser Ranges window (see Figure 130 on page 211).

Refresh   Refreshes the Manage Unassigned Volumes window.

Help   Provides help about the Manage Unassigned Volumes window.

Note: Only 50 physical volumes are displayed. If more than 50 Unassigned volumes exist, then **–More–** is displayed at the bottom of the list box.

Manage Import Volumes

The Manage Import Volumes window (Figure 139) allows you to move physical volumes (**J**- and **K**-type) in the Import category to the Insert category. You can also eject the volumes from the 3494.
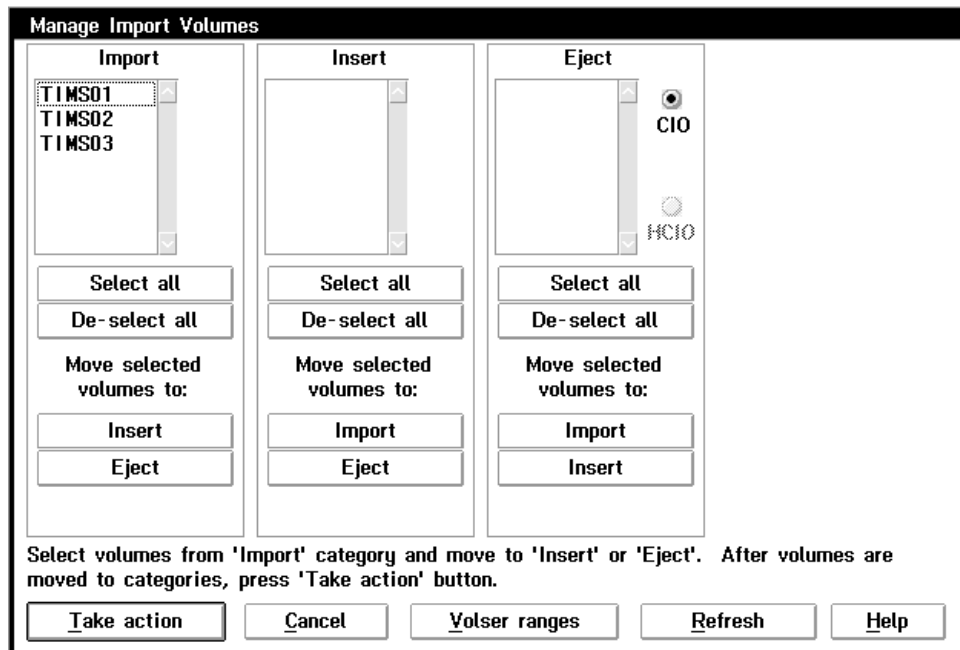
Figure 139. Manage Import Volumes Window

The Manage Import Volumes window has the following push buttons:

Select all   Selects all volumes within the current list box.

De-select all   Deselects all volumes within the current list box.

Import   Moves the selected volumes to the Import category list box.

Insert   Moves the selected volumes to the Insert category list box.

Eject   Moves the selected volumes to the Eject category list box.

Take action   Confirms and activates a request to move volumes to the selected category.

Cancel   Closes the Manage Import Volumes window without saving any of the changes.

Volser ranges Opens the Volser Ranges window (see Figure 130 on page 211).

Refresh   Refreshes the Manage Import Volumes window.

Help   Provides help about the Manage Import Volumes window.

Note: Only 50 physical volumes are displayed. If more than 50 Import volumes exist, then **–More–** is displayed at the bottom of the list box.

Manage Insert Volumes

The Manage Insert Volumes window (Figure 140) allows you to reevaluate the physical volumes in the Insert category for 3590 native use. By redefining the volser ranges, you can move the volumes to the Insert categories for the VTSs. You can also eject the volumes from the 3494.
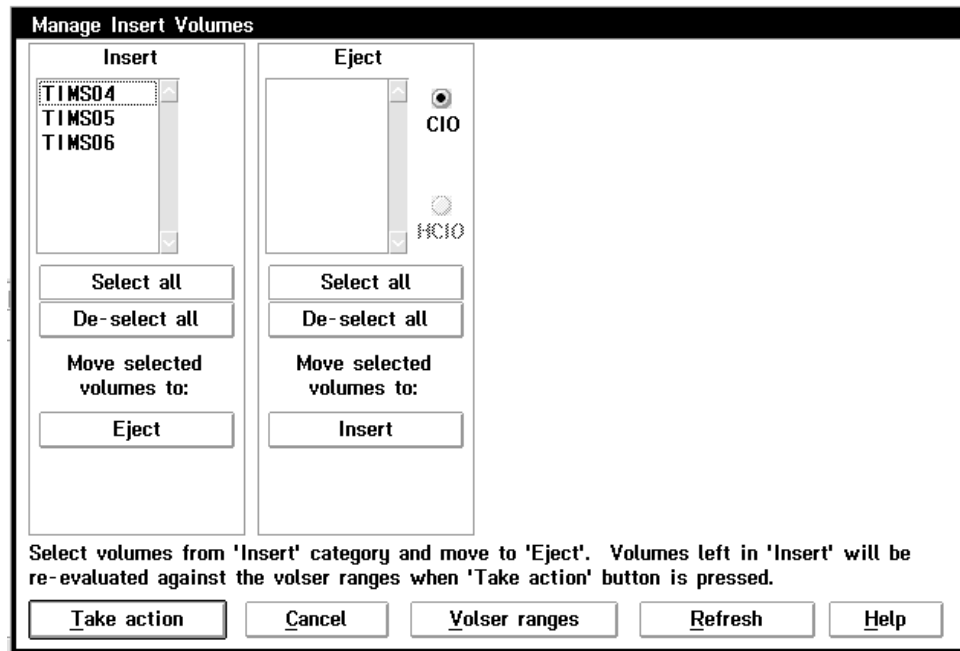
Figure 140. Manage Insert Volumes Window

The Manage Insert Volumes window has the following push buttons:

Select all   Selects all volumes within the current list box.

De-select all   Deselects all volumes within the current list box.

Insert   Moves the selected volumes to the Insert category list box.

Eject   Moves the selected volumes to the Eject category list box.

Take action   Confirms and activates a request to move volumes to the selected category.

Cancel   Closes Manage Insert Volumes window without saving any of the changes.

Volser ranges   Opens the Volser Ranges window (see Figure 130 on page 211).

Refresh   Refreshes the Manage Insert Volumes window.

Help   Provides help about the Manage Insert Volumes window.

Note: Only 50 physical volumes are displayed. If more than 50 Insert volumes exist, then **–More–** is displayed at the bottom of the list box.

Manage Export-Hold Volumes

The Manage Export-Hold Volumes window (Figure 141) allows you to move Exported Stacked Volumes in the Export-Hold category to the Import category. You can also eject the Exported Stacked Volumes from the 3494.
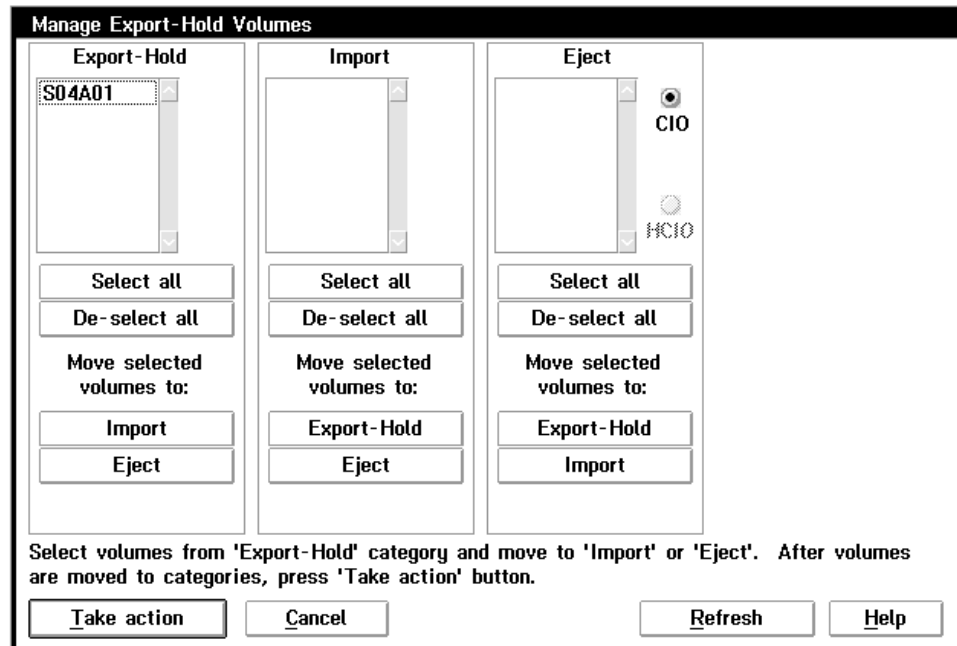
Figure 141. Manage Export-Hold Volumes Window

The Manage Export-Hold Volumes window has the following push buttons:

Select all   Selects all volumes within the current list box.

De-select all Deselects all volumes within the current list box.

Export-Hold   Moves the selected volumes to the Export-Hold category list box.

Import   Moves the selected volumes to the Import category list box.

Eject   Moves the selected volumes to the Eject category list box.

Take action   Confirms and activates a request to move volumes to the selected category.

Cancel   Closes the Manage Export-Hold Volumes window without saving any of the changes.

Refresh   Refreshes the Manage Export-Hold Volumes window.

Help   Provides help about the Manage Export-Hold Volumes window.

Note: Only 50 physical volumes are displayed. If more than 50 Export-Hold volumes exist, then **–More–** is displayed at the bottom of the list box.

Cancel VTS Export/Import

The Cancel VTS Export/Import window (Figure 142) allows you to send a cancel request to the VTS for an in-progress Export or Import operation. The in-progress Export and Import operations are displayed in the list box. You can select only one operation at a time.
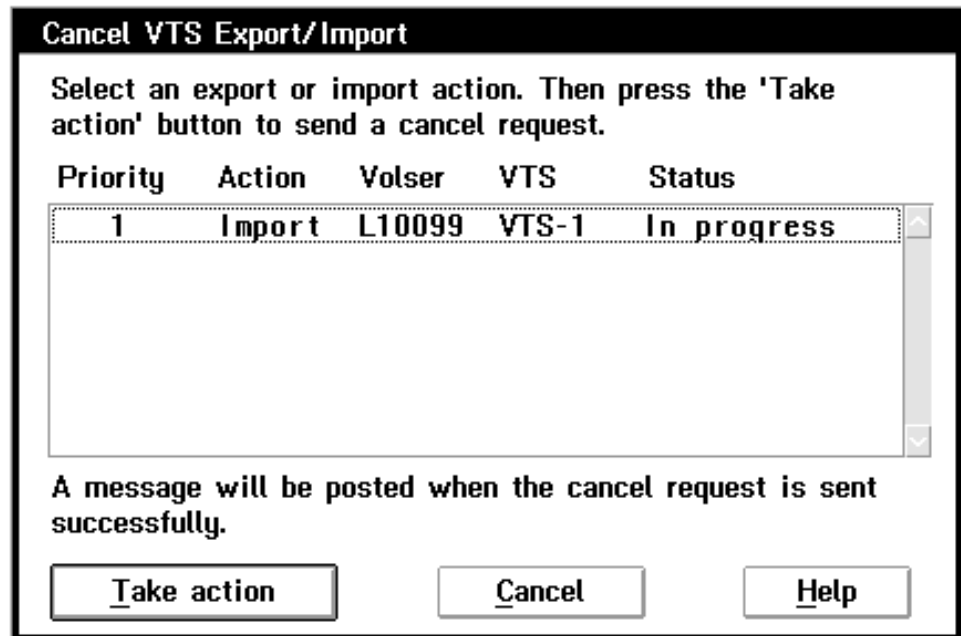
Figure 142. Cancel VTS Export/Import Window

The Cancel VTS Export/Import window has the following push buttons:

Take action   Sends the cancel request for the highlighted Export or Import operation.

Cancel   Closes the Cancel VTS Export/Import window. No action is taken.

Help   Provides help about the Cancel VTS Export/Import window.

Manage Constructs and Pools

The Manage Constructs and Pools window (Figure 143 on page 226) provides access to multiple panels that allow you to manage the storage management constructs and stacked volume pool properties, move/eject stacked volumes, manage logical volumes, and transfer LM administrative data. To access a management function, use the mouse or keyboard to select a panel from the list box. Select the **Open panel** button.
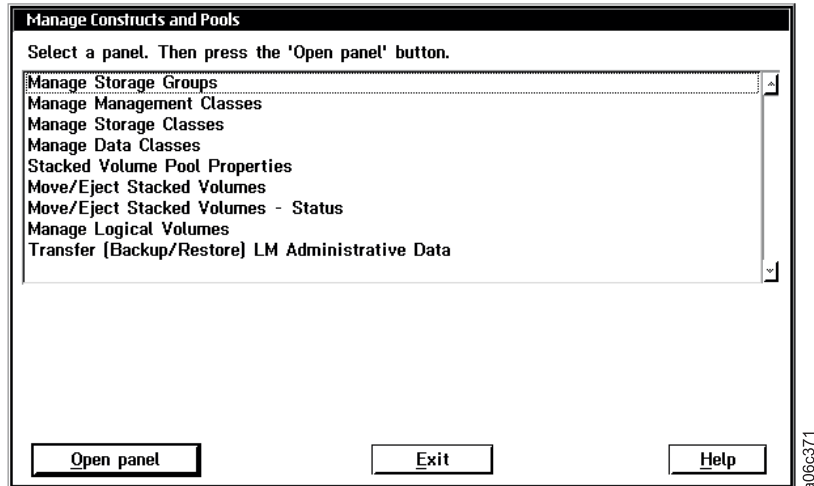
Figure 143. Manage Constructs and Pools

Open panel

   Select a panel from the listbox. Then, select this button to open the panel.

Exit   Closes the Manage Constructs and Pools window.

Help   Provides help about the Manage Constructs and Pools window.

Manage Storage Groups

Note: You can view the Manage Storage Groups window from the Specialist (see "Specialist Features and Functions" on page 332).

The Manage Storage Groups window (Figure 144 on page 227) allows you to view and manage storage groups. The following actions can be performed:

• Add a storage group
• Modify an existing storage group
• Delete a storage group
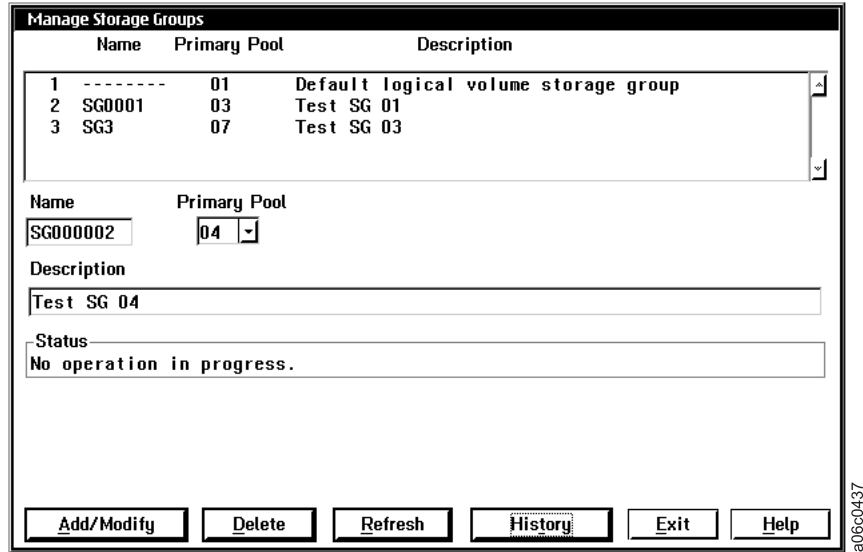
Figure 144. Manage Storage Groups Window

To add a storage group, enter a one to eight-character alphanumeric name in the **Name** field. The name must be unique within the storage group construct names. Select a primary pool and enter a short description in the **Description** field. Select the **Add/Modify** button.

To modify a storage group, select from the list of current storage groups presented in the list box. Use the mouse or keyboard to highlight the storage group you want to modify. Make modifications to the primary pool and/or description. Select the **Add/Modify** button.

To delete a storage group, select from the list of current storage groups presented in the list box. Use the mouse or keyboard to highlight the storage group you want to delete. Select the **Delete** button.

Notes:

1. The default storage group, identified by eight dashes (--------), cannot be deleted.
2. Up to 256 storage groups, including the default, can be defined.

Add/Modify
  Adds the entered storage group or modifies the selected storage group.

Delete
  Deletes the selected storage group.

Refresh
  Refreshes the Manage Storage Groups window.

History
  Displays previous requests to Manage Storage Groups. The requests are displayed in a separate screen:

Figure 145. Manage Storage Groups History Table

Select an entry in the history table to display details. The details will be displayed in a separate screen:
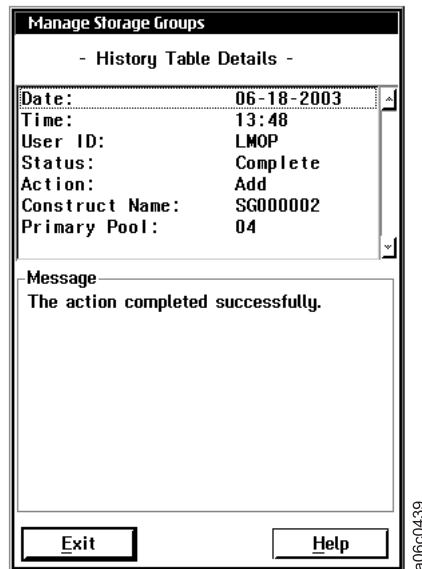
Figure 146. Manage Storage Groups History Details

Exit
Closes the Manage Storage Groups window.

Help
Provides help about the Manage Storage Groups window.

Manage Management Classes

Note: You can view the Manage Management Classes window from the Specialist (see "Specialist Features and Functions" on page 332).

The Manage Management Classes window (Figure 147 on page 229) allows you to view and manage management classes. The following actions can be performed:

• Add a management class
• Modify an existing management class

• Delete a management class

```
Manage Management Classes
              Secondary   PTP Copy
      Name    Pool        Control        PTP I/O VTS    Description
  1   --------  00    VTC defined       VTC defined    Default management cla
  2   MC000001  02    Immediate copy    VTC defined    Test MC 01
  3   MC2       07    Deferred copy     VTC defined    Test MC 02
  4   MC234555  00    Deferred copy     Dist. Lib 0    Test MC

Name              Secondary Pool        PTP Copy Control        PTP I/O VTS
MC234555          00  (None)  [▼]      Deferred copy    [▼]    Dist. Library 0  [▼]
Description
Test MC
 ┌Status──────────────────────────────────────────────────────────────┐
 │No operation in progress.                                            │
 └─────────────────────────────────────────────────────────────────────┘

  Add/Modify      Delete      Refresh      History      Exit      Help
```

Figure 147. Manage Management Classes Window

To add a management class, do the following:

1. Enter a one to eight-character alphanumeric name in the **Name** field. The name must be unique within the management class construct names.

2. Select a Secondary Pool. If ″0″ is selected, a secondary copy will not be made.

3. Specify the **PTP Copy Control** setting. If **Immediate copy** is selected, the copy is made at the same time as the first copy. If **Deferred copy** is selected, the copy is made at a time after the first copy is made. If **VTC Defined** is selected, the setting is defined by the VTC. If **No copy** is selected, no copy will be made.

4. Specify the **PtP I/O VTS** setting. If **VTC Defined** is selected, the VTC determines which VTS acts as the I/O VTS. If **Dist. Library 0** is selected, Distribution Library 0 (VTS 0) acts as the I/O VTS. If **Dist. Library 1** is selected, Distribution Library 1 (VTS 1) acts as the I/O VTS.

5. Enter a short description in the **Description** field.

6. Select the **Add/Modify** button.

To modify a management class, select from the list of current management classes presented in the list box. Use the mouse or keyboard to highlight the management class you want to modify. Make modifications to the secondary pool, PtP copy control, and/or description. Select the **Add/Modify** button.

To delete a management class, select from the list of current management classes presented in the list box. Use the mouse or keyboard to highlight the management class you want to delete. Select the **Delete** button.

Notes:

1. The default management class, identified by eight dashes (--------), cannot be deleted.

2. Up to 256 management classes, including the default, can be defined.

Add/Modify

> Adds the entered management class or modifies the selected management class.

Delete Deletes the selected management class.

Refresh

> Refreshes the Manage Management Class window.

History

> Displays previous requests to Manage Management Classes. The requests are displayed in a separate screen:
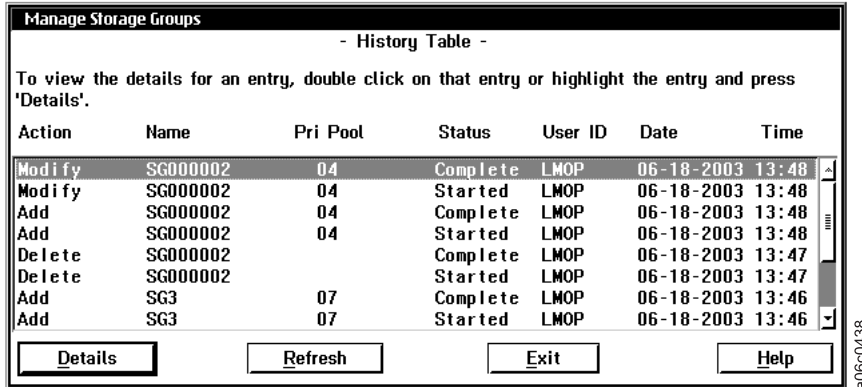

Figure 148. Manage Management Classes History Table

> Select an entry in the history table to display details. The details will be displayed in a separate screen:

Figure 149. Manage Management Classes History Details

Exit Closes the Manage Management Class window.

Help Provides help about the Manage Management Class window.

Manage Storage Classes

/   **Note:** You can view the Manage Storage Classes window from the Specialist (see
/   "Specialist Features and Functions" on page 332).

The Manage Storage Classes window (Figure 150) allows you to view and manage
storage classes. The following actions can be performed:

- Add a storage class
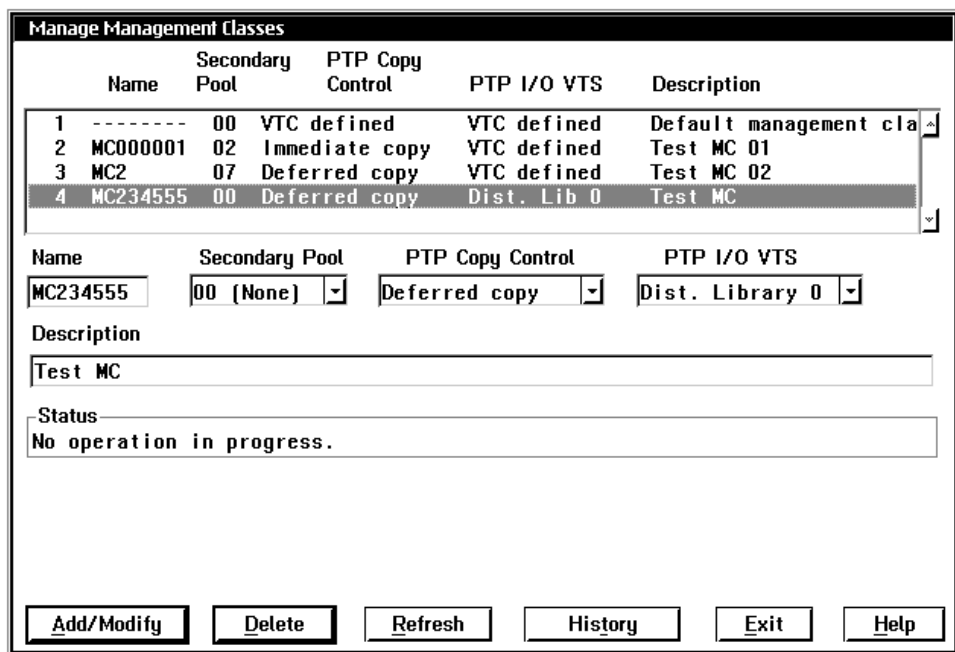- Modify an existing storage class
- Delete a storage class
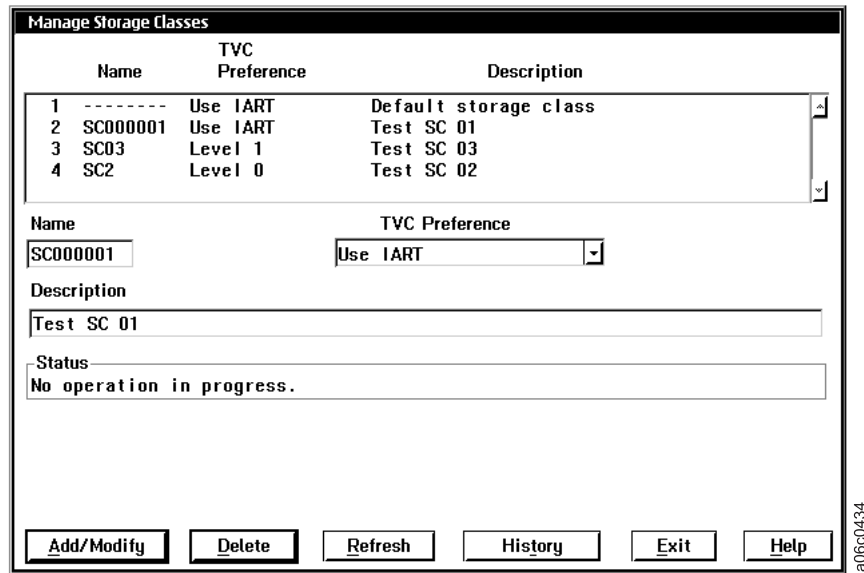
Figure 150. Manage Storage Classes Window

To add a storage class, do the following:

1. Enter a one to eight-character alphanumeric name in the **Name** field. The name
   must be unique within the storage class construct names.
2. Specify the **Tape Volume Cache Preference**. If **Use IART** is selected, the Initial
   Access Response Time (IART) method specified by the host to the VTS is used.
   If **0** is selected, volumes are removed from the tape volume cached (TVC) as
   soon as they are copied to tape. If **1** is selected, copied volumes are the first to
   be removed from TVC when space is needed in the TVC.
3. Enter a short description in the **Description** field.
4. Select the **Add/Modify** button.

To modify a storage class, select from the list of current storage classes presented
in the list box. Use the mouse or keyboard to highlight the storage class you want
to modify. Modify the TVC preference and/or description. Select the **Add/Modify**
button.

To delete a storage class, select from the list of current storage classes presented
in the list box. Use the mouse or keyboard to highlight the storage class you want
to delete. Select the **Delete** button.

Notes:

1. The default storage class, identified by eight dashes (--------), cannot be deleted.
2. Up to 256 storage classes, including the default, can be defined.

Add/Modify
> Adds the entered storage class or modifies the selected storage class.

Delete Deletes the selected storage class.

Refresh
> Refreshes the Manage Storage Class window.

History
> Displays previous requests to Manage Storage Classes. The requests are displayed in a separate screen:

Figure 151. Manage Storage Classes History Table

Select an entry in the history table to display details. The details will be displayed in a separate screen:

Figure 152. Manage Storage Classes History Details

Exit Closes the Manage Storage Class window.

Help Provides help about the Manage Storage Class window.

Manage Data Classes

/
/

Note: You can view the Manage Data Classes window from the Specialist (see "Specialist Features and Functions" on page 332).

The Manage Data Classes window (Figure 153) allows you to view and manage data classes. The following actions can be performed:

- Add a data class
- Modify an existing data class
- Delete a data class
- View history

Note: The Data Class does not have any associated actions at this time.

Figure 153. Manage Data Classes Window

To add a data class, do the following:

1. Enter an eight-character alphanumeric name in the **Name** field. The name must be unique within the data class construct names.
2. Enter a short description in the **Description** field.
3. Select the **Add/Modify** button.

To modify a data class, select from the list of current data classes presented in the list box. Use the mouse or keyboard to highlight the data class you want to modify. Modify the description. Select the **Add/Modify** button.

To delete a data class, select from the list of current data classes presented in the list box. Use the mouse or keyboard to highlight the data class you want to delete. Select the **Delete** button.

To view history, select the **History** button. The following screen will appear:

Figure 154. Manage Data Classes History Table

For further history details, select **Details**. The following screen will appear:

Figure 155. Manage Data Classes History Details

Notes:

1. The default data class, identified by eight dashes (--------), cannot be deleted.
2. Up to 256 data classes, including the default, can be defined.

Add/Modify
> Adds the entered data class or modifies the selected data class.

Delete   Deletes the selected data class.

Refresh
> Refreshes the Manage Data Classes window.

Exit   Closes the Manage Data Classes window.

Help   Provides help about the Manage Data Classes window.

Stacked Volume Pool Properties

/
/
Note: This feature is available on the Specialist under the title ″Modified Volume Pool Properties″ (see "Specialist Features and Functions" on page 332).

The Stacked Volume Pool Properties window (Figure 156) allows you to modify stacked volume pool properties. The storage pool properties define whether a pool can borrow/take from the Common Scratch Pool, and if so, what type of media it can borrow/take and what media type to borrow/take first and second. Storage pool properties can be set for general use pools 1 through 32. Pool properties are set separately for each VTS.
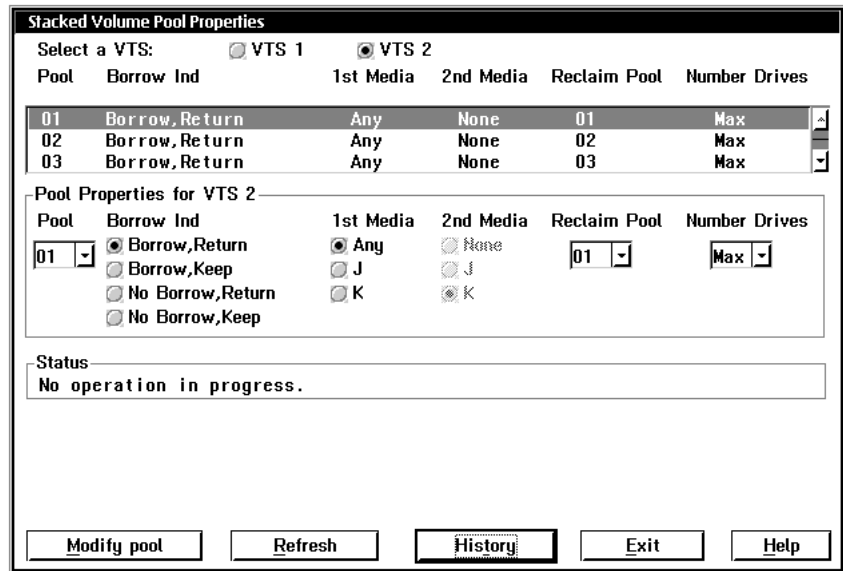
Figure 156. Stacked Volume Pool Properties Window

To modify pool properties, do the following:

1. Select VTS 1 or 2.

2. Select from the list of current stacked volume pools presented in the list box. Use the mouse or keyboard to highlight the stacked volume pool you want to modify.

3. In the Pool Properties for VTS section, modify the fields as needed.

   Borrow Ind

   > The setting that defines if the pool borrows or takes from the common scratch pool (Pool 00)

   > **Borrow, Keep**
   > > Borrows from the Common Scratch Pool (Pool 00) and does not return it

   > **Borrow, Return**
   > > Borrows from the Common Scratch Pool (Pool 00) and returns it later

   > **No Borrow, Keep**
   > > Does not borrow from the Common Scratch Pool (Pool 00), does not return existing cartridges

No Borrow, Return

Does not borrow from the Common Scratch Pool (Pool 00), returns existing cartridges later

1st Media

The setting that indicates the primary media type that the pool can borrow/take from the Common Scratch Pool (Pool 00)

Any   No preference

J   High Performance Cartridge Tape (HPCT)

K   Extended High Performance Cartridge Tape (EHPCT)

2nd Media

The setting that indicates the secondary media type that the pool can borrow/take from the Common Scratch Pool (Pool 00)

None   The only media type that the pool can borrow/take is defined by the 1st Media selection.

J   High Performance Cartridge Tape (HPCT)

K   Extended High Performance Cartridge Tape (EHPCT)

Reclaim Pool

The pool that logical volumes are assigned to when the physical volume they reside on is reclaimed by the VTS.

Number Drives

The maximum number of devices used to migrate data. Allows control of pre-migration tapes.

4. Select the **Modify pool** button

Modify pool

Modifies the selected storage pool's properties.

Refresh

Refreshes the Stacked Volume Pool Properties window.

History

Displays previous requests to Stacked Volume Pool Properties. The requests are displayed in a separate screen:

Figure 157. Stacked Volume Pool Properties History Table

Select an entry in the history table to display details. The details will be displayed in a separate screen:
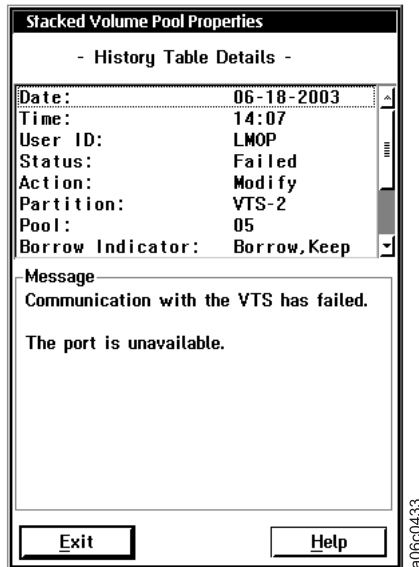
Figure 158. Stacked Volume Pool Properties History Details

Exit   Closes the Stacked Volume Pool Properties window.

Help   Provides help about the Stacked Volume Pool Properties window.

Move/Eject Stacked Volumes

/
/

Note: You can view the Move/Eject Stacked Volumes window from the Specialist (see "Specialist Features and Functions" on page 332).

The Move/Eject Stacked Volumes window (Figure 159 on page 238) allows you to move and eject stacked volumes. The VTS must be at code level 2.26.1.0 or higher and the Library Manager must be at code level 527 or higher to perform this function. The following action can be performed:

• Move a range of volumes to another pool
• Move a range of scratch only volumes to another pool
• Move a quantity of scratch only volumes to another pool
• Move logical volumes stored on range of stacked volumes to a target pool
• Eject a range of volumes
• Eject a range of scratch only volumes
• Eject a quantity of scratch only volumes
• Cancel active move requests
• Cancel active eject requests
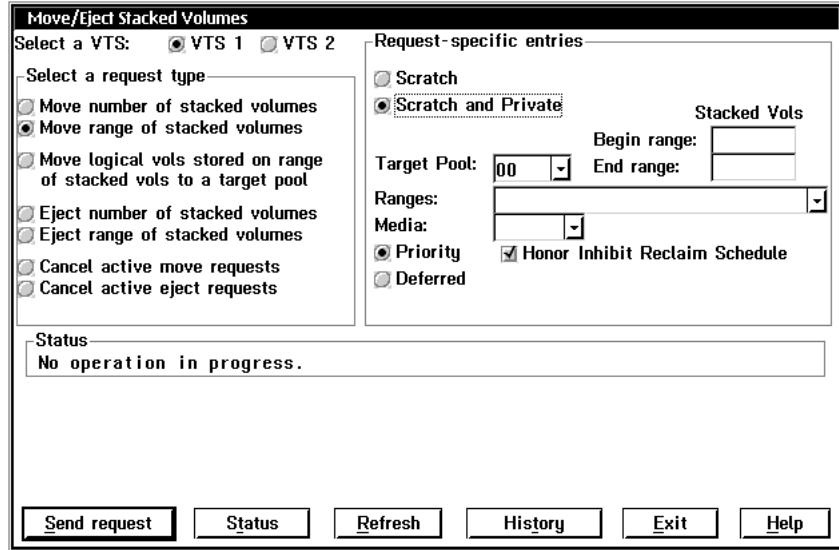
Figure 159. Move Stacked Volumes Window

The following requests can be completed for VTS 1 or VTS 2 (if installed). Select either one in the **Select a VTS:** option.

To move a range of volumes to another pool:

1. Select **Move range of stacked volumes**.
2. In the Request-specific entries, do the following:
   a. Select **Scratch and Private**.
   b. Define the volser range in the **Begin range** and **End range** fields or select a range using the **Ranges** pulldown.
   c. Select the pool where the volumes will be moved to in the **Target Pool** pulldown.
   d. Select the media type for the request in the **Media** pulldown.
      - **Any:** Indicates that either J or K media types can be moved/ejected
      - **J:** Indicates the default is the High Performance Cartridge Tape (HPCT)
      - **K:** Indicates the default is the Extended High Performance Cartridge Tape (EHPCT)
   e. Select either **Priority** or **Deferred**. A priority move request is forced to the top of the queue so it is performed immediately. A deferred move request occurs as part of the normal reclaim function.
   f. If **Priority** was selected, checking the **Honor Inhibit Reclaim Schedule** prevents requests from being performed during the times inhibited by the reclaim schedule.
3. Select the **Send Request** push button.

To move a range of scratch only volumes to another pool:

1. Select **Move range of stacked volumes**.
2. In the Request-specific entries, do the following:
   a. Select **Scratch**.
   b. Define the volser range in the **Begin range** and **End range** fields or select a range using the **Ranges** pulldown.

c. Select the pool where the volumes will be moved to in the **Target Pool** pulldown.

d. Select the media type for the request in the **Media** pulldown.

- **Any:** Indicates that either J or K media types can be moved/ejected
- **J:** Indicates the default is the High Performance Cartridge Tape (HPCT)
- **K:** Indicates the default is the Extended High Performance Cartridge Tape (EHPCT)

3. Select the **Send Request** push button.

To move a quantity of scratch only volumes to another pool:

Note: Only permanent members of the pool are eligible to be moved. For example, borrowed empty volumes that are currently in the source pool will not be moved to the target pool.

1. Select **Move number of stacked volumes**.

2. In the Request-specific entries, do the following:

a. Specify the number of volumes to move in the **Number of vols:** field.

b. Select the pool where the volumes will be taken from in the **Source Pool** pulldown.

c. Select the pool where the volumes will be moved to in the **Target Pool** pulldown.

d. Select the media type for the request in the **Media** pulldown.

- **Any:** Indicates that either J or K media types can be moved/ejected
- **J:** Indicates the default is the High Performance Cartridge Tape (HPCT)
- **K:** Indicates the default is the Extended High Performance Cartridge Tape (EHPCT)

3. Select the **Send Request** push button.

To move active logical volumes off of stacked volumes:

1. Select **Move logical vols stored on range of stacked vols to a target pool**.

2. In the Request-specific entries, do the following:

a. Define the volser range of stacked volumes in the **Begin range** and **End range** fields or select a range of stacked volumes using the **Ranges** pulldown.

b. Select the pool where the data (the active logical volumes) will be moved to in the **Target Pool** pulldown.

   Note: The stacked volumes will remain in their original pool, only the active logical volumes will be moved.

c. Select the media type for the request in the **Media** pulldown.

- **Any:** Indicates that either J or K media types can be moved/ejected
- **J:** Indicates the default is the High Performance Cartridge Tape (HPCT)
- **K:** Indicates the default is the Extended High Performance Cartridge Tape (EHPCT)

d. Select either **Priority** or **Deferred**. A priority move request is forced to the top of the queue so it is performed immediately. A deferred move request occurs as part of the normal reclaim function.

e. If **Priority** was selected, checking the **Honor Inhibit Reclaim Schedule** prevents requests from being performed during the times inhibited by the reclaim schedule.

3. Select the **Send Request** push button.

Note: If a volume cannot be moved, it may be for one of the following reasons.

- Volumes may be borrowed and not permanent residents of the source pool.
- The VTS may encounter error flag(s) set for volumes.
- Volumes may be set to read-only.
- VTS may encounter an error during processing of a volume.

To eject a range of volumes:

1. Select **Eject range of stacked volumes**.
2. In the Request-specific entries, do the following:
   a. Select **Scratch and Private**.
   b. Define the volser range in the **Begin range** and **End range** fields or select a range using the **Ranges** pulldown.
   c. Select the media type for the request in the **Media** pulldown.
      - **Any:** Indicates that either J or K media types can be moved/ejected
      - **J:** Indicates the default is the High Performance Cartridge Tape (HPCT)
      - **K:** Indicates the default is the Extended High Performance Cartridge Tape (EHPCT)
   d. Select either **Priority** or **Deferred**. A priority eject request is forced to the top of the queue so it is performed immediately. A deferred eject request occurs as part of the normal reclaim function.
   e. If **Priority** was selected, checking the **Honor Inhibit Reclaim Schedule** prevents requests from being performed during the times inhibited by the reclaim schedule.
3. Select the **Send Request** push button.

To eject a range of scratch only volumes:

1. Select **Eject range of stacked volumes**.
2. In the Request-specific entries, do the following:
   a. Select **Scratch**.
   b. Define the volser range in the **Begin range** and **End range** fields or select a range using the **Ranges** pulldown.
   c. Select the media type for the request in the **Media** pulldown.
      - **Any:** Indicates that either J or K media types can be moved/ejected
      - **J:** Indicates the default is the High Performance Cartridge Tape (HPCT)
      - **K:** Indicates the default is the Extended High Performance Cartridge Tape (EHPCT)
   d. Select where the cartridges will be ejected to by clicking the radio button next to **CIO** Convenience I/O or **HCIO** High Capacity I/O Facility (if installed).
3. Select the **Send Request** push button.

To eject a quantity of scratch only volumes:

Note: Only permanent members of the pool are eligible to be ejected. For example, borrowed empty volumes that are currently in the source pool will not be ejected.

1. Select **Eject number of stacked volumes**.
2. In the Request-specific entries, do the following:
    a. Specify the number of volumes to eject in the **Number of vols:** field.
    b. Select the pool where the volumes will be ejected from in the **Source Pool** pulldown.
    c. Select the media type for the request in the **Media** pulldown.
        • **Any:** Indicates that either J or K media types can be moved/ejected
        • **J:** Indicates the default is the High Performance Cartridge Tape (HPCT)
        • **K:** Indicates the default is the Extended High Performance Cartridge Tape (EHPCT)
    d. Select where the cartridges will be ejected to by clicking the radio button next to **CIO** Convenience I/O or **HCIO** High Capacity I/O Facility (if installed).
3. Select the **Send Request** push button.

To cancel active move/eject requests:
1. Select **Cancel Active Move Requests** or **Cancel Active Eject Requests**.
2. Select an option in the Target Pool drop-down list.
    • To cancel actions for a specific pool, select the pool.
    • To cancel actions for all pools, select ″All Pools″.
3. Specify the cancellation of either **Priority**, **Deferred**, or **All** Requests.

Send Request
> Sends the move/eject request.

Status
> Opens the Move/Eject Stacked Volumes — Status window.

Refresh
> Refreshes the Move/Eject Stacked Volumes window.

History
> Displays previous requests to Move/Eject Stacked Volumes. The requests are displayed in a separate screen:

Figure 160. Move/Eject Stacked Volumes History Table

> Select an entry in the history table to display details. The details will be displayed in a separate screen:
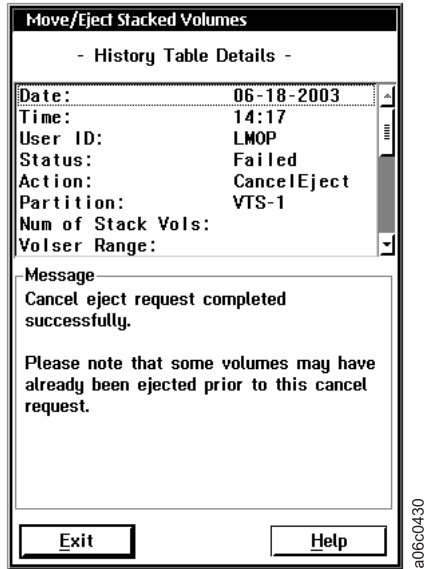
Figure 161. Move/Eject Stacked Volumes History Details

> **Exit** Closes the Move/Eject Stacked Volumes window.
>
> **Help** Provides help about the Move/Eject Stacked Volumes window.

Move/Eject Stacked Volumes (Status)

/   **Note:** You can view the Move/Eject Stacked Volumes status from the Specialist
/   (see "Specialist Features and Functions" on page 332).

This screen allows you to view the status of move/eject requests for the VTS.
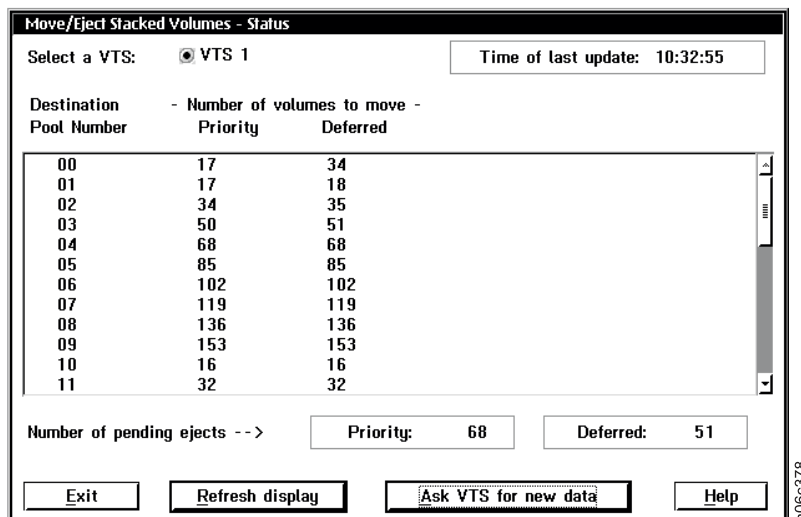
Figure 162. Move/Eject Stacked Volume (Status)

The table displays the following information:

Destination Pool Number

       The storage pool where the range of volumes specified in the request are being moved.

Number of volumes to move — Priority
The number of active priority move requests. A priority move request is a request that is forced to the top of the queue, so that it gets completed immediately.

Number of volumes to move — Deferred
The number of active deferred move requests. A deferred move is a request where the move occurs as part of the normal reclaim function.

The number of pending ejects are separated into two categories:

Priority
The number of active priority eject requests. A priority eject request is a request that is forced to the top of the queue, so that it gets completed immediately.

Deferred
The number of active deferred eject requests. A deferred eject request is a request where the eject occurs as part of the normal reclaim function.

Exit   Closes the Move/Eject Stacked Volumes (Status) window.

Refresh display
Refreshes the data on the Move/Eject Stacked Volumes (Status) window. Check the **Time of last update** to determine if the data is current.

Ask VTS for new data
Sends a request for new data to all VTSs that are Advanced Policy Management Capable. The panel data is refreshed automatically after the VTS responds to the request.

Help   Provides help about the Move/Eject Stacked Volumes (Status) window.

Manage Logical Volumes

Note: You can view the Manage Logical Volumes window from the Specialist (see "Specialist Features and Functions" on page 332).

Note: In a PtP VTS configuration, the insertion of logical volumes is controlled only from the User Interface distributed library.

The Manage Logical Volumes window (Figure 163 on page 245) allows two operations — the insertion of logical volumes into a VTS and/or changing the construct names of existing logical volumes. With the latest Library Manager code, a total of 500 000 logical volumes (with a maximum of 250 000 volumes per VTS) can be inserted into the 3494. With previous versions of the code, up to 50 000 logical volumes can be inserted. For information on determining the code level you have, see "Using the Help Window" on page 115.

Volsers must be six characters in length and must be unique within a physical library. A logical volume's volser cannot match another logical or physical volume's volser. If a duplicate volser is encountered, the duplicate is not inserted.

To insert logical volumes, perform the following steps:
1. Select the **Insert new logical volumes** radio button.
2. Enter a volser or range of volsers to be inserted into the 3494.
3. Select the cartridge type to be emulated.

4. Select management constructs in the drop-down lists beneath Storage Group, Storage Class, Management Class, and Data Class. Select Default or one of the existing constructs. For MVS attached systems, select Default for all four constructs.

5. Select the VTS library into which the volumes are to be inserted.

6. Select the **Perform action** push button.

To change the construct names of existing logical volumes, perform the following steps:

Note: If the host is an MVS host, do not change construct names of existing logical volumes. The host will overwrite the selected names.

1. Select the **Change existing logical volumes** radio button.

2. Enter a volser or range of volsers to be changed.

3. Select management constructs in the drop-down lists beneath Storage Group, Storage Class, Management Class, and Data Class. Select Default or one of the 8–character constructs.

4. Select the VTS library which volumes are to be changed.

5. Select the **Perform action** push button.

The Manage Logical Volumes window has the following controls:

Volser Range entry fields   The volser entry fields must contain six alphanumeric characters. The two volsers must be entered in the same format. Corresponding characters in each volser must both be either alphabetic or both be numeric. For example, AAA998 and AAB004 are of the same form, but AA9998 and AAB004 are not.

The volser is increased such that alphabetic characters are increased alphabetically, and numeric characters are increased numerically. For example, volser range ABC000–ABD999 would result in 2,000 volsers (ABC000–ABC999 and ABD000–ABD999).

Emulation buttons   These buttons allow you to select the type of physical cartridge the logical volume will emulate. The options are Cartridge System Tape (CST) or Enhanced Capacity Cartridge System Tape (ECCST).

Storage Management Construct drop-downs
These drop-down lists allow you to select the storage group, management class, storage class, and/or data class that the volser(s) should be assigned to.

Note: The default constructs are indicated by eight dashes (--------).

VTS Library buttons   These buttons allow you to select the VTS into which the logical volumes will be inserted. Buttons are displayed only for the number of VTSs installed.
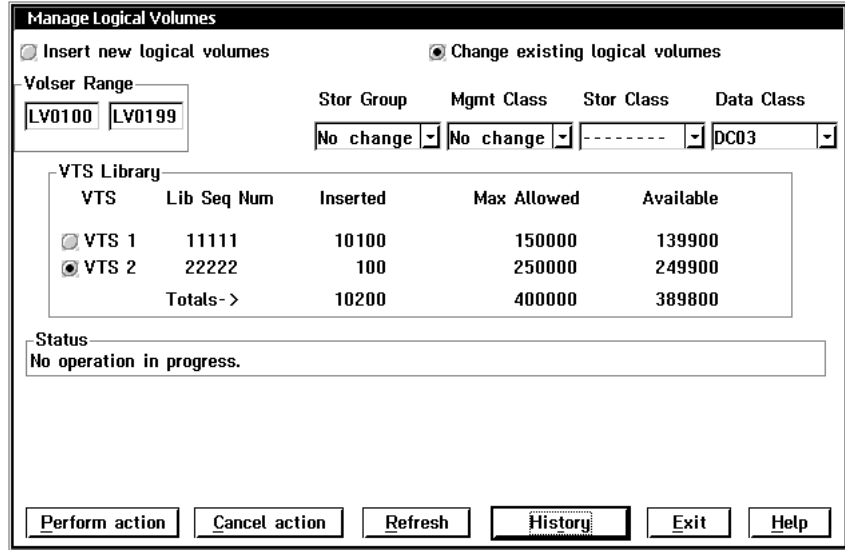
Figure 163. Manage Logical Volumes Window

The Manage Logical Volumes window has the following push buttons:

Perform action

Initiates the Insert Logical Volumes operation or Change Existing Logical Volumes operation. The number of volumes that are to be inserted is displayed for you to confirm. Select **Yes** to proceed with the Insert operation or **No** to cancel the Insert operation.

A check is made to ensure that the total number of logical volumes for the 3494 does not exceed the maximum allowable number. If the Insert operation would result in more than the maximum allowable number of logical volumes in the 3494, an error message is displayed, and the Insert operation is canceled.

When multiple VTSs are in the 3494, logical volumes may be assigned to each VTS in any quantity, providing that the total for all logical volumes does not exceed the maximum allowable for the 3494.

During the Insert operation, the line status indicates the progress of the Insert operation.

Cancel action Closes the Manage Logical Volumes window.

Refresh Refreshes the Manage Logical Volumes window.

History Displays previous requests to Manage Logical Volumes. The requests are displayed in a separate screen:
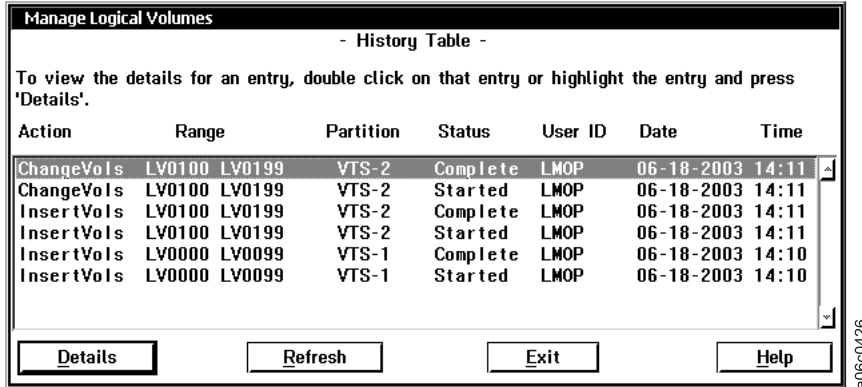
Figure 164. Manage Logical Volumes History Table

Select an entry in the history table to display details. The details will be displayed in a separate screen:
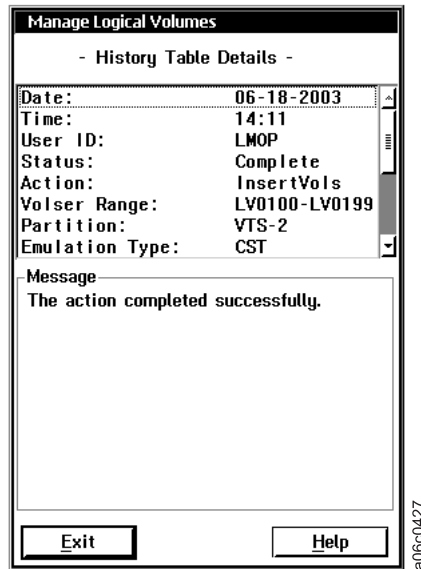
Figure 165. Manage Logical Volumes History Details

Exit   Closes the Manage Logical Volumes window.

Help   Provides help about the Manage Logical Volumes window.

Transfer LM Administrative Data

The Transfer LM Administrative Data window allows you to backup or restore Library and/or VTS data.
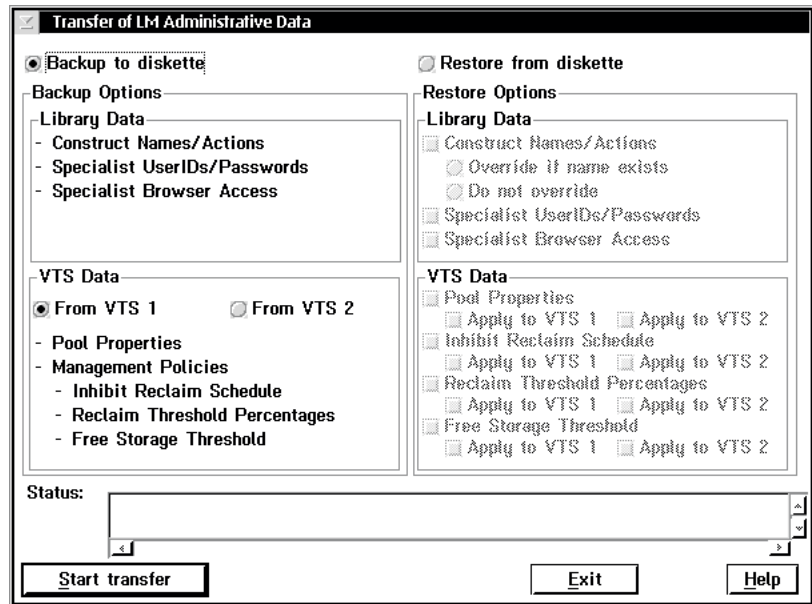
Figure 166. Transfer LM Administrative Data Window — Backup to Diskette
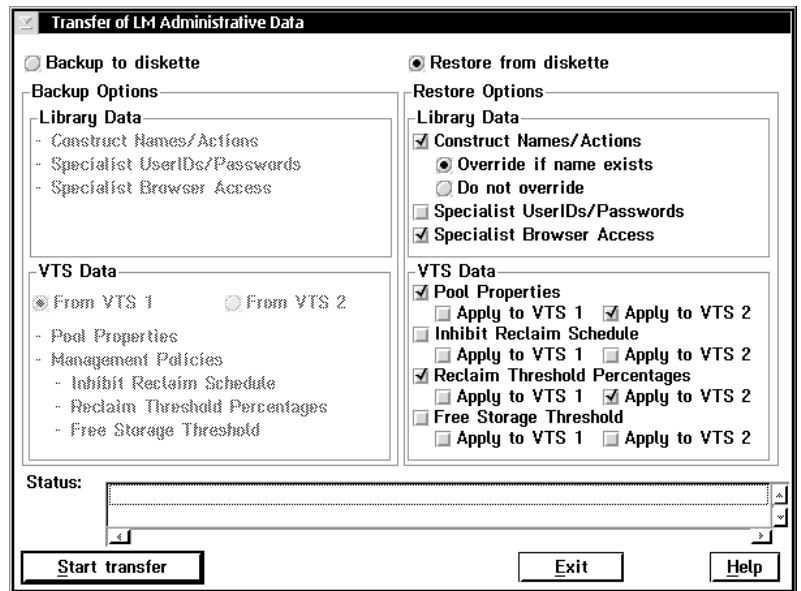
Figure 167. Transfer LM Administrative Data Window — Restore from Diskette

To backup the current LM administrative data to diskette, insert a blank, formatted diskette in the A: drive. Select the **Backup to diskette** radio button. Select **From VTS 1** or **From VTS 2** and then select the **Start Transfer** button.

To restore LM administrative data from a diskette, insert the diskette containing the data into the A: drive. Select the **Restore from diskette** radio button. Select the data you would like to restore and then select the **Start Transfer** button.

The data options are as follows:

- Library Data
  - **Construct Names/Actions**: On restore, non-existent construct names/actions are added up to the maximum construct names allowed. Select **Override if name exists** to copy over existing construct names/actions with the new ones on the diskette. Select **Do not override** to ignore existing construct names/actions on the diskette and keep the existing construct names/actions.
  - **Specialist Userids/Passwords**: All existing userids/passwords are replaced. Non-existent userids/passwords are added.
  - **Specialist Browser Access**: Replaces existing capabilities. This sets the Web access for Specialist-related pages.
- VTS Data — The following options can be applied to either VTS 1 or VTS 2 (if installed) for backups, and can be applied to either VTS 1, VTS 2 (if installed), or both for restores.
  - **Pool Properties**: The pool properties can be applied to any VTS in the library regardless of whether it has Advanced Policy Management FC 4001 installed. If a VTS does not support Advanced Policy Management, the pool properties applied will have no effect.
  - **Inhibit Reclaim Schedule**: The inhibit reclaim schedule is backed up. During restore, the schedule is applied based on the number of VTSs in the library. The existing schedule is replaced.
  - **Reclaim Threshold Percentages**: The reclaim threshold percentages can be applied to any VTS in the library regardless of whether it has Advanced Policy Management FC 4001 installed. If a VTS does not support Advanced Policy Management, the reclaim threshold percentage for pool 01 is used.
  - **Free Storage Threshold**: The free storage threshold can be backed up and/or restored.

Manage 3592 Devices

To manage the 3592 devices, select the **Commands** pulldown, select **System Management**, and scroll to **Manage 3592 devices**.
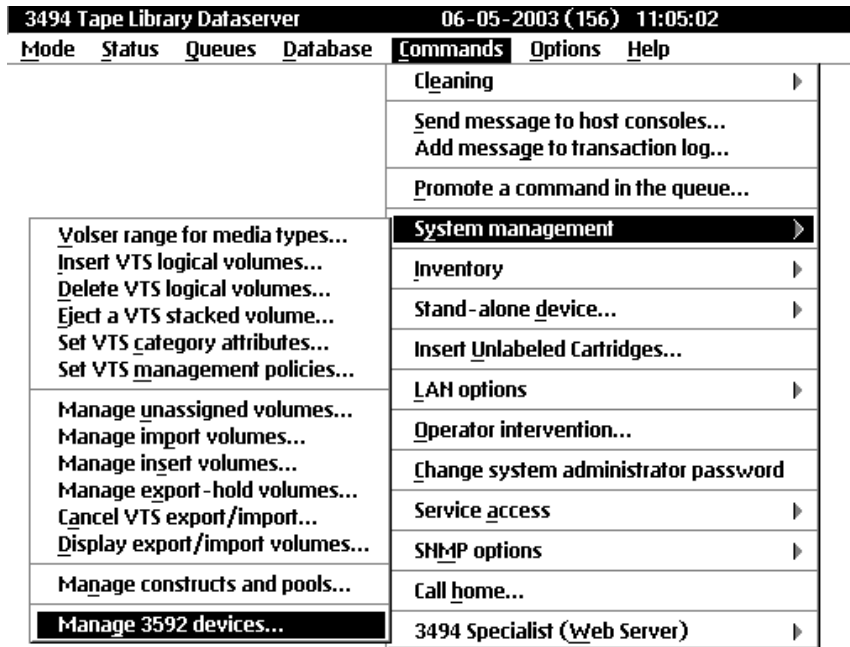
Figure 168. Manage 3592 Devices

From this menu, the following operations can be performed. Service Only operations must be performed by a service representative.

- Get VPD (General Operator)
- Set VPD (Service Only)
- VPD Summary/Code Load (System Administrator Only)
- Dump Processing (Service Only)
- Verify Fix Diagnostics (Service Only)
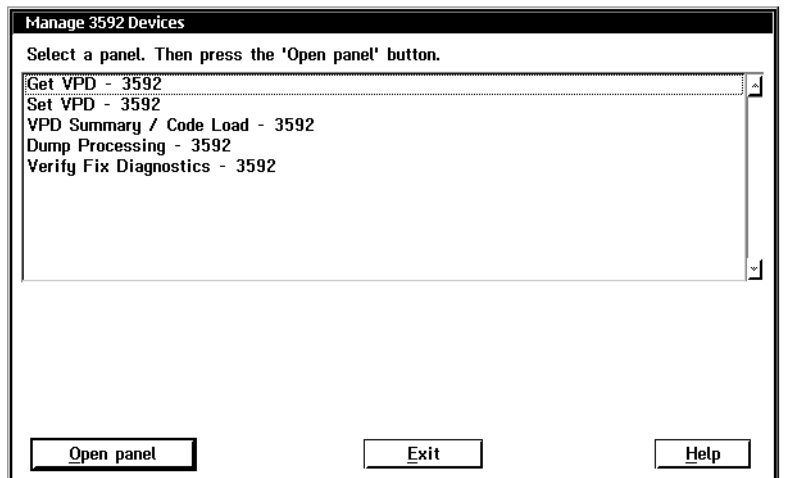
Figure 169. Manage 3592 Devices Panel Selection

Select the panel you would like to work with and press the **Open Panel** button.

Get Drive VPD

The Get VPD window allows you to view vital product data of your 3592 tape devices.

```
Get VPD - 3592
Select a device from list box and then press the      Device    Frame Num    Frame Type
'Get VPD' button at bottom of panel.                  281          02          D22-2      ▼
Basic Data

Device / Date and Time: ............... 281 / 06-02-2003 11:45     ▲
Serial Number: ........................ 222222222222
EC Number: ............................ DDRVE2
Active Code Level: .................... D310-R03
Active Code Time: ..................... 0 Days 00:03:00
Secondary Code Level: ................. D310-R04                   ▼
Extended Data
Fibre Channel Port 0 Status:                                       ▲
   Online/Offline: .................... Offline
   Fibre Address: ..................... 0x00A2A4A6
   Speed: ............................. 2 GB/sec
   NPort Topology: .................... Yes
   LPort Topology: .................... Yes
   Fibre Connection Failed: ........... Yes
   Address Conflict: .................. Yes                        ▼
┌Status─────────────────────────────────────────────────────────┐
│No operation in progress.                                        │
└─────────────────────────────────────────────────────────────────┘

┌─Get VPD─┐  ┌─Cancel Get VPD─┐  ┌─Refresh─┐  ┌─History─┐  ┌─Exit─┐  ┌─Help─┐
```

Figure 170. Get Drive VPD Data Window

To view VPD for a single device, perform the following steps:

1. Select a 3592 device from the drop-down menu.
2. Select the **Get VPD** button.

To view History, perform the following steps:

1. Select the History button.
2. The History Table will be displayed.

```
Get VPD - 3592
                              - History Table -

To view the details for an entry, double click on that entry or highlight the entry and press
'Details'.

Action      Drive                    Status       User ID    Date          Time
GetVPD      281                      Complete     LMOP       06-02-2003  11:45   ▲
GetVPD      281                      Started      LMOP       06-02-2003  11:45
GetVPD      281                      Complete     LMOP       06-02-2003  11:45
GetVPD      281                      Started      LMOP       06-02-2003  11:45
GetVPD      382                      Complete     LMOP       06-02-2003  11:30
GetVPD      382                      Started      LMOP       06-02-2003  11:30
GetVPD      382                      Complete     LMOP       06-02-2003  11:30
GetVPD      382                      Started      LMOP       06-02-2003  11:29   ▼
┌─Details─┐        ┌─Refresh─┐        ┌─Exit─┐        ┌─Help─┐
```

Figure 171. Get VPD History Table

3. To get more information about an action, select the action and press the **Details**. The following popup window will display more information about the selected action.
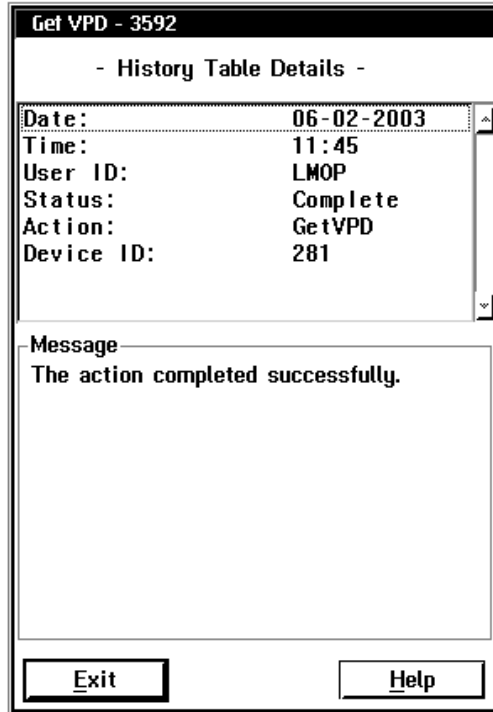
Figure 172. Get VPD History Details

The VPD is split into two sections — Basic and Extended.

The Get Drive VPD window has the following push buttons:

Get VPD
Retrieves vital product data for the specified tape drive and displays it on the screen.

Cancel Get VPD
Cancels the current VPD request.

Refresh
Refreshes the screen with the most recent vital product data.

History
Displays a history table, showing past VPD requests.

Exit   Closes the Get Drive VPD window.

Help   Provides help about the Get Drive VPD window.

VPD Summary/Code Load (System Administrator Only)

Note: You can view vital product data from the Specialist under the title ″Retrieve 3592 Drive VPD″ (see "Specialist Features and Functions" on page 332).

The VPD Summary/Code Load window allows you to view a summary of vital product data and load code.

```
VPD Summary / Code Load - 3592
                                              ---- Code Levels ----
Dev/Frame   Status (VPD Summary)     ECNum    SerialNum   WORM  Active      Secondary

180/02 Complete                      ECNUM1 123456789tuv  N  D310-R01  D310-R02-S
181/02 Complete                      DDRVE2 222222222222  N  D310-R03  D310-R04-I
182/02 Complete                      ECNUM1 123456789tuv  N  D310-R01  D310-R02-S
183/02 Complete                      DDRVE2 222222222222  N  D310-R03  D310-R04-I
184/02 Complete                      ECNUM1 123456789tuv  N  D310-R01  D310-R02-S
280/03 Complete                      DDRVE2 222222222222  N  D310-R03  D310-R04-I

    [ Get VPD Summary ]   [ Cancel Get VPD Summary ]       [ Select All ]  [ De-Select All ]


    [ Copy Code from CD to Hard Drive ]

    File Name          Date/Time           Size
    D310_654.FMR   04-07-2004 11:46:13   1,889,437
    D310_792.FMR   04-07-2004 11:46:13   1,889,437
    D310_954.FMR   04-07-2004 11:46:13   1,889,437

    [ Start Code Load ]    [ Start Code Activate ]      [ Cancel Code Load/Activate ]

    □ Force    [ Start Code Load/Activate ]
    [ Refresh ]          [ History ]            [ Exit ]            [ Help ]
```

Figure 173. VPD Summary/Code Load Window

To get a summary of the drive VPD, perform the following steps:

1. Select a 3592 device or set of devices from the listbox.

2. Select the **Get VPD Summary** button.

You can either load drive code from a CD or a hard disk. To load code from a CD, you must transfer to code image to the hard disk. To load code, perform the following steps:

1. Select the drive(s) for which you wish to load code.

2. If media is not in the drive, you will be prompted to insert a CD into the drive. Insert the CD and select the **OK** button. A file list of valid code images on the CD will appear. Select the code image you want and select the **OK** button. The code image you selected will appear in the drop-down list. Select the appropriate file from the drop-down list and select the **Start Transfer** button. When the image is fully transferred to the hard disk, it will appear in the "Current code files on hard drive" listbox.

3. Select a file from the "Current code files on hard drive" listbox.

4. Select the **Start Load** button.

Note: If the code is already transferred to the drive, you can select the **Start Code Activate** button to perform just the activate for the device. This skips downloading the code.

To view History, perform the following steps:

1. Select the History button.

2. The History Table will be displayed.

Figure 174. VPD Summary/Code Load History Table

3. To get more information about an action, select the action and press the **D**etails. The following popup window will display more information about the selected action.

Figure 175. VPD Summary/Code Load History Details

The VPD Summary/Code Load window has the following push buttons:

Start Transfer
  Transfers a code image from a CD to the hard disk.

Stop Transfer
  Stops the transfer of a code image from a CD to a hard disk.

Start Load
  Installs microcode in a drive.

Activate Only

> Activates the selected code image for the selected device(s).

History

> Displays a history table for the function.

Exit   Closes the window.

Help   Provides help about the window.

Inventory

The **Inventory** option allows the following operations:

- Inventory new storage or reinventory complete system
- Disable inventory update
- Enable inventory update
- Perform inventory update (full)
- Perform inventory update (partial)

Inventory New Storage or Re-inventory Complete System

The system administrator password typically protects these options. The 3494 can perform the inventory process only under the following conditions:

- The Library Manager is offline and in Auto mode.
- The Teach process is completed.
- The cleaner volume masks are set (see "Cleaner Volume Masks" on page 259).
- The volser ranges are set (see "Set the Volser Range" on page 259).

Select a type of inventory as follows:

- Inventory new storage (at subsystem installation time)

  Note: Selecting inventory new storage causes the 3494 to eject any cartridges with unreadable external labels.

- Re-inventory the complete system (at any time)

  Notes:

  1. If VTSs are installed, see "Re-inventory with VTSs" on page 262.
  2. If you select the **Re-inventory Complete System** option and there are VTS Import or Export Stacked Volumes in the Unassigned, Import, or Export-Hold categories, then the Display VTS Export/Import Volumes window (Figure 176 on page 256) opens. You cannot continue with the re-inventory until you eject the Export and Import volumes. The re-inventory is blocked to prevent the possible destruction of important exported data. You should exit this window, then select the appropriate windows under the Commands window under **System Management** in the LM Operator window and eject the indicated volumes. When you have ejected all Export and Import volumes from the 3494, you can then select the **Re-inventory Complete System** option and continue.

```
┌─────────────────────────────────────────────────────────────┐
│ Display VTS Export/Import Volumes                             │
├─────────────────────────────────────────────────────────────┤
│                                                               │
│  A reinventory of the complete system cannot be executed while│
│  there are VTS export/import volumes in the library.          │
│                                                               │
│                                                               │
│  ┌─Number of Volumes─────────────────────────────────────┐   │
│  │    Unassigned category:          4                     │   │
│  │    Import category:              4                     │   │
│  │    Export-Hold category:         0                     │   │
│  │                                                        │   │
│  └────────────────────────────────────────────────────────┘   │
│                                                               │
│  These stacked volumes can be moved to the insert category or │
│  ejected from the library by using the following panels under │
│  'System Management' from the 'Commands' pulldown:            │
│                                                               │
│                                                               │
│          - Manage Unassigned Volumes                          │
│          - Manage Import Volumes                              │
│          - Manage Export-Hold Volumes                         │
│                                                               │
│  ┌──────────┐                              ┌──────────┐       │
│  │   OK     │                              │   Help   │       │
│  └──────────┘                              └──────────┘       │
└─────────────────────────────────────────────────────────────┘
```

Figure 176. Display VTS Export/Import Volumes Window

Save Logical Volumes

When you request a complete inventory and the 3494 contains a VTS, the 3494 prompts you to save the logical volumes (see Figure 177 on page 257). Answering **Yes** saves the logical volumes. You do not need to reinsert them after the inventory completes. Answering **No** erases all the logical volumes. You must reinsert the logical volumes after the inventory completes.

Attention: If the library includes a VTS that is part of a PtP VTS configuration, you must save the logical volumes. This ensures that the logical volume databases will remain equal on the distributed libraries of the PtP VTS.

Figure 177. Save Logical Volumes Window

Inventory - Save Logical Volumes and Physical Volume Information

The Inventory - Save Logical Volumes and Physical Volume Information window (Figure 178 on page 258) opens before the start of an Inventory operation. This allows you to save the VTS logical volumes and physical volume information stored in the Library Manager database. This save operation has the following benefits:

- When you save the VTS logical volumes, you do not have to reinsert them later. This also preserves the category information in the database.
- When you save the physical volume information, you also preserve the category information in the database.

If the database contains physical volume information, this window contains two radio buttons for the non-VTS partition:

- Save physical volume information
- Don't save physical volume information

If the database contains both physical and logical volume information, this window contains three radio buttons for the VTS partitions:

- Save logical volumes and physical volume information
- Save logical volumes only
- Don't save any volumes or volume information

The Inventory - Save Logical Volumes and Physical Volume Information window has the following control:

Buttons for each partition   These buttons allow you to select the Save or Don't Save action you want the 3494 to perform. Buttons are available only for the number of VTSs installed.

Buttons for saving/deleting library constructs (and associated definitions)
These buttons allow you to select "Save library construct definitions" or "Delete library construct definitions".

```
┌─────────────────────────────────────────────────────────────────────────┐
│ ▽  Inventory - Save Logical Volumes and Physical Volume Information        │
├───────────────────────────────────────────────────────────────────────────┤
│ The physical volume information for each partition can either be saved or  │
│ deleted. Please view the help panel.                                       │
│                                                                            │
│ The VTS logical volumes can either be saved or deleted. Saving them        │
│ eliminates the need to re-insert them later and preserves the volume       │
│ information. Please view the help panel.                                   │
│                                                                            │
│    Partition    Lib Seq Num          Actions                               │
│  ┌─────────────────────────────────────────────────────────────────────┐  │
│  │  Non-VTS       00000        No physical volumes in database          │  │
│  │                                                                       │  │
│  │  VTS 1         11111   ◉ Save logical volumes and physical volume     │  │
│  │                          information                                  │  │
│  │                        ○ Save logical volumes only                    │  │
│  │                        ○ Don't save any volumes or volume information │  │
│  │  VTS 2         22222        No physical volumes in database           │  │
│  │                        ◉ Save logical volumes only                    │  │
│  │                        ○ Don't save any volumes or volume information │  │
│  └─────────────────────────────────────────────────────────────────────┘  │
│                                                                            │
│  The library constructs (and associated definitions) can be saved or       │
│  deleted.                                                                   │
│      ◉ Save library construct definitions.                                  │
│      ○ Delete library construct definitions                                 │
│                                                                            │
│  ┌──────────┐        ┌──────────────────┐        ┌──────────┐              │
│  │  OK...   │        │ Cancel inventory │        │  Help    │              │
│  └──────────┘        └──────────────────┘        └──────────┘              │
└───────────────────────────────────────────────────────────────────────────┘
```
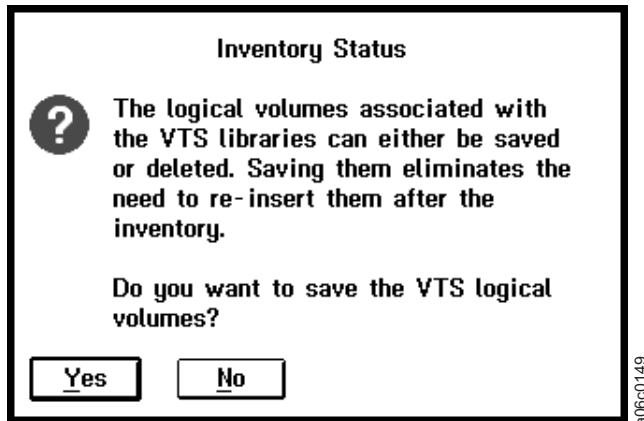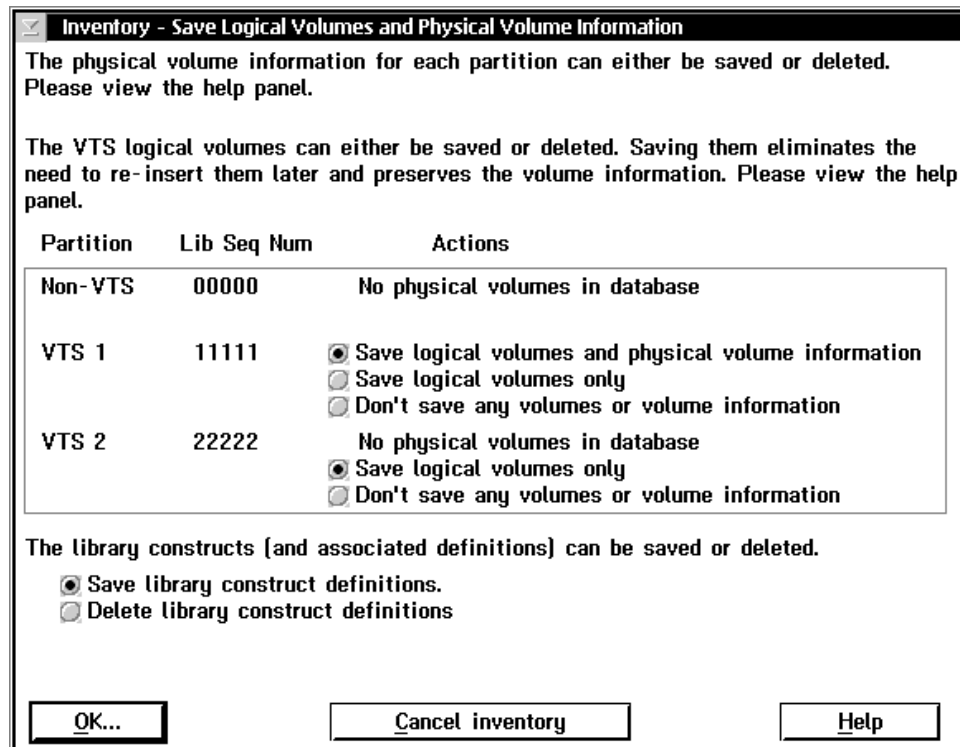
Figure 178. Inventory - Save Logical Volumes and Physical Volume Information Window

The Inventory - Save Logical Volumes and Physical Volume Information window has the following push buttons:

OK...   Accepts the options selected with the radio buttons and continues with preparations for the Inventory operation.

Cancel inventory   Cancels the Inventory operation and closes the Inventory - Save Logical Volumes and Physical Volume Information window.

Help   Provides help about the Inventory - Save Logical Volumes and Physical Volume Information window.

Set the Volser Range

When selecting a type of inventory, the Volser Ranges window (Figure 179) opens to allow you to set the volser ranges.

Figure 179. Inventory - Volser Ranges Window

This window is similar to the Volser Ranges window selectable in the Commands window (Figure 130 on page 211). The only difference is the addition of the **Start Inventory...** push button. Select this push button after reviewing or modifying the volser ranges. Selecting the **Start Inventory...** push button allows the inventory process to continue. Selecting the **Cancel inventory** push button cancels the inventory process.

Cleaner Volume Masks

When selecting a type of inventory, an option to set the cleaner volume masks is displayed. You must set at least one of the masks (for example, CLN***). The CLN prefix is not a requirement. You can use any valid volser. The Inventory - Cleaner Masks window (Figure 180 on page 260) allows you to set the cleaner volume masks.

The cleaner volume masks are external labels with patterns of characters used to identify the volumes that are cleaner cartridges. The cleaner volume masks allow for identification of cleaning cartridges that either are put into the 3494 through an input station or are identified during an inventory operation. When identified, cleaner volumes are assigned to a cleaner volume category.

The Inventory - Cleaner Masks window allows the entry of up to ten cleaner masks. If this is the first time the masks are displayed, the first mask is set to a default value of CLN***, and the other nine masks are set to blanks. If this is not the first time the masks are displayed, whatever was entered last is displayed. You can use the asterisk (*) in the mask. It is interpreted as a wild card character (any valid character). When the masks are set, the 3494 considers any volser labels that match any of the masks to be cleaner volumes.
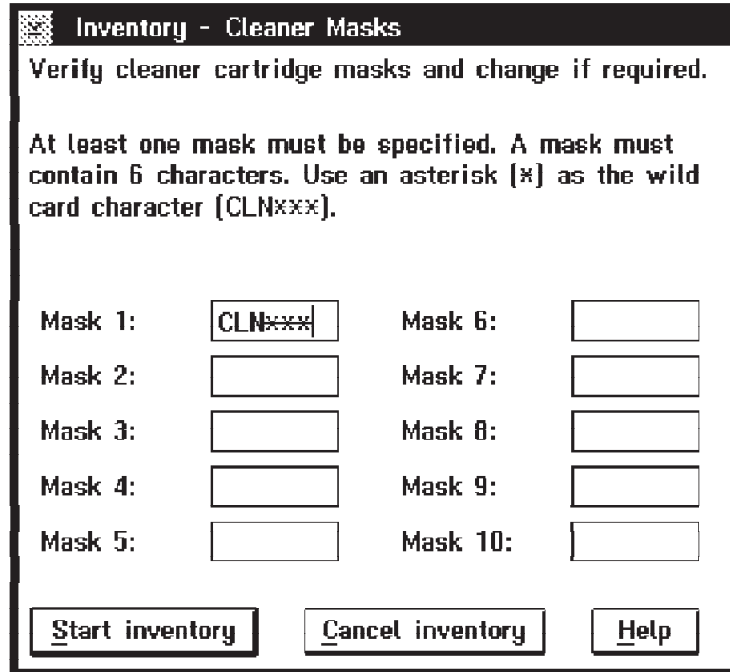
Figure 180. Inventory - Cleaner Masks Window

The Inventory - Cleaner Masks window has the following push buttons:

Start inventory   Starts the inventory process.

Cancel inventory   Cancels the inventory process.

Help   Provides help about the Inventory - Cleaner Masks window.

Inventory Status

The Inventory Status window (Figure 181) displays the status information about the inventory operation in progress. It is updated periodically as the operation progresses.

Figure 181. Inventory Status Window

The Inventory Status window contains the following messages:

- **Rack XX is being inventoried** and **Number of racks complete**. This display occurs during the physical inventory operation.
- **Indexing database, please stand by.** This display occurs after the physical inventory operation.
- **Inventory cancel in progress, please stand by.** This display occurs when you cancel the inventory.

Note: If the Dual Active Accessors feature is installed, information is displayed for both accessors (see Figure 182).
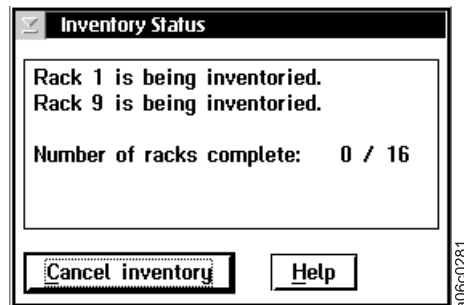
Figure 182. Inventory Status Window (Dual Active Accessor Libraries)

The Inventory Status window has the following push buttons:

Cancel inventory   Cancels the inventory process. You are prompted to confirm your selection. If you select **Yes**, the inventory is canceled, the current rack being inventoried is marked not inventoried, and the window is closed. If you select **No**, the inventory continues. This push button is disabled (grayed or reduced contrast) during the indexing database phase.

> **Note:** If you cancel the inventory, select the **Inventory New Storage** option when you

are ready to continue. This option allows the inventory to continue from the point at which you canceled the original inventory.

Help   Provides help about the Inventory Status window.

Re-inventory with VTSs

Before selecting the **Re-inventory complete system** option, you must return VTS stacked volumes mounted on 3590 tape drives associated with the VTS to 3494 storage cells (this is done by taking the VTS offline, which causes the VTS to unload the drives). Do this by setting the VTSs to the Offline state before setting the 3494 to the Offline state.

To prepare for **Re-inventory complete system**, perform the following steps:

1. All logical libraries (VTSs and non-VTS logical libraries, if any) must be varied offline at the attaching hosts.
2. Select the **Service menu...** option in the Mode window to allow access to additional service functions.
3. In the Service window (Figure 183 on page 263), select the **VTS subsystem management** option, then select the **Online/Offline...** option to display the VTS Online/Offline window (Figure 184 on page 264).
4. To set the VTS units offline, perform the following:
   a. Select the **VTS 1 -> Offline** option and wait for messages indicating that the Offline operation initiated and completed successfully. If an error message is displayed, contact your service representative.
   b. If a second VTS is installed, select the **VTS 2 -> Offline** option and wait for messages indicating that the Offline operation initiated and completed successfully.
   c. When all VTS units are offline, close the window by selecting the **Cancel** option in the VTS Online/Offline window.
5. Place the 3494 in the Offline state by using the Mode window.
6. In the Commands window, select the **Inventory** option, then select the **Re-inventory complete system** option. When the inventory operation is complete, return the 3494 to the Online state by using the Mode window.

   Note: Be sure to select the **Yes** option in the Save Logical Volumes window (see Figure 177 on page 257) when asked if you want to save the VTS logical volumes.

   Attention: If the 3494 includes a VTS that is part of a PtP VTS configuration, you must save the logical volumes. This ensures that the logical volume databases will remain equal on the distributed libraries of the PtP VTS.

7. In the Service window, place all VTSs online by selecting the **VTS subsystem management** option and the **Online/Offline...** option.
8. Select the **Operator menu** option in the Mode window to display only operator action bar items.
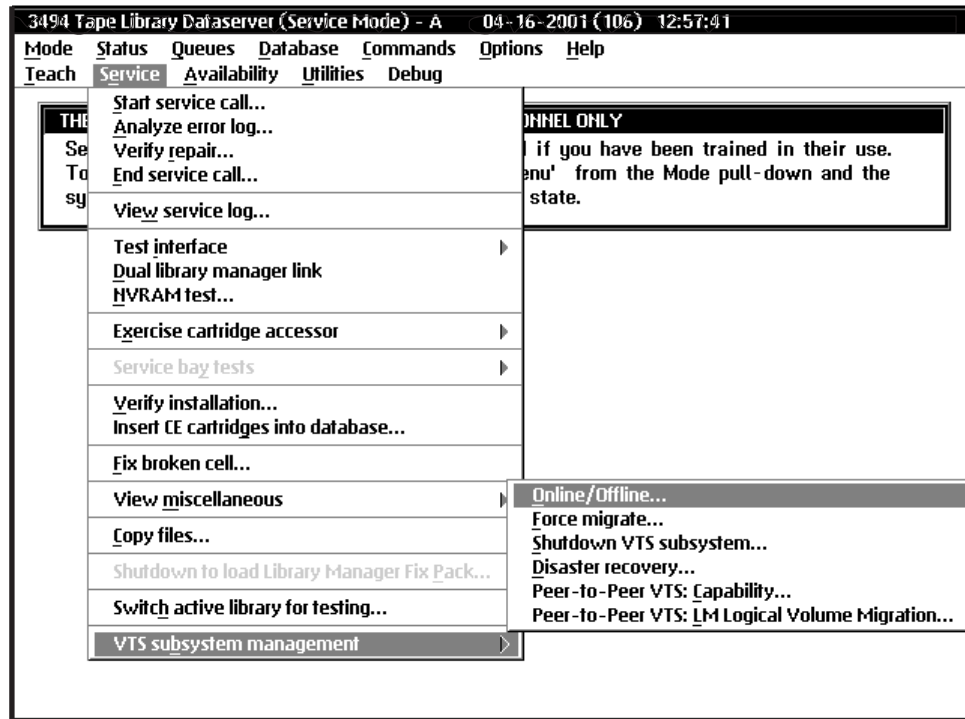9. The attaching hosts may vary libraries online.

```
3494 Tape Library Dataserver (Service Mode) - A      04-16-2001 (106)  12:57:41
Mode   Status   Queues   Database   Commands   Options   Help
Teach  Service  Availability  Utilities  Debug

         Start service call...
  THE    Analyze error log...                          ONNEL ONLY
  Se     Verify repair...                              l if you have been trained in their use.
  To     End service call...                           enu'  from the Mode pull-down and the
  sy     View service log...                           state.

         Test interface                         ▶
         Dual library manager link
         NVRAM test...

         Exercise cartridge accessor            ▶

         Service bay tests                      ▶

         Verify installation...
         Insert CE cartridges into database...

         Fix broken cell...

         View miscellaneous                     ▶    Online/Offline...
                                                      Force migrate...
         Copy files...                                Shutdown VTS subsystem...
                                                      Disaster recovery...
         Shutdown to load Library Manager Fix Pack...  Peer-to-Peer VTS: Capability...
                                                      Peer-to-Peer VTS: LM Logical Volume Migration...
         Switch active library for testing...

         VTS subsystem management               ▶
```

a06c0256
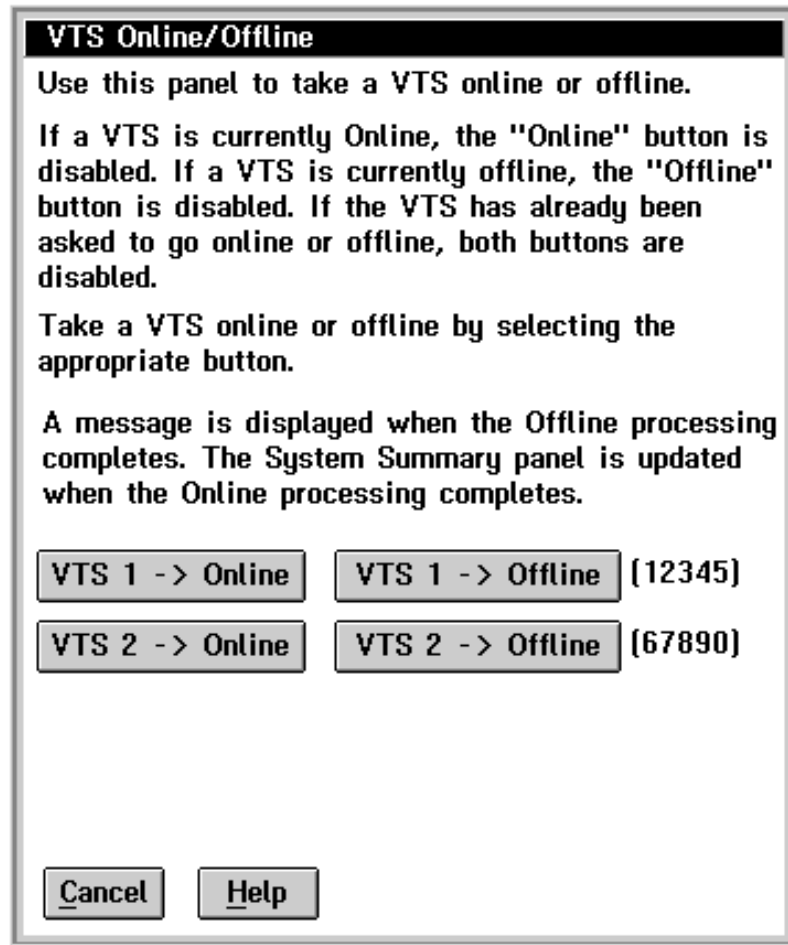
Figure 183. Service Window

Figure 184. VTS Online/Offline Window

Disable Inventory Update

Select the **Disable Inventory Update** option (Figure 185 on page 265) to prevent the inventory update from being performed after you open and close a door. The 3494 remembers this selection across shutdowns.

Note: You should insert or eject cartridges through an I/O facility only while Inventory Update is disabled.

A system administrator password typically protects this option. The password protection option can be selected during installation (see "Change System Administrator Password" on page 290).
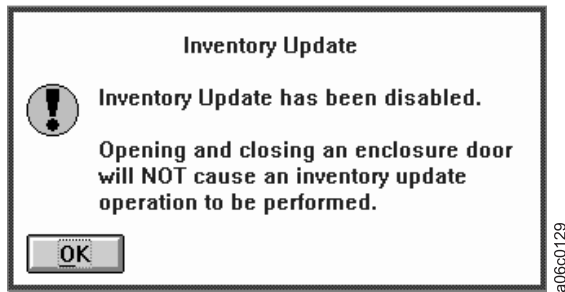
Figure 185. Disable Inventory Update Window

Enable Inventory Update

Select the **Enable Inventory Update** option (Figure 186) to perform an inventory update after opening and closing a door. This selection is remembered across shutdowns.
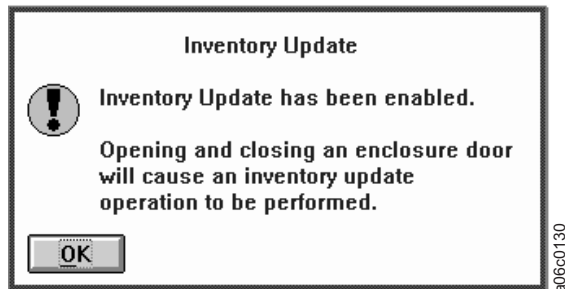

Figure 186. Enable Inventory Update Window

Perform Inventory Update (Full)

Select the **Perform Inventory Update (Full)** option (Figure 187) to perform an inventory update immediately. All frames in the 3494 are inventoried.
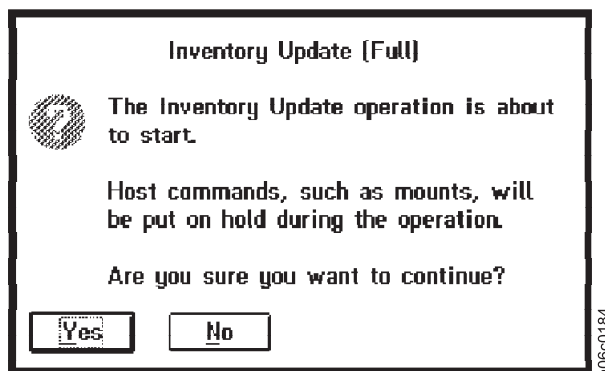

Figure 187. Perform Inventory Update Window

The Inventory Update Status window (Figure 188 on page 266) displays status information about the Inventory Update operation in progress.
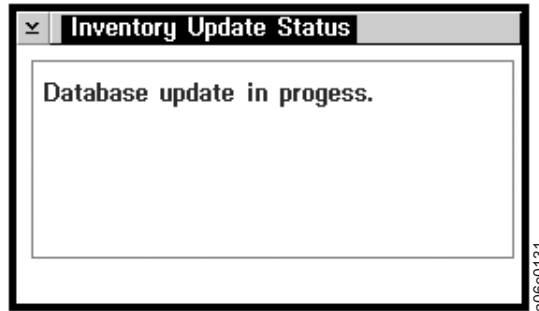
Figure 188. Inventory Update Status Window

The Inventory Update Status window contains the following messages:
- **Rack XX is being inventoried** and **Number of racks complete**. This display occurs during the physical inventory operation.
- **Database update in progress.** This display occurs after the physical inventory operation.

Note: If the Dual Active Accessors feature is installed, information is displayed for both accessors (Figure 189).
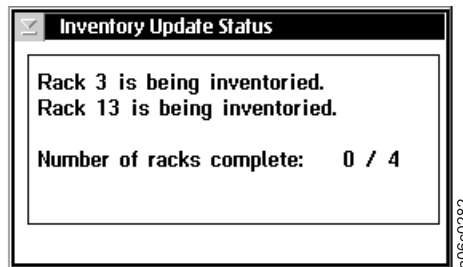

Figure 189. Inventory Update Status Window (Dual Active Accessor Libraries)

Perform Inventory Update (Partial)

Only those frames associated with doors that have been opened are inventoried. If Adjacent Frame Update was enabled during the Teach operation, the frames to either side are also inventoried. If the Dual Active Accessors feature is installed and if racks on both sides of the 3494 are being inventoried, both accessors are used; otherwise only one accessor is used.

The Perform Inventory Update (Partial) window (Figure 190 on page 267) is used to select the frames that should be scanned during the Inventory Update operation:
- A selected check box indicates that a frame's door has been opened since the last inventory.
- A cleared check box indicates that a frame's door has not been opened since the last inventory.
- The partial Inventory Update operation inventories the frames whose check boxes are selected.
- Select or clear the check boxes to reflect the frames that you want inventoried, then select the **Perform inventory update...** push button.
- Mounts and demounts are allowed during an inventory update for cartridges that are in a rack that has already been inventoried or is not involved in the inventory

update. However, performing mounts and demounts during an inventory update does affect the duration of the Inventory Update operation.
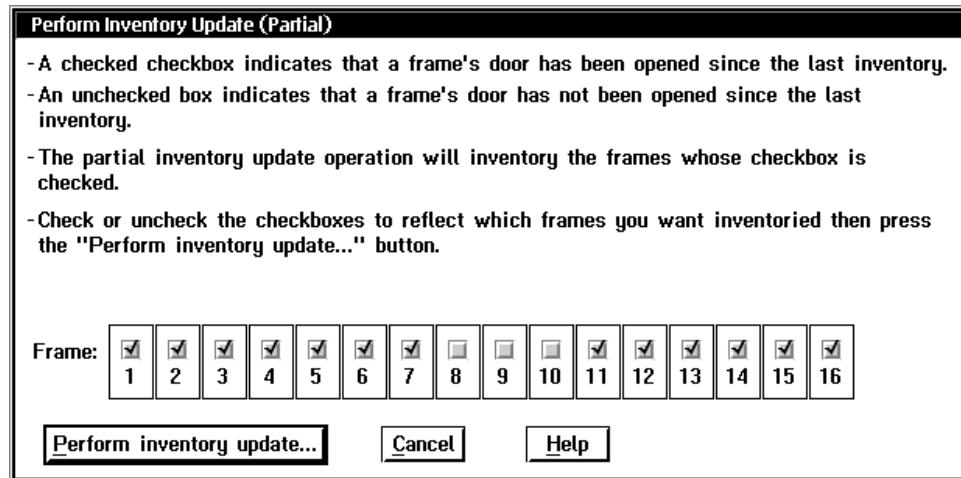


```
Perform Inventory Update (Partial)

- A checked checkbox indicates that a frame's door has been opened since the last inventory.
- An unchecked box indicates that a frame's door has not been opened since the last
  inventory.
- The partial inventory update operation will inventory the frames whose checkbox is
  checked.
- Check or uncheck the checkboxes to reflect which frames you want inventoried then press
  the "Perform inventory update..." button.

Frame:  ☑  ☑  ☑  ☑  ☑  ☑  ☑  ☐  ☐  ☐  ☑  ☑  ☑  ☑  ☑  ☑
        1   2   3   4   5   6   7   8   9  10  11  12  13  14  15  16

  [ Perform inventory update... ]      [ Cancel ]      [ Help ]
```

Figure 190. Perform Inventory Update (Partial) Window

The Perform Inventory Update (Partial) window has the following push buttons:

Perform inventory update... Starts the Inventory Update operation on the selected frames.

Cancel Cancels the frame selection.

Help Provides help about the Perform Inventory Update (Partial) window.

Stand-Alone Device

The **Stand-alone device...** option allows the following operations:

- Setup standalone device
- Reset standalone device
- Stand-alone device status

Setup Stand-Alone Device

The Setup Stand-alone Device window (Figure 191 on page 268) allows you to set up a drive in standalone mode. This mode is used to allow a host to run software that, in general, is in complete control of the drive. The software must be attached to a tape drive that is physically or virtually inside a 3494. The software is not aware that the drive is in the 3494, and it cannot issue commands to mount and demount volumes in that 3494.

Stand alone device is supported for virtual drives within a VTS with the exception of the Mount from Input Station feature.

Stand alone device is not supported for the physical drives associated with a VTS.

To assist the host software, the 3494 uses standalone mode to load and unload one or more specific cartridges automatically into a specific drive, without any host software interaction. The host software allows you to specify the cartridge that is mounted and demounted into a drive by using the Library Manager console.

Note: The drive that is being used in standalone mode should be varied offline from all hosts except the host that is being used in this special mode. This prevents unwanted interaction from all hosts except the desired one.
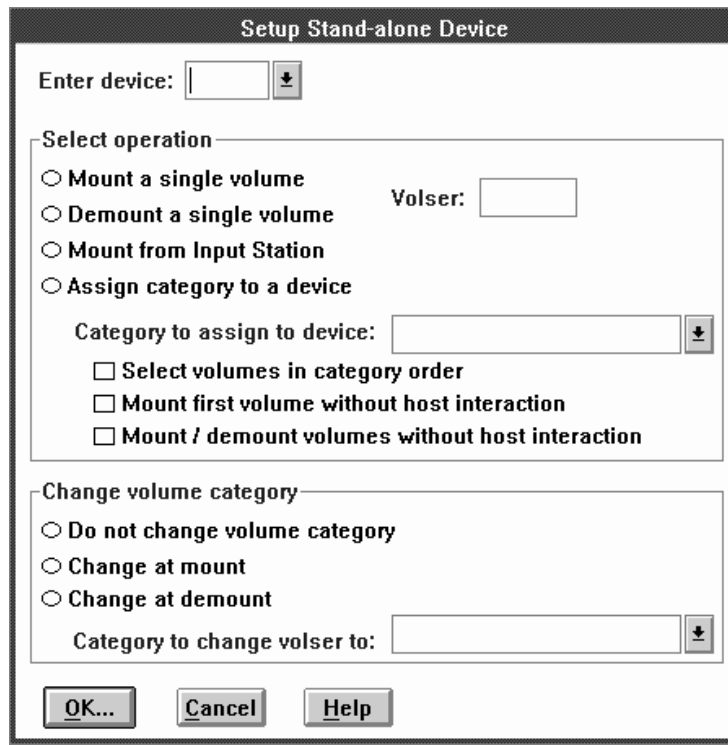

Figure 191. Setup Stand-Alone Device Window

Enter device This list box lists all the drives in the 3494, including virtual drives. It excludes physical drives that are associated with a VTS.

You can select the following operations:

Mount a single volume This operation causes the single volume to be mounted in a requested drive. When you select this operation, you must enter a volser in the **Volser:** field. You must also select either **Do not change volume category** or **Change at mount**.

Demount a single volume This operation causes a single volume to be demounted from the requested drive. When you select this operation, you can enter a volser in the **Volser:** field, or you can leave the field blank. If you leave the field blank, the volume mounted in the drive currently is demounted. You must select **Do not change volume category** or **Change at demount** for this operation.

Mount from Input Station This operation mounts non-3494 cartridges that are located in the convenience I/O station directly on the requested drive. It then returns them to the convenience I/O station after unloading.

Mount from Input Station is not supported for virtual drives within a VTS.

Assign category to a device This operation causes a category to be assigned to a drive. When you select this operation, you must enter a **Category to assign to device** and select one of the three **Change volume category** options.

Volser This entry field is active when you select either **Mount a single volume** or **Demount a single volume**. This field is required for the **Mount a single volume** option. It is optional for the **Demount a single volume** option.

Category to assign to device

This entry field is active when you select **Assign category to a device**. You must enter a valid category. The list displays the current user categories and their host-assigned aliases.

Select volumes in category order

This option is available if you have selected **Assign category to a device**. Selecting this option causes volumes to be mounted in their category order.

Note: If you select the **Select volumes in category order** option, you should also select one of the following (mount) options, or the drive will not be put in standalone mode.

Mount first volume without host interaction

This option is available if you have selected **Assign category to a device**. Selecting this option causes the first mount to a device to be performed without host interaction.

Mount/demount volumes without host interaction

This option is available if you have selected **Assign category to a device**. Selecting this option causes mounts and demounts to be performed automatically without host interaction.

The following are methods for changing a volume's category:

Do not change volume category

This option leaves the volume category alone during the standalone device operation.

Change at mount This option changes the volume's category when a volume is mounted. If you select this method, you must make a valid entry in the **Category to change volser to:** field.

Change at demount This option changes the volume's category when the volume is demounted. If you select this method, you must make a valid entry in the **Category to change volser to:** field.

Category to change volser to:

You must enter a valid category in this field. The list displays the current user categories and their host-assigned aliases.

The Setup Stand-alone Device window has the following push buttons:

OK... Requests that a device be set up as a standalone device. If the information that you entered is valid, you are prompted to confirm the request.

Cancel Closes the Setup Stand-alone Device window without setting up a device as standalone.

Help Provides help about the Setup Stand-alone Device window.

Reset Stand-Alone Device

The Reset Stand-alone Device option allows you to take a device out of standalone mode. The Reset Stand-alone Device window (Figure 192) presents a list of devices that are currently in standalone mode. To reset a device, select it, then select the **Reset...** push button. If there are no devices currently in standalone mode, a message is displayed.

Figure 192. Reset Stand-Alone Device Window

The Reset Stand-alone Device window has the following push buttons:

Reset... Requests that a device be taken out of standalone mode. If you entered a valid device, you are prompted to confirm your request.

Cancel Closes the Reset Stand-alone Device window without resetting a standalone device.

Help Provides help for the Reset Stand-alone Device window.

Stand-Alone Device Status

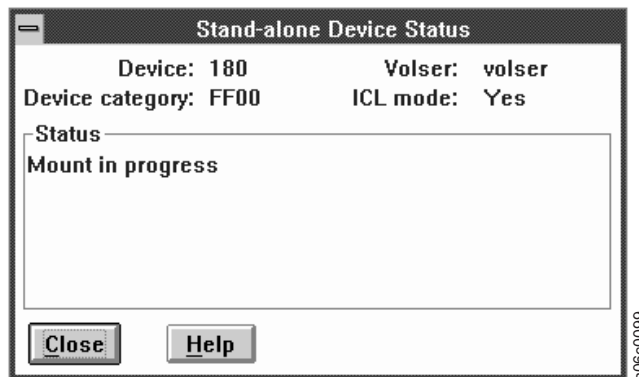Each device set up as a standalone device has a separate status window (see Figure 193).

Figure 193. Stand-Alone Device Status Window

Device   The device identification of the standalone device.

Device category   The category associated with the standalone device, if any. The device category is displayed as 0 if the device does not have an associated category. The FFF7 category is used for Mount from Input Station.

Volser   Displays the volser of the currently mounted volume or the volser of the volume in the process of being mounted.

ICL mode   If you selected the **Mount / demount volumes without host interaction** option when you set up the device as a standalone device, a device is set up to implicitly mount and demount volumes. If you selected this option, the ICL mode status is displayed as **Yes**. If you did not select this option, the ICL mode status is displayed as **No**.

Status   The current status of the device is displayed here.

The Stand-alone Device Status window has the following push buttons:

Close   Closes the Stand-alone Device Status window.

Help   Provides help for the Stand-alone Device Status window.

Insert Unlabeled Cartridges

Note: Do not use this function using cartridges with device-readable labels.

The Insert Unlabeled Cartridges operation is designed to allow you to insert volumes into the Library Manager database that do not have an external device-readable label. These volumes may be used in the same manner that regular, properly labelled volumes are used, except for operations requiring an external device-readable label. To insert unlabeled cartridges, perform the following steps:

1. Ensure that the convenience I/O station is empty.
2. In the spaces in the Insert Unlabeled Cartridges window (Figure 194 on page 273), enter the volsers and the cartridge type of all the cartridges you want to insert.

   Note: If a volume with a device-readable label is inserted with a different volser entered in the Insert Unlabeled Cartridges window, problems will occur during a subsequent Inventory or Inventory Update operation.

3. Place the cartridges in the convenience I/O station in the same sequence as represented in the Insert Unlabeled Cartridges window, then close the convenience I/O station door.
4. Select the **OK** push button.

Each volser entered is checked to ensure that it is a valid number and that no other cartridge in the 3494 has the same number. The validity of the cartridge type is also checked. Valid characters for an unlabeled cartridge volser are alphanumeric characters plus the following special characters: **– # & $ @**. The cartridges are then inserted into the 3494. After all the cartridges are inserted into the 3494, you may repeat the operation.

If the misplaced or inaccessible flags are set for an existing volser in the 3494, the cartridge is inserted and the flags are cleared.

5. Select the **Cancel** option to cancel the Insert Unlabeled Cartridges operation.

You can use the Insert Unlabeled Cartridges function to insert empty stacked volumes for a VTS. To be successful, the volser must fall into a stacked volume volser range (see Figure 194 on page 273), and the media type must be **J** or **K**. However, IBM recommends that you **DO NOT** use the Insert Unlabeled Cartridges function for stacked volumes in normal operations. You should use it only for reinserting volumes that have a damaged external label.
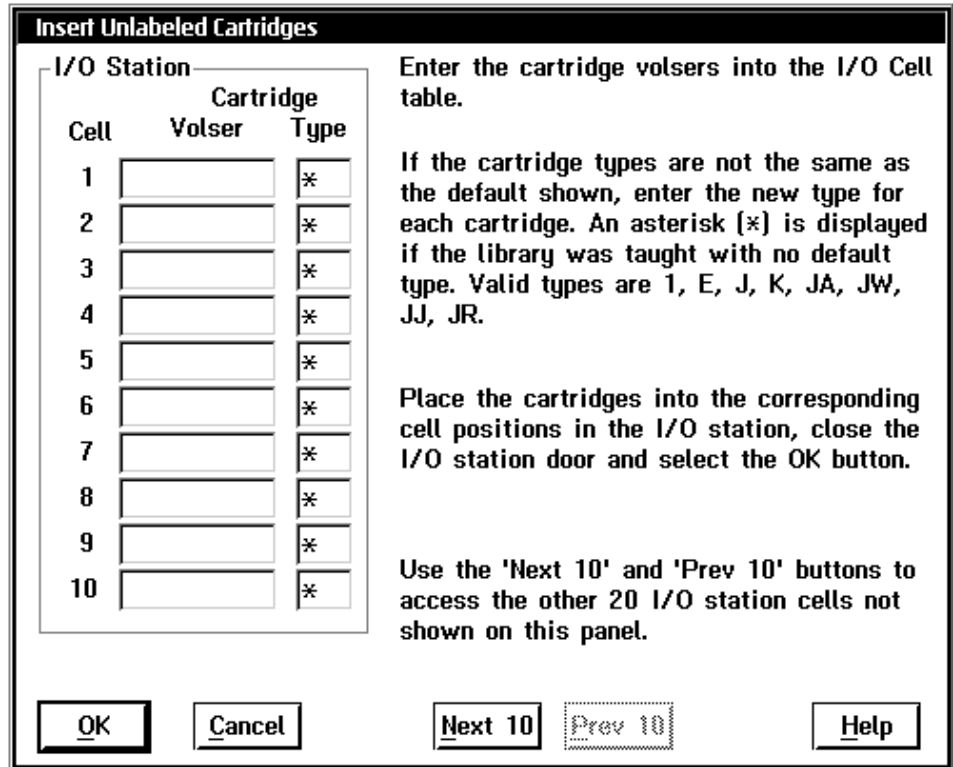
Figure 194. Insert Unlabeled Cartridges Window

The Insert Unlabeled Cartridges window has the following push buttons:

OK   Performs the Insert Unlabeled Cartridges operation.

Cancel   Cancels the Insert Unlabeled Cartridges operation and closes the Insert Unlabeled Cartridges window.

Next 10   Is displayed when the 30-cartridge convenience I/O station is installed; displays the next ten cells.

Prev 10   Is displayed when the 30-cartridge convenience I/O station is installed; displays the previous ten cells.

Help   Provides help about the Insert Unlabeled Cartridges window.

LAN Options

Note: You can view LAN information from the Specialist (see "Specialist Features and Functions" on page 332).

LAN options allows the following operations:
- Add LAN host to library
- Delete LAN host from library
- Update LAN host information
- Library LAN information

Add LAN Host to Library

The Add LAN Host to Library window (Figure 195 on page 275) allows you to configure a LAN-attached host for communication with the 3494. You can configure up to 32 LAN host ports. The information you need to enter may be available from a command on the host. The person who set up your LAN configuration also may be able to provide this information.

Note: If the host is an AS/400 or iSeries, the following commands provide the information that you need to enter in the Add LAN Host to Library window:

- If the AS/400 or iSeries operating system is earlier than Version 3 Release 6, use DSPLANMLD (the Display LAN Information command).
- If the AS/400 or iSeries operating system is Version 3 Release 6 or later, use DSPLANMLB (the Display LAN Media Library Information command).

Communication Protocol   Select the type of communication protocol for use with this host.

Each LAN-attached host has a particular LAN protocol that it uses to communicate with the 3494. Table 12 lists LAN-attached hosts and their associated protocols.

Table 12. LAN Host Communication Protocols

LAN-Attached Host	LAN Protocol
AS/400 V5R1 and below, iSeries	APPC
AS/400 V5R2	APPC or TCP/IP
VSE/ESA	APPC/VTAM
RS/6000, pSeries	TCP/IP
RS/6000 SP™	TCP/IP
Hewlett-Packard	TCP/IP
Sun	TCP/IP
Windows NT	TCP/IP
Windows 2000	TCP/IP

If you select APPC as the communications protocol, an Add LAN Host to Library window (Figure 195 on page 275) opens. This window allows you to add a LAN-attached host, such as an AS/400 or iSeries, to the 3494 configuration.

Figure 195. Add LAN Host to Library Window (APPC Selected)

Fill in the following fields:

Host Alias (optional) The alias for a host is a user-supplied nickname for that host. This is an optional field, and you may leave it blank if you do not want an alias. This entry field accepts only alphanumeric characters and the "." character.

Host Transaction Program Name

Specifies the name of the LAN transaction program that runs on the host to receive data from the Library Manager. For example, on the AS/400 and iSeries, the LAN transaction program name is **QMLD/QMLDSTRCC**. This entry field accepts only alphanumeric characters and the "/" character. Blank spaces are not valid.

Host Network ID Specifies the name of the remote network in which the adjacent control point (the host) resides. This entry field accepts only alphanumeric characters and the "@", "#", and "$" characters. Blank spaces are not valid.

The Common Programming Interface (CPI) - Communications partner_LU_name of the host, consists of the host remote network identifier and the host remote location. For example, if the host partner_LU_name is **USIBMSU.S10A4045**, then the Host Network ID is **USIBMSU**.

Host Location Name Specifies the remote location name (of the host) with which the 3494 communicates. This entry field accepts only alphanumeric characters and the "@", "#", and "$" characters. Blank spaces are not valid.

The Common Programming Interface (CPI) - Communications partner_LU_name of the host, consists of the remote network identifier and the remote location. For example, if the host partner_LU_name is **USIBMSU.S10A4045**, then the Host Location Name is **S10A4045**.

Host Adapter Address   Specifies the LAN adapter address of the remote controller (host). This can be the host adapter card universally administered address (UAA), such as 10005A1E3338, or a locally administered address (LAA), such as 400012345678. You may enter only hexadecimal digits in this field. Blank spaces are not valid. This entry field accepts only alphanumeric characters and the "@", "#", and "$" characters. Blank spaces are not valid.

Ethernet Format check box   If the Host Adapter Address that you entered in the Host Adapter Address field is in Ethernet Format, select this check box. If the Host Adapter Address field is in Token-Ring Format, do not select this check box.

XID (optional)   (Exchange ID) This is an optional field. If you leave it blank, the XID is assigned a value of "00000000". If you enter an XID value, it must be either five or eight hexadecimal bytes. If you enter only five bytes, the prefix "05D" is used.

Note: XID is optional for APPC and APPC/VTAM hosts. It is not applicable for TCP/IP hosts.

The Add LAN Host to Library window has the following push buttons:

OK   Adds a LAN-attached host to the 3494 using the information in the Add LAN Host to Library window.

Cancel   Cancels the Add LAN Host operation and closes the Add LAN Host to Library window without adding a host.

Help   Provides help about the Add LAN Host to Library window.

If you select APPC/VTAM as the communications protocol, an Add LAN Host to Library window (Figure 196) opens. This allows you to add a LAN-attached host, such as VSE/ESA, to the 3494 configuration.

Figure 196. Add LAN Host to Library Window (APPC/VTAM Selected)

Fill in the following fields:

Host Alias (optional) The alias for a host is a user-supplied nickname for that host. This is an optional field, and you may leave it blank if you do not want an alias. This entry field accepts only alphanumeric characters and the "." character.

Host Transaction Program Name
Specifies the name of the LAN transaction program that runs on the host to receive data from the Library Manager. This entry field accepts only alphanumeric characters and the "/" character. Blank spaces are not valid. For example, if the host is VSE/ESA, the default transaction program name is **VSE1LCA**.

Host Network ID Specifies the name of the remote network in which the adjacent control point (the host) resides. This entry field accepts only alphanumeric characters and the "@", "#", and "$" characters. Blank spaces are not valid.

The Common Programming Interface (CPI) - Communications partner_LU_name of the host, consists of the host remote network identifier and the host remote location. For example, if the host partner_LU_name is **USIBMSU.VSE1LCA**, then the Host Network ID is **USIBMSU**.

Host Location Name	Specifies the remote location name (of the host) with which the tape library communicates. This entry field accepts only alphanumeric characters and the "@", "#", and "$" characters. Blank spaces are not valid.
	The Common Programming Interface (CPI) - Communications partner_LU_name of the host, consists of the remote network identifier and the remote location. For example, if the host partner_LU_name is **USIBMSU.VSE1LCA**, then the Host Location Name is **VSE1LCA**.
Host Adapter Address	Specifies the LAN adapter address of the remote controller (host). This can be the host adapter card universally administered address (UAA), such as 10005A1E3338, or a locally administered address (LAA), such as 400012345678. This entry field accepts only alphanumeric characters and the "@", "#", and "$" characters. Blank spaces are not valid.
Ethernet Format check box	If the Host Adapter Address that you entered in the Host Adapter Address field is in Ethernet Format, select this check box. If the Host Adapter Address field is in Token-Ring Format, do not select this check box.
Physical Unit Name	This is the name of the physical unit that the 3494 communicates with for this host, for example, VSE3174. The physical unit name must be either eight or fewer characters, or eight or fewer characters followed by a period (.) and eight or fewer characters. This field accepts only alphanumeric characters and the "." character. Blank spaces are not valid.
XID (optional)	(Exchange ID) This is an optional field. If you leave it blank, the XID is assigned a value of "00000000". If you enter an XID value, it must be either five or eight hexadecimal bytes. If you enter only five bytes, the prefix "05D" is used.
	Note: XID is optional for APPC and APPC/VTAM hosts. It is not applicable for TCP/IP hosts.

The Add LAN Host to Library window has the following push buttons:

OK Adds a LAN-attached host to the 3494 using the information in the Add LAN Host to Library window.

Cancel Cancels the Add LAN Host operation and closes the Add LAN Host to Library window without adding a host.

Help Provides help about the Add LAN Host to Library window.

If you select TCP/IP as the communications protocol, an Add LAN Host to Library window (Figure 197) opens. This allows you to add a LAN-attached host, such as an AS/400 V5R2, RS/6000 or pSeries, to the 3494 configuration.

Figure 197. Add LAN Host to Library Window (TCP/IP Selected)

Fill in the following fields:

Host Alias (optional)   The alias for a host is a user-supplied nickname for that host. This is an optional field, and you may leave it blank if you do not want an alias. This entry field accepts only alphanumeric characters and the ".", "-", and "_" characters.

Host IP Address   The Host IP Address is the unique Internet address assigned to the host. This field accepts only digits and the ".", "-", and "_" characters. Blank spaces are not valid. The correct form is xxx.xxx.xxx.xxx where xxx represents a number from 000–255.

Host Name   The Host Name is the Hostname defined in the TCP/IP network. This field accepts only alphanumeric characters and the ".", "-", and "_" characters. Blank spaces are not valid.

The Add LAN Host to Library window has the following push buttons:

OK   Adds a LAN-attached host to the 3494 using the information in the Add LAN Host to Library window.

Cancel   Cancels the Add LAN Host operation and closes the Add LAN Host to Library window without adding a host.

Help   Provides help about the Add LAN Host to Library window.

Delete LAN Host from Library

In the Delete LAN Host from Library window (Figure 198), select the LAN-attached host to be deleted from the 3494 configuration. The library no longer responds to requests from the deleted host.
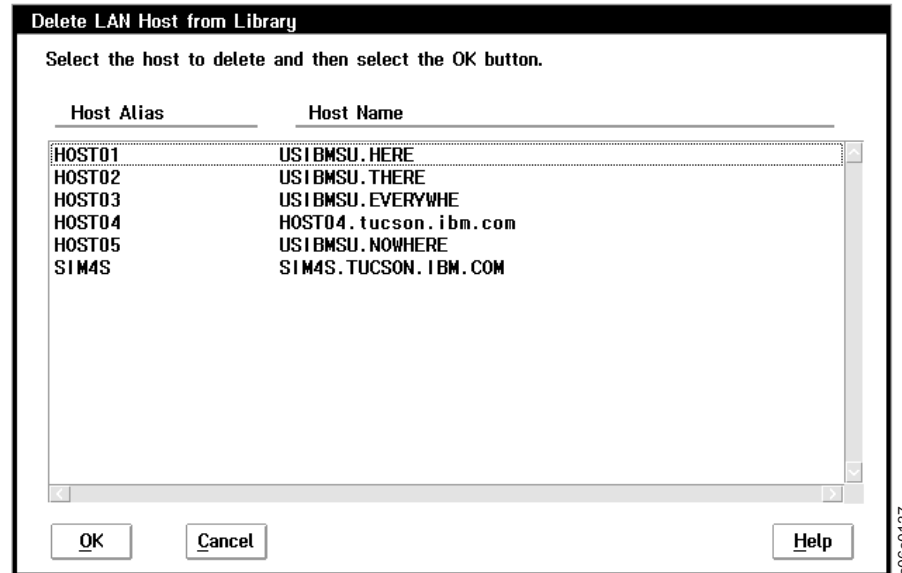

Figure 198. Delete LAN Host from Library Window

Host Alias (optional)	The alias for a host is a user-supplied nickname for that host. This is an optional field, and will be blank if there is no alias.
Host Name	This field lists the names of all hosts that are configured with the 3494 through LANs.
	For TCP/IP hosts, the Host Name is the Hostname defined in the TCP/IP network. In Figure 198, **sim45.tucson.ibm.com** is a TCP/IP Hostname.
	For APPC and APPC/VTAM hosts, the Host Name is a combination of the Host Network ID and the Host Location Name. For example, if the Host Network ID is **USIBMSU**, and the Host Location Name is **S10A4045**, then the Host Name is **USIBMSU.S10A4045**.

This window displays the host names and (if set up) the host aliases of all the hosts that are configured with the 3494 through a LAN. Select the host you want to delete, then select the **OK** push button.

A caution window opens to verify that you really want to delete this host. Selecting the **Yes** push button on this window deletes the host from the 3494.

The Delete LAN Host from Library window has the following push buttons:

OK	Deletes the selected host from the 3494.
Cancel	Cancels the Delete LAN Host operation and closes the Delete LAN Host from Library window without deleting a host.

Help   Provides help about the Delete LAN Host from Library window.

Update LAN Host Information

The Update LAN Host Information window (Figure 199) allows you to select a particular LAN-attached host to update that host's 3494 LAN configuration data. After you select a host, you can update the host information.
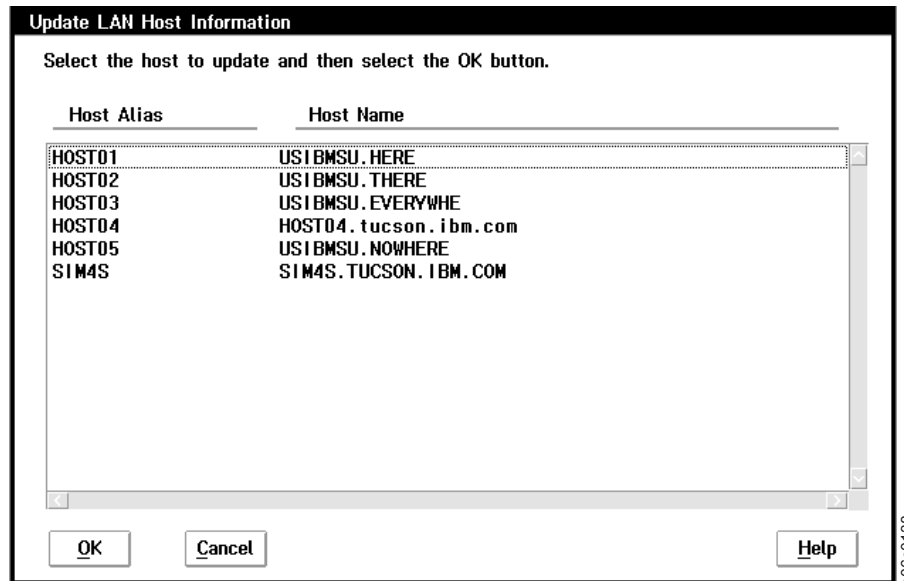
```
Update LAN Host Information
 Select the host to update and then select the OK button.

     Host Alias              Host Name

   HOST01               USIBMSU.HERE
   HOST02               USIBMSU.THERE
   HOST03               USIBMSU.EVERYWHE
   HOST04               HOST04.tucson.ibm.com
   HOST05               USIBMSU.NOWHERE
   SIM4S                SIM4S.TUCSON.IBM.COM

     OK        Cancel                                    Help
```

Figure 199. Update LAN Host Information Window

Host Alias (optional)   The alias for a host is a user-supplied nickname for that host. This is an optional field, and will be blank if there is no alias.

Host Name   This field lists the names of all the hosts that are configured with the 3494 through LANs.

For TCP/IP hosts, the Host Name is the Hostname defined in the TCP/IP network. In Figure 199, **sim45.tucson.ibm.com** is a TCP/IP Hostname.

For APPC and APPC/VTAM hosts, the Host Name is a combination of the Host Network ID and the Host Location Name. For example, if the Host Network ID is **USIBMSU**, and the Host Location Name is **S10A4045**, then the Host Name is **USIBMSU.S10A4045**.

Select the host that requires updating, then select the **OK** push button. This opens the Change LAN Host Information window, which shows the current LAN host information.

The Update LAN Host Information window has the following push buttons:

OK   Closes the Update LAN Host Information window and opens a Change LAN Host Information window for the host that you selected.

Cancel	Closes the Update LAN Host Information window without selecting a host for update.
Help	Provides help about the Update LAN Host Information window.

Change LAN Host Information

Figure 200 shows the Change LAN Host Information window for APPC hosts. Figure 201 on page 284 shows the Change LAN Host Information window for APPC/VTAM hosts. Figure 202 on page 286 shows the Change LAN Host Information window for TCP/IP hosts. These windows allow you to change the information about a LAN host in the 3494 configuration. When you have done this, the 3494 responds to the host with the new configuration data.

Figure 200. Change LAN Host Information Window (APPC)

Host Alias (optional)	The alias for a host is a user-supplied nickname for that host. This is an optional field, and you may leave it blank if you do not want an alias. This entry field accepts only alphanumeric characters and the ".", "-", and "_" characters.
Host Transaction Program Name	Specifies the name of the LAN transaction program that runs on the host to receive data from the Library Manager. This entry field accepts only alphanumeric characters and the "/" character. Blank spaces are not valid.
Host Network ID	Specifies the name of the remote network in which the adjacent control point (host) resides. This entry field accepts only alphanumeric characters and the "@", "#", and "$" characters. Blank spaces are not valid.

The Common Programming Interface (CPI) - Communications partner_LU_name of the host, consists of the host remote network identifier and the host remote location. For example, if the host partner_LU_name is **USIBMSU.S10A4045**, then the Host Network ID is **USIBMSU**.

Host Location Name   Specifies the remote location name (of the host) with which the 3494 communicates. This entry field accepts only alphanumeric characters and the "@", "#", and "$" characters. Blank spaces are not valid.

The Common Programming Interface (CPI) - Communications partner_LU_name of the host, consists of the remote network identifier and the remote location. For example, if the host partner_LU_name is **USIBMSU.S10A4045**, then the Host Location Name is **S10A4045**.

Host Adapter Address   Specifies the LAN adapter address of the remote controller (host). This can be the host adapter card universally administered address (UAA), such as 10005A1E3338, or a locally administered address (LAA), such as 400012345678. Only hexadecimal digits can be entered. Blank spaces are not valid.

Ethernet Format check box   If the Host Adapter Address that you entered in the Host Adapter Address field is in Ethernet Format, select this check box. If the Host Adapter Address field is in Token-Ring Format, do not select this check box.

XID (optional)   (Exchange ID) This is an optional field. If you leave it blank, the XID is assigned a value of "00000000". If you enter an XID value, it must be either five or eight hexadecimal bytes. If you enter only five bytes, the prefix "05D" is used.

Note: XID is optional for APPC and APPC/VTAM hosts. It is not applicable for TCP/IP hosts.

Note: If the host is an AS/400 or iSeries, the following commands provide the information that you need to update the Change LAN Host Information window:
  • If the AS/400 or iSeries operating system is earlier than Version 3 Release 6, use DSPLANMLD (the Display LAN Information command).
  • If the AS/400 or iSeries operating system is Version 3 Release 6 or later, use DSPLANMLB (the Display LAN Media Library Information command).

The Change LAN Host Information window has the following push buttons:

OK   Updates the LAN host information by using the changes entered in the Change LAN Host Information window

Cancel   Closes the Change LAN Host Information window without updating the host information.

Help   Provides help about the Change LAN Host Information window.

The Change LAN Host Information window for APPC/VTAM hosts (Figure 201) allows you to change the information about a LAN host in the 3494 configuration. When this is done, the 3494 responds to the host with the new configuration data.

Figure 201. Change LAN Host Information Window (APPC/VTAM)

Host Alias (optional)   The alias for a host is a user-supplied nickname for that host. This is an optional field, and you may leave it blank if you do not want an alias. This entry field accepts only alphanumeric characters and the ".", "-", and "_" characters.

Host Transaction Program Name
Specifies the name of the LAN transaction program that runs on the host to receive data from the Library Manager. This entry field accepts only alphanumeric characters and the "/" character. Blank spaces are not valid.

Host Network ID   Specifies the name of the remote network in which the adjacent control point (host) resides. This entry field accepts only alphanumeric characters and the "@", "#", and "$" characters. Blank spaces are not valid.

The Common Programming Interface (CPI) - Communications partner_LU_name of the host, consists of the host remote network identifier and the host remote location. For example, if the host partner_LU_name is **USIBMSU.S10A4045**, then the Host Network ID is **USIBMSU**.

Host Location Name   Specifies the remote location name (of the host) with which the 3494 communicates. This entry field

	accepts only alphanumeric characters and the "@", "#", and "$" characters. Blank spaces are not valid.
	The Common Programming Interface (CPI) - Communications partner_LU_name of the host, consists of the remote network identifier and the remote location. For example, if the host partner_LU_name is **USIBMSU.S10A4045**, then the Host Location Name is **S10A4045**.
Host Adapter Address	Specifies the LAN adapter address of the remote controller (host). This can be the host adapter card universally administered address (UAA), such as 10005A1E3338, or a locally administered address (LAA), such as 400012345678. Only hexadecimal digits can be entered. Blank spaces are not valid.
Ethernet Format check box	If the Host Adapter Address that you entered in the Host Adapter Address field is in Ethernet Format, select this check box. If the Host Adapter Address field is in Token-Ring Format, do not select this check box.
Physical Unit Name	This is the name of the physical unit that the 3494 communicates with for this host, for example, VSE3174. The physical unit name must be either eight or fewer characters, or eight or fewer characters followed by a period (.) and eight or fewer characters. This field accepts only alphanumeric characters and the "." character. Blank spaces are not valid.
XID (optional)	(Exchange ID) This is an optional field. If you leave it blank, the XID is assigned a value of "00000000". If you enter an XID value, it must be either five or eight hexadecimal bytes. If you enter only five bytes, the prefix "05D" is used.
	Note: XID is optional for APPC and APPC/VTAM hosts. It is not applicable for TCP/IP hosts.

Note: If the host is an AS/400 or iSeries, the following commands provide the information that you need to update the Change LAN Host Information window:

- If the AS/400 or iSeries operating system is earlier than Version 3 Release 6, use DSPLANMLD (the Display LAN Information command).
- If the AS/400 or iSeries operating system is Version 3 Release 6 or later, use DSPLANMLB (the Display LAN Media Library Information command).

The Change LAN Host Information window has the following push buttons:

OK	Updates the LAN host information by using the changes entered in the Change LAN Host Information window.
Cancel	Closes the Change LAN Host Information window without updating the host information.
Help	Provides help about the Change LAN Host Information window.

The Change LAN Host Information window for TCP/IP hosts (Figure 202) allows you to change the information about a LAN host in the 3494 configuration. When this is done, the 3494 responds to the host with the new configuration data.

Figure 202. Change LAN Host Information Window (TCP/IP)

Host Alias (optional)   The alias for a host is a user-supplied nickname for that host. This is an optional field, and you may leave it blank if you do not want an alias. This entry field accepts only alphanumeric characters and the ".", "-", and "_" characters.

Host IP Address   The Host IP Address is the unique Internet address assigned to the host. This field accepts only digits and the ".", "-", and "_" characters. Blank spaces are not valid. The correct form is dotted decimal notation (xxx.xxx.xxx.xxx where xxx represents a number from 000–255).

Host Name   The Host Name is the Hostname defined in the TCP/IP network. This field accepts only alphanumeric characters and the ".", "-", and "_" characters. Blank spaces are not valid.

Note: If the host is an AS/400 or iSeries, the following commands provide the information that you need to update the Change LAN Host Information window:

- If the AS/400 or iSeries operating system is earlier than Version 3 Release 6, use DSPLANMLD (the Display LAN Information command).
- If the AS/400 or iSeries operating system is Version 3 Release 6 or later, use DSPLANMLB (the Display LAN Media Library Information command).

The Change LAN Host Information window has the following push buttons:

OK   Updates the LAN host information by using the changes entered in the Change LAN Host Information window.

Cancel   Closes the Change LAN Host Information window without updating the host information.

Help   Provides help about the Change LAN Host Information window.

Library LAN Information

/
/

Note: You can view Library LAN information from the Specialist under the title "LAN Information" (see "Specialist Features and Functions" on page 332).

The Library LAN Information window (Figure 203) supplies the 3494 LAN information that the host system requires to communicate with the 3494.

```
┌─────────────────────────────────────────────────────────┐
│ ▌Library LAN Information                                  │
│ Fields with asterisks [*] are for this Library Manager.   │
│                                                            │
│ Library Transaction                                        │
│ Program Name . . . . . . . LIBMGRTP                        │
│                                                            │
│ Library Network ID . . . . USIBMSU *                       │
│                            USIBMSU                         │
│                                                            │
│ Library Location Name . . LIBMGRC3 *                       │
│                            LIBMGRC2                         │
│                                                            │
│ Library Adapter Address . 10005A8A5E75 *                   │
│                            10005CB100F5                     │
│                                                            │
│ Library IP Address . . . . 9.115.43.225 *                  │
│                            9.115.43.226                     │
│                                                            │
│ Library Host Name . . . . libmgrc3.ibm.com *               │
│                            libmgrc2.ibm.com                 │
│                                                            │
│  ┌──────────┐  ┌──────────┐                                │
│  │   OK     │  │  Help    │                                │
│  └──────────┘  └──────────┘                                │
└─────────────────────────────────────────────────────────┘
```
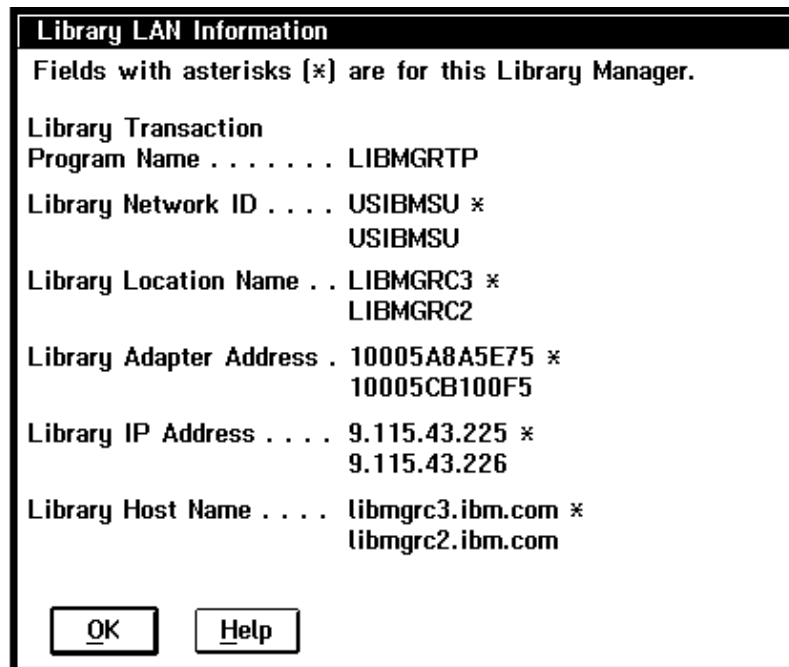
Figure 203. 3494 LAN Information Window

Note: If HA1 Frames are installed, information for both Library Managers is shown. An asterisk (*) indicates that the item is for the local Library Manager.

Library Transaction Program Name

Specifies the name of the LAN transaction program that runs on the Library Manager to receive data from the host.

Library Network ID   Specifies the name of the remote network in which the adjacent control point (the Library Manager) resides.

The Common Programming Interface (CPI) - Communications partner_LU_name of the host, consists of the Library Manager network identifier and the Library Manager location name. For

example, if the Library Manager partner_LU_name is **USIBMSU.LIBMGRC3**, then the Library Manager Network ID is **USIBMSU**.

Library Location Name Specifies the remote location name (of the Library Manager) with which the host communicates.

The Common Programming Interface (CPI) - Communications partner_LU_name of the Library Manager, consists of the network identifier and the location name. For example, if the Library Manager partner_LU_name is **USIBMSU.LIBMGRC3**, then the Library Manager Location Name is **LIBMGRC3**.

Library Adapter Address Specifies the LAN adapter address of the remote controller (the Library Manager). This can be the Library Manager adapter card universally administered address (UAA), such as 10005A8A5E75, or a locally administered address (LAA), such as 40003494001A.

Library IP Address The Library Manager IP Address is the unique Internet address assigned to the Library Manager.

Library Host Name The Library Name is the Hostname defined in the TCP/IP network for the Library Manager. In Figure 203 on page 287, **libmgrc3.ibm.com** is a TCP/IP Hostname.

The Library LAN Information window has the following push buttons:

OK Closes the Library LAN Information window.

Help Provides help about the Library LAN Information window.

Operator Intervention

Certain conditions in the 3494, when detected, require short-term operator intervention to resolve. These conditions do not stop the Library Manager from accepting commands but can delay the execution of certain queued operations. See Chapter 7, "Remote Library Manager Console Feature," on page 345 for most conditions that require intervention.

The Library Manager keeps track of the outstanding intervention-required conditions. These conditions can be displayed on the Library Manager console, and you can indicate the conditions that you have resolved. Steps are provided to resolve each condition. For instructions on removing a cartridge from the gripper, see "Cartridge Removal from the Gripper" on page 342.

Note: You can view operator intervention information from the Specialist (see "Specialist Features and Functions" on page 332).

The Operator Intervention window (Figure 204 on page 289) displays the list of conditions and the priority assigned (the priorities are **1**, **2**, and **3**; priority **1** is the highest, and priority **3** is the lowest. If no outstanding conditions exist, the list is blank.

1. Determine what condition to resolve, perform the necessary action, then indicate that you resolved the condition by highlighting the condition and selecting the **OK** push button. You can also select the **Help** push button for the operator actions.

   Notes:

   a. Certain conditions (for example, library full, convenience I/O station full, and out of cleaner cartridges) are cleared automatically after you resolve the intervention-required condition.

   b. Certain conditions require you to open the frame door to resolve.

   c. You can highlight more than one condition. Choosing **OK** clears all the items you highlighted.

   d. You can display the operator interventions in date and time order or in priority order. Select the appropriate button under Display Order to change the display.

2. Repeat step 1 until you have resolved all needed conditions.

   When you indicate that all outstanding conditions are resolved, the window closes. Also, you can close the window and resolve some conditions later by selecting the **Cancel** push button.
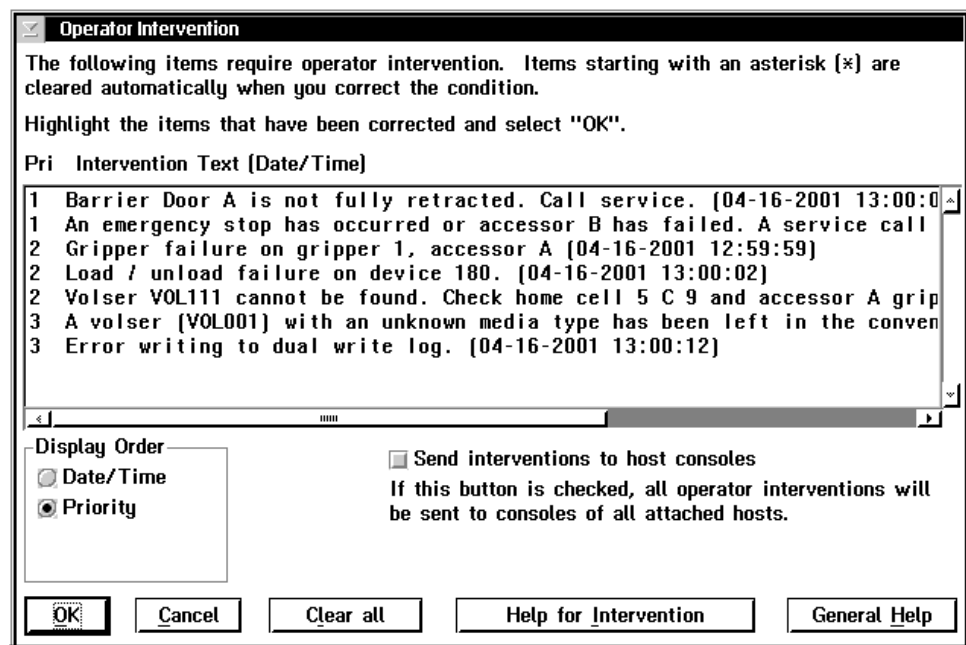
Figure 204. Operator Intervention Window

The Operator Intervention window has one check box:

Send interventions to host consoles

If you select this check box, all operator intervention messages are sent to all attached hosts. If the hosts are configured to display messages, these messages are displayed on the host console.

The Operator Intervention window has the following push buttons:

Clear all   Allows the system administrator to clear all operator interventions that start with an * (asterisk) from the list and closes the Operator

Intervention window. This requires system administrator authority. These interventions should be cleared automatically.

OK   Clears the highlighted intervention items from the list. If all the items are cleared, closes the Operator Intervention window.

Cancel   Closes the Operator Intervention window without removing any highlighted intervention items from the list.

Help for Interventions
Provides help about the highlighted intervention.

General Help   Provides help about the Operator Intervention window. The Help contains a list of operator actions for every intervention condition.

Change System Administrator Password

/
/
/

Note: You can change the system administrator password from the Specialist by selecting ″Change User Password″ under ″Manage Security″ (see "Specialist Features and Functions" on page 332).

The System Administrator Password window (Figure 205 on page 291) allows you to change the system administrator password, if it was selected during installation. The system administrator password protects the following functions:

- Access to actions required as part of emergency power off (EPO) recovery during Library Manager startup.

   If during initialization the Library Manager determines that EPO recovery is required, you are informed that either the system administrator or the service representative password is required. When you enter the password, the Library Manager displays the actions required for EPO recovery.

- Inventory new storage
- Re-inventory complete subsystem
- Shutdown
- Unlocking the keyboard and display when they have been locked by selecting the **Lockup Library Manager...** option under the Mode window
- Delete logical volumes
- Clear all operator interventions

Figure 205. System Administrator Password Window

Current password	Specifies entry of the current password.
New password	Specifies entry of the new password.
Verify	Specifies reentry of the new password.

The System Administrator Password window has the following push buttons:

OK	Updates the password to the new password.
Cancel	Closes the System Administrator Password window without changing the password.
Help	Provides help about the System Administrator Password window.

If you enter the current password correctly, you can access the function.

Note: Do not forget the system administrator password. If this is the first time this window opens, the **Current password** is the only entry required. This entry becomes the system administrator password for all protected functions. If you cannot remember the password, call your service representative.

You can change the password by entering a new password into the **New password** and **Verify** fields after entering the current password. If the current password is correct and the two new password fields match, you have access to the protected functions, and the password is changed. Changing the system administrator password on one protected menu changes the password to all protected menus, except for the Service menu. If Service mode is active, these functions do not require the system administrator password.

Service Access

Enable service access	This option provides the ability to access the Library Managers through a modem connection, if installed. This also allows service personnel to off-load files (log and dump) from the Library Manager. The Library Manager may prompt you for the system administrator password.
Disable service access	This option prevents the ability to access the

Library Manager through a modem connection, if installed. The Library Manager may prompt you for the system administrator password.

Monitoring Library Manager Events

The 3494 can attach to many different host systems, with various operating systems that communicate with the 3494 using different types of connections. During operation, the 3494 may encounter situations that you would want to know about, such as a door being opened (which causes the 3494 to stop). Because there are many different attachment methods, the 3494 provides a standard TCP/IP protocol called Simple Network Management Protocol (SNMP) to send alerts (called SNMP traps) over a TCP/IP LAN network to one or more SNMP monitoring stations. These monitoring stations, along with other user-supplied software, can alert operations staff to possible problems or operator interventions that occur at the 3494. Figure 206 shows a basic SNMP block diagram.
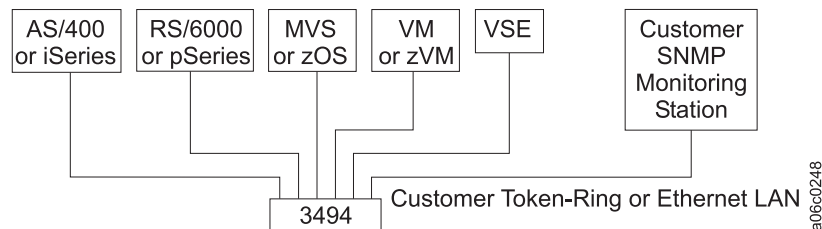
Figure 206. SNMP Basic Block Diagram

With this method, the 3494 can be monitored at one or more locations, along with other equipment (both IBM and non-IBM) that also supports the SNMP protocol. Monitoring is independent of the host system that is controlling the equipment and is independent of the location of the 3494s.

The Library Manager contains limited SNMP support. This section discusses how to use the Library Manager's SNMP features.

The Library Manager generates SNMP trap messages to inform network monitoring stations that certain events have occurred on the 3494. The Library Manager code does not contain any SNMP Management Information Base (MIB) support.

The Library Manager code offers the ability to monitor the following Library Manager events:

- **OPINT** - Operator Interventions
- **UNSOL** - Unsolicited Attention Messages
- **SERVC** - Service Request Messages (not supported currently)
- **CHCK1** - Library Manager Check1 Conditions
- **TESTM** - Test SNMP Trap Message

OPINT Events　　　　　OPINT events inform the monitoring station of the state of the 3494. They can inform the monitor station that the 3494 has developed problems and can even request service calls. All OPINT messages are located in the OPINT message table (see Table 13 on page 300).

OPINT traps are the best way to monitor the 3494, and these Library Manager trap types should be selected at all times.

UNSOL Events   UNSOL events offer additional support to the OPINT messages. They are not as helpful as the OPINT message, but they can be used to track drive availability, volume movement, and so on.

In order to receive UNSOL messages, the 3494 must be online, and it must have at least one host. All UNSOL messages are located in the UNSOL message section (see "UNSOL Library Manager SNMP Traps" on page 308).

CHCK1 Events   CHCK1 events are posted when the Library Manager code encounters problems that require re-initializing the Library Manager.

TESTM Events   The Library Manager generates TESTM events automatically to test the ability to send SNMP trap messages. They are intended to verify the ability to send traps to the monitor station.

Using SNMP Features

The following sections describe the Library Manager's SNMP features.

Selecting SNMP Trap Types

First, you must select the type of Library Manager trap events that need to be monitored. To do this, select the **Commands** option on the Main menu, and select **SNMP options**. Then, select the **Select SNMP trap types** submenu option. The Select SNMP Trap Types window (Figure 207) opens, showing all the Library Manager trap types. Select the Library Manager trap types that need to be monitored, then select the **OK** push button.
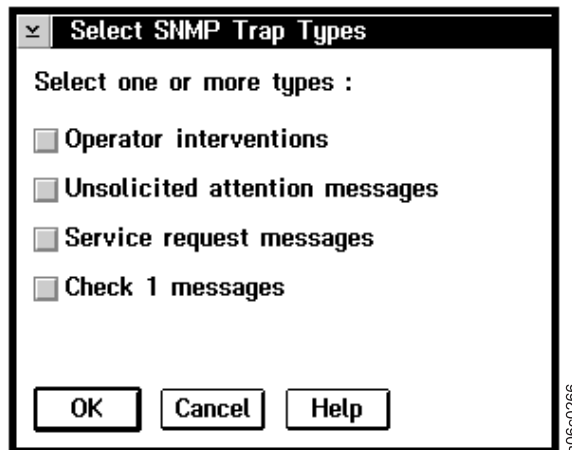
Figure 207. Select SNMP Trap Types Window

Configuring SNMP Trap Destinations

When you have selected the Library Manager Trap Types, you must configure the Library Manager to send the SNMP traps to the correct monitoring station. To do this, select **SNMP Options** in the Commands window, then select the **Change SNMP trap destinations** option.

You can configure the Library Manager to send SNMP traps to a maximum of five different trap destinations.

/   **Note:** If HA1 Frames are installed, you must switch active Library Managers and
/   then configure the newly active Library Manager's settings to match those of
/   the previously active Library Manager. Only the active Library Manager
/   sends trap messages.

The procedure for configuring the SNMP trap destination depends on the OS/2® version (2.11 or 4.0). To determine the version of OS/2 you have, select the **About** option on the Help menu (see "Using the Help Window" on page 115).

OS/2 Version 2.11

Figure 208 shows the OS/2 2.11 version of the Change SNMP Trap Destinations window.
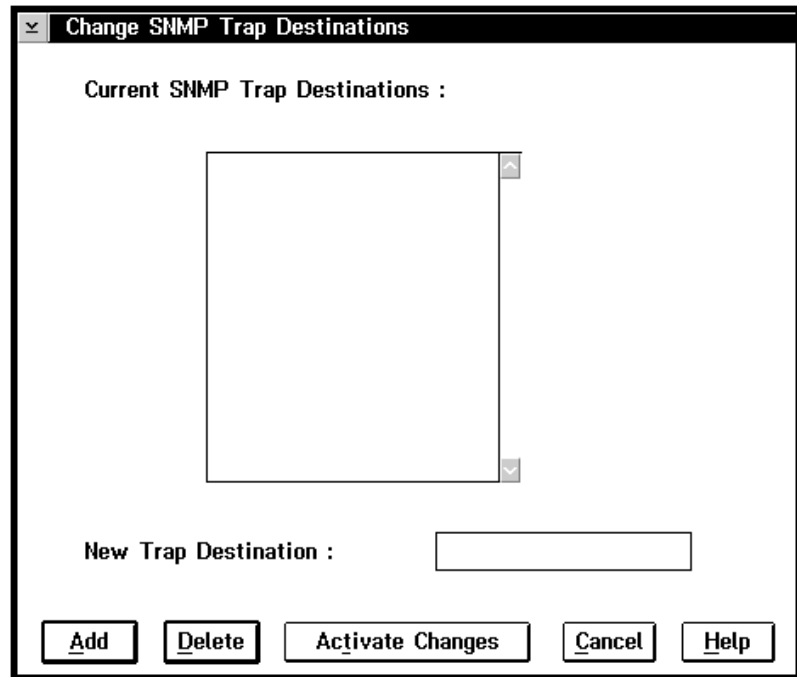
Figure 208. Change SNMP Trap Destinations Window (OS/2 2.11)

Adding a Destination: Perform the following steps to add an SNMP trap destination:

1. Enter the new SNMP trap destination in the **New Trap Destination** field.
2. Select the **Add** push button.

Deleting a Destination: Perform the following steps to delete an SNMP trap destination:

1. In the list box, highlight the SNMP trap destination that you want to delete.
2. Select the **Delete** push button.

The changes are activated when you select the **Activate Changes** push button. If the SNMP daemon is running when you select **Activate Changes**, the Library Manager kills it and restarts the daemon with the new changes.

OS/2 Version 4.0

For OS/2 Version 4.0, the SNMP HRMCNFIG program configures SNMP trap destinations. If you have OS/2 Version 4.0, selecting the **Change SNMP trap destinations** option starts this program for you automatically.

Figure 209 shows the SNMP Configuration window.
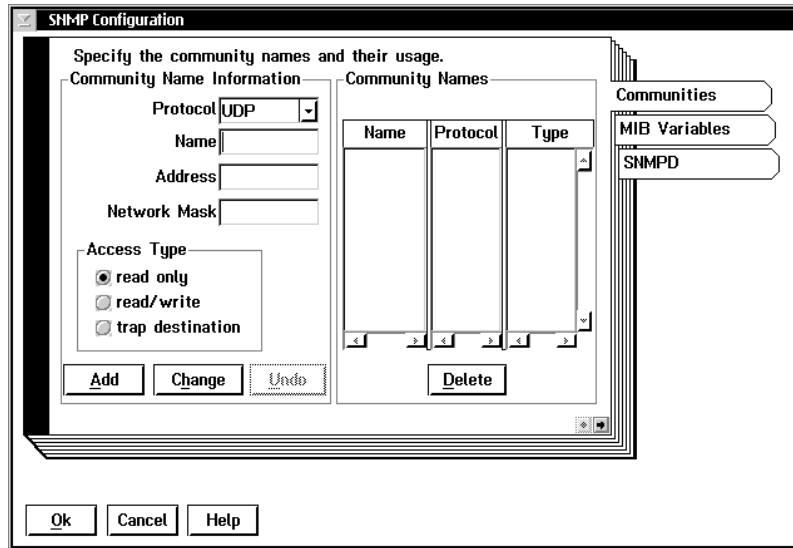
Figure 209. SNMP Configuration Window

Adding a Destination: Perform the following steps to add an SNMP trap destination:

1. When the HRMCNFIG program is running, select the **trap destination** radio button. The **Network Mask** input field is then unavailable. (SNMP trap messages do not need to use this option.)

2. Select **UDP** in the Protocol field, enter the monitor station name and address in the appropriate fields, then select the **Add** push button. Do this for each of the monitor stations.

3. Select the **OK** push button when done.

Note: HRMCNFIG is a process external to the Library Manager, and therefore, you must wait until that process has completed before Library Manager's SNMP support is enabled. To do this, wait until the **Change SNMP trap destinations** becomes available again. When it is available, you can use all SNMP features.

Deleting a Destination: Perform the following steps to delete an SNMP trap destination:

1. In the list box, highlight the SNMP trap destination that you want to delete.

2. Select the **Delete** push button.

3. Select the **OK** push button when done.

Starting SNMP

When you have selected the trap types and configured the SNMP trap destinations, you must enable the Library Manager SNMP support. To do this, select the **Start SNMP** option in the SNMP Options window.

Selecting this option starts the SNMP daemon. To ensure that the daemon is running, press **Ctrl + Esc** to bring up a window list and ensure that SNMPD is listed.

Stopping SNMP

Selecting the **Stop SNMP** option in the SNMP Options window disables the Library Manager's SNMP features. If the SNMP daemon is not running, no Library Manager SNMP traps are generated.

Sending TESTM Messages

When you have configured SNMP, send an SNMP trap to ensure that SNMP is configured correctly. The TESTM trap allows you to send a test message to the monitor stations, which have been set up to receive the SNMP trap messages.

To send a TESTM SNMP trap, select the **Send TESTM Trap** option in the SNMP Options window. Selecting this option opens a window that allows entry of a string to send to all the monitor stations that the Library Manager is configured for (see Figure 210).
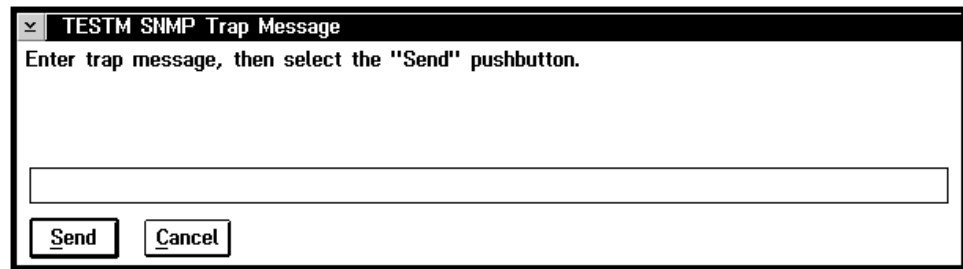
Figure 210. TESTM SNMP Trap Message Window

Most problems sending SNMP messages are related to network configuration. If the monitor station does not receive the trap, check the SNMPD window located on the Library Manager to see if the SNMPD trap message was sent. If the daemon shows the message, ensure that the network path to the monitor station is correct.

Trouble Shooting SNMP Problems

Most problems encountered are related to the site network or software. Check the following on the Library Manager to ensure that SNMP is working correctly:

1. Ensure that the SNMPD process is running.
2. Ensure that you can "ping" the monitor station from a Service window. If you cannot "ping" the monitor station, then there is a network configuration problem that you must correct. The SNMP trap can never get to the monitoring station until you correct the network configuration problem.
3. Generate a TESTM trap message, then check the SNMPD window to determine if it was sent. To do this, press **Ctrl + Esc** to bring up the Window List, then use the pointing device or arrow keys to highlight the SNMPD process. You should see the TESTM trap message in the window. If there are any errors, then the daemon is not being started correctly.

Receiving SNMPD Traps on the Monitor Station

All the Library Manager trap types follow a very similar format. Each Library Manager SNMP trap message generated has the same starting format. This helps the programmer on the monitor station handle the different Library Manager SNMP trap message types.

Each field in the Library Manager SNMP trap message is space delimited. This allows the programmer to tokenize the incoming Library Manager SNMP trap message.

Most Library Manager SNMP trap messages contain both a set of parameters and a message string. The parameters are intended to aid the programmer in extracting the necessary information from the trap message. The message string is intended for users who do not have the ability to program the network monitor station software to parse and process the Library Manager SNMP traps. Each Library Manager SNMP contains this message string, which contains enough information to post to the simplest SNMP monitor program.

The basic format for a Library Manager SNMP Trap Message is as follows:

3494 {Library Sequence Number} {Library Manager Trap Type} {Trap Number} {*Rest of Message*}

3494	Indicates that a 3494 generated this message.
Library Sequence Number	This is the Library Sequence Number of the logical library that generated the message. It gives the programmer the ability to know the 3494 that generated the SNMP Trap message. Each 3494 has a unique Library Sequence Number.
Library Manager Trap Type	This is one of the following trap types: • OPINT • UNSOL • SERVC • CHCK1 • TESTM
Trap Number	This is the trap number of the Library Manager Trap Type. Each Library Manager Trap Type contains a unique set of traps, each with its own format. This field allows the programmer to determine the Library Manager Trap Type message that was sent.
Rest of Message	The content of this part of the Library Manager SNMP trap message is quite flexible. Some Library Manager messages contain parameters or a message string. The Library Manager SNMP trap message parameters are meant to help the monitoring station software gather the related information quickly. The message string is meant for human readability.

Here is an example of a Library Manager SNMP trap message:

```
3494 C2444 OPINT 4 - - - *The Library is full.
```

In this example, the message was generated from a 3494 with a Library Sequence Number of C2444. The Library Manager Trap Type is OPINT, or an operator intervention. The OPINT trap number is 4, the parameters are all -, and the rest of the trap message indicates that the 3494 is full of cartridges.

Outline for Receiving Library Manager SNMP Traps

Perform the following steps to receive Library Manager SNMP traps:

1. Ensure that the SNMP trap was generated from a 3494.

2. If the message was generated from a Library Manager, tokenize the incoming SNMP trap and read the 3494 that generated the trap message. This can be done by reading the Library Sequence Number.

3. Determine the Library Manager SNMP Trap Type that was sent. This is one of the Library Manager SNMP Trap Types. This is the next field in the space-delimited string.

4. When you have determined that the SNMP trap message was generated from a 3494, its identity, and the type of Library Manager SNMP trap message that was sent, the message can be tokenized again to remove the message parameters and message string.

Note: It is a good idea to program the monitor station to handle conditions such as an unrecognized Library Manager SNMP trap. Additional Library Manager SNMP traps may be added and documentation updated, as they are updated.

Programming Tools

The Library Manager code contains an aid for the developer to help check the monitor's ability to handle all the Library Manager SNMP traps. This program is located in **C:\lm\exe**.

To use the program, first ensure that SNMP is enabled and configured on the Library Manager. The program cannot generate any SNMP traps if SNMP is not enabled on the Library Manager.

To start the program, open a service window and enter **SNMPTEST**.

If the program does not come to the foreground, press the **Ctrl + Esc** keys to bring up the Window List. Select the **SNMPTEST** program. Use the program to generate the required SNMP traps, and when done, exit the SNMPTEST program and close the service window.

OPINT Library Manager SNMP Traps

This section discusses the format of the Library Manager OPINT SNMP traps. Library Manager OPINT SNMP traps are the easiest to program for, because they all follow the same format. The general Library Manager OPINT SNMP trap has the following format:

3494 {Library Sequence Number} OPINT {OPINT Trap Number} {Parameter A} {Parameter B} {Parameter C} {Actual Library Manager OPINT Trap Message}

The following is an example of an OPINT Library Manager SNMP Trap:

```
3494 C2444 OPINT 48 180 - - A cartridge containing invalid media has
been left in the device 180 feed slot. Remove the cartridge.
```

In this example, a cartridge with invalid media type has been left in the feed slot of device 180 on library C2444.

Notes:

1. Library Manager OPINT SNMP trap messages pad all unused parameters with a dash (–) in order to maintain the space delimited architecture.

2. All Library Manager SNMP trap messages are actually one line of text; however, due to the printing process, some may take up several lines of text in this manual.

Valid values for the OPINT tables parameters are:

–   The dash indicates that the parameter is not used for this Library Manager OPINT messages.

Gripper   Valid Gripper values are: 1, which indicates Gripper one, and 2, which indicates Gripper two.

Accessor   Valid Accessor values are: A, which indicates Accessor A, and B, which indicates Accessor B.

                 Note: Only the HA1 Frames have an Accessor B.

Device   Valid device values are from 0–0xFFF. This parameter is always reported in hexadecimal.

Volser   This is a six-character string (example: CNN444).

Rack Cell   The Rack Cell parameter has the following format: RackColumnCell. As an example, 1 G 1 means rack 1, column G, and cell 1.

External   Same as Volser - Used only in libraries with VTSs.

Internal   Same as Volser - Used only in libraries with VTSs.

VTS   Valid VTS parameters are the following:
- **VTS_1**, which indicates VTS 1
- **VTS_2**, which indicates VTS 2

Certain versions of OS/2 trap if the overall SNMP message is over 132 bytes in length. To prevent this trap, the Library Manager software checks to see if the SNMP trap message is longer than 132 bytes and inserts a null character at the 132-byte limit. Therefore, some Library Manager OPINT SNMP traps are truncated to prevent this problem.

Table 13 contains the Library Manager OPINT interventions.

Notes:
1. Items starting with an asterisk (*) are cleared automatically when you clear the condition causing the intervention.
2. You can view operator interventions from the Specialist (see "Specialist Features and Functions" on page 332.

Table 13. Operator Intervention Messages and Parameters (OPINT TRAP Type)

OPINT #	Parameter [A]	Parameter [B]	Parameter [C]	Actual Library Manager OPINT Trap Message
1	Gripper	Accessor	—	Gripper failure on Gripper [A], Accessor [B]
3	—	—	—	* The convenience I/O station is full.
4	—	—	—	* The library is full.
5	Volser	—	—	A duplicate volser ([A]) was ejected to the convenience I/O station.
6	Volser	—	—	A duplicate volser ([A]) was left in the convenience I/O station.

OPINT #	Parameter [A]	Parameter [B]	Parameter [C]	Actual Library Manager OPINT Trap Message
7	—	—	—	An unreadable volser was left in the convenience I/O station.
8	—	—	—	* The library is out of CST/ECCST cleaner cartridges.
9	Volser	—	—	An unexpected volser ([A]) was found and ejected to the convenience I/O station.
10	—	—	—	* The high-capacity output rack is full.
11	Volser	Rack Cell	—	A duplicate volser ([A]) was left in high-capacity Input rack cell [B].
12	Rack Cell	—	—	An unreadable volser was left in high-capacity Input rack cell [A].
13	Volser	Rack Cell	—	An invalid volser ([A]) was left in high-capacity Input rack cell [B].
14	Volser	—	—	An invalid volser ([A]) was left in the convenience I/O station.
15	Volser	Rack Cell	—	A duplicate volser ([A]) was ejected to high-capacity output rack cell [B].
16	Volser	Rack Cell	—	An unexpected volser ([A]) was ejected to high-capacity output rack cell [B].
17	Device	—	—	Load / unload failure on device [A]. Empty the feed slot.
18	Volser	—	—	An unexpected volser ([A]) was left in the convenience I/O station.
19	Volser	Rack Cell	—	An unexpected volser ([A]) was left in high-capacity output rack cell [B].
20	—	—	—	* The convenience I/O station door is open.
21	—	—	—	* The convenience I/O station door is open.
22	Volser	—	—	Volser ([A]) could not be put away. It was ejected to the convenience I/O station.
23	Volser	Rack Cell	—	Volser ([A]) could not be put away. It was ejected to high-capacity output rack cell [B].
24	—	—	—	The convenience I/O station should be empty but is not; check the station visually.
25	Gripper	Accessor	—	A cartridge could not be released from Gripper [A], Accessor [B].
26	Volser	—	—	A cartridge ([A]) has been dropped.
28	—	—	—	An emergency stop has occurred.
29	Volser	—	—	Damaged volser ([A]) ejected to the convenience I/O station.
30	Volser	Rack Cell	—	Damaged volser ([A]) ejected to high-capacity output facility cell: [B].
31	Device	—	—	Device [A] is not ready.
34	Device	—	—	A mislabeled cleaner cartridge has been left in device [A] feed slot. Remove the cartridge.

Table 13. Operator Intervention Messages and Parameters (OPINT TRAP Type) (continued)

OPINT #	Parameter [A]	Parameter [B]	Parameter [C]	Actual Library Manager OPINT Trap Message
35	Device	—	—	A recoverable error occurred on device [A]. A service call may be needed if the error persists.
36	—	—	—	A mislabeled cleaner cartridge has been ejected to the convenience I/O station.
37	—	—	—	A mislabeled cleaner cartridge has been ejected to the high-capacity output station.
39	Rack Cell	—	—	A duplicate volser has been found at cell [A].
40	Rack Cell	—	—	The cartridge label located at cell [A] is unreadable.
41	Rack Cell	—	—	The cartridge label located at cell [A] is not valid.
42	—	—	—	The system has failed. A service call is required.
43	—	—	—	* The accessor or gripper configuration has changed. The library must be retaught.
44	—	—	—	* The top two I/O station cells are inaccessible. Move cartridges to cell 3 or below.
45	Volser	Rack Cell	—	Volser ([A]) cannot be removed from cell [B].
46	Volser	Rack Cell	—	Volser ([A]) cannot be removed from high-capacity station cell [B].
47	Device	—	—	Device [A] has failed. A service call is needed.
48	Device	—	—	A cartridge containing invalid media has been left in device [A] feed slot. Remove the cartridge.
49	Volser	—	—	An invalid media volser ([A]) has been ejected to the convenience I/O station.
50	Volser	—	—	An invalid media volser ([A]) has been ejected to the high-capacity output station.
51	—	—	—	* The library is out of HPCT cleaner cartridges.
52	Volser	—	—	A volser ([A]) with an unknown media type has been ejected to the convenience I/O station.
53	Volser	Rack Cell	—	A volser ([A]) with an unknown media type has been ejected to high-capacity output facility cell [B].
54	Volser	—	—	Volser ([A]) cannot be removed from the convenience I/O station.
55	—	—	—	Free storage threshold has been crossed for VTS z.

OPINT #	Parameter [A]	Parameter [B]	Parameter [C]	Actual Library Manager OPINT Trap Message
56	Volser	—	—	A volser ([A]) with an unknown media type has been left in the convenience input station.
57	Volser	—	—	A volser ([A]) with an unknown media type has been left in the high-capacity input station.
58	Volser	—	—	An invalid volser ([A]) has been ejected to the convenience I/O station.
59	Rack Cell	—	—	The cartridge label located at cell [A] has an unknown media type.
60	Volser	—	—	During an Inventory Update operation, volser [A] was ejected to the convenience I/O station because there were no free cells.
61	Volser	—	—	During an Inventory Update operation, volser [A] was ejected to the High-Capacity station because there were no free cells.
62	Accessor	—	—	Power failure on Accessor [A]. Call service.
63	Accessor	—	—	Accessor [A] has failed. Call service.
64	—	—	—	Dual write has failed. A service call is required.
65	Volser	Slot	Rack Cell	An error occurred for cartridge [A] during insert from CIO slot [B] to cell [C].
66	—	—	—	* VTS Import: Unassigned volumes have been inserted into the library.
67	Volser	—	—	Eject failed for volser [A]. The Library Manager initiated this operation.
68	—	—	—	A Library Manager switch has completed. This switch was initiated by the operator.
69	—	—	—	A Library Manager switch has completed. This switch was due to an error.
70	—	—	—	This message may be any of the following: • A hard drive has failed. Call service. • LM-A hard drive failure. Call service. Library is operational but degraded. Primary hard drive failed. • LM-A hard drive failure. Call service. Library is operational but degraded. Mirror hard drive failed. • LM-B hard drive failure. Call service. Library is operational but degraded. Primary hard drive failed. • LM-B hard drive failure. Call service. Library is operational but degraded. Mirror hard drive failed.

Table 13. Operator Intervention Messages and Parameters (OPINT TRAP Type) (continued)

OPINT #	Parameter [A]	Parameter [B]	Parameter [C]	Actual Library Manager OPINT Trap Message
71	—	—	—	This message may be any of the following: • Mirroring disabled. Call service. Library is operational but degraded. • LM-A mirroring disabled. Call service. Library is operational but degraded. • LM-B mirroring disabled. Call service. Library is operational but degraded.
72	—	—	—	Barrier door A is not fully retracted. Call service.
73	—	—	—	Barrier door B is not fully retracted. Call service.
74	—	Port #	—	Control unit on port xx requires a higher level of Library Manager.
75	—	—	—	Database discrepancies have been found. Call service. Library is still operational.
76	Volser	Rack Cell	—	Volser [A] cannot be found. Check home cell [B] and Accessor A, Gripper 1.
77	Volser	Rack Cell	—	Volser [A] cannot be found. Check home cell [B] and Accessor A, Gripper 2.
78	Volser	Rack Cell	—	Volser [A] cannot be found. Check home cell [B] and Accessor B, Gripper 1.
79	Volser	Rack Cell	—	Volser [A] cannot be found. Check home cell [B] and Accessor B, Gripper 2.
80	—	—	—	Error writing to dual write log (on Library Manager A or B).
81	Accessor	—	—	An emergency stop has occurred, or Accessor [A] has failed. A service call is required.
82	Volser	I/O Slot Number	—	Volser xxxxxx left in convenience I/O slot [B] due to vision system failure.
83	Volser	Rack Cell	—	Volser xxxxxx left in high-capacity rack cell xx y zz [B] due to vision system failure.
84	—	—	—	Scratch mount performance is degraded. A service call is required.
85	—	—	—	Database performance is degraded.
86	—	—	—	Problem detected with Token Ring connection. Call service.
87	LMA/LMB	—	—	Login is now disabled on [A]. Call service.
88	Pool #	VTS #	—	Target Storage Pool [A] is out of stacked volumes for VTS [B].
89	Constr	Max #	—	The number of [A] constructs reached the maximum number allowed ([B]).
90	Constr	Curr #	Max #	The number of [A] constructs exceeded [B]. The maximum number allowed is [C].
91	LMA/LMB	—	—	[A] The internal LAN switch (HUB) failed or is not configured correctly. Call service.

Table 13. Operator Intervention Messages and Parameters (OPINT TRAP Type) (continued)

OPINT #	Parameter [A]	Parameter [B]	Parameter [C]	Actual Library Manager OPINT Trap Message
92	Sqlcode	—	—	A database error occurred. View help panel for SQL error code [A]. Call service.
93	—	—	—	NVRAM read failure on LM-A. Call service.
94	—	—	—	NVRAM write failure on LM-A. Call service.
95	—	—	—	NVRAM read failure on LM-B. Call service.
96	—	—	—	NVRAM write failure on LM-B. Call service.
97	Opint #	—	—	Unknown intervention for condition [A]. View help panel.
98	LMA/LMB	—	—	[A] The internal LAN switch (HUB) is not configured correctly.
99	Volser	—	—	Volser [A] ejected during recovery processing.
100	Volser	—	—	A read-only status stacked volume [A] has been ejected. (VTS z)
101	—	—	—	* A VTS is out of empty stacked volumes. (VTS z)
102	External	Internal	—	A stacked volume has a label error. Internal: [B], External: [A]. (VTS z)
103	—	—	—	A permanent, unrecoverable tape volume cache error has occurred. (VTS z)
104	Volser	—	—	An orphaned logical volume ([A]) has been found. Call service. (VTS z)
105	—	—	—	A VTS has a CHECK1 failure. (VTS z)
107	Stacked	Logical	—	Logical volume [B] was not fully recovered from damaged stacked volume [A]. (VTS z)
108	Error Code	—	—	The tape volume cache is degraded. ([A]) (VTS z)
109	Volser	—	—	Database restore from volume [A] failed. Attempting to restore from next most recent. (VTS z)
110	Volser	—	—	Insert of logical volume [A] failed during disaster recovery. (VTS z)
111	Volser	—	—	Damaged volume [A] ejected during disaster recovery. Could not be read on two drives. (VTS z)
112	Device	—	—	Device [A] has been made unavailable by a VTS. (VTS z)
113	VTS	—	—	A VTS does not have enough available physical drives to continue operation.
114	Volser	—	—	A VTS attempted unsuccessfully to eject a stacked volume ([A]) during disaster recovery. (VTS z)
115	Volser	—	—	A VTS attempted unsuccessfully to eject a damaged stacked volume ([A]). (VTS z)

Table 13. Operator Intervention Messages and Parameters (OPINT TRAP Type) (continued)

OPINT #	Parameter [A]	Parameter [B]	Parameter [C]	Actual Library Manager OPINT Trap Message
116	Device	—	—	VTS physical device [A] is cabled incorrectly. It has been made unavailable. (VTS z)
117	Device	—	—	A VTS cannot communicate with device [A]. It has been made unavailable. (VTS z)
118	Physical	Logical	Reason Code	Mount of logical volume [B] failed because physical volume [A] is not in the library. (rc=[c]) (VTS z)
120	Physical	Logical	Reason Code	Mount of logical volume [B] failed because physical volume [A] is misplaced. (rc=[c]) (VTS z)
121	Physical	Logical	Reason Code	Mount of logical volume [B] failed because physical volume [A] is inaccessible. (rc=[c]) (VTS z)
122	Physical	Logical	Reason Code	Mount of logical volume [B] located on physical volume [A] failed. (rc=[c]) (VTS z)
123	Volser	Error Code	—	Stacked volume [A] is in Read-Only status with a reason code of [B]. (VTS z)
124	Volser	Error Code	—	Stacked volume [A] is unavailable with a reason code of [B]. (VTS z)
125	Error Code	—	—	VTS Controller degraded. Error Code [A]. Call service. (VTS z)
126	Device	—	—	VTS requested that device [A] be made unavailable, but a mount/demount is in progress. (VTS z)
127	—	—	—	Invalid mixture of VTS physical drive types. (VTS z)
128	—	—	—	* A VTS does not have enough physical drives to continue operation. (VTS z)
130	Volser	—	—	Stacked volume [A] failed scratch mount. Label cannot be read. Tape needs to be re-initialized. (VTS z)
131	Volser	—	—	Stacked volume [A] ejected due to incompatible media type. (VTS z)
132	Volser	—	—	Stacked volume [A] could not be ejected because the convenience I/O station is full, or the door is open. (VTS z)
134	Volser	—	—	Write-protected stacked volume [A] ejected. (VTS z)
135	Volser	—	—	A VTS unsuccessfully attempted to eject write-protected stacked volume [A]. (VTS z)
136	Volser	—	—	Stacked volume [A] moved to category FF08 due to unreadable internal label. (VTS z)
137	—	—	—	A VTS has initialized with the Library. (VTS z)
138	Media	—	—	* The Common Scratch Pool (Pool 00) is out of [A] media stacked volumes. (VTS z)

OPINT #	Parameter [A]	Parameter [B]	Parameter [C]	Actual Library Manager OPINT Trap Message
139	Pool #	—	—	* Storage Pool [A] is out of scratch stacked volumes. (VTS z)
140	Volser	Pool #	Pool #	Volser [A] could not be moved from Storage Pool [B] to Storage Pool [C]. View help panel for error code. (VTS z)
141	Volser	—	—	VTS was unable to obtain construct information for logical volume [A]. (VTS z)
142	Volser	—	—	Stacked volume [A] exists in VTS database but not in Library Manager database. (VTS z)
143	—	—	—	VTS has completed processing the stacked volumes as part of Disaster Recovery inventory. (VTS z)
144	Volser	Errcode	—	Eject failed on stacked volume [A] that contains active data. View help panel for error code = [B]. (VTS z)
145	Volser	—	—	Unable to make stacked volume [A] read-only. (VTS z)
146	Volser	—	—	Unable to make stacked volume [A] read-write. (VTS z)
147	Volser	—	—	Stacked volume [A] is in an invalid state. (VTS z)
148	—	—	—	There are stacked volumes in the VTS database that cannot be found in the library. (VTS z)
151	—	—	—	The time on the VTS could not be adjusted. Call service. (VTS z)
152	Volser	—	—	Active data on ejected stacked volume [A] needs to be recovered. (VTS z)
153	Volser	—	—	Stacked volume [A] is misplaced. (VTS z)
300	—	—	—	One or more logical volumes have corrupted tokens. Call service. (VTS z)
301	—	—	—	Previous Peer-to-Peer Logical Volume Restore did not complete. Call service.
302	Volser	—	—	Volser [A] is damaged.
303	Volser	—	—	Volser [A] is in the manual eject category.
304	Port #	—	—	VTS ADSM port [A] failed. Call service.
305	# Errors	Volser	—	More than [A] errors encountered for stacked volume [B].
400	—	—	—	* The library is out of ETC cleaner cartridges.
401	Cartridge type	Volser	—	[A] cleaner cartridge [B] was ejected due to maximum use.
402	Percent	Accessor	—	[A] percent of mounts performed by Accessor-[B] over the past hour required excessive mount recovery. Call service.

Table 13. Operator Intervention Messages and Parameters (OPINT TRAP Type) (continued)

	OPINT #	Parameter [A]	Parameter [B]	Parameter [C]	Actual Library Manager OPINT Trap Message
/ / / /	403	Percent	Accessor	—	[A] percent of mounts performed by Accessor-[B] over the past 24 hours required excessive mount recovery. Call service.
/ / /	404	Device	Percent	Accessor	Device [A] required excessive mount recovery ([B] percent of mounts) over the past hour (Accessor-[C]). Call service.
/ / /	405	Device	Percent	Accessor	Device [A] required excessive mount recovery ([B] percent of mounts) over the past 24 hours (Accessor-[C]). Call service.
/	406	LMA or LMB	—	—	Logging is degraded on [A]. Call service.
/ /	407	LM Return Code	TSMC Return Code	—	Communication with the TSMC has failed (LM rc = [A], TSMC rc = [B]. Call service.
/ /	408	LMA or LMB	Return Code	—	[A]: TSMC configuration has failed (rc = [B]). Call service.
/ / /	412	Volser	—	—	Volser [A] has been returned to the station. A service cartridge cannot be inserted via CIO or HCIO.

UNSOL Library Manager SNMP Traps

This section discusses the format of the Library Manager UNSOL messages. Unlike the Library Manager OPINT SNMP traps, the UNSOL SNMP trap messages are all different and require special programming to handle them.

There are seven supported Library Manager UNSOL SNMP trap messages:
1. X10 - Category State Change
2. X11 - Library Manager Operator Message
3. X12 - Library I/O Station State Change
4. X13 - Operational State Change
5. X14 - Volume Exception
6. X15 - Device Availability Changed
7. X16 - Device Category Change Notification

Note: X represents the hexadecimal value.

Category State Change SNMP Trap

This message indicates that the Library Manager has added one or more cartridges into the Insert category. The Category State Change message format is:

```
3494 [Library Sequence Number] UNSOL 10 [Parameter A]
*Volumes added to category: [Parameter A]
```

Library Sequence Number   Unique Library Sequence Number of the 3494 that generated the SNMP trap message.

Parameter A   This parameter is the category that volumes are added in.

Library Manager Operator Message SNMP Traps

The content is a message from the Library Manager operator console to all hosts connected to the 3494. The Library Manager Operator Message format is:

```
3494 [Library Sequence Number] UNSOL 11 *[Message from operator]
```

Library Sequence Number   Unique Library Sequence Number of the 3494 that generated the SNMP trap message.

Message from operator   This is the string that the operator on the Library Manager typed in.

Example:

```
3494 C2444 UNSOL 11 *The 3494 is being taken offline.
```

Here the C2444 3494 generated the message, and the operator entered "The 3494 is being taken offline".

Library I/O Station State Change SNMP Traps

The Library I/O Station State Change message format is:

```
3494 [Library Sequence Number] UNSOL 12 [Param A] [Param B] [Param C] [Param D]
[Param E] [Param F] [Param G] [Param H] *I/O Station
```

Library Sequence Number

Unique Library Sequence Number of the 3494 that generated the SNMP trap message.

Param A   It is one of the following:

1. **IE** - indicating "All Convenience Input Stations Empty"
2. —

Param B   It is one of the following:

1. **IO** - indicating "Open Input Door"
2. —

Param C   It is one of the following:

1. **OE** - indicating "All Convenience Output Stations Empty"
2. —

Param D   It is one of the following:

1. **OF** - indicating "All Convenience Output Stations Full"
2. —

Param E   It is one of the following:

1. **II** - indicating "3494 I/O Station in Input Mode"
2. —

Param F   It is one of the following:

1. **BA** - indicating "Bulk I/O Allowed"
2. —

Param G   It is one of the following:

1. **BF** - indicating "Bulk Output Station Full"
2. —

Param H   It is one of the following:

1. **OO** - indicating "Open Output Door"
2. —

Example:

```
3494 C2444 UNSOL 12 IE IO - - II - BF - *I/O Station
```

Operational State Change SNMP Traps

The Operational State Change message format is:

```
3494 [Library Sequence Number] UNSOL 13 [Mode] [State] [Degraded] [Safety
Enclosure Interlock Open] [Vision System Non-Operational] [Intervention
Required] [Check1] [All Storage Cells Full] [Out of Cleaners] [Dual Write
Disabled] [Smoke Detected] [Manual Mode] *Operational State Change
```

Library Sequence Number   Unique Library Sequence Number of the 3494 that
                                generated the SNMP trap message.

Mode   The mode is one of the following:
- Auto
- Pause
- Manual

State   The state is one of the following:
- Online
- Offline

Degraded   It is one of the following:
- —
- Degrad

Safety Enclosure Interlock Open
                                It is one of the following:
- —
- SO

Vision System Non-Operational
                                It is one of the following:
- —
- VN

Intervention Required   It is one of the following:
- —
- IR

Check1   It is one of the following:
- —
- C1

All Storage Cells Full   It is one of the following:
- —
- SF

Out of Cleaners   It is one of the following:
- —
- OC

Dual Write Disabled   It is one of the following:
- —
- DD

Smoke Detected   It is one of the following:

- —
- SM

Manual Mode Manual mode is one of the following:

- —
- MM

Example:

```
C2444 UNSOL 13 AUTO ONLINE - - VN - - - - - - - *Operational State Change
```

This message indicates that the vision system is not operational.

Volume Exception SNMP Traps

The Volume Exception message format is:

```
3494 [Library Sequence Number] UNSOL 14 [Exception Code] [Volser]
[Category] [ERA] [Message]
```

Library Sequence Number Unique Library Sequence Number of the 3494 that generated the SNMP trap message.

Exception Code The exception code is one of the following:

- 0x01
- 0x02
- 0x03
- 0x04
- 0x05
- 0x06
- 0x07
- 0x08
- 0x09

Volser This is a six-character string.

Category Category affected by the volume exception.

ERA Additional information, not supported currently.

Message The message is one of the following:

- *Misplaced Volume Found
- *Volume Misplaced
- *Duplicate Volser Ejected
- *Duplicate Volser in Input Station
- *Unreadable Volser left in Input Station
- *Unexpected Volume Ejected
- *Volume Inaccessible
- *Inaccessible Volumes Restored
- *Cleaner Volume Ejected
- *Unknown Volume Exception

The following is an example of a message:

```
3494 C2444 UNSOL 14 1 CNN444 FF01 20 *Misplaced Volume Found
```

Device Availability Changed SNMP Traps

The Device Availability Changed message format is:

```
3494 [Library Sequence Number] UNSOL 15 [Device] [Availability] [Modifier]
[First Errorcode] [Message String]
```

Library Sequence Number   Unique Library Sequence Number of the 3494 that generated the SNMP trap message.

Device   Device that is going either available or unavailable.

Availability   Availability is one of the following:
- A - Device becoming available
- U - Device going unavailable

Modifier   Additional information, not supported currently.

First Errorcode   Additional information, not supported currently.

Message String   The message string is one of the following:
- *Device [Device] has been made available by the library
- *Device [Device] has been made unavailable by the library

The following is an example of a message string:

```
3494 C2444 UNSOL 15 180 A 20 6E84 *Device 180 has been made available by
the Library.
```

Device Category Change Notification SNMP Traps

The Device Category Change Notification message format is:

```
3494 [Library Sequence Number] UNSOL 16 [Device] [Category] [Parameters]
*Device Category Change
```

Library Sequence Number   Unique Library Sequence Number of the tape library that generated the SNMP trap message.

Device   Device reporting the change.

Category   Category change has been made.

Parameters   Additional information, not supported currently.

Example:

```
3494 C2444 UNSOL 16 180 FF01 20 *Device Category Change
```

CHCK1 Library Manager SNMP Traps

This section discusses the format of the Library Manager CHECK1 messages. All CHECK1 Library Manager SNMP Traps have the same format.

The format for CHECK1 Library Manager SNMP Traps is:

```
3494 [Library Sequence Number] CHCK1 [Errorcode] [Modifier] *A CHECK1 with
errorcode: [Errorcode], and modifier: [Modifier], has occurred on [Library Sequence Number]
```

The following is an example of a CHECK1 Library Manager SNMP trap message:

```
3494 C2444 CHCK1 BDDD 230 *A CHECK1 with errorcode: BDDD, and modifier:
230, has occurred on C2444
```

Note: All Library Manager SNMP trap messages are actually one line of text; some have been split in order to fit on the pages of this document.

In the example, a BDDD CHECK1, with modifier 230, occurred on the C2444 tape library .

Library Sequence Number
Unique Library Sequence Number of the 3494 that generated the SNMP trap message.

Errorcode The error code is a hexadecimal value from 0 to 0xFFFF.

Modifier The modifier that the CHECK1 uses for additional information about the condition. Valid values are 0 to 64 KB.

TESTM Library Manager SNMP Traps

This section discusses the TESTM Library Manager SNMP trap messages. All Library Manager TESTM SNMP trap messages have the following format:

```
3494 [Library Sequence Number] TESTM *{User Message}
```

The following is an example of a TESTM Library Manager SNMP trap message:

```
3494 C2444 TESTM *THIS IS A TEST, 8/26/01 - 10:30 am
```

In this example, the user entered the string "THIS IS A TEST, 8/26/01 - 10:30 am". The asterisk character (*) is inserted automatically in the Library Manager TESTM message. It is intended to aid the monitor station programmer.

″Fast Ready″ Category Hold SNMP Traps

This section discusses the ″Fast Ready″ Category Hold Library Manager SNMP trap messages. The three possible messages are listed below. ″xxxx″ denotes the category and ″yy″ the number of hours.

```
3494 [Library Sequence Number] 409 xxxx - - Volume hold function disabled for
fast-ready category xxxx
```

```
3494 [Library Sequence Number] 410 xxxx yy- - Hold/Expire time has been changed
 to yy hours for fast-ready category xxxx
```

```
3494 [Library Sequence Number] 411 xxxx - - Fast-ready asttribute deleted for
fast-ready category xxxx
```

These messages are informational in nature and do not require any specific operator action.

″Fast Ready″ Category Hold Host Messaging

This section discusses the ″Fast Ready″ Category Hold host messages. The three possible messages are listed in Table 14.

Table 14. ″Fast Ready″ Category Hold Host Messages

MSG #	Parameter [A]	Parameter [B]	Actual ″Fast Ready″ Category Hold Host Message
409	Category	—	Volume hold function disabled for fast-ready category [A].
410	Hours	Category	Hold/Expire time has been changed to [A] hours for fast-ready category [B].
411	Category	—	Fast-ready attribute deleted for category [A].

These messages are informational in nature and do not require any specific operator action.

Call Home

The Call Home window (Figure 211 on page 315) allows you to initiate a "Call Home" for a selected subsystem.

You can initiate a "Call Home" request by performing the following steps:

1. Select a subsystem from the list box, which contains a list of subsystems that are capable of Call Home operations.

2. Select the button for the **Type of Call Home** request. There are two types of Call Home requests:

   Initial install   Select to send a request to test the installation of the Call Home function in the subsystem. A service representative normally initiates this request.

   Subsystem problem   Select to send a request to a subsystem to execute its Call Home function. You normally initiate this request because you found a problem in the subsystem.

   Send LM code level   Select to send a request to the subsystem to execute its LM Call Home function. This is generally not an error condition and is normally initiated by the customer so that accurate LM code levels are reported. Please note that a subsystem may be ″Call Home″ capable but not necessarily ″LM Call Home″ capable. In this case a warning popup message will be posted for that subsystem.

3. Select the **Initiate call home...** push button to send the request.

The Call Home window has the following controls:

Type of Call Home   These buttons allow you to select the type of Call Home request that you want to initiate.
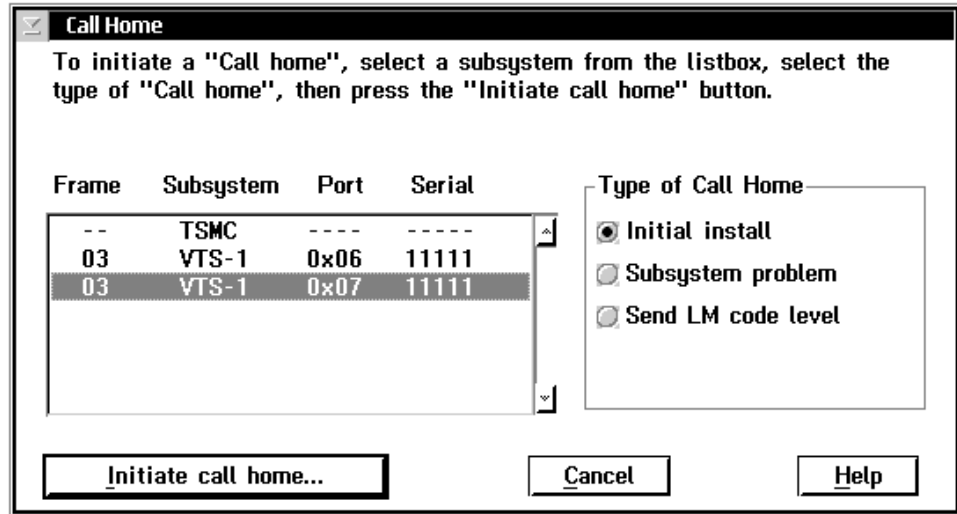
Figure 211. Call Home Window

The Call Home window has the following push buttons:

Initiate call home...   Initiates the Call Home request.

Cancel   Closes the Call Home window without initiating the Call Home request.

Help   Provides help about the Call Home window.

Specialist (Web Server)

The Specialist must be enabled before it can function. Selecting the **Specialist (Web Server)** option opens a window with the following options:

Settings   Selecting this option allows control of the Web Administrator's userid and selection of function available to users through the Specialist interface. The Web Administrator's userid must be activated from the LM console before any set up of additional userids and passwords can be done. The 3494 Specialist is shipped with a default userid. Once the Web Administrator's userid is activated successfully, the system administrator can login as the *webadmin* user and create other userids and passwords. The *webadmin* userid is shipped with a default password.

Note: See "Establishing Userids" on page 317 below for more information on administering userids and passwords. The default userid and password can be found in that section.

The following actions can be performed from the Settings screen on the LM:

- Activate/Deactivate the Web Administrator's User ID (select the **Activate** or **Deactivate** button)
- Reset the Web Administrator's password to the default password (select the **Reset to default**

button). This should be used in emergency situations when the person who knows the password is not available.

- Allow or restrict access to Web pages that provide control of Library Manager information. The System Administrator can decide what LM control functions are available to users. Each control page can be allowed or restricted. The administrator may allow users to insert logical volumes, but not allow them to update storage pool properties. To do this, select ″Yes″ or ″No″ in the Allow Access options and select the **Submit Access Change** button.
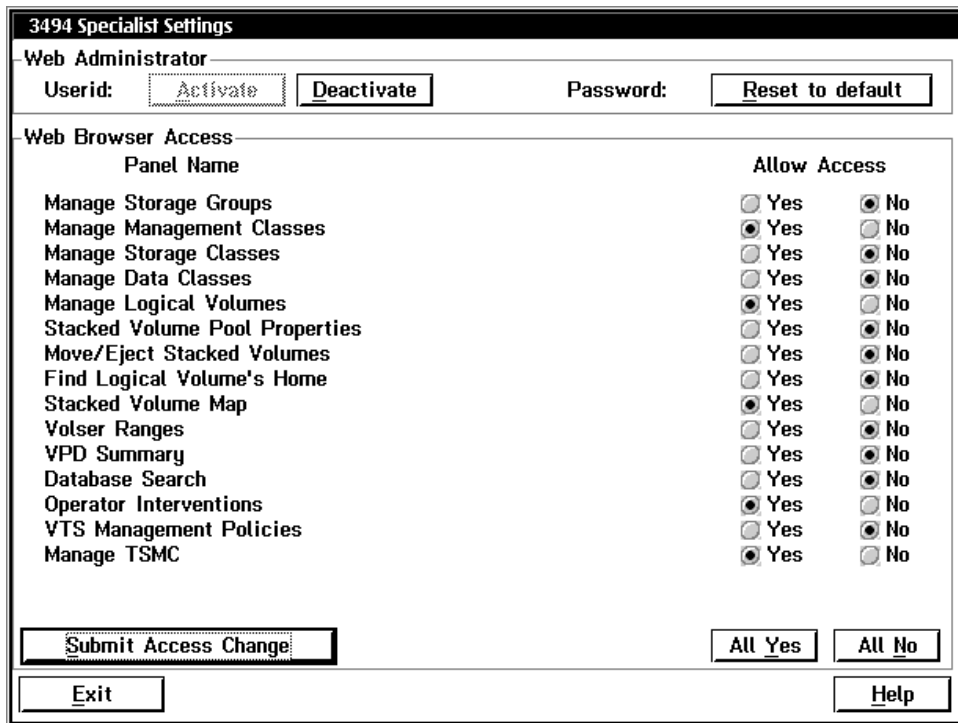
Figure 212. 3494 Specialist Settings

Activate	Activates the Web Administrator's User ID.
Deactivate	Deactivates the Web Administrator's User ID.
Reset to default	Resets the Web Administrator's password to the default password.
Submit Access Change	Submits the selected access changes. Access changes are not

		effective until this button is pressed.
	All <u>Y</u>es	Marks all of the **Allow Access** options ″Yes.″
	All <u>N</u>o	Marks all of the **Allow Access** options ″No.″
	<u>E</u>xit	Closes the 3494 Specialist Settings window.
	<u>H</u>elp	Provides help about the 3494 Specialist Settings window.

Enable/Disable   Selecting this option allows you to either:

- **Enable:** Enable and start the Specialist function. This allows remote access to Library Manager status information and control functions.
- **Disable:** Disable and stop the Specialist function and prevent it from restarting. Remote access to Library Manager status information and control functions is not allowed.

When you have enabled the Specialist, it continues to run while the Library Manager is powered-on. To ensure that the Specialist is running, press Ctrl + Esc. If the Specialist is enabled and running, **3494 TotalStorage Specialist** will be in the window list. Press Esc to close the window list.

Note: You cannot enable the Specialist **from** the Specialist. You must do this at the Library Manager.

If the **Enable** option is unavailable, the Specialist has already been enabled. At this time, the **Disable** option is available.

If the **Specialist (Web server)** option in the Commands window is unavailable, the Library Manager operating system either is not at the proper level or does not have enough memory to support the Web server. The Specialist cannot be started.

Establishing Userids

The default userid and password are *webadmin* and *webadmin*. In order to use any control functions on the Web Specialist, the default userid must be activated from the LM. To activate the *webadmin* userid, do the following:

1. Select **Commands**.
2. Select **3494 Specialist (Web Server)**.
3. Select **Settings**.
4. Select the **Activate** push button.

5. Wait for the message that the Web Administrator Userid was activated.

Attention: It is recommended that the default password be changed immediately following activation of the userid.

To change a user's password (including *webadmin*), do the following:
1. Access the Specialist Web interface.
2. Select **Security**.
3. Select **Change User Password**.

Users can also modify their own passwords by completing the above procedure.

The Specialist allows certain control functions to be performed from a remote location. These functions are protected by secure userids and passwords. When one of these restricted access functions is selected, you will be prompted for a userid and password. You are only required to log in once per browser session.

Attention: You will remain logged in until you exit your browser entirely.

To add additional users, do the following:

Note: The maximum number of users is 48.
1. Access the Specialist Web interface.
2. Select **Security**.
3. Select **Administer Users**.
4. Add the appropriate userids and passwords. Userids or passwords must be a one to eight-alphanumeric character name. They are not case sensitive.

It is recommended that the *webadmin* userid be deactivated after the individual userids have been established. The *webadmin* userid is a superuser ID. There should be limited access to the password. To deactivate the *webadmin* userid, do the following:
1. Select **Commands**.
2. Select **3494 Specialist (Web Server)**.
3. Select **Settings**.
4. Select the **Deactivate** push button.

Using the Specialist

A Web browser must be installed on the user's computer. Perform the following steps to use the Specialist:
1. From the user's computer, start Microsoft® Internet Explorer.
2. In the Location space (where you would enter, for example, www.ibm.com), type the host name of the Library Manager. This is the TCP/IP name that was given to the Library Manager at configuration time. Your TCP/IP administrator should know this name. Instead of the host name in the Web address space, you can enter the IP address of the Library Manager. If you do not have a nameserver or the name of your Library Manager does not have an entry in your nameserver, you must use the IP address instead of a name. Again, your TCP/IP administrator will know this information.

   In this example, you would type:

   ```
   http://libmgr01
   ```

   OR

```
http://9.67.43.126
```

With newer browsers, it is not necessary to type:

```
http://
```

before entering the host name or IP address.

Note that you can always use the IP address, but it is more difficult to remember than a host name. That is why a nameserver is used normally. You might need to type the whole host name and domain name, such as:

```
http://libmgr01.vnet.ibm.com
```

Try typing only the host name first. In a local intranet, this usually works. If you receive the home page for the Specialist, it is enabled and running.

Using the Options Window

Figure 213 shows the Options window.

```
3494 Tape Library Dataserver
Mode   Status   Queues   Database   Commands   Options   Help
                                    Change power-on language →  ✓English...
                                                                 Español...
                                                                 Français...
                                                                 Italiano...
```

a06c0267
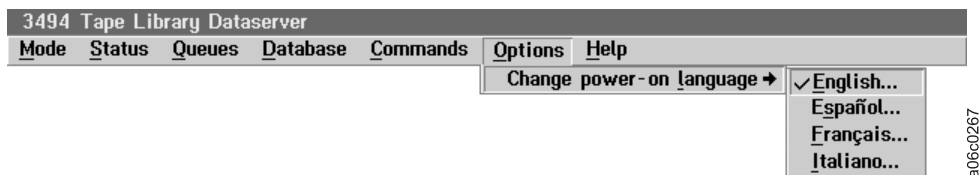
Figure 213. Options Window

The following option is available in the Options window:

Change power-on language Displays a list of supported languages that are selectable. A check mark indicates the current language. If you select a language, you are requested to confirm your selection. The new language becomes active when the Library Manager is shut down and restarted.

Using Manual Mode

You can use Manual mode during the following conditions:
- A problem in the 3494 prevents automated operations.
- A service representative is performing scheduled maintenance activities.

The Library Manager allows you to select Manual mode in the Mode window of the Operator menu (see "Manual Mode" in "Using the Mode Window" on page 120).

When in Manual mode, you follow the instructions on the Library Manager display and confirm as necessary when you complete the instructions. The 3494 continues to process automatically mount and demount requests that are issued to the virtual drives in a VTS. These requests are not included in the actions that display for operator processing. If a logical volume needs to be recalled from a physical volume in order to satisfy a mount to a virtual drive, the actions that are required under Manual mode include the resulting mount for that physical volume.

Typical actions include physical cartridge mounts, demounts, and ejects (removing cartridges from the 3494). A sample window with pending actions is shown in Figure 218 on page 323.

The Library Manager recognizes when a requested physical cartridge is mounted successfully in the requested drive and removes the mount request from the list automatically. Instructions to eject a cartridge are removed from the list manually when you use the keyboard to confirm (respond) that the action is completed or has an error.

A limited number of processed instructions can be viewed on the Library Manager display to correct any mistakes (see Figure 221 on page 329).

See "Cartridge Storage Cells" on page 34 for a description of the **From** and **To** locations used to find a cartridge for a mount.

Note: The display windows shown are examples. They may not be exactly the same as the windows on your Library Manager display.

Attention: In the event the Library Manager cannot park the accessor, it is possible usually to operate the 3494 in Manual mode. The operator should move the accessor manually only to gain access to a cartridge or to a drive. If necessary, perform "Cartridge Removal from the Gripper" on page 342. Call your service representative.

Starting Manual Mode

To start Manual mode, perform the following steps:

Note: Enable Inventory Update if it is disabled or verify Inventory Update is enabled before selecting Manual mode.

1. Select **Mode** (Figure 214) from the action bar of the Operator menu at the Library Manager (see "Using the Mode Window" on page 120).
2. Verify that the 3494 is online. If it is offline, select the **Online...** option and confirm your selection (see "Online" on page 122).
3. Select the **Manual...** option in the Mode window (see "Manual" on page 122).

/

/
/
/
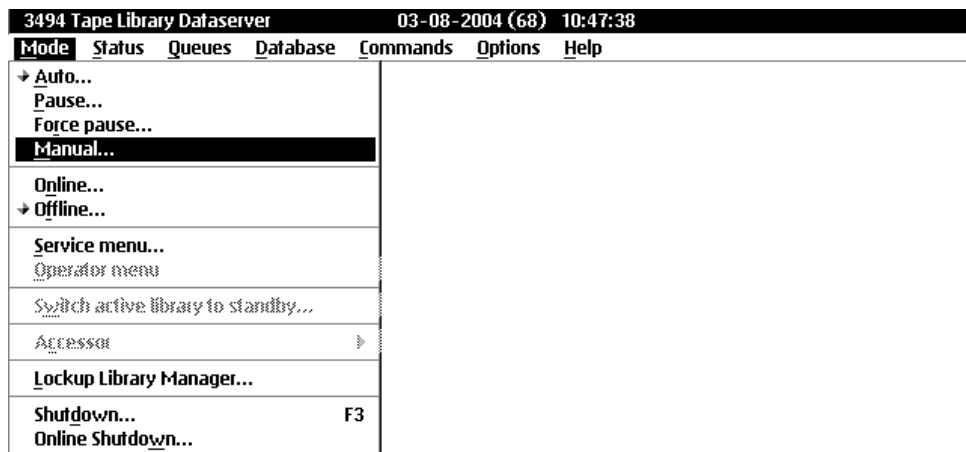
Figure 214. Mode Window

4. Select the **Yes** push button in the Mode/State Change Request window (Figure 215) to start the change to Manual mode.
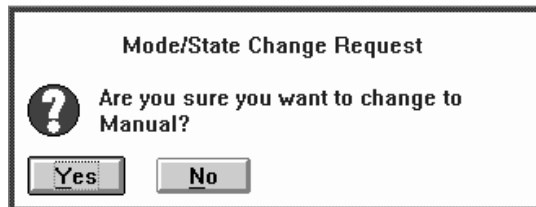
Figure 215. Mode/State Change Request Window

During the change to Manual mode, a wait period allows the Library Manager, if possible, to process all operations in progress, park the cartridge accessor, and

remove power from the cartridge accessor. Figure 216 shows the Manual Pending window.
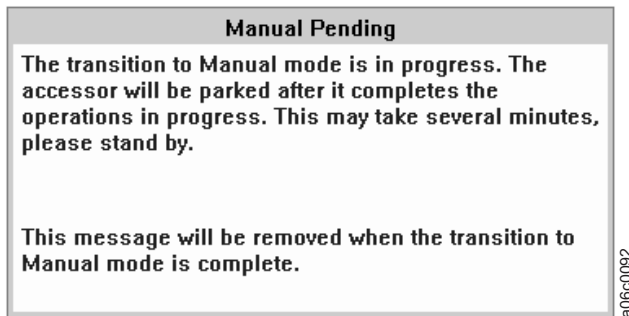
Figure 216. Manual Pending Window

When the transition to Manual mode is complete, the Manual Mode Terminal window opens, displaying the Help screen for the Action List (see Figure 217).
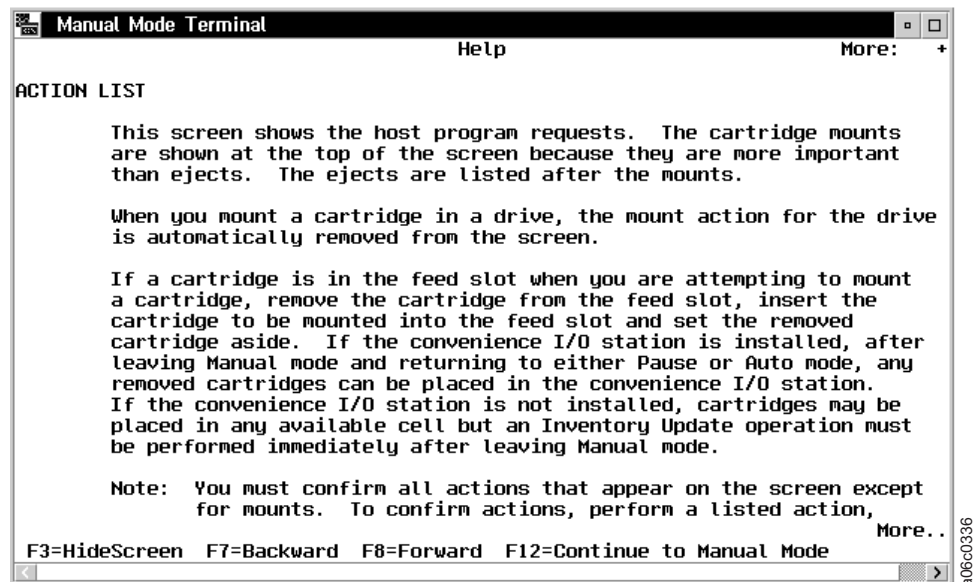
Figure 217. Help Screen for Action List

To continue to the Manual Mode Action List, press F12. This completes the transition to Manual mode.

You can use the F3 key to hide the Manual Mode Terminal window. The window will be hidden, but you can retrieve it by selecting the **Manual...** option in the Mode window.

Operating in Manual Mode

Figure 218 on page 323 shows the Manual Mode Terminal window with the Action List.

```
                              Action List

Select an action. Press Enter to confirm action completion (except Mounts).

     Action      VOLSER      From                 To

     Mount       WCC007      Rack   12 B 11       Device 3F1
     Mount       WSB392      Rack    7 C  5       Device 3F0
     Mount       TFW001      Device 201           Device 3F1
     Mount       SCR023      Rack   12 E  6       Device 3F0
     Mount       WRO112      Rack    3 J 13       Device 201
     Mount       TGB041      Rack    4 F  3?      Device 200
     Mount       ECR223      Rack   10 D 13       Device 3F1
     Mount       SFC607      Rack    9 F  2       Device 3E1
     Mount       FGG641      Rack   11 C 10       Device 200
     Eject       ERV399      Rack   13 F 11


More actions are waiting.
Press the Refresh key (F9) to update the list.
F1=Help  F3=HideScreen  F4=Error  F5=Insert  F6=Review  F9=Refresh  F10=Locate
```

Figure 218. Manual Mode Terminal Window with Action List

Legend:

Action   The operator task. See the following procedures for details.

VOLSER   The cartridge volume serial number.

From   The place where you should find the cartridge specified in
                  VOLSER.

To   The place where you should put the cartridge.

Device   The device ID the 3490E, 3590, or 3592 tape drive was taught as.

Rack   The physical storage address that can contain one cartridge.

?   The cartridge may not be in the location specified. See note 2b on
                  page 325.

The Action List presents tasks to perform. Perform the actions in the sequence
listed (see Figure 218). Read the following Mount, Demount, Insert, and Eject
procedures for how to perform each action.

The following function keys are available on the Action List:

F1   Displays instructions for performing Manual mode tasks.

F3   Hides the Manual Mode Terminal window. The window is hidden, but you
            can retrieve it by selecting the Mode window, then selecting **Manual** mode.

F4   Indicates that an action cannot be completed. The Error Processing window
            opens, which contains a list of possible error choices (see Figure 222 on
            page 330).

F5   Allows you to add volumes manually to the 3494. The Insert Cartridges
            window opens, which contains prompts for cartridge insertion (see
            Figure 219 on page 326).

F6   Displays up to the last 20 commands processed in Manual mode. You can
            use this to verify or to correct a possible error when returning a cartridge to
            its storage cell.

F7   Displays information above the visible area of the screen.

F8	Displays information below the visible area of the screen.
F9	Updates the Action List with additional host requests.
F10	Opens the Locate Cartridge Home window, which allows you to find a volser's home cell (see Figure 223 on page 331).

In addition, the following keys are on the Action List:

Arrows	Highlights the action to be performed. You can use the up arrow (↑) or down arrow (↓).
Enter	Sends confirmation to the Library Manager that the highlighted action (eject) was completed.

Select the action. Instructions include the following:

Mount	Specifies the cartridge volser to be retrieved from a specific storage cell and loaded in a specific tape drive.
Eject	Specifies the cartridge volser to be removed from the 3494.

Note: If the drive's feed slot already contains a cartridge, perform "Demounting Cartridges" on page 325.

Mounting Cartridges

The 3490E message display or the 3590 operator panel or the 3592 operator panel and the Action List display mount requests from the host. The two mount procedures are "Using the Drive Message Display," which is the most efficient, and "Using the Action List."

Attention: Do not attempt to insert a 3592 Enterprise Tape Cartridge into a 3590 tape drive. Do not attempt to insert a 3490E Enhanced Capacity Cartridge System Tape into a 3592 tape drive. Do not attempt to insert a 3590 High Performance Cartridge Tape or Extended High Performance Cartridge Tape into a 3490E tape drive. Do not attempt to insert a 3490E Enhanced Capacity Cartridge System Tape into a 3590 tape drive.

Using the Drive Message Display

Do not use the Library Manager for this procedure. Perform the following steps to use the drive message display:

1. Read the 3490E or 3590 or 3592 message display for the volume serial number of the cartridge and the cell location of the volume. The drive message display alternates between the two messages.

2. Get the cartridge from the specified cell location.

3. Mount the cartridge on the specified drive. If the drive's feed slot already contains a cartridge, perform "Demounting Cartridges" on page 325.

Using the Action List

Use the Library Manager for this procedure. Perform the following steps to use the Action List:

1. Select mounts in the order shown on the Action List (Figure 218 on page 323). The mounts are listed in order of priority with the highest priority at the top.

    Note: Mounts are confirmed and removed from the Action List automatically when a successful mount is done.

2. Get the specified volume at its **From** storage cell location. See "Cartridge Storage Cells" on page 34 if you are not familiar with the numbering of components.

   Notes:

   a. If the **From** location is a drive, remove the cartridge from the drive.

   b. If the **From** location is followed by ?, the cartridge has already been used in Manual mode. If the cartridge is not in the indicated **From** location, look in the output facility where you are storing demounted cartridges (for example, the cartridge cart or the high-capacity output facility).

3. Place the volume in the specified **To** drive. The message display on the drive indicates the volser of the requested volume alternating with the cell location of the cartridge.

   Note: If the drive already contains a cartridge, perform "Demounting Cartridges."

Demounting Cartridges

Note: Do not place demounted cartridges in the high-capacity output facility. If you do, they will be scanned and not reinserted, because the facility is configured only for output. If the high-capacity I/O facility is defined, you can use it to store the demounted cartridges, because the facility will be scanned on returning to Auto mode and reinserted.

When you are performing a mount and the drive contains a cartridge, perform the following steps:

1. Remove the cartridge from the drive.

2. Perform one of the following procedures with the cartridge:

   • Place the cartridges in a secure location, such as a cartridge cart. Put these cartridges in the 3494 through an I/O station when you return the 3494 to Auto mode.

   • For an extended period of Manual mode, you may choose to use Figure 223 on page 331 to put the cartridges in their home cells.

   • Place the cartridge in any unoccupied cartridge cell in the 3494, **except in the high-capacity output cells**. Ensure that Inventory Update is enabled.

Inserting Cartridges

An Insert operation is initiated when you must add a cartridge to the 3494. One or more cartridges may be in the convenience I/O station, or someone may give you a cartridge to add to the 3494. Perform the following steps to insert a cartridge:

1. Press the **Insert** key (**F5**) on the Action List of the Library Manager (see Figure 218 on page 323).

2. In the Insert Cartridges window (Figure 219 on page 326), the volser of the cartridge to be inserted. The cartridge volser is the set of up to six alphanumeric characters on the label attached to the end of the cartridge.

   Note: Use the left arrow (←) and right arrow (→) keys to move the cursor within a field. Use the Tab key to move between fields.

3. Type the character (**1**, **E**, **J**, **K**, **A**, **W**, **2**, **R**) that corresponds to the cartridge type.

Notes:

/   a. Cartridge System Tape (single-tone case) is type **1**.

/   b. Enhanced Capacity Cartridge System Tape (two-tone case) is type **E**.

/   c. High Performance Cartridge Tape (black with blue inserts) is type **J**.

/   d. Extended High Performance Cartridge Tape (black with green inserts) is
/   type **K**.

/   e. Enterprise Tape Cartridge (black with dark blue door and write-protect
/   switch) is type **A**. (The cartridge bar code label indicates type ″JA″.)

/   f. Enterprise WORM Tape Cartridge (black with light blue door and
/   write-protect switch) is type **W**. (The cartridge bar code label indicates type
/   ″JW″.)

/   g. Enterprise Economy Tape Cartridge (silvery with light blue door and
/   write-protect switch) is type **2**. (The cartridge bar code label indicates type
/   ″JJ″.)

/   h. Enterprise Economy WORM Tape Cartridge (silvery with dark blue door and
/   write-protect switch) is type **R**. (The cartridge bar code label indicates type
/   ″JR″.)

4. Type the character (0, 1, or 2) that corresponds to the 3494 with which to associate the cartridge. The following are the options:

    0. Non-VTS Library

    1. VTS 1

    2. VTS 2

The associated library sequence number displays next to each option.

Note: You can insert only **J**- and **K**-type media into a VTS logical library.
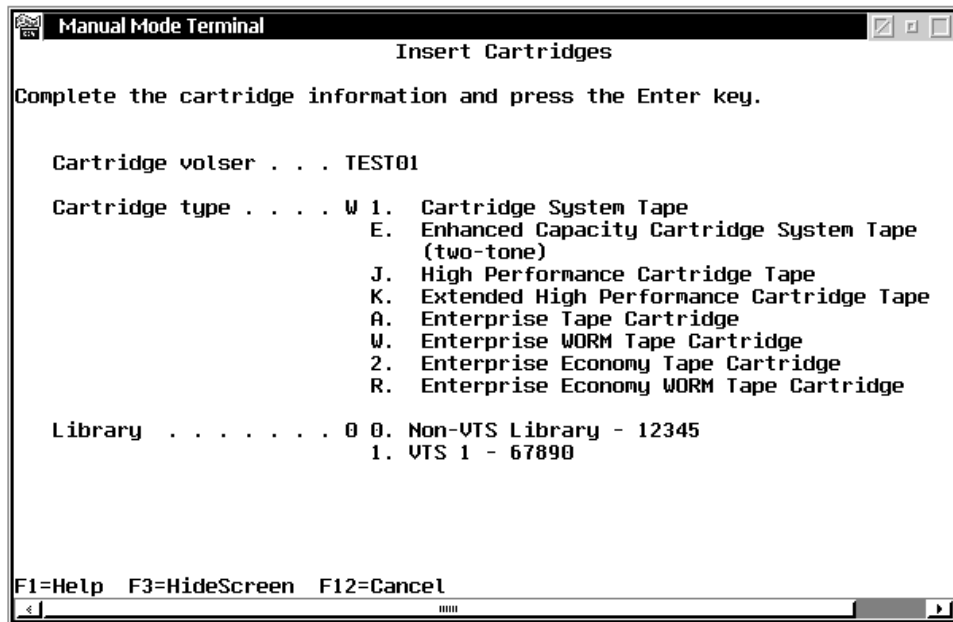
Figure 219. Manual Mode Insert Cartridges Window

The following function keys are available in the Manual Mode Insert Cartridges window:

F1   Provides help about the Manual Mode Insert Cartridges window.

F3	Hides the Manual Mode Insert Cartridges window. The Manual Mode Insert Cartridges window is hidden, but you can retrieve it by selecting the Mode window, then selecting the **Manual** mode option.
F12	Closes the Manual Mode Insert Cartridges window and returns to the Action List.
Arrows	Move the cursor by pressing the right arrow (→) or left arrow (←) key.
Enter	Confirms entries in a field or confirms the insertion of a cartridge.

5. Press the **Enter** key. A window (Figure 220) opens with the **Home Cell** rack storage location for the inserted cartridge.

6. Place the cartridge in the designated rack storage cell.

   Note: If you cannot put the cartridge in the specified storage cell, press the **Error** key (**F4**) to request a new storage cell location.

7. Press the **Enter** key to confirm that the Insert action is complete. The Insert Cartridges window opens again.

8. If you have another cartridge to insert, repeat step 2 on page 325 through step 7 for the next cartridge. If there are no more cartridges to insert, press the **Cancel** key (**F12**) to return to the Action List.

```
                      Insert Cartridges

Complete the cartridge information, then press the Enter key.

Volser of Cartridge. . . WCC001
Cartridge type . . . . .  _1. Cartridge System Tape
                          _E. Enhanced Capacity Cartridge System Tape
                          _J. High Performance Cartridge Tape
                          _K. Extended High Performance Cartridge Tape
                          _A. Enterprise Tape Cartridge
    +------------------------------------------------------------------+
    | Put the cartridge in the indicated home cell, press the Enter key. |
    | If you cannot use the home cell, press the Error key (F4) to have a |
    | different cell specified.                                          |
    |                                                                    |
    | Home Cell . . . Rack 1 B 10                                        |
    |                                                                    |
    |                                                                    |
    | F1=Help  F4=Error  F12=Cancel                                      |
    +------------------------------------------------------------------+


F1=Help  F3=HideScreen  F12=Cancel
```

Figure 220. Manual Mode Insert Cartridges Window

The following function keys are available in the Manual Mode Insert Cartridges window:

F1	Provides help about the Manual Mode Insert Cartridges window.
F4	Allows you to specify another home-cell location because you cannot insert the cartridge in the specified location.
F12	Closes the window and returns to the Manual Mode Insert Cartridges window.
Enter	Sends confirmation to the host program, which verifies that the

cartridge is inserted in the specified location. Also, opens the Manual Mode Insert Cartridges window for the next Insert operation.

Note: When you return to the Manual mode Action List (Figure 218 on page 323), if you inserted **J**- or **K**-type media in a 3494 capable of Export and Import operations, the Manage Unassigned Volumes window (Figure 138 on page 221) opens automatically.

Ejecting Cartridges

Perform the following steps to remove a cartridge from the 3494:

1. From the Action List window (Figure 218 on page 323), determine the drive (device) or storage cell **From** location containing the cartridge that you want to eject.

2. Go to the drive or storage cell and remove the cartridge. Verify that the cartridge volser matches the volser specified on the Action List.

   Notes:

   a. If the **From** location is a drive, remove the cartridge from the drive.

   b. If a ? follows the **From** location, the cartridge has already been used in Manual mode. If the cartridge is not present in the indicated **From** location, look in the location where you are storing demounted cartridges (for example, the high-capacity output area).

3. Remove the cartridge from the enclosure or place it in a safe location. Be sure to remove all ejected cartridges from the enclosure when you complete Manual mode operations.

4. Confirm that the eject operation is complete by performing the following steps:

   a. On the Library Manager Action List, highlight the action item you want to confirm.

      To highlight an item, use the up arrow (↑) or down arrow (↓) key to move the highlight bar to the desired action item.

   b. To confirm the highlighted action item, press the **Enter** key.

   Note: Be sure to confirm each ejected cartridge after completing the eject task. Eject actions remain on the Action List until you confirm them manually.

5. Press the **Refresh** key (**F9**) to update the list.

Reviewing Unknown Volume Locations

Use this procedure if you are not sure where a volume should go. You can display the volser **From** location and **To** location of the last 20 completed actions. Perform the following steps and use this information to verify the accuracy of a completed action item:

1. Press the **Review** key (**F6**) on the Library Manager Action List (Figure 218 on page 323).

2. Press **F12** to return to the Action List.

If the Manual Mode Review List (Figure 221 on page 329) did not list the volume, use the Locate Cartridge Home window (Figure 223 on page 331) to find a storage cell to put the volume in.

```
                        Review List

    Action      VOLSER     From              To

    Mount       GKT333     Rack   2 B 40     Device 200     Confirmed
    Eject       SRJ485     Rack   1 A 7                     Confirmed
    Mount       EPF371     Device 200        Device 3E1     Confirmed
    Mount       SDR495     Rack   7 A 6      Device 201        ERROR (see Note)












   F1=Help   F3=HideScreen   F12=Cancel
```

Figure 221. Manual Mode Review List Window

Note: The operator pressing F4 on the Action List caused the ERROR indication.

You can only view this list. You perform the tasks (actions) from the Action List.

Error Processing

Perform the following steps to describe the problem to the host system if you
cannot complete a mount or eject action:

1. Highlight the action item that you cannot complete on the Action List. Use the
   up arrow (↑) or down arrow (↓) key to highlight the questioned action.

2. Press the **Error** key (**F4**) on the Library Manager Action List.

3. Select the error description that best fits the problem. Use the up arrow (↑) or
   down arrow (↓) key in the Manual Mode Error Processing window (Figure 222
   on page 330) to highlight the error description.

4. Press the **Enter** key to send the error description to the host processor.

Note: Press the **Cancel** key (**F12**) to replace the Error Processing window with the
         Action List. No error message is sent.

```
                        Error Processing

Select the error description that best fits the error situation and press
the Enter key.


     Action      VOLSER     From                To
     Mount       SSG332     Rack 2 D 22         Device 3F5


     Error Description . . .
                            Rack Cell Empty
                            Rack Cell In Use
                            Wrong VOLSER
                            Device In Use
                            No Cartridge In Device
                            Cartridge Not Found
                            Other Error


F1=Help  F3=HideScreen  F12=Cancel
```
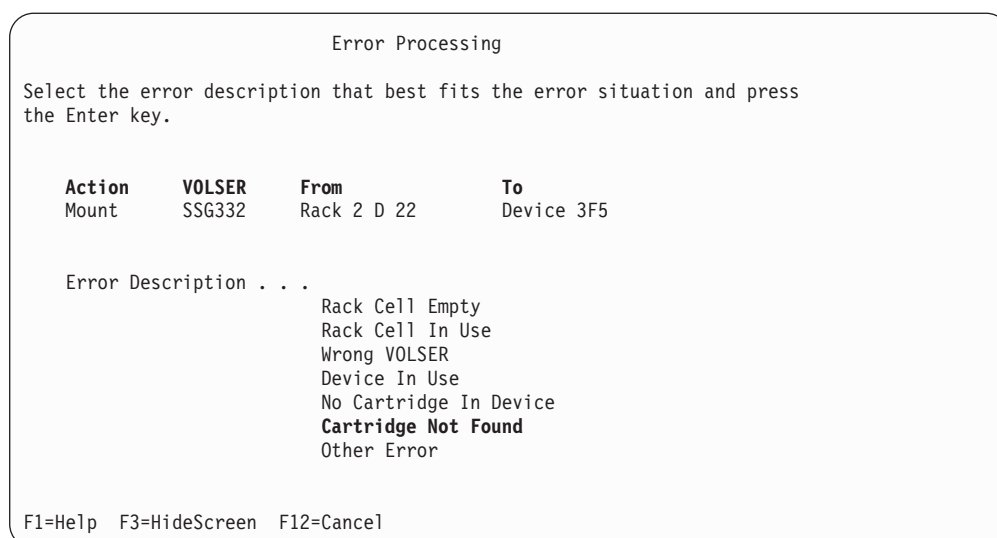
Figure 222. Manual Mode Error Processing Window

Locating and Identifying Home-Cell Locations

You may need to locate and identify the home-cell location for one of the following reasons:

- To determine the home cell in which to place a misplaced or inaccessible volume.
- To determine the home cell so you can find a volume.

Perform the following steps to locate and identify the home-cell location:

1. Press the **Locate** key (**F10**) on the Library Manager Action List (Figure 218 on page 323).
2. Enter the volume to find its home cell, then press the **Enter** key.

   The home cell for the volume displays in the Locate Cartridge Home window (Figure 223 on page 331).
3. If you place the volume in the home cell or verify that the volume is already in the home cell, press the **Enter** key; otherwise, press the **Cancel** key (**F12**).
4. Press the **Cancel** key (**F12**) to return to the Action List.

Note: The Locate function works only for physical volumes. Logical volumes do not have a home cell.

```
                      Locate Cartridge Home

Complete the cartridge volser and press the Enter key.


   Cartridge volser . . . MRB234




      +-----------------------------------------------------------+
      | The home cell for the specified cartridge is displayed below. |
      | If you put the cartridge in this home cell or verify that it  |
      | is already there, press the Enter key.  Otherwise, press the  |
      | Cancel key (F12).                                         |
      |                                                           |
      |                                                           |
      | Home Cell . . . Rack  1 A 11                              |
      |                                                           |
      | F1=Help  F12=Cancel                                       |
      +-----------------------------------------------------------+



F1=Help  F3==HideScreen  F12=Cancel
```

Figure 223. Manual Mode Locate Cartridge Home Window

Ending Manual Mode

To end Manual mode, perform the following steps:

1. Leave the cartridges in the drives. The 3494 moves them automatically when it returns to Auto mode.

2. Close the front doors on the 3494.

3. Ensure that any mounts that have been started are not on the Manual Mode display.

4. Press **Ctrl + Esc** to produce the task list.

5. Select the **3494 Tape Library Dataserver** option on the task list with the pointing device or press F3.

6. Select **Mode** from the action bar on the Operator menu.

7. Verify Inventory Update is enabled before returning to Auto Mode. Enable Inventory Update if it is disabled so that Inventory Update can reestablish current location on all volsers.

8. Select the **Auto...** option in the Mode window. The Mode Change Request window opens to ask if you want to change the operating mode. Select the **Yes** push button to change to Auto mode.

   An Auto Pending message indicates that the transition to Auto mode is in progress. The 3494 returns to Auto mode after Manual mode.

   When the transition to Auto mode is made, an inventory update is performed. The Inventory Update operation must complete before the Auto activity resumes.

3494 Web Interfaces

This section describes the following 3494 remote Web interfaces:

- Enterprise Automated Tape Library Specialist
- Peer-to-Peer VTS Specialist

These features are part of a family of IBM TotalStorage management products. These Specialists enable you to communicate with specific storage devices in your enterprise from a remote location using a Web browser.

Specialist Features and Functions

The Specialist is the Web-based user interface that can be used to view the current status and configuration of the 3494 and the Library Manager. It can also be used to perform limited control functions on the Library Manager.

Specialist Page Layout

The Specialist provides display functions and limited control functions. The following are available on the Specialist:

- A home page
- A set of Library Manager pages
- A set of Logical Libraries pages
- A set of VTS pages (if a VTS is installed)
- A set of Security pages (functional code level 527 or greater)
- Links to the Peer-to-Peer VTS Specialist (if a Peer-to-Peer VTS is installed)

The Specialist displays the content of pages similar to the content of pages at the Library Manager. This makes the transition to using the Specialist easier. The tasks that can be performed from the Specialist are listed in Table 15 in the order they appear in the navigation frame. For more information on each task, there is user assistance provided on the Specialist.

Table 15. Quick Reference to Specialist Advanced Operating Procedures

Task	Description
Home	Displays what is currently attached to the system. Also allows you to select a language.
Monitor library manager	Displays a system summary of the Library Manager.
System summary	Displays summary information on various components and functions of the library system. Gives a high level overview of overall system status.
Operational status	Displays information on the 3494 operational status.
Operator interventions	Displays a list of operator interventions which can be sorted by date and time or priority.
Component availability	Displays the availability of library components.
Performance statistics	Displays a table and graph that displays the current library performance statistics. Statistics are compiled on the hour.
Accessor mounts per hour	Displays a table and graph that displays the accessor mounts per hour. Data is displayed for the previous 24 hours.
Command queue	Displays a table that shows the commands in the queue and information about the commands.
Lan host status	Displays information on the status of hosts attached to the library system through a LAN. Information displayed includes the host alias, host name, LAN port, and whether or not the LAN is initialized.

/ / / / / /	Lan information	Displays library LAN information necessary for the host system to establish communication. Information displayed includes the program name, the network ID, the location name, the adapter address (for APPC-connected libraries), and the IP address (for TCP/IP-connected libraries).
/ /	Dual accessor zones	Displays graphically the frames composing the library and which accessor serves which frames.
	Volser ranges	Displays a table that summarizes the currently defined volser ranges.
	Cleaner masks	Displays a list of cleaner cartridge masks currently being used in the library.
/ /	**Administer library manager**	Allows retrieval and viewing of key Library Manager information.
/	Retrieve 3592 drive VPD	Displays vital product data for the 3592 drives.
/ /	Search database	Allows searching the volume database for specific volumes.
/ /	Modify volser ranges	Allows addition, modification, deletion, or viewing of volser ranges.
/ /	Manage operator interventions	Allows modification of operator interventions and enabling or disabling of host notification.
/ /	**Monitor logical library**	Provides an overview of the 3494 logical configuration.
/ /	Logical library status	Displays a graphical representation of the logical library configuration.
	Native	Displays information about the native partition status of the Library.
	VTS 1	Displays information about the VTS partition status of the Library. If a second VTS exists in the configuration, a VTS 2 navigation item will appear.
/ / /	**Monitor VTS 1**	Summarizes the VTS status, if a VTS exists in the configuration. If there are two VTSs configured, a second navigation item will appear.
/	VTS status	Displays a table summarizing the status of the VTS.
	Active data	Displays the amount of free storage, maximum active data, active storage, and a free storage alarm level for VTS. Data is displayed for the previous 30 days.
	Active data distribution	Displays distribution in percentage of active data on volumes. If the VTS is Advanced Policy Management capable (FC 4001), percentages are shown for each pool, as well as all pools.
	Data flow	Displays the amount of data written to and read from the channel. Data is displayed for the previous 24 hours.
	Logical mounts per hour	Displays the number of logical mounts per hour, which includes the sum of fast ready mounts, cache hit mounts, and physical mounts (recalls). Data is displayed for the previous 24 hours.

Table 15. Quick Reference to Specialist Advanced Operating Procedures (continued)

	Mount hit data	Displays the distribution in percentage of three types of logical mounts: fast ready hits, cache hits, and physical mounts required. Data is displayed for the previous 24 hours.
	Physical device mount history	Displays the maximum, average, and minimum numbers of physical tape drives used at one time to mount stacked volumes. Data is displayed for the previous 24 hours.
	Real time statistics	Displays the VTS real time statistics. If the VTS is Advanced Policy Management capable (FC 4001), backstore media counts by pool are included.
	Move/eject status	Displays the status of in-progress eject and move stacked volume requests.
	Volser ranges	Displays the currently defined volser ranges.
	Management policies	Displays the current VTS management policy settings for inhibit reclaim and the free storage threshold. If the VTS is Advanced Policy Management capable (FC 4001), thresholds are shown by pool.
	Category attributes	Displays a list of categories which are defined as "Fast Ready" categories.
/ / /	**Administer VTS 1**	Allows modification of the VTS status, if a VTS exists in the configuration. If there are two VTSs configured, a second navigation item will appear.
	Find logical volume	Allows you to locate a logical volume's physical location.
	Manage logical volumes	Allows you to insert logical tape volumes into a VTS partition or change storage constructs assigned to logical volumes.
	Move/eject stacked volumes	Allows you to move and eject stacked volumes. You can also cancel active move/eject stacked volume requests. This feature is only available if the VTS is Advanced Policy Management capable (FC 4001). Eject functions may be available without FC 4001.
	Request stacked volume map	Allows you to request a list of logical volumes on a physical cartridge and download it to your Web browser.
	Modify storage pool properties	Allows you to set storage pool properties. These properties define whether a pool can borrow/take from the Common Scratch Pool, and if so, what type of media.
/ / /	Modify management properties	Allows the Inhibit Reclaim Threshold, Reclaim Threshold Percent, and Free Storage Threshold to be set.
/	**Manage constructs**	
/ /	Storage groups	Allows addition, deletion, or modification of storage groups.
/ /	Management classes	Allows addition, deletion, or modification of management classes.
/ /	Storage classes	Allows addition, deletion, or modification of storage classes.

Table 15. Quick Reference to Specialist Advanced Operating Procedures (continued)

/ /	Data classes	Allows addition, deletion, or modification of data classes.
/ /	**Manage security**	Allows you to make changes to user and password settings.
	Change my password	Allows all authorized users to change their passwords.
	Administer users	Allows a person with Web administrator (*webadmin*) authority to add users, delete users, or change passwords for other users.
/	**Service library manager**	
/	**Administer call home**	
/ / /	Test interface	Allows testing the interface between the Master Console and the Library Manager and also testing the entire Call Home path.
/ /	Configure settings	Allows configuration of the Library Manager Call Home feature.
/ /	Flush queue	Allows deletion of all unsent entries from the Call Home queue.
/ / / /	Set heartbeat	Allows setting the Master Console's *heartbeat* interval. The heartbeat is a Call Home record sent regularly to IBM that includes diagnostic and other data regarding the device sending the call.
/ / /	Configure network	Allows setting the IP addresses for the Master Console and the Library Manager; the Library Manager's alias can also be set here.
	Peer-to-Peer VTS Specialist	Selecting **Peer-to-Peer VTS Specialist** displays a list of PtP VTSs configured in the library (see "Peer-to-Peer VTS Specialist Features and Functions" on page 336). Then, selecting the name of a PtP VTS displays a list of virtual tape controllers. Selecting a virtual tape controller links you to the Peer-to-Peer VTS Specialist. Note that if there is not at least one PtP VTS configured in the 3494, the **Peer-to-Peer VTS Specialist** selection will not be shown and will not be selectable.

Specialist Connection

Figure 224 on page 336 shows the connection for the Specialist. The connection uses currently available 3494 components. The Web browser is in your system. Your system must be LAN-attached to provide connectivity to the 3494. Service representatives may also use the Remote Access path by using SLIP through the Remote Support modem and switch.

You must connect the Library Manager to your system's LAN with FC 5219 (Token-Ring Adapter) or FC 5220 (Ethernet Adapter). During the installation process, the service representative will set up TCP/IP on the Library Manager to use your assigned TCP/IP host name and TCP/IP address (and router information, if necessary). You can help the installation process if you obtain the following information before the installation starts:

• TCP/IP host name
• TCP/IP address

- Subnet mask (or network mask)
- Router address (or Gateway address)*
- Domain name*
- Nameserver address*

*These items are optional. Their use depends on your system's LAN configuration.
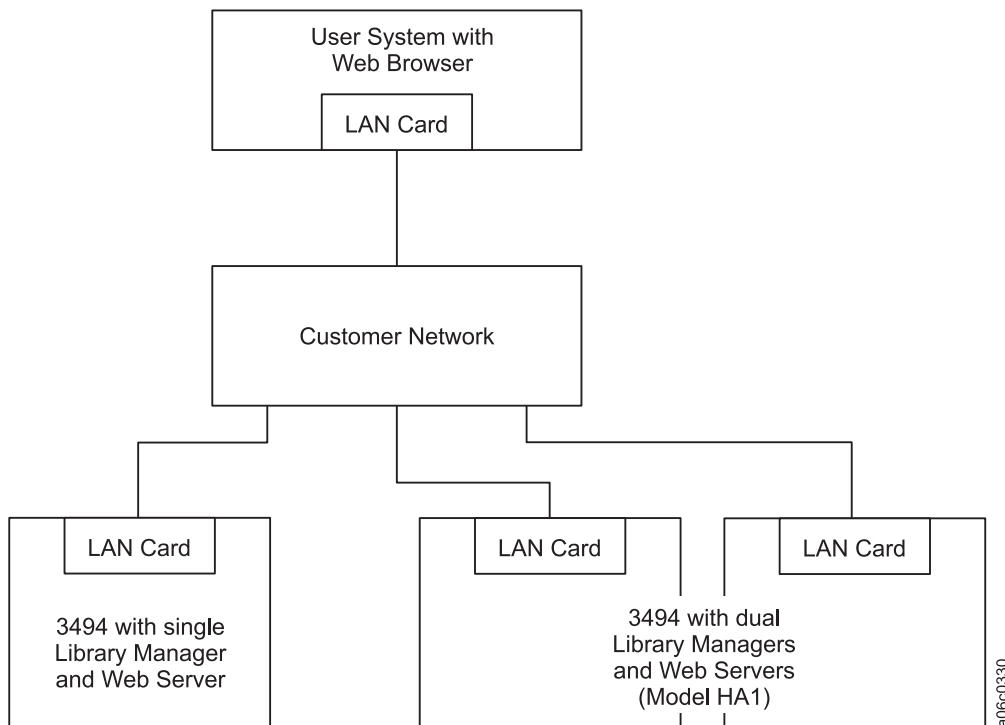
Figure 224. Specialist Connection

System Requirements

/ You must have Microsoft Internet Explorer Version 6.0 or a fully compatible alternative browser with JavaScript™ and Java™ enabled. The Specialist does not support a text-based Web browser.

Help Text

Help is available for each page. There is a Help button on each Web page that, when selected, brings up a new window with the Help text for that page. The user may close the new window when finished with the Help. The Web page that called Help is still available in the background.

/ Peer-to-Peer VTS Specialist Features and Functions

/ The Peer-to-Peer VTS Specialist is the Web-based user interface that can be used
/ to view the current status and configuration of the Peer-to-Peer VTS. The following
/ sections list the information that you can access through the Peer-to-Peer VTS
/ Specialist. Note that the Peer-to-Peer VTS Specialist does not allow access to data
/ that is stored on the logical tape volumes.

/ The composite library name is displayed at the top of each of the following pages:

Welcome page

This is the initial Web page presented when the Peer-to-Peer VTS Specialist is accessed. It allows you to select the language.

The Home Page screen contains the following information:
- Network name (HOSTNAME) of the virtual tape controller that is serving the Web pages
- Library information:
  - Library type and number
  - Library name
  - Sequence number

View current drive activity

This screen displays current activity on the virtual drives.

The Current Drive Activity screen contains the following information:
- Controller number
- Virtual tape drive number
- The volume serial number of the volume currently mounted
- Number of bytes written to the volume currently mounted
- Number of bytes read from the volume currently mounted
- The amount of time the volume has been mounted
- The time it took to mount the volume
- Indication of which VTS is being used for read and write operations

View logical volume status

This screen allows the user to request information for a given logical volume. This screen also provides a link to the Current Drive Activity screen.

The Logical Volume Status screen contains the following:
- Logical volume entry box

  When the user enters the serial number of a logical volume, the Logical Volume Status Results screen is displayed.

Logical volume status results

This screen displays information for the requested logical volume from the perspective of the virtual tape controller being accessed.

The Logical Volume Status Results screen contains the following information:
- Logical volume information:
  - Indication of whether the latest version of the logical volume has been copied
- Logical volume information for each VTS:
  - Library name for the associated distributed library
  - Serial number of the stacked (physical) volume on which the logical volume is stored
  - Indication of whether the data is current or downlevel on the VTS
  - Category of the logical volume
  - Indication of whether the volume category is current or downlevel on the VTS
  - Indication of whether the logical volume is a pre-existing volume (that is, existed on a VTS before being converted to a PtP VTS)

- Indication of whether the logical volume is resident in the VTS cache
- Amount of compressed data written to the logical volume (file size)
- The time the Rewind/Unload command completed when the logical volume was modified
- The time the Rewind/Unload command completed when the logical volume was accessed

View current copy workload

This screen contains information on the amount of copy work that the PtP VTS system is performing from the perspective of the virtual tape controller being accessed.

The Current Copy Workload screen contains the following information:
- Indication of whether copying is disabled
- Copy work not yet started for each VTS:
  - The number of volumes to be copied

View copy queue

This screen shows the contents of the VTC copy queue. Specific information for each item in the queue includes:
- Volser
- Identifier of the source VTS
- Number of bytes to be written
- Age of the item

Perform standalone operations

This screen allows the user to perform standalone mount or demount operations. Controls available for mount operations include:
- A text box for entering the volser
- A drop-down menu for selecting the device
- A pushbutton to initiate the mount operation

Any existing standalone mounts are listed below the mount operation controls. Information and controls listed for each standalone mount include:
- An option button for selecting the standalone mount for a demount operation
- The volser for the standalone mount
- The device associated with the standalone mount
- The status of the mount operation (e.g., ″mount pending″)
- The VTS in use for the mount operation

Beneath the list of standalone mounts is a pushbutton for demounting any selected mounts. If there are no existing standalone mounts, this pushbutton does not appear.

After pressing the Mount or Demount pushbuttons, an informational message appears at the top of the screen informing the user whether or not the operation completed successfully.

Monitor system status

This top-level heading in the Peer-to-Peer VTS Specialist navigation panel contains the following screens:

Overall system status: This screen displays an at-a-glance status of the components in the PtP VTS system. Clicking any virtual tape controller displays the Virtual tape controllers screen. Clicking any VTS displays the Virtual tape servers screen. Clicking any library displays the Libraries screen. Clicking any link between the virtual tape controllers and the VTSs opens a new browser window that contains additional information.

Virtual tape controllers: This screen displays status information for all of the virtual tape controllers. If a problem exists, one or more fields will contain a red icon. Clicking a value with a red icon next to it opens a new browser window that contains additional information.

The Virtual tape controllers screen contains the following information:
- Controller number
- Network name
- State
- Indication of whether copying is disabled

Virtual tape servers: This screen displays status information for all of the VTSs from the perspective of the virtual tape controller being accessed. If a problem exists, one or more fields will contain a red icon. Clicking a value with the red icon next to it opens a new browser window that contains additional information.

The Virtual tape servers screen contains the following information:
- VTS number
- Library name for the associated distributed library
- Status
- Activity level
- VTS service preparation state

Libraries: This screen displays status information for all of the libraries from the perspective of the virtual tape controller being accessed. If a problem exists, one or more fields will contain a red icon. Clicking a value with the red icon next to it opens a new browser window that contains additional information.

The Libraries screen contains the following information:
- Library type and number
- Library name
- Library mode
- Library Manager status
- Indication of whether the library is operating in a degraded mode
- Indication of whether the safety enclosure interlock has been opened
- Indication of whether intervention is required
- Indication of whether there are insufficient resources for mounts
- Indication of whether the VTS has run out of empty stacked volumes
- Indication of whether VTS operations are degraded
- Indication of whether a VTS is in service preparation state

Monitor system configuration

This top-level heading in the Peer-to-Peer VTS Specialist navigation panel contains the following screens:

/ ***Overall system configuration:*** This screen displays the components in the
/ Peer-to-Peer VTS system. Clicking any virtual tape controller displays the Virtual
/ tape controllers screen. Clicking any VTS displays the Virtual tape servers screen.
/ Clicking any 3494 displays the Libraries screen.

/ *Virtual tape controllers:* The Virtual tape controllers screen contains the following
/ virtual tape controller information:
/ • Deferred copy priority threshold
/ • Controller number
/ • Network name
/ • Serial number
/ • Network IP address
/ • Code level
/ • Number of virtual tape drives that the virtual tape controller presents to the host
/ • Operational mode
/ • I/O VTS selection mode
/ • Copy mode. This item is a hyperlink that opens a pop-up window explaining the
/   status of any virtual tape controller in Deferred mode.

/ *Virtual tape servers:* The Virtual tape servers screen contains the following VTS
/ information:
/ • VTS number
/ • Library name for the associated distributed library
/ • Serial number
/ • Number of virtual tape drives available to the virtual tape controllers
/ • Code level

/ *Libraries:* The Libraries screen contains the following library information:
/ • Library type and number
/ • Library name
/ • Sequence number
/ • Indication of the distributed library that is the User Interface Library
/ • Network IP address for Library Managers A and B
/ • Code level for Library Managers A and B
/ • Code level for physical tape drives

/ ## Access to Additional Information
/ You can access the following additional information:
/ • User assistance provides the following:
/   – An overview of the PtP VTS system
/   – Descriptions of the information provided on the various screens
/   – A glossary of terms
/ • Online access to documentation
/   This publication and those listed below are available over the Internet at the IBM
/   Publications Center, accessible through the IBM Website:
/   – *IBM TotalStorage Enterprise Automated Tape Library (3494) Introduction and
/   Planning Guide*
/   – *IBM TotalStorage 3494 Tape Library: Planning, Implementing, and Monitoring*

/   – *IBM TotalStorage Peer-to-Peer Virtual Tape Server Planning and*
/   *Implementation Guide*
/   • Links to the Specialist home pages (see "IBM TotalStorage 3494 Tape Library
/   Specialist" on page 40)

Cartridge Removal from the Gripper

Some operator intervention conditions require you to remove a cartridge from the gripper. Figure 225 shows the picker and the gripper assembly. Perform the following steps to remove the cartridge from the gripper:

1. If the 3494 is not already in Pause mode, press the **Pause** push button on the operator panel.

2. Open the front door of the 3494 in front of the cartridge accessor.

3. Rotate the picker **1** so that it is pointing toward the right side of the device, parallel to the rails **3** .

4. Push the reach assembly **5** out so that it is extended fully.

5. Press the top **2** of the gripper assembly to release the cartridge **4** .

6. Push the reach assembly in so it is retracted fully.

7. Close the front door.

8. Press the **Auto** push button on the operator panel to return the 3494 to Auto mode.
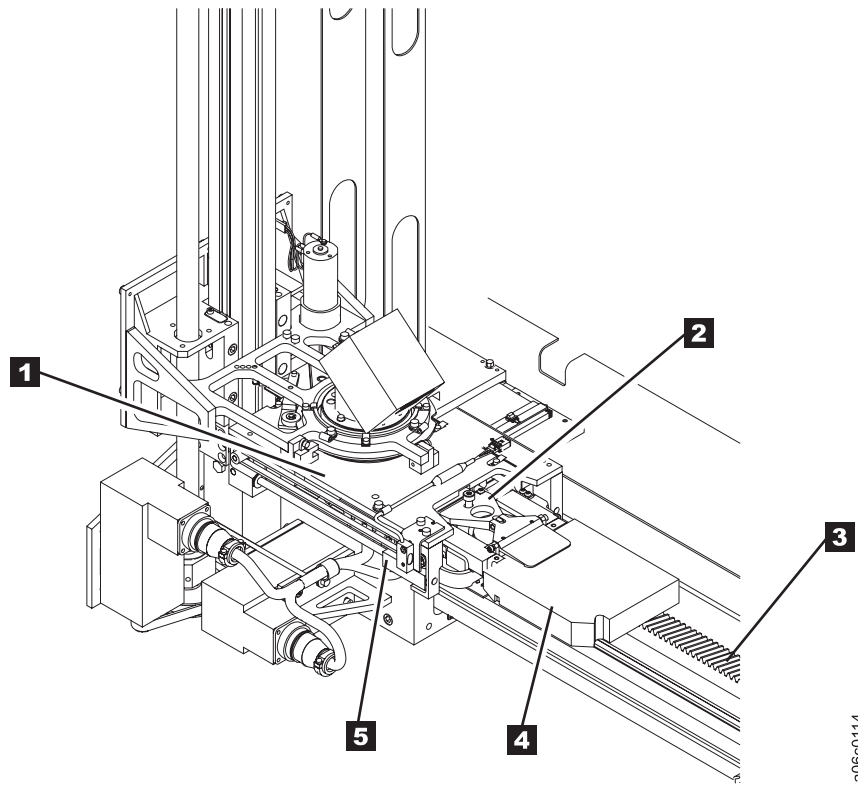
Figure 225. Cartridge Removal from the Gripper

Using the Keyboard Template

Appendix A, "Keyboard Template," on page 419 shows the function keys on the Library Manager keyboard that you use during normal activity.

You can remove and copy the template, then fold it to create a triangular bar shape with the keys showing on one face. You can then place the template in a convenient location for quick access to the correct key for a specific function.

Chapter 7. Remote Library Manager Console Feature

This chapter describes the Remote Library Manager Console feature for the 3494.

When the Remote Library Manager Console feature is installed, you can control or monitor operations for 3494s from a remote location. The Remote Library Manager Console (controlling workstation) is connected to the Library Manager (controlling workstation) through a local area network (LAN). Either the Token-Ring LAN Attachment feature or the Ethernet LAN Attachment feature is ordered when the Remote Library Manager Console feature is ordered. Figure 226 shows an example of the Token-Ring LAN and the Ethernet LAN.
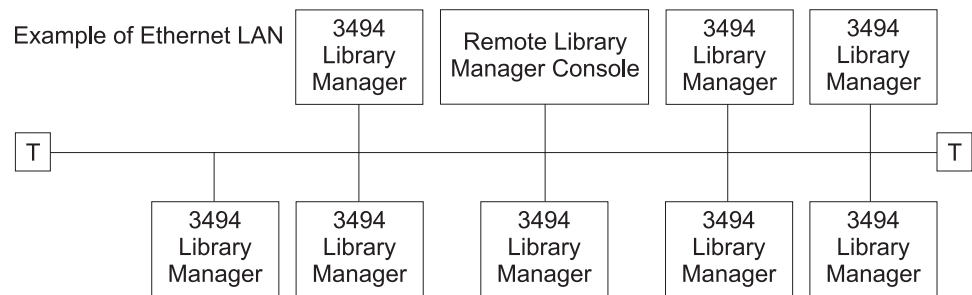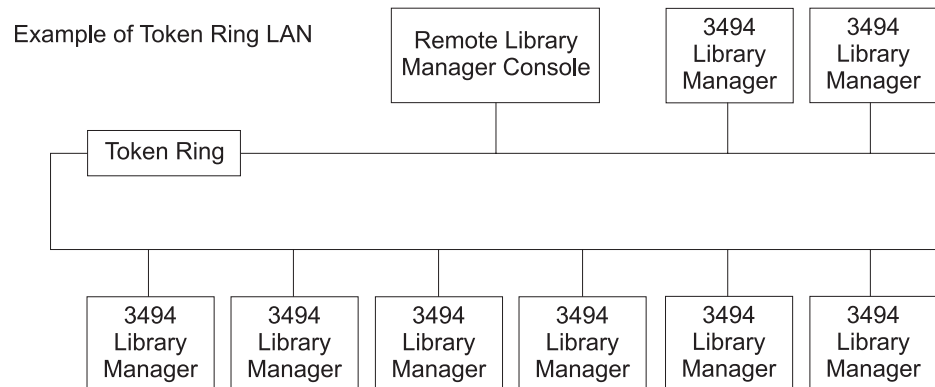
Figure 226. LAN Attachments

The Distributed Console Access Facility (DCAF) product is installed on the Library Manager and the remote Library Manager console when the Remote Library Manager Console feature is installed. If this topic does not describe a task you want to perform, see the *Distributed Console Access Facility: Installation Guide* and the *Distributed Console Access Facility: V1R3.1 Target User's Guide*. If the task is similar to one in a referenced document, use the description presented here.

This chapter is intended for system planners, system programmers, LAN administrators, and operators. Some users are expected to be familiar with operating system and text editor.

Installing and Configuring

The Remote Library Manager Console feature can use one of two communication protocols to establish communications between the remote (controlling workstation) console and the (target workstation) Library Manager. To establish communications between the remote Library Manager console and the 3494, the *communications protocol* and *LAN adapter protocol* support must be configured properly. The installation program, which is on the Remote Library Manager Console feature disk, handles configuration. Review the Remote Library Manager Console feature installation instructions to understand the following:

- How the remote Library Manager console and 3494 communications are integrated
- How the names and addresses are used to configure the communications protocol

Starting DCAF on the Remote Library Manager Console

Starting DCAF on the remote Library Manager console causes DCAF to start automatically on the Library Manager. To start the remote Library Manager console program, perform the following steps:

1. Start the Communications Protocol on the remote (controlling workstation) console.

2. Select the **Distributed Console Access Facility** group, as shown in Figure 227.

Figure 227. Icon for Distributed Console Access Facility

3. Select the **DCAF Controller** icon in the Distributed Console Access Facility - Icon View window (Figure 228).
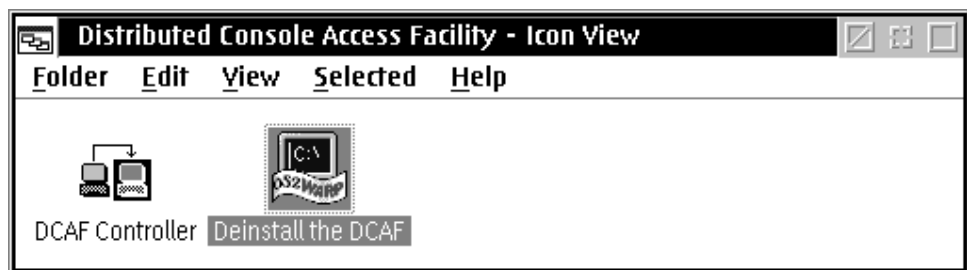
Figure 228. Distributed Console Access Facility - Icon View Window

After the IBM logo is displayed, the DCAF controlling main window (Figure 229) opens.
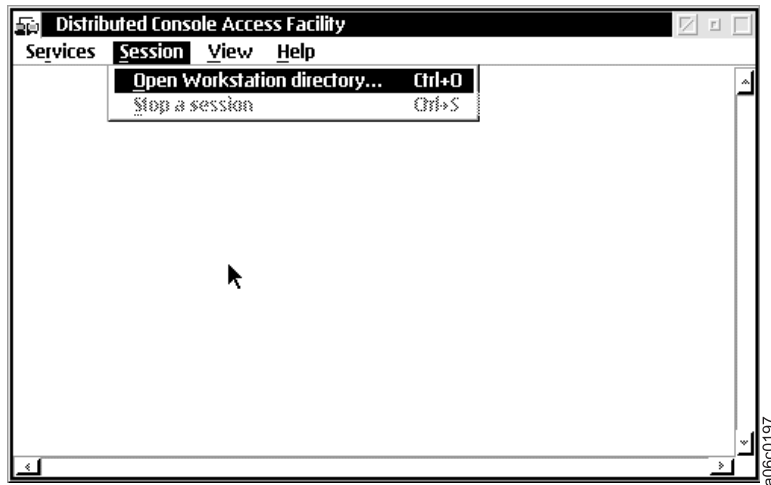
Figure 229. DCAF Controlling Main Window

4. Workstations must be added (see step 8 on page 350). Select the **Open Workstation directory...** option on the Session menu.

   The DCAF - Directory window (Figure 230) opens. This window lists the link records of the target workstations that are connected directly through the Communications Protocol.
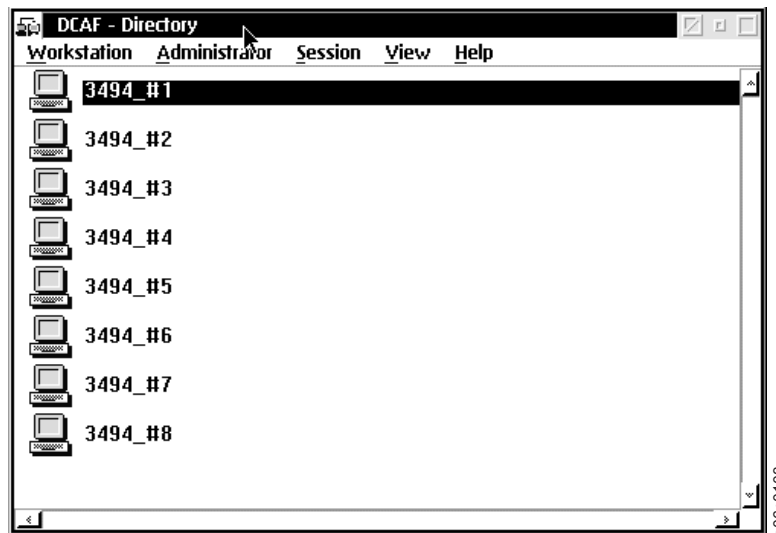
Figure 230. DCAF - Directory Window

5. Select the workstation name by performing one of the following:
   - Position the pointing device cursor on the required link (for example, 3494_#1), then double-click with the left pointing device button.
   - Use the up arrow (↑) or down arrow (↓) key to select a link record, then press the Enter key.

   The DCAF - Target Password window (Figure 231 on page 348) opens.
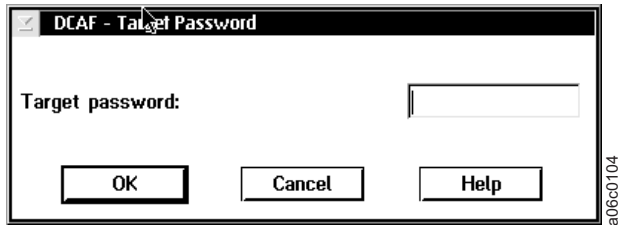
Figure 231. DCAF - Target Password Window

6. Type the target password (the default is *lmpsword*) to start the session.

   As you type the password, the cursor moves, and an asterisk (*) is displayed in place of the character. The following are password guidelines:

   - One to eight characters
   - Uppercase or lowercase letters A–Z
   - Digits 0–9
   - Embedded blanks (blanks after the last character are ignored)

7. Select the **OK** push button or select **OK** with the left pointing device button.

   While the remote Library Manager console Distributed Console Access Facility is starting, it displays its status (Figure 232).
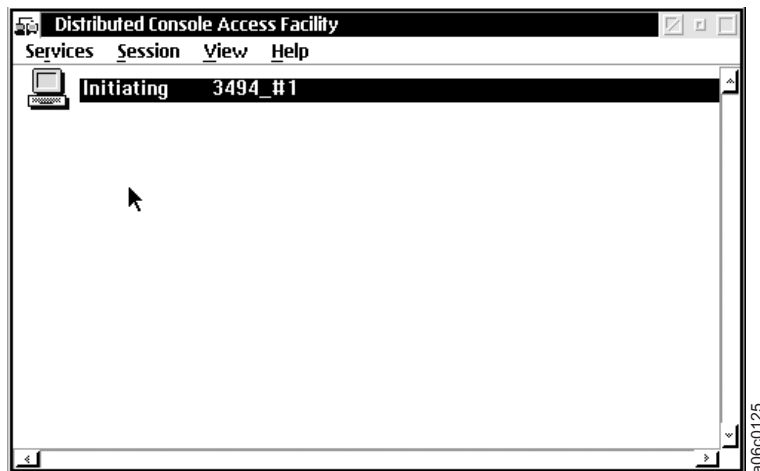
Figure 232. Initiating the Remote Library Manager Console

The advanced program-to-program communications (APPC) or TCP/IP indicating **Started** is displayed momentarily on the Library Manager display (Figure 233).
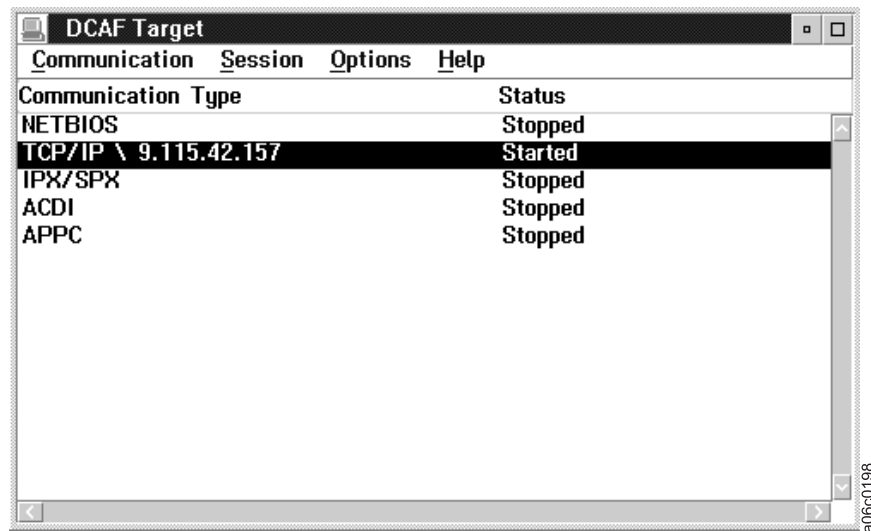
Figure 233. Establishing Communication with the Library Manager

After the initiation of the Library Manager is completed, the main window opens on the remote Library Manager console (Figure 234). In this case, the selected Library Manager is paused, and the Whole Queue window is displayed when the remote Library Manager console is started. You can size this window to full screen by placing the pointing device cursor in the right box of the title bar and clicking once with the left pointing device button.
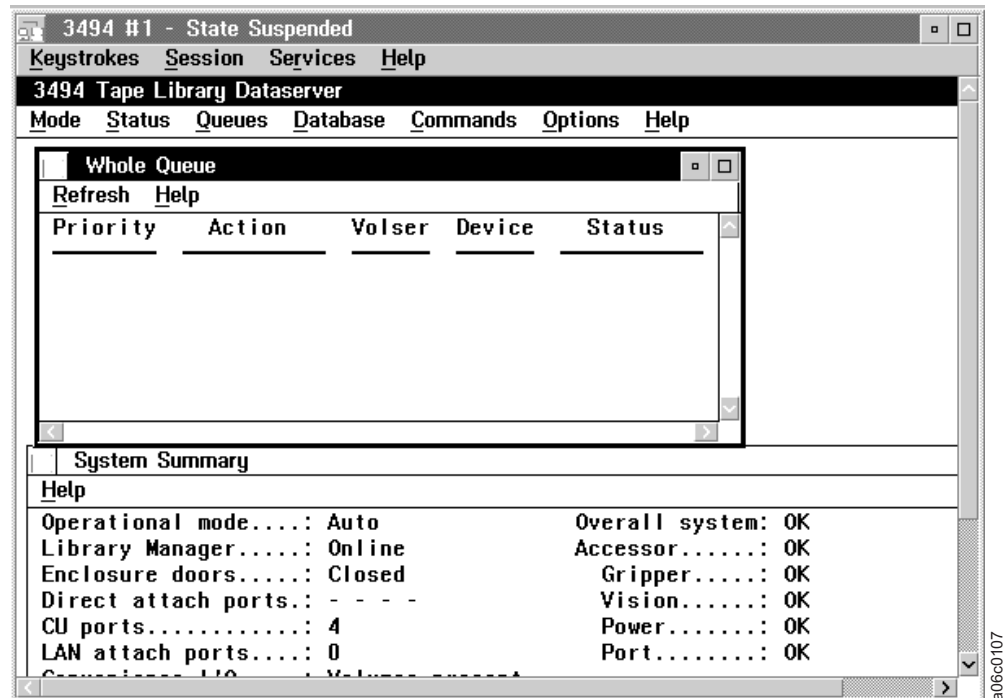
Figure 234. Remote Library Manager Console Main Window

You can now use the pointing device cursor and buttons to select options on the selected 3494, just as if you were at that 3494.

From the remote Library Manager console, you can also select the following options:

Keystrokes   See "Using Keystrokes during a Remote Library Manager Console Session."

Session   See "Changing the Session State from Remote Library Manager Console" on page 353.

Services   See "Transferring Files" on page 356.

Help   Select this push button to receive information about the item that the cursor is on or about the entire window.

8. To start a session with another 3494, perform the following steps:

   a. Press **Ctrl + Esc** to view the task list on the remote (controlling workstation) console.

   b. Under **DCAF Controller**, select the **Distributed Console Access Facility** option.

   c. Repeat step 4 on page 347 (**Open Workstation directory...** on the Session menu) through step 7 on page 348.

Controlling a 3494 from Remote Library Manager Console

The remote Library Manager console operator can control one or more 3494s from a remote Library Manager console when the **Active** option is selected on the Session menu. The remote Library Manager console displays the target Library Manager screen of each selected 3494 in the network. You can display the screens by switching between Library Managers or by displaying them simultaneously through windows by using the remote Library Manager console task list.

Using Keystrokes during a Remote Library Manager Console Session

The Keystrokes mode, displayed on the title bar of the remote Library Manager console session window, determines whether the remote Library Manager console's keyboard input and pointing device movements affect the remote Library Manager console or the Library Manager. The remote Library Manager console starts with *State Active* and *Keystrokes remote* displayed in the title bar (Figure 235 on page 351).

The remote Library Manager console operator can change keystroke modes during an active session.

Keystrokes Remote Mode on Remote Library Manager Console

All the keyboard input on the remote Library Manager console, except the remote Library Manager console operating system hot keys, affects the Library Manager. Operating system hot key combinations always affect only the remote Library Manager console. Alt + Esc, Alt + Tab, and Ctrl + Esc are the hot key combinations. For example, Ctrl + Esc causes the remote Library Manager console's task list to be displayed on the remote Library Manager console.

Pointing device movements inside the Library Manager window on the remote Library Manager console are sent to the Library Manager. If you move the pointing device outside the Remote Library Manager Console window, the pointing device movements are processed on the remote Library Manager console. For example, if you select an action from a menu in a Library Manager window, the action is

processed on the Library Manager. If you select an action from a menu in a remote Library Manager console window, the action is processed on the remote Library Manager console.

You can send operating system hot key combinations to the Library Manager from the Keystrokes menu (Figure 235).
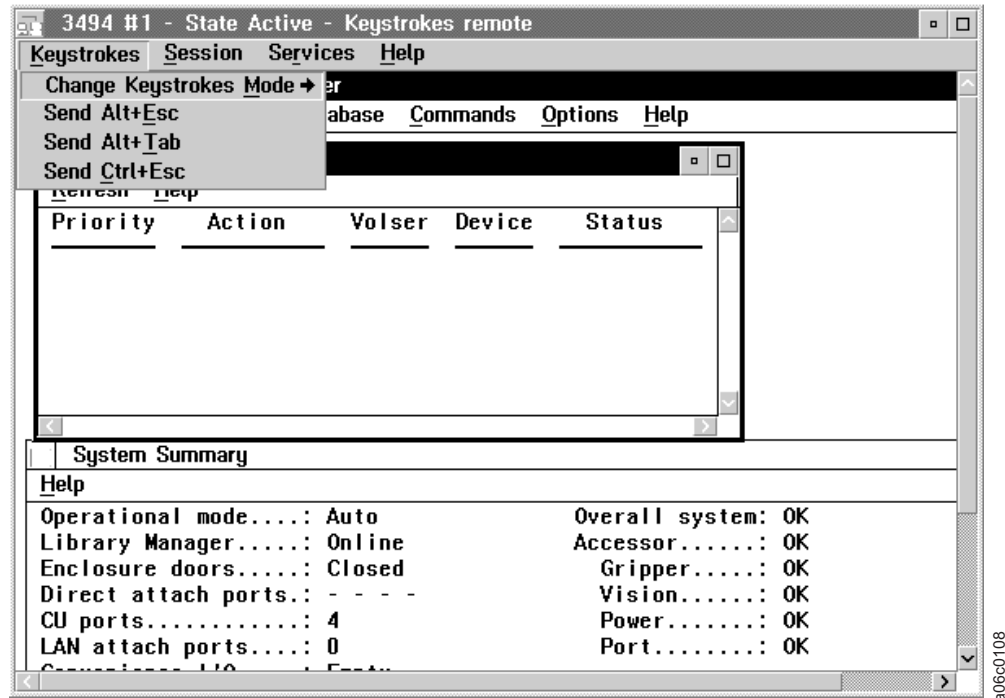
Figure 235. Remote Library Manager Console Window with Keystrokes Menu

Figure 235 shows the remote Library Manager console window with a view of the Library Manager's display during an active session. The remote Library Manager console user is working in *Keystrokes remote* mode.

Keystrokes Local Mode on Remote Library Manager Console

All the keyboard input and pointing device movements affect only the remote Library Manager console. The remote Library Manager console processes all keystrokes on the remote console.

Only shortcut keys from the Keystrokes menu affect the Library Manager. These shortcut keys simulate the operating system hot key combinations, which are Alt + Esc, Alt + Tab, and Ctrl + Esc. Table 16 shows the effect of the shortcut keys.

Table 16. Shortcut Keys for the Library Manager

Keys	Result
Ctrl + E	Simulates the Alt + Esc key combination on the Library Manager, which causes the Library Manager to show the windows and full-screen sessions in an ordered rotation.
Ctrl + U	Simulates the Alt + Tab key combination on the Library Manager, which causes the Library Manager to show the system menus for the windows and full-screen sessions in an ordered rotation.
Ctrl + C	Simulates the Ctrl + Esc key combination on the Library Manager, which causes the Library Manager to display its task list.

Changing Keystrokes Mode

To change Keystrokes mode on the remote Library Manager console, perform one of the following:

- Press the controlling hot key combination (default **Alt + T**) to switch between *Keystrokes local* and *Keystrokes remote* mode or

- Move the pointing device into the Keystrokes menu and select **Keystrokes remote** or **Keystrokes local** under **Change Keystrokes Mode**.

Using Hot Key Combinations

To view the task list on the remote Library Manager console, press **Ctrl + Esc**.

To view the task list on the Library Manager, select the **Send Ctrl + Esc** option on the Keystrokes menu on the remote Library Manager console.

Sending the Alt + Esc Command to the Library Manager

To send the Alt + Esc command to the Library Manager, perform the following steps:

1. Select the **Send Alt + Esc** option on the Keystrokes menu on the remote Library Manager console session window (Figure 235 on page 351).

2. If the remote Library Manager console is in Keystrokes local mode, press the **Ctrl + E** shortcut key.

Sending the Alt + Esc command lets you see the Library Manager's full screen or window sessions in an ordered rotation. If you go through the rotation to a full screen session, you are immediately in the full screen session of the Library Manager.

Sending the Alt + Tab Command to the Library Manager

To send the Alt + Tab command to the Library Manager, perform the following steps:

1. Select the **Send Alt + Tab** option on the Keystrokes menu on the remote Library Manager console session window (Figure 235 on page 351).

2. If the remote Library Manager console is in Keystrokes local mode, press the **Ctrl + U** shortcut key.

Sending the Alt + Tab command lets you see the system menu for the Library Manager's full screen or window sessions in an ordered rotation. Sending this command causes the Library Manager's system menu for the next window to be displayed.

Sending the Ctrl + Esc Command to the Library Manager

To send the Ctrl + Esc command to the Library Manager during an active session, perform the following steps:

1. Select the **Send Ctrl + Esc** option on the Keystrokes menu in the remote Library Manager console session window (Figure 235 on page 351).

2. If the remote Library Manager console is in Keystrokes local mode, press the **Ctrl + C** shortcut key.

Sending the Ctrl + Esc command lets you display the task list on the Library Manager. After you display the task list, you can select a task from the list.

Changing the Session State from Remote Library Manager Console

The session state is the current state of the session between the remote Library Manager console and the Library Manager workstations. Both workstation users can change the session. While the remote Library Manager console is changing the session state, the Library Manager cannot alter that session. If both users try to change the state at the same time, the Library Manager takes precedence.

A status indicator of the session is displayed in the title bar of the session window or, when the session interface is minimized, under the remote Library Manager console icon.

Figure 236 shows the remote Library Manager console window in the Library Manager's display during an active session. The remote Library Manager console is in Keystrokes remote mode.
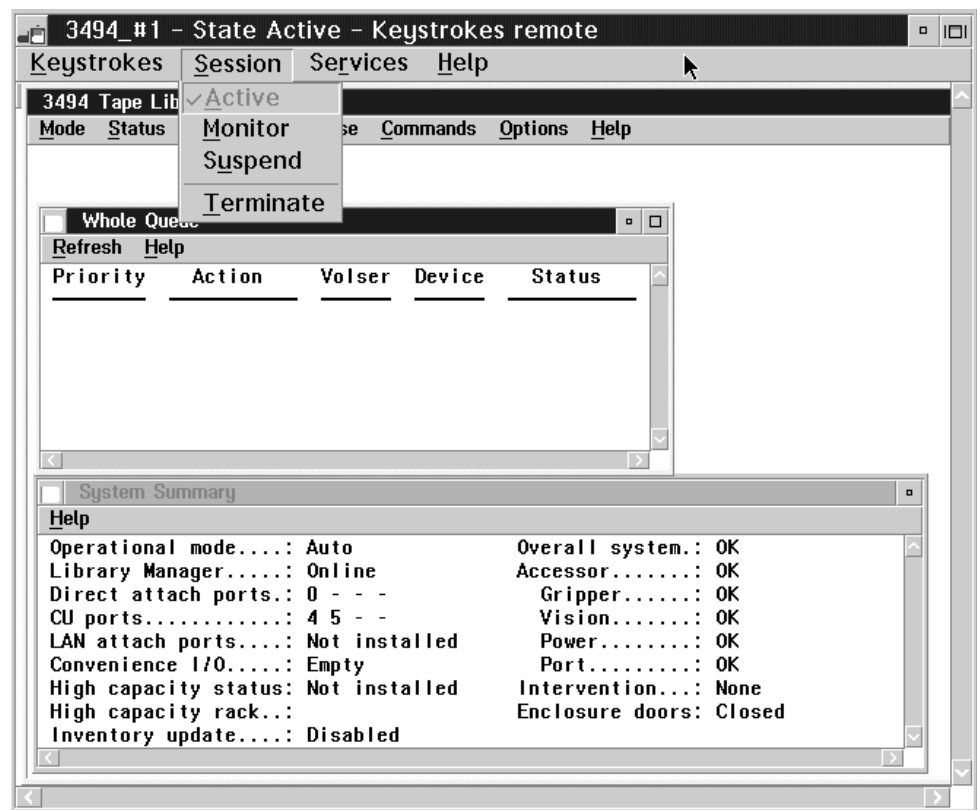
Figure 236. Remote Library Manager Console Session Window with Session Menu

The link record name (3494_#1), the current session State (Active), and the Keystrokes mode (remote) are displayed on the title bar of the remote Library Manager console window. Table 17 on page 354 describes the session states.

To change the session state, perform the following steps:

1. In the Session menu select the action to change the session state.
2. Press one of the following shortcut keys associated with the action to change the session if the remote Library Manager console is in Keystrokes local mode:

   Active   Ctrl + A

   Monitor   Ctrl + M

S̲uspend	Ctrl + S
T̲erminate	Ctrl + T

Table 17. Session States

Session State	Description
Active	A DCAF session is established. The controlling workstation (remote Library Manager console) controls the keyboard and monitors the display of the target workstation (Library Manager). The Library Manager keyboard is locked; the keystrokes and pointing device commands entered on the Library Manager are not processed. The Library Manager user can regain control by pressing the hot key combination to change the session state.
Busy	A DCAF session is established. The Library Manager user pressed the hot key combination and regained control. The remote Library Manager console user must wait until the Library Manager user puts the DCAF session in another state.
Initiating	The remote Library Manager console is starting a DCAF session with the Library Manager.
Monitor	A DCAF session is established. The remote Library Manager console monitors (watches) the activity of the Library Manager. The remote Library Manager console user sees the Library Manager display, but the Library Manager user is in control of the keyboard and pointing device input. The Library Manager user can press the hot key combination to change the session state.
Suspend	The DCAF session in progress is suspended (stopped temporarily). The remote Library Manager console does not monitor the Library Manager and does not have control of the keyboard and pointing device. Either console user can resume the session.
Terminate	The DCAF session is ending.

Using the Pointing Device during a Session

Figure 237 on page 355 shows the Library Manager's display during an active session. The remote Library Manager console user selected the operational status from the Library Manager with the pointing device. The remote Library Manager console is in Keystrokes remote mode.
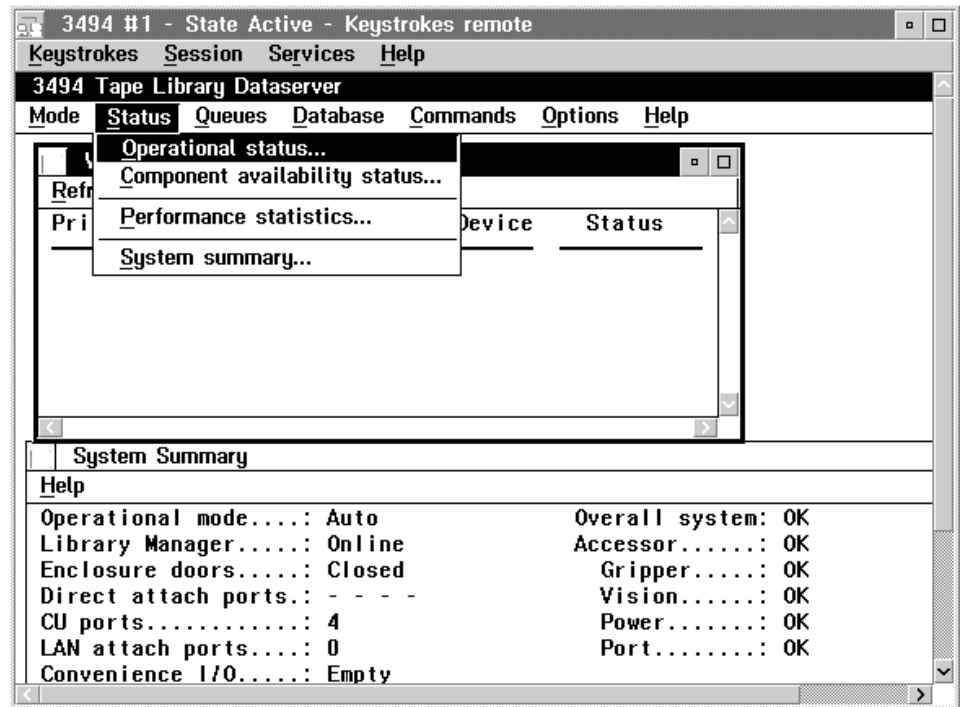
Figure 237. Remote Library Manager Console Session Window

During an active session, the pointing device is useful for selecting options from the remote Library Manager console menu bar or for performing operations on the Library Manager display. The Keystrokes mode (local or remote) is for the remote Library Manager console keyboard only and has no effect on the pointing device.

The remote Library Manager console pointing device determines the position of the pointing device of the Library Manager. The remote Library Manager console pointing device can move the Library Manager pointing device if the following conditions are true:

*   The remote Library Manager console session window is the active window where the remote Library Manager console user is giving pointing device commands.
*   The remote Library Manager console pointing device position is within the remote Library Manager console session window.

Note: The pointing device displayed on the remote Library Manager console may not be the same as on the Library Manager because of differences in the display drivers.

Excessive movement of the pointing device during the active state in the remote Library Manager console window can cause the operation to run slowly because the pointing device movement sends information across the network.

Note: If you perform an operation that is not allowed on the remote Library Manager console, the Library Manager console beeps once.

When the remote Library Manager console is in the active state, the Library Manager pointing device is disabled. During the Monitor, Busy, or Suspend states, the pointing devices for the remote Library Manager console and the Library Manager function independently.

Moving among Multiple Sessions

Moving among multiple remote Library Manager console sessions follows the general conventions for moving around the windows.

The remote Library Manager console main window displays each Library Manager session. The current sessions are listed by the appropriate link record name. To change to a different session, perform the following steps:

1. Select the new session from the remote Library Manager console main window.
2. Go to the task list and switch to the new session.

You can minimize or maximize the remote Library Manager console session windows and arrange them on the remote Library Manager console. To return to the remote Library Manager console main window, go to the task list and switch to the Distributed Console Access Facility (remote Library Manager console main window).

Transferring Files

You can use the file-transfer utility to transfer files from the Library Manager to the remote Library Manager console. Transferring files to the Library Manager is not allowed. Only the remote Library Manager console can initiate a file transfer. The remote Library Manager console can be in the Monitor state or the Active state.

To transfer files from the Library Manager, perform the following steps:

1. Select the **Start file transfer** option from the Services menu on the remote Library Manager console. The File Transfer Utility window opens.
2. Type the *path* and the *file name* of the source file. If the path is not specified, the drive and directory where the DCAF is installed are used.
3. Type the *path* and the *file name* of the destination file. If the file name is not specified, the same name as the source file is used.
4. Select the Overwrite check box if you want to replace a destination file that already exists.
5. Select the **Receive** push button for the remote Library Manager console to receive the file from the Library Manager.

   A window opens that shows what percent of the file has transferred. To interrupt the file transfer, select the **Stop** push button.

Library Manager Operations with Remote Library Manager Console

You can change the session state and the password from the Library Manager.

Changing the Session State of the Library Manager

After a session is established between the remote Library Manager console and the Library Manager, the remote Library Manager console controls the Library Manager keyboard and monitors the Library Manager display. The keyboard and pointing device on the Library Manager are locked.

To regain control at the Library Manager, the session state must be changed. To change the session state perform one of the following:

- The remote Library Manager console operator can change the session state as follows:
  - Terminate the session. All remote operations stop until a new session is established.

- Suspend the session. Control returns to the Library Manager.
- Monitor the session. The remote Library Manager console can monitor the display on the Library Manager, but the keyboard on the Library Manager is active.

- The Library Manager operator can change the session state by using the hot key combination at the Library Manager keyboard as follows:

  1. Press **Alt + T** on the Library Manager console. The DCAF Target \ Busy window (Figure 240 on page 358) opens and shows that the target is busy.
  2. Click once with the pointing device in the minimize box in the upper right corner of the target window. The Library Manager keyboard is now operational.

  Attention: Do not close this window. If you **CLOSE** this window instead of **MINIMIZING** it, remote console access to the Library Manager is disabled until the Library Manager is rebooted.

- If you want to return control to the remote Library Manager console or want to allow the remote Library Manager console to monitor operations, change the session state as follows:

  - The remote Library Manager console operator can stop and restart the connection at the remote Library Manager console.
  - The Library Manager operator can restart the session as follows:

    1. Press **Ctrl + Esc** to display the Window List.
    2. On the Window List (Figure 238), select the **DCAF Target \ Busy** option with the pointing device.
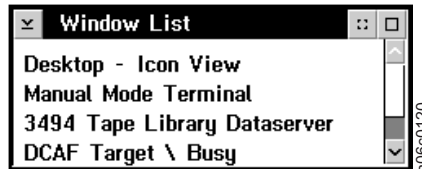
Figure 238. Window List

3. In the DCAF Target \ Busy window (Figure 239 on page 358), select the Session window, then select the **Active** or **Monitor** option.
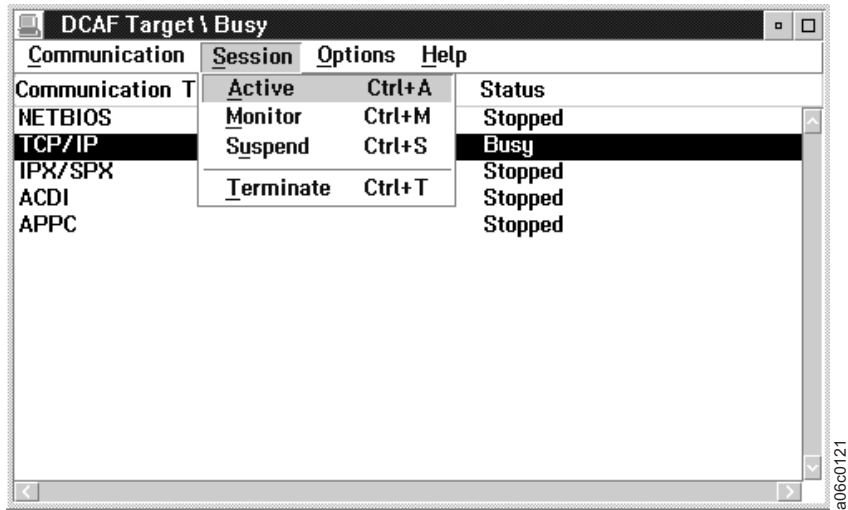
Figure 239. Active Session

Changing the Password from the Library Manager

You can change the remote Library Manager console logon password *only* from the Library Manager during a session. To change the password, perform the following steps:

1. If you have an active session, take control at the Library Manager by pressing **Alt + T**. The DCAF Target \ Busy window (Figure 240) opens.
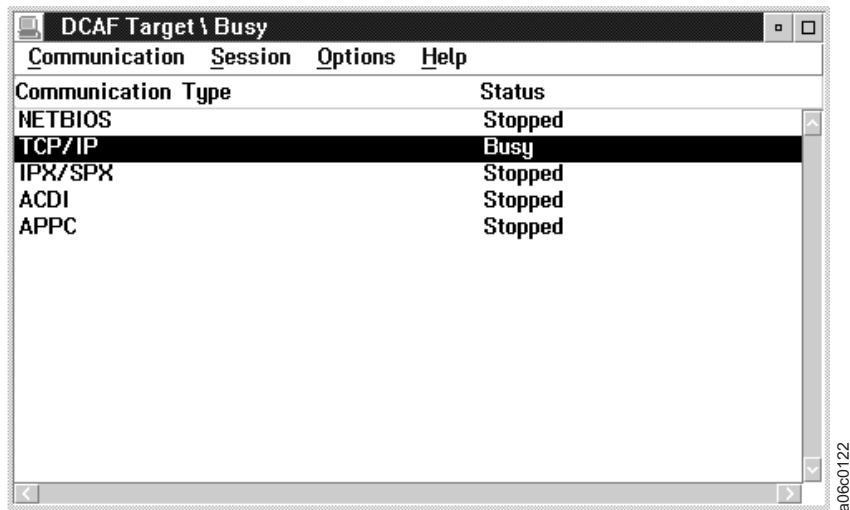
Figure 240. Changing Sessions

2. On the Options menu, select the **Password...** option in the DCAF Target \ Busy window (see Figure 241 on page 359).
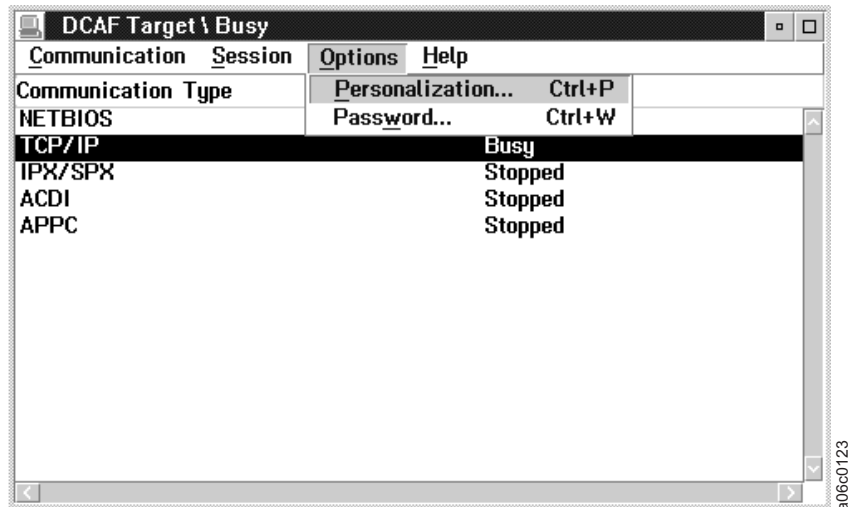
Figure 241. Options Menu

3. In the DCAF Password window (Figure 242), select the **Enable password** check box.
4. Type the current password in the **Current password:** field. The default password is *Impsword*.
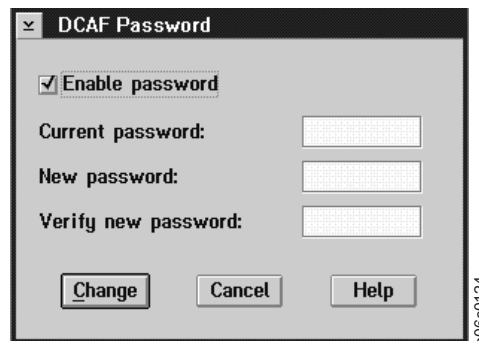
Figure 242. DCAF Password

5. Type the new password in the **New password:** field. The following are the password guidelines:
   - One to eight characters
   - Uppercase or lowercase letters A–Z
   - Digits 0–9
   - Embedded blanks (blanks after the last character are ignored)
6. Type the new password again in the **Verify new password:** field.
7. Select the **Change** push button. A message confirming the password change is displayed.

Note: Give the password to the remote Library Manager console operator.

Remote Library Manager Console Problem Analysis

Table 18 shows the fault symptoms and describes possible solutions to problems with the remote Library Manager console functions.

Table 18. Fault Symptoms

Symptom	Description and Possible Solution
The Library Manager keyboard is locked.	When a session is active, the Library Manager keyboard is locked. In this case, press the **Alt + T** hot key combination to regain control at the Library Manager.
EQN0516 or EQN0524 error	Ensure that the communications manager is started. If the session state takes too long because of network traffic, you may receive this error on the remote Library Manager console. Close the warning window for this error and retry the connection.
The pointing device button commands to the Library Manager are ignored.	As you move a window with the pointing device from the remote Library Manager console, if you drag a window (of the Library Manager) so high that its top goes out of the visible region on the remote (controlling) console, you are moving the pointing device out of the DCAF session. Therefore, the pointing device button actions are not sent to the Library Manager until you move the pointing device back into the active session window at the Library Manager. When you move back into the active session, the window on the Library Manager seems to move with the pointing device and not drop, even though you have released the pointing device button. Click the pointing device button again to drop the window where you want the window to drop.
The Library Manager console beeps.	If you perform an operation that is not allowed on the remote Library Manager console, the Library Manager console beeps once.

Chapter 8. Problem Determination Procedures

This chapter describes how to determine when a problem has occurred in the 3494 and the actions necessary to resolve the problem.

See Table 19 for quick reference to particular conditions.

Quick Reference to Problem Determination Procedures

Table 19. Quick Reference to Problem Determination Procedures

Conditions	Reference
Library Manager failures in a DFSMS/MVS (z/OS) environment (includes HA1 Frames switchovers)	"Library Manager Failure in DFSMS/MVS (z/OS)" on page 363
Library Manager failures in an MVS/BTLS environment (includes HA1 Frames switchovers)	"Library Manager Failure in MVS/BTLS" on page 367
Reported by a host console message	"DFSMS/MVS System-Managed Tape Messages" on page 370
Intervention required on Library Manager System Summary or SNMP OPINT trap message	"Intervention-Required Conditions and Actions" on page 387
Disruption of services or physical damage to a site with a VTS	"VTS Recovery Actions" on page 416
Export/Import List Volume status codes in the status file	Appendix B, "VTS Export and Import Advanced Function," on page 421

When a problem occurs in the 3494 or associated tape subsystems, completion of one or more 3494 operations may not be possible. This topic provides information on how to identify problems, what is their significance to continuing operations in the 3494, and what actions to take for recovery.

Several symptoms indicate that a problem occurred with the 3494 or associated tape subsystems. These symptoms are in the following general categories:

- One or more jobs that require volumes in the 3494 are not progressing or completing as expected. The following are possible causes:
  - The workload demand on the 3494 exceeds its capability. For example, the number of requests to mount volumes on drives in a 3494 received in a period exceeds the number the 3494 can process during that period. The result is that the requests stay in the Library Manager queue for a longer period before being performed. Although this is not a problem with the 3494, if this is occurring on a regular basis, workload balancing must be addressed.
  - The failure of a component in the 3494 is causing degraded performance. Library operations are performed but are slower to complete because of the failure. For example, when one of the two grippers fails, all operations continue with the other gripper but take longer to complete than when both grippers are functional. Service is required to correct the problem.
  - The 3494 or attached tape subsystems detected a failure or exception condition that is preventing one or more 3494 operations from completing. The 3494 reports the condition to the host for operator or service

representative handling. See "Failure and Exception Condition Reporting" for the conditions and required actions.

- Console messages concerning the 3494 are being generated. The following are possible conditions:
  - A failure or exception condition occurs while the 3494 is performing one or more requested operations. The 3494 reports the condition to the host, which generates a host console message to inform you that a problem exists with the 3494. See "Failure and Exception Condition Reporting" for the conditions and required actions.
  - The Library Manager console provides information about many of the failure and exception conditions reported to the host. Although the host console messages are the primary source for problem determination, the information at the Library Manager is useful during operator and service representative problem resolution. See "Information Provided at the Library Manager Console" on page 381 for the information and required actions.
- A service representative has requested time on the 3494 to correct a problem.

  In addition to possible host console messages, 3494 or associated tape subsystems failures that cause exception conditions are logged in the error recording data set on the host. MVS, OS/390, and z/OS hosts, for example, log errors in file SYS1.LOGREC. A service representative reviews the data sets as part of normal diagnosis. Also, when errors that the 3494 recovers internally exceed a threshold, the condition is also logged for action by the service representative.

The primary indication that a problem has occurred is a host console message. The following topic describes what actions to take based on specific console messages.

Failure and Exception Condition Reporting

The library reports failures or exception conditions that it detects to the attached hosts for operator action. Most failures or exception conditions are also logged at the host for later use by a service representative. Failures or exception conditions fall into one of the following categories:

- A failure or exception condition is detected in a request from a host to perform a library function.

  The requested function is rejected, and the reason is reported back to the host immediately.
- Some library function requests, such as mounting a cartridge, are queued within the Library Manager for subsequent execution. A failure or exception condition can be detected during the execution of a queued library function request.

  The host that requested the 3494 function is notified that a failure or exception condition was detected during the execution of the request. The notification also includes the reason for the failure or exception condition.
- A failure or exception condition is detected that is independent of any specific requested 3494 function.

  All hosts attached to the 3494 are notified of the failure or exception condition.

When a failure or exception condition is reported to the host, the result is dependent on the host's operating system. For an MVS , OS/390, or z/OS host, the reported condition results in a console message. "DFSMS/MVS System-Managed Tape Messages" on page 370 describes the console message that the MVS, OS/390, or z/OS operating system under the DFSMS/MVS System-Managed Tape environment generates as a result of a 3494-reported failure or exception condition.

See the following documentation for the messages provided and their format for other operating systems and environments:

- MVS Basic Tape Library Support (BTLS) - User's Guide and Reference
- VM/ESA or z/VM
- OS/400®
- AIX

For several of the conditions, one of the actions that can be specified is to select the Operator Intervention menu. See "Operator Intervention" on page 288 for the actions to take for each intervention condition.

Library Manager Failure Recovery Procedures

Notes:

1. This procedure is designed for the recovery of DFSMS/MVS, z/OS, or MVS/BTLS host sessions. If you are using any other host platform, contact your software provider before continuing with this procedure.
2. These procedures apply to both single Library Manager and HA1 Frames (dual Library Manager) configurations. In a dual Library Manager configuration, these procedures apply to the activation of the standby Library Manager when the active Library Manager fails.
3. Host actions may include varying the 3494 online after a short delay for the conditions that restart the Library Manager. Host tape operations or short jobs may have to be resubmitted, and operator actions from the Library Manager console may require restart.

When a failure occurs in the Library Manager from either a CHECK-1 or a processor exception, or when the Library Manager experiences certain hardware failures, do the following procedures to recover host operations. These recovery procedures allow recovery from many different scenarios. You must follow these steps in the exact sequence to achieve a complete recovery.

Throughout the recovery procedures, you are directed to do certain actions at either the Library Manager or at the host operating console. It may be helpful to have two people do the various tasks involved in this procedure due to locations of the 3494.

For recovery procedures of DFSMS/MVS (z/OS), see "Library Manager Failure in DFSMS/MVS (z/OS)." For recovery procedures of MVS/BTLS, see "Library Manager Failure in MVS/BTLS" on page 367.

Library Manager Failure in DFSMS/MVS (z/OS)

The following failure conditions cause you to initiate this procedure:

- Library Manager CHECK-1 condition
- Library Manager hardware failure
- Library Manager processor exception software error

When the active Library Manager fails in a dual Library Manager environment, it may or may not display a message. The standby Library Manager displays a message stating that a switchover is being made, which takes approximately ten minutes to complete.

Note: Some Library Manager recovery operations may take longer than expected to complete. Allow sufficient time for the Library Manager to complete its switchover recovery procedures. Seek assistance **before** interrupting the Library Manager recovery operation.

Library Manager Displays (DFSMS/MVS or z/OS)

A Library Manager failure causes the Library Manager console to display certain messages. If the failure has not affected the display and the display is powered on, the Library Manager may display one or more of the following messages:

Single Library Manager Configuration: In a single Library Manager configuration, the following conditions may occur:

- 'Severe execution error' window
- System hang with nonresponsive Library Manager keyboard or pointing device

  Note: If this occurs, press **Alt + T** to ensure that the keyboard and display are not being controlled from the remote console.

- Mode changes that show ***Pending*** for an excessive length of time
- Error recovery in progress

Dual Library Manager Configuration: In a dual Library Manager configuration, the following conditions may occur:

- 'Switching to active Library Manager' window displayed
- 'Severe execution error' window
- System hang with nonresponsive Library Manager keyboard or pointing device

  Note: If this occurs, press **Alt + T** to ensure that the keyboard and display are not being controlled from the remote console.

- Mode changes that show ***Pending*** for an excessive length of time
- Error recovery in progress

To restart a Library Manager manually, go to "Library Manager Recovery Starts (DFSMS/MVS or z/OS)" on page 365.

Host Messages (DFSMS/MVS or z/OS)

When the Library Manager fails, the host operator may or may not see one or more of the following messages displayed on the host console:

- Library Manager CHECK-1 condition
- Library Manager equipment check
- Library path check
- Library Manager offline
- Library Manager switchover in progress

The Library Manager operator and the host operator should communicate actively with each other to reduce the amount of down time and ensure the accuracy of this procedure.

Start Library Manager and Host Recovery Procedure (DFSMS/MVS or z/OS)

Follow each step of the following procedure without deviation.

Library Manager Recovery Starts (DFSMS/MVS or z/OS)

Perform one of the following procedures, depending on the Library Manager configuration of your 3494.

Single Library Manager Configuration: For a single Library Manager configuration, perform the following:

- Contact host operations and report what has occurred at the Library Manager:
  - If a CHECK-1 or a processor exception occurred, the Library Manager attempts to restart itself automatically.

    Note: If there is no change on the System Status window and messages after 30 minutes, do a manual restart. **Do not power off the Library Manager.** Press the **Ctrl + Alt + Del** key sequence to restart the Library Manager.

    You may need to repeat this procedure. If there is no response after the second attempt to recover the Library Manager, call your next level of support.

  - If the failure is anything other than a CHECK-1, restart the Library Manager manually by pressing the **Ctrl + Alt + Del** key sequence.
  - While waiting for the Library Manager to initialize and enter the Auto mode, Online state, go to "Library Manager Recovers (DFSMS/MVS or z/OS)."

    Note: This action takes approximately 20 minutes.

Dual Library Manager Configuration: For a dual Library Manager configuration, no Library Manager corrective action is needed. The standby Library Manager switches control from the active Library Manager automatically.

If the active Library Manager is not responding and the standby Library Manager does not indicate that it is switching to active after five minutes (see Figure 243 on page 366), perform the previous steps for a single Library Manager on the one that failed.

While waiting for the Library Manager to initialize and go to the Auto mode, Online state, go to "Library Manager Recovers (DFSMS/MVS or z/OS)."

Library Manager Recovers (DFSMS/MVS or z/OS)

Perform one of the following procedures, depending on the Library Manager configuration of your 3494.

Single Library Manager Configuration: For a single Library Manager configuration, perform the following steps:

1. Wait for the Library Manager to be re-initialized and enter the Auto mode, Online state. This may take up to 20 minutes.
2. If the failure occurred while inserting cartridges into the high-capacity I/O facility, do not remove the cartridges. Leave the cartridges in place, and the operation restarts automatically. Cartridges inserted in the convenience I/O station that remain in the station must be removed from the station, then reinserted after the Library Manager re-initializes.

3. If the Library Manager reflects the Auto mode, Online state, it has recovered. Call your service representative for a recoverable Library Manager error. Continue with "DFSMS Host Action."

   or

4. If the Library Manager does not display the Auto mode, Online state **and** more than 30 minutes have elapsed since the re-initialization started, call your service representative for a unrecoverable Library Manager error.

5. When the repair action is completed and the library is available to be varied online, continue with "DFSMS Host Action."

Dual Library Manager Configuration: For a dual Library Manager configuration, perform the following steps:

1. Wait until the switchover completes and the standby Library Manager has become the active Library Manager. The switchover takes approximately ten minutes (see Figure 243).

```
This Library
Manager is
switching from
Standby to
Active, please
stand by.
```
R4DM9446

Figure 243. Library Manager Switching Window

2. Call your service representative to repair the failed Library Manager.

   The failed Library Manager may recover from the failure and become available as the standby Library Manager after the database is synchronized.

3. If the failure occurred while inserting cartridges into the high-capacity I/O facility, do not remove the cartridges. Leave the cartridges in place, and the operation restarts automatically. Cartridges inserted in the convenience I/O station that remain in the station must be removed from the station, then reinserted after the Library Manager re-initializes.

4. Notify the host operator that the switchover is complete.

5. Continue with "DFSMS Host Action."

DFSMS Host Action

If the Library Manager has been varied offline because of the failure, when the Library Manager is in the Auto mode, Online state, perform the following actions at the host:

1. Return DFSMS host control of the 3494 to online status by issuing the following command:

   VARY SMS, LIB(libname[1]), ONLINE

2. Confirm that the appropriate drives are online and available by issuing the following command:

   LIBRARY DISPDRV, libname[1]

   For any drive that is not online, issue the following command:

   VARY xxx, ONLINE

---

1. Where libname is the name of the 3494.

3. If the system environment includes JES-3, the library tape drives must be in normal status. Use of the JES-3 VARY commands for the GLOBAL and all LOCAL processors may be appropriate.

4. If the system environment includes LEGENT Multiple Image Manager (MIM), the 3494 tape drives must be in normal status. Use the MIM vary commands on each applicable host.

5. If the system environment includes a different product, such as Tivoli® Storage Manager or EPIC, use the appropriate commands to ensure normal 3494 and tape drive status.

6. You may retry any pending jobs waiting for a response to an outstanding **WTOR (CBR4196D)** message by responding to the host request with an R (**Retry**).

7. If the CHECK-1 occurred while doing cartridge ejects, verify that the last three volsers placed in either the high-capacity I/O facility or the convenience I/O station are still present in the DFSMS database. If the volsers are present in the DFSMS database, the volsers must be inserted through an input station, then the DFSMS command to eject the volsers needs to be reissued.

This completes the DFSMS recovery procedure. The 3494 subsystem should now be ready for submission of tape jobs.

Note: Any tape job that aborted needs to be resubmitted.

Library Manager Failure in MVS/BTLS

The following failure conditions cause you to initiate this procedure:
- Library Manager CHECK-1 condition
- Library Manager hardware failure
- Library Manager processor exception software error

When the active Library Manager fails in a dual Library Manager system, it may or may not display a message. The standby Library Manager displays a message stating that a switchover is being made, which can take up to ten minutes to complete.

Note: Some Library Manager recovery operations may take longer than expected to complete. Allow sufficient time for the Library Manager to complete its switchover procedures. Seek assistance **before** interrupting the Library Manager recovery operation.

Host Messages (MVS/BTLS)

When the Library Manager fails, **BTLS Error Code=70 Library Manager Equipment Check** may be displayed on the host console for single Library Managers or dual Library Managers that cannot switch over. For dual Library Managers that can switch over, **BTLS Error Code=74 Library Informational Data** may be displayed on the host console.

Library Manager Displays (MVS/BTLS)

A Library Manager failure causes the Library Manager console to display certain messages. If the failure has not affected the display and the display is powered-on, the Library Manager may display one or more of the following messages:

Single Library Manager Configuration: In a single Library Manager configuration, the following conditions may occur:

- 'Severe execution error' window
- System hang with nonresponsive Library Manager keyboard or pointing device

  Note: If this occurs, press **Alt + T** to ensure that the keyboard and display are not being controlled from the remote console.
- Mode changes that show *Pending* for an excessive length of time
- Error recovery in progress

Dual Library Manager Configuration: In a dual Library Manager configuration, the following conditions may occur:

- 'Switching to active Library Manager' window displayed
- 'Severe execution error' window
- System hang with nonresponsive Library Manager keyboard or pointing device

  Note: If this occurs, press **Alt + T** to ensure that the keyboard and display are not being controlled from the remote console.
- Mode changes that show *Pending* for an excessive length of time
- Error recovery in progress

To restart a Library Manager manually, go to "Library Manager Recovery Starts (MVS/BTLS)."

Start Library Manager and Host Recovery Procedure (MVS/BTLS)

Follow each step of the following procedure without deviation.

Library Manager Recovery Starts (MVS/BTLS)

Perform one of the following procedures, depending on the Library Manager configuration of your 3494.

Single Library Manager Configuration: For a single Library Manager configuration, perform the following steps:

1. Contact host operations and report what has occurred at the Library Manager.
2. If a BTLS Error Code=70 Library Manager Equipment Check occurred, the Library Manager attempts to restart itself automatically.

   The Library Manager should start initial program load (IPL) in about five minutes and may take up to 20 minutes to complete and become active. If, after five minutes, there is no change in the System Status messages, or an "Error recovery in progress" message is not displayed, do a manual restart. **Do not power off the Library Manager.** Press the **Ctrl + Alt + Del** key sequence to restart the Library Manager.

   This procedure may need to be repeated. If the Library Manager fails to start an IPL within five minutes after the second attempt to recover, call your next level of support.
3. If the failure did not cause the Library Manager to restart automatically, press the **Ctrl + Alt + Del** key sequence to restart the Library Manager.

   While waiting up to 20 minutes for the Library Manager to initialize and enter the Auto mode, Online state, go to "Library Manager Recovers (MVS/BTLS)" on page 369.

Dual Library Manager Configuration: For a dual Library Manager configuration, no Library Manager corrective action is needed. The standby Library Manager switches control from the active Library Manager automatically, which takes approximately ten minutes to complete (see Figure 244).

If the active Library Manager is not responding and the standby Library Manager does not indicate that it is switching to active after five minutes (see Figure 244), perform the previous steps for a single Library Manager on the one that failed.

```
This Library
Manager is
switching from
Standby to
Active, please
stand by.
```
R4DM9446

Figure 244. Library Manager Switching Window

While waiting for the Library Manager to initialize and go to the Auto mode, Online state, go to "Library Manager Recovers (MVS/BTLS)."

Library Manager Recovers (MVS/BTLS)

Perform one of the following procedures, depending on the Library Manager configuration of your 3494.

Single Library Manager Configuration: For a single Library Manager configuration, perform the following steps:

1. Wait for the Library Manager to be re-initialized and enter the Auto mode, Online state. This may take up to 20 minutes.
2. If the failure occurred while inserting cartridges into the high-capacity I/O facility, do not remove the cartridges. Leave the cartridges in place, and the operation restarts automatically. Cartridges inserted in the convenience I/O station that remain in the station must be removed from the station, then reinserted after the Library Manager re-initializes.
3. If the Library Manager displays the Auto mode, Online state, it has recovered. Call your service representative for a recoverable Library Manager error. Continue with "BTLS Host Action" on page 370.
4. If the Library Manager does not display the Auto mode, Online state **and** more than 30 minutes have elapsed since the re-initialization began, call your service representative for an unrecoverable Library Manager error.
5. When the repair action is completed and the 3494 is available to be varied online, continue with "BTLS Host Action" on page 370.

Dual Library Manager Configuration: For a dual Library Manager configuration, perform the following steps:

1. Wait until the switchover completes and the standby Library Manager has become the active Library Manager. The switchover takes approximately ten minutes to complete. The standby Library Manager is the active Library Manager when its System Status displays the Auto mode, Online state.
2. Call your service representative to repair the failed Library Manager.

   The failed Library Manager may recover from the failure and become available as the standby Library Manager after the database is synchronized.

3. If the failure occurred while inserting cartridges into the high-capacity I/O facility, do not remove the cartridges. Leave the cartridges in place, and the operation restarts automatically. Cartridges inserted in the convenience I/O station that remain in the station must be removed from the station, then reinserted after the Library Manager re-initializes.

4. Continue with "BTLS Host Action."

BTLS Host Action

When the Library Manager is in the Auto mode, Online state, perform the following BTLS host actions:

1. Display the unit status by issuing the following command for each tape drive in the 3494:

   D U,,, xxx[2]

2. Re-drive the mount for each tape drive showing **MTP** (mount pending) by issuing either of the following commands:

   • From TSO terminals, issue the TSO library mount command.

   LIBRARY MOUNT UNIT(unit)**[VOLSER**(volser)**]**

   or

   • Submit JCL to perform a mount. See the *Basic Tape Library Support User's Guide and Reference* for commands.

3. Submit tape jobs.

4. Resubmit any tape jobs that aborted.

This completes the MVS/BTLS recovery procedure.

DFSMS/MVS System-Managed Tape Messages

When a failure or exception condition is reported to a host system operating under the DFSMS/MVS System-Managed Tape environment, the following messages are generated. For each message, a brief description about the cause of the condition is described along with appropriate recovery actions.

Also see *z/OS System Messages, Volume 2* for additional CBRxxxx messages generated as a result of error or exception conditions detected with the DFSMS/MVS System-Managed Tape environment software.

In the messages, *library-name* is the name defined by the installation for a particular library.

---

2. Where xxx is the device address.

DFSMS Library Failure Messages or Exception Conditions

Table 20. DFSMS Messages Based on Library Failure or Exception Conditions

Resulting Console Message	Action
CBR3711I Unexpected error code *error code* **and modifier** *modifier* **from library** *library-name*. An error has been detected during processing in library *library-name*. The 3494 returned a unit check with error code and modifier *error code and modifier*, which is an unexpected or inappropriate response to the 3494 request. It is likely that the microcode in the 3494 and the software are not at the correct level.	Call your service representative.
CBR3712I Unexpected completion code, CC=*cc***, from library** *library-name*. An error has been detected during processing in library *library-name*. An unexpected or inappropriate completion code *cc* has been received from the 3494. It is likely that the microcode in the 3494 and the software are not at the correct level.	Call your service representative.
CBR3721I Library *library-name* **in manual mode.** Library *library-name* is in Manual mode and cannot complete or accept 3494 audit requests. Any pending audit requests queued within the 3494 when it was placed in Manual mode are failed resulting in this message. Any subsequent audit requests issued to the 3494 also fail and result in this message.	When the library has returned to Auto mode, resubmit the audit requests.
CBR3722I Library *library-name* **equipment check.** The 3494 or one of the associated tape subsystems has detected a 3494 hardware failure. The failing 3494 component must be repaired before 3494 requests can be completed successfully.	Call your service representative.
CBR3724I Volume *volser* **does not exist in library** *library-name*. Volume *volser* does not reside in 3494 *library-name*. It is possible that another host system has ejected the volume from the 3494.	1. Use the ISMF mountable tape volume list function to examine the current state of the volume under DFSMS. 2. Determine where the volume is and reenter it into the library's input station.
CBR3725I Library *library-name* **command reject for volume** *volser*. **Library error code=***error-code*. Library *library-name* has rejected a request for a 3494 operation with volume *volser*. The error code indicates the reason for the rejection but is included for diagnostic purposes only. It is likely that the microcode in the 3494 and the software are not at the correct level.	Notify your system administrator.

Table 20. DFSMS Messages Based on Library Failure or Exception Conditions (continued)

Resulting Console Message	Action
CBR3726I Function incompatible error code *error-code* **from library** *library-name* **for volume** *volser*. The library cannot process a request for a 3494 operation with volume *volser* because the request is incompatible with the configuration or set of installed features of the 3494. If *error-code=6*, an attempt was made to eject a logical volume from a VTS. If *error-code=7* or *8*, a command for an Export or Import operation was issued to a VTS partition that is not capable of Export and Import operations. If *error-code=D*, an attempt was made to either eject or audit a logical volume in a PtP VTS, and the subsystem is in the Service Preparation mode. If *error-code=E*, one of the following occurred: • An attempt was made to eject a logical volume in a PtP VTS, and the subsystem already has 1,000 eject operations in progress. • An attempt was made to audit a logical volume in a PtP VTS, and the subsystem already has 1,000 audit operations in progress. If *error-code=F*, a command that specified a parameter value that the subsystem does not support was issued to a PtP VTS. If *error-code=10*, a category mount request or a set volume category request was issued to a PtP VTS, and the subsystem was in read-only mode. It is also possible that the microcode in the 3494 and the software are not at the correct level.	Notify your system administrator.
CBR3727I Control Unit and Library Manager incompatible in library *library-name*, **error code** *error-code*. During processing of a 3494 request in library *library-name*, it was determined that the tape control unit and the Library Manager are at incompatible software levels. Error code *error-code* indicates the nature of the incompatibility.	1. If another tape subsystem is in the 3494, vary the drives associated with the failed subsystem offline and resubmit the request or job. 2. Call your service representative.

Table 20. DFSMS Messages Based on Library Failure or Exception Conditions (continued)

Resulting Console Message	Action
CBR3728I Volume *volser* **in use in library** *library-name***. {Already mounted|Mount pending|Eject in progress|Eject pending|Export in progress}.** The 3494 cannot process a request for a 3494 operation with volume *volser* because the volume is already in use in the 3494. One of the following situations is present: • The volume is already mounted on another drive. • A mount request for the volume is pending. • The volume is being ejected from the 3494 currently. • An eject request is pending. • The volume is being exported.	1. Determine why the volume is already in use. 2. Resubmit the 3494 request when the volume is no longer in use.
CBR3729I Library Manager for library *library-name* **offline.** A 3494 request was issued to library *library-name*, but the Library Manager is offline. Possible causes are: • The Library Manager is powered-off. • The Library Manager is still in the process of initialization. • The Library Manager state is set to Offline.	1. Check that the Library Manager is powered-on and the Operator menu is active. 2. Check the **Library manager** field of the System Summary window. It should indicate **Online**. 3. If it does not indicate **Online**, use the Mode window and place the library in the Online state. If the 3494 does not go to the Online state, call your service representative. 4. Vary the 3494 online at the host console. 5. Resubmit the request or job.
CBR3750I Message from library *library-name***:** *message***.** The operator at library *library-name* has sent message *message* to all connected hosts. Messages can be sent automatically from a VTS subsystem that is performing Export or Import operations to post operation progress. If enabled at the 3494 (see Figure 204 on page 289), text messages also surface for operator interventions that occur at the 3494. See Table 13 on page 300 for the complete text associated with each numbered intervention message.	Handle the operator intervention as required.
CBR3751E Device *device-number* **in library** *library-name* **is unavailable.** Device *device-number* in library *library-name* is no longer available. Either the state of the device has been changed through the Library Manager console, or the 3494 detected a device failure. The device is varied offline to prevent it from being allocated.	1. If the device was made unavailable through the Library Manager console, make it available again through the Library Manager console. 2. If the device was made unavailable due to a failure that the library detected, an intervention-required condition is set for the device. Call your service representative.
CBR3752I Device *device-number* **in library** *library-name* **is now available.** Device *device-number* in library *library-name* that was unavailable previously is now available. The device was made available through the Library Manager console.	Vary the device online from the host system console to make it available for allocation.

Resulting Console Message	Action
CBR3753E All convenience output stations in library *library-name* **are full.** Ejected cartridges occupy all the storage cells in the convenience output station in library *library-name*. No more cartridges can be ejected to a convenience output station until some of the already-ejected cartridges have been removed. The 3494 continues to accept and queue eject requests. This message is retained on the console until the convenience output station is no longer full.	Remove one or more cartridges from the convenience output station. There is also an intervention-required condition set for this condition. It is cleared automatically when the convenience output station is no longer full.
CBR3754E High capacity output station in library *library-name* **is full.** Ejected cartridges occupy all the storage cells in the high-capacity output facility in library *library-name*. No more cartridges can be ejected to the high-capacity output facility until some of the already-ejected cartridges have been removed. The 3494 continues to accept and queue eject requests. This message is retained on the console until the high-capacity output facility is no longer full.	Remove one or more cartridges from the high-capacity output facility. There is also an intervention-required condition set for this condition. It is cleared automatically when the high-capacity output facility is no longer full.
CBR3755E {Input|Output} door open in library *library-name***.** One of the following conditions has been detected in library *library-name*: • The station door has been open for more than five minutes. • An eject operation cannot be completed because the door is open. This message is retained on the console until the open door has been closed.	Go to the 3494 and close the station door. There is also an intervention-required condition set for this condition. It is cleared automatically when the station door is closed.

Table 20. DFSMS Messages Based on Library Failure or Exception Conditions (continued)

Resulting Console Message	Action

CBR3757E Library *library-name* **in {Pause/Manual mode} operational state.**
 	
Library *library-name* is not running in Auto (normal) mode. The operational state (mode) is one of the following:
 	
Pause mode
        All mechanical motion in the 3494 has stopped. Pause mode is entered automatically when a failure in the 3494 prevents further automated operation or when entered by a command from the Library Manager operator console. The Library Manager continues to accept orders from the host but queues them for execution after Pause mode changes to Auto or Manual mode.
 	
Manual mode
        All mechanical motion within the 3494 has stopped. Manual mode is entered by a command from the Library Manager operator console. The Library Manager continues to accept orders from the host and instructs you to do the functions manually that are normally done automatically, such as volume fetch and mounting.
 	
This message is retained on the console until the 3494 has returned to the automated operational state.
	1. The 3494 may no longer be in Auto mode because of an operational requirement, such as high-capacity I/O or service.
	2. If no operation or service was planned for the 3494 that would have caused the change in mode, go to the library and determine why it is no longer in Auto mode.
	3. If there are intervention-required conditions at the library, clear them, then return the 3494 to Auto mode.
	4. If a repair action is required, call your service representative.

CBR3758E Library *library-name* **operation degraded.** One or more components of library *library-name* have failed or otherwise become unavailable for use. The 3494 is continuing to function but performance may be degraded. If the **CBR3760E Library** *library-name* **vision system not operational** message accompanies this message, audit and eject requests cannot be performed, and volumes cannot be added to the 3494. This message is retained on the console until all 3494 facilities have become fully operational.	1. Call your service representative. 2. There also may be one or more intervention-required conditions at the 3494 to clear.
CBR3759E Library *library-name* **safety enclosure interlock open.** One of the enclosure doors to the library *library-name* is open. The 3494 is in Pause mode. This message is retained on the console until the safety interlocks are closed.	1. If you are doing an operation that involves entering the enclosure, no action is necessary. 2. If someone could be entering the enclosure without authorization, contact your site security. Intervention at the 3494 is required to return the 3494 to Auto mode.

Table 20. DFSMS Messages Based on Library Failure or Exception Conditions (continued)

Resulting Console Message	Action
CBR3760E Library *library-name* **vision system not operational.** Key components of the vision system of library *library-name* have failed. The 3494 cannot read the external labels on cartridges. Processing of audit or eject requests cannot be performed. Also, volumes cannot be added to the 3494 because their external labels cannot be read. Other requests continue to be accepted and performed. This message is retained on the console until the vision system is operational again.	1. Call your service representative to repair the 3494 vision system. 2. Resubmit audit or eject requests when the vision system is operational.
CBR3761E Library *library-name* **Library Manager offline.** Library *library-name* started the process of going offline as the result of an operator at the Library Manager requesting the library to move to the Offline state. All requests that the Library Manager has accepted already are completed normally. No other requests are accepted.	1. Determine why the Library Manager was placed in the Offline state. 2. If a repair action is required, call your service representative.
CBR3762E Library *library-name* **intervention required.** One or more conditions in library *library-name* requires operator intervention to resolve. Function requests continue to be accepted and executed, if possible. If **CBR3757E Library** *library-name* **in Pause mode operational state** accompanies this message, the intervention condition caused automated operations to be stopped. This message is retained on the console until all intervention-required conditions have been cleared.	1. Go to the 3494 and follow the instructions for the intervention-required condition specified on the Library Manager operator console. See "Intervention-Required Conditions and Actions" on page 387 for the intervention-required conditions. 2. After all conditions are resolved, return the 3494 to Auto mode, if required.
CBR3763E Library *library-name* **Library Manager CHECK-1 condition.** The Library Manager detected a severe failure condition in library *library-name*. All requests that the Library Manager accepted are lost.	1. Go to the library and determine if the Library Manager is trying to recover. If it is, the Library Manager console is displaying an initialization message. If it is not, it is displaying an execution or fatal error message. 2. If the Library Manager recovers, resubmit all outstanding library requests or jobs. 3. If it does not recover, call your service representative.
CBR3764E Library *library-name* **all storage cells full.** All storage cells in library *library-name* are occupied by, or reserved for, cartridges that are already in the 3494. No more cartridges can be added to the 3494. Cartridges in the input station of the 3494 cannot be added to the 3494. This message is retained on the console until the 3494 has available storage cells.	Cartridges must be ejected before any can be added to the library. There is also an intervention-required condition set for this condition. It is cleared automatically when the 3494 is no longer full.

Table 20. DFSMS Messages Based on Library Failure or Exception Conditions (continued)

Resulting Console Message	Action
CBR3765E No cleaner volumes available in library *library-name***.** The Library Manager in library *library-name* must perform a clean operation on one of the drives in the library, but no compatible cleaner volumes are available in the 3494. This message is retained on the console until the 3494 has at least one appropriate cleaner volume.	1. Select the **Operator intervention...** option in the Commands window on the Library Manager console. 2. Find the intervention-required condition that identifies the type of cleaner cartridge that the 3494 requires. 3. Place one or more compatible cleaner volumes, with bar code labels that match the cleaner masks, into the convenience input station.
CBR3766E Dual write disabled in library *library-name***.** The Library Manager in library *library-name* is not updating the secondary database for the Library Manager inventory. This can be the result of a hardware failure. Operations continue with the primary database.	Call your service representative.
CBR3769I Misplaced volume *volser* **found in library** *library-name***.** Library *library-name* found volume *volser* that had been reported as misplaced previously. The Library Manager updated the inventory to reflect the new location of the volume.	Resubmit the 3494 request or job that failed because the volume was misplaced.
CBR3770I Volume *volser* **misplaced in library** *library-name***.** During the execution of a 3494 operation with volume *volser* in library *library-name*, the volume cannot be found at the location recorded in the Library Manager inventory.	1. Go to the 3494 and find the volume record in the database. (Select the **Search database for volumes...** option in the Database window.) 2. Place the 3494 in Pause mode. 3. Enter the 3494 and find the home cell the volume should have been in and search for it in the surrounding cells. If the database shows the volume in a device, check that device. If you find the volume, leave the 3494 and place the volume in the convenience input station. 4. Place the 3494 in Auto mode. 5. Resubmit the 3494 request or job after the input station is inventoried.
CBR3771I Duplicate volume *volser* **ejected from library** *library-name***.** A volume was found in a 3494 cell whose volser *volser* is a duplicate of one already in library *library-name*. The location recorded in the Library Manager inventory for this volser already contains a volume with the same volser; this volume was ejected from the 3494 to a convenience output station.	1. Remove the ejected volume from the output station. 2. Determine why the volume has a duplicate label. 3. Clear the item from the Intervention Required window. See Table 27 on page 397 for details.
CBR3772I Duplicate volume *volser* **left in input station in library** *library-name***.** An attempt was made to enter volume *volser* into library *library-name*. The volser is already recorded in the Library Manager inventory, and the location assigned in the inventory contains a volume with the volser. The entered volume remains in the input station.	1. Remove the volume from the input station. 2. Determine why the volume has a duplicate label. 3. Clear the item from the Intervention Required window. See Table 27 on page 397 for details.

Table 20. DFSMS Messages Based on Library Failure or Exception Conditions (continued)

Resulting Console Message	Action
CBR3773I Cartridge with unreadable or invalid external label left in input station in library *library-name***.** An attempt was made to enter a cartridge into library *library-name*. The external label on the cartridge is missing, unreadable, or contains an invalid character. The cartridge remains in the input station.	1. Remove the cartridge from the input station and correct the problem with the external label, then reenter the cartridge into the 3494. 2. Clear the item from the Intervention Required window. See Table 27 on page 397 for details.
CBR3774I Unexpected volume *volser* **ejected from library** *library-name***.** Volume *volser* is in an unexpected location in library *library-name*. Either no entry exists for the volser in the Library Manager inventory, or the cartridge external label is missing or unreadable. The cartridge was ejected from the library to a convenience output station.	1. Remove the ejected cartridge from the output station. 2. Determine if the label is missing or damaged and replace it if necessary. 3. Determine the 3494 that the volume belongs in using the interactive storage management facility (ISMF) tape volume list application and place the volume in the convenience input station of that 3494. 4. Clear the item from the Intervention Required window. See Table 27 on page 397 for details.
CBR3776I Volume *volser* **inaccessible in library** *library-name***.** During the execution of a 3494 operation, library *library-name* has indicated that volume *volser* is inaccessible. The volume cannot be retrieved using normal 3494 automated function; manual intervention is needed.	1. Go to the 3494 and if an intervention-required indication is displayed, determine whether it is for the inaccessible volume by viewing the intervention conditions. If it is the inaccessible volume, follow the instructions for the inaccessible condition. 2. If the intervention-required indication is not displayed or the inaccessible volume is not one of the conditions listed, find the volume record in the database. (Select the **Search database for volumes...** option in the Database window.) 3. Place the 3494 in Pause mode. 4. Enter the 3494 and find the home cell the volume should have been in and search for it in the surrounding cells. If the database shows the volume in a device, check that device. If the volume is stuck in the device, call your service representative to remove the volume. If the volume is found, and after leaving the 3494, place it in the convenience input station. 5. Place the 3494 in Auto mode. 6. Resubmit the 3494 request or job after the input station is inventoried.
CBR3777I Volume *volser* **now accessible in library** *library-name***.** Volume *volser* that was reported as inaccessible previously is retrieved and is accessible now for automated operations in library *library-name*.	Resubmit the 3494 request or job that failed because the volume was inaccessible.
CBR3778I Cleaner volume ejected from library *library-name***.** A cleaner volume exceeded its maximum usage count and was ejected from library *library-name*.	1. Remove the cartridge from the convenience output station. 2. Place a new cleaner cartridge of the same type, with a bar code label that matches one of the cleaner masks, in the convenience input station.

Resulting Console Message	Action
CBR3779I Damaged volume volser ejected from library *library-name***.** Damaged volume *volser* has been ejected from library *library-name*. The cartridge has been damaged physically, such that it cannot be loaded on a tape device. Either the leader block is missing, or the tape medium has become detached from the leader block.	1. Remove the cartridge from the output station and repair or replace it. 2. Clear the item from the Intervention Required window. See Table 28 on page 402 for details.
CBR3781I No {MEDIA1|MEDIA2|MEDIA3|MEDIA4} scratch volumes available in library *library-name***.** A library operation requires a scratch volume of the indicated media type, and there are none available in the 3494.	Either add volumes of the appropriate media type to the 3494 or perform a scratch cycle though your tape management system to convert volumes to scratch in the 3494.
CBR3782I Volume *volser* **in library** *library-name* **external label missing or unreadable.** The external cartridge label for volume *volser* in library *library-name* is missing, or the library vision system cannot read it correctly. The 3494 cannot perform volume verification. Mount, demount, and eject requests are completed without verification.	1. Issue a 3494 request to eject the volume from the 3494 and apply a new cartridge external label, if it has not already been ejected. 2. Place the cartridge in the convenience input station. 3. Clear the item from the Intervention Required window. See "Operator Intervention" on page 288 for details.
CBR3783E Library Manager switchover in library *library-name* **in progress.** In HA1 Frames configuration, this indicates that the standby Library Manager is in the process of switching over to active. The switchover may be the result of a Library Manager-detected unrecoverable error or an operator request initiated through the Library Manager.	See "Library Manager Failure in DFSMS/MVS (z/OS)" on page 363 for recovery procedures. CBR3784I indicates when the switchover is complete.
CBR3784I The Library Manager switchover in library *library-name* **is now complete.** In HA1 Frames, this indicates that a failure on the active Library Manager has resulted in a switchover to the standby Library Manager. This message indicates that the switchover is complete.	Any outstanding mount requests (CBR4196D) can be responded to and any new requests to the 3494 can be submitted. See "Start Library Manager and Host Recovery Procedure (DFSMS/MVS or z/OS)" on page 365 to recover from inserts or ejects that may have been in progress at the time of the failure.
CBR3785E Copy operations disabled in library *library-name***.** Copying of data between the VTSs in PtP VTS *library-name* can no longer be performed. Possible causes are: • One of the VTSs has become unavailable. • All ESCON links to one of the VTSs have become unavailable.	Call your service representative.
CBR3786E VTS operations degraded in library *library-name***.** PtP VTS *library-name* does not have all of its elements available, either because of failure or service representative action.	Unless your service representative has notified you that the PtP VTS will become degraded, call your service representative.

Table 20. DFSMS Messages Based on Library Failure or Exception Conditions (continued)

Resulting Console Message	Action
CBR3787E Immediate mode copy operations deferred in library *library-name***.** PtP VTS *library-name* is configured in the Immediate Copy mode, and one or more copies could not be completed before presenting ending status for a rewind/unload command. Possible causes are: • Copy operations have become disabled. • A copy operation was taking more than the time allowed by the Virtual Tape Controller (40 minutes). The copy will complete independently of the presentation of ending status for the rewind/unload command. This message will be deleted when the copy completes.	If CBR3785E is also presented, call your service representative. If not, then it is likely that the workload on the subsystem is high, and copies will be completed automatically.
CBR3788E Service preparation occurring in library *library-name***.** One of the VTSs in PtP VTS *library-name* is either being prepared for service or is being serviced. Operations of the PtP VTS will be degraded.	No action is required. When the service representative has completed service on the VTS, normal operations will resume, and this message will be deleted.
CBR3789E VTS library *library-name* **is out of empty stacked volumes.** Library *library-name* has no scratch stacked volumes. When this occurs and the library is not a distributed library (meaning that it is not part of a PtP VTS), mount operations can no longer be performed until additional scratch stacked volumes are available. If the 3494 is one of the distributed libraries of a PtP VTS, most mounts will continue being performed using the resources of the other distributed 3494. Mounts that fail result in a CBR4196D message and should be retried to use the resources of the other distributed library.	If 3494 is not a distributed library, add additional physical volumes to the 3494. If 3494 is a distributed library: • Add additional physical volumes to the library. • Reply retry to any CBR4196D messages.
CBR3790E VTS library *library-name* **has insufficient resources to continue mount processing.** Library *library-name* does not have the resources to continue processing mounts. A possible cause is that the VTS has determined that it does not have at least two available physical devices. When this occurs and the library is not a distributed library (meaning that it is not part of a PtP VTS), mount operations can no longer be performed until the missing resources are available. If the 3494 is one of the distributed libraries of a PtP VTS, most mounts will continue being performed using the resources of the other distributed library. Mounts that are failed will result in a CBR4196D message and should be retried to use the resources of the other distributed library.	If library is not a distributed library, call your service representative. If library is a distributed library: • Reply retry to any CBR4196D messages. • Call your service representative.

Information Provided at the Library Manager Console

The Library Manager console provides information about many of the failure and exception conditions reported to the host. It also provides overall status about the operation of the library. This section shows several windows you can use for problem determination. See "Using the Library Manager" on page 109 for details about the windows. The windows are described in the order you should follow when determining the source of the problem.

Operator Note:: The primary aids for problem determination should be the messages posted on the host console. Use the information at the Library Manager console only as additional information to aid in finding the fault.

Problem Determination Using System Summary

The System Summary window (see Figure 54 on page 119) provides an overall view of the status of the library. If the System Summary window is not displayed on the console, select the Status window, then select the **System summary...** option. Table 21 summarizes the key fields and what action to take.

Table 21. Problem Determination Using System Summary Window

Field Name	Action
Cannot Display System Summary If the System Summary window cannot be displayed, a failure has occurred in the Library Manager.	Call your service representative.
Operational mode **Auto** should be indicated, showing normal operation. **Pause** shows that the 3494 has stopped performing automated operations.	1. Determine why the mode is not Auto. 2. Check the **Enclosure doors**, **Overall system**, and **Intervention** fields. 3. Ensure that the front doors are closed. 4. Place the 3494 in Auto mode.
Library Manager **Online** should be indicated, showing normal operation. **Offline** shows that the Library Manager is not communicating with any of the associated 3490E or 3590 subsystems in the 3494.	1. Determine why the Library Manager is offline. 2. Place the Library Manager in the Online state.
Enclosure doors **Closed** should be indicated, showing normal operation. **Open** indicates that one or more doors are open and that automated operations are paused.	1. Ensure that the front doors are closed. 2. Return the 3494 to Auto mode. 3. If you cannot set the 3494 to Auto mode, call your service representative.
Direct attach ports A hexadecimal number, 0–3 and 8–B, should be displayed for each installed and initialized port. If a dash is displayed, that port is not initialized.	1. Ensure that the host is powered on and operating. 2. Ensure that the any device driver program on the host is initialized. 3. Call your service representative.

Table 21. Problem Determination Using System Summary Window (continued)

Field Name	Action
CU ports A hexadecimal number, 0–F (depending on the port configuration), should be displayed for each 3490E or 3590 control unit port. If a dash (–) is displayed, that port is not initialized. No communication between the Library Manager and the 3490E or 3590 control unit occurs. If the port to a 3490E or 3590 subsystem is not initialized, automated operations for the drives in that subsystem cannot be performed.	1. Ensure that all 3490E or 3590 subsystems in the library are powered on. Perform the power-on procedure for the 3490E or 3590 subsystems. 2. Check the Error indicator on the 3490E or 3590 control unit setup panel. If it is lit, that control unit has a serious fault; call your service representative to repair the control unit. 3. Call your service representative.
LAN Attach Ports A decimal count of the number of LAN-attached hosts that are initialized currently with the 3494. If no hosts are initialized with the 3494, this shows as a dash. For example, if there are three hosts initialized with the 3494, this number is **3**. If one host goes down, this number changes to **2** when the 3494 tries to communicate with that host.	The number in this field is not, by itself, an indication of failure. If there seems to be a problem communicating with a host, select **Status** on the Operator window action bar, then select the **LAN Status...** option to view the status of all LAN-attached hosts. Select the host in question from the list of hosts and note the last two columns of the display. If the host is initialized currently, the column labeled **Init** contains a **1**. If a host was initialized and something happened to cause the host to seem to go down (to the 3494), the column labeled **Init** is a **0**, because the library is not initialized currently with that host. The column labeled **Prev Init** is a **1**, because that host was initialized at one time with the 3494. This field is accurate only since the last time the Library Manager was started.
Convenience I/O **Empty** or **Volumes present** should be indicated. **Unknown** indicates that the system has not been taught and **Not Available** indicates that the convenience I/O station has been made unavailable.	Call your service representative to teach the system or make the convenience I/O station available.
Convenience I/O Mode **Insert** or **Import** should be indicated.	Call your service representative to teach the system or make the convenience I/O station available.
High capacity status **Failed** indicates that the high-capacity operation has failed to complete.	Call your service representative.
Inventory update **Failed** indicates that the Inventory Update operation has failed to complete.	Call your service representative.
Overall system **OK** should be indicated. **Degraded** indicates that a component in the 3494 has failed, but the 3494 is continuing to operate. **Failed** indicates that a component has failed, and operations cannot continue.	If **Failed** is indicated, call your service representative. If **Degraded** persists, also call your service representative.

Table 21. Problem Determination Using System Summary Window (continued)

Field Name	Action
Accessor **OK** should be indicated. **Failed** indicates that the accessor (or both accessors if HA1 Frames are installed) has failed or has been made unavailable, and operations cannot be completed. **Degraded** indicates that one accessor in HA1 Frames configuration has failed or been made unavailable.	1. Attempt to return the 3494 to Auto mode. 2. If the problem persists, call your service representative.
Gripper **OK** should be indicated. **Failed** indicates that the gripper (or both grippers if HA1 Frames are installed) has failed or has been made unavailable, and operations cannot be completed. **Degraded** indicates that at least one gripper in an HA1 Frames configuration has failed or been made unavailable.	Call your service representative.
Vision **OK** should be indicated. **Failed** indicates that the vision system (or both vision systems if HA1 Frames are installed) has failed or has been made unavailable and operations cannot be completed. **Degraded** indicates that one vision system in an HA1 Frames configuration has failed or been made unavailable.	Call your service representative.
Power **OK** should be indicated. **Power is off** indicates that power to the cartridge accessor (or both accessors if an HA1 Frames is installed) was removed and must be restored before automated operations can resume. **Degraded** indicates that the power to one of the accessors in an HA1 Frames configuration was removed.	1. If **Unknown** is indicated, power off the tape library, then power it on. 2. Ensure that all of the safety interlocks are closed. 3. Place the library back in Auto mode.
Port **OK** should be indicated. **Not initialized** indicates that communication with the accessor controller has not been established. Automated operations cannot be performed without communication between the Library Manager and the accessor controller. **Degraded** indicates that communication with one of the accessors in an HA1 Frames configuration has not been established.	1. Attempt to return 3494 to Auto mode. 2. If the port field does not change to **OK**, call your service representative.
Intervention **None** should be indicated. **Required** indicates that you must resolve one or more conditions. Depending on the condition, some or all automated operations may be suspended.	1. Select the **Operator intervention...** option in the Commands window. See "Intervention-Required Conditions and Actions" on page 387 for resolving these conditions. 2. After all the conditions are resolved, return the library to Auto mode, if required.

Problem Determination Using Component Availability Status

The Component Availability Status window (see Figure 84 on page 142) provides the availability status of each component in the 3494. If a component is available, it can be used to perform 3494 operations. If a component is unavailable, it cannot be used to perform 3494 operations. To show the window, select the **Component availability status...** option in the Status window.

The three major groupings of components in this window are the convenience I/O station, the accessor and its associated components, and the tape subsystems. The convenience I/O station, the accessor and its associated components should indicate **Available**, which indicates that the component is available or **Unavailable**, which indicates that the component is not available. Tape subsystems show a ***** next to the device number if it is unavailable, otherwise it is left blank. If any component indicates **Unavailable** or *****, call your service representative so that it can be repaired and made available.

Problem Determination Using Search Database for Volumes

Use the Search Database for Volumes window (see Figure 104 on page 170) to determine if the 3494 contains volumes that some action must be taken for. To show the window, select the **Search database for volumes...** option in the Database window. You can also use this window to find volumes reported in a host console message.

For each volume in the library, flags in the database indicate status or an exception condition. Figure 245 shows a summary of the volume status.
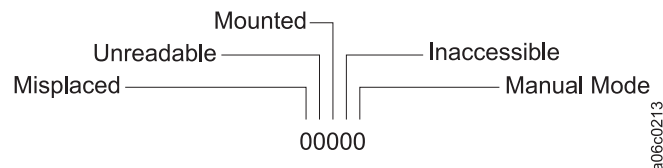
Figure 245. Status Flags

Table 22 on page 385 lists the problem scenarios that the Search Database for Volumes window can be helpful in resolving.

Table 22. Problem Determination Using Search Database for Volumes Window

Problem Scenario	Action
Specific Inaccessible Volume A host console message indicates that an operation failed because the volume is inaccessible. An Export or Import operation produced a Status File record with status code 16 (Stacked Volume Access Failure).	1. Enter the volser in the **Volser:** field, then select the **Search** push button. The database record for the volume is shown. The Inaccessible flag should be set (the fourth position of the Flags field set to 1). 2. Place the 3494 in Pause mode. 3. Enter the 3494 and find the volume using the cell positions indicated in the database record. Check both the cell and home positions. If the cell position indicated is a device, check that device. 4. If the volume is stuck in a device, call your service representative. 5. If you can remove the volume, place it in an error recovery cell. 6. Check the volumes on either side of the cell to ensure that they are seated fully in their cells. If a volume is not seated, the gripper cannot get the volume to the left of the unseated volume. 7. Return the 3494 to Auto mode. 8. Resubmit the 3494 request or job after the inventory update is complete.
Specific Misplaced Volume A host console message indicates that an operation failed because the volume is misplaced. An Export or Import operation produced a Status File record with status code 16 (Stacked Volume Access Failure).	1. Enter the volser in the **Volser:** field, then select the **Search** push button. The database record for the cartridge is shown. The misplaced flag should be set (the first position of the flags field set to 1). If the Manual mode flag (fifth position of the Flag field) is also set, determine if the volume was taken out of the 3494. 2. Place the 3494 in Pause mode. 3. Open the front doors on the 3494 and find the location where the volume was last known to be (indicated in the database record for the cell and home location). 4. Look for the volser in the surrounding cells. If the cell location indicated is a device, check that device. 5. If the volume is stuck in a device, call your service representative. 6. If you find the volume, place it in an error recovery cell. 7. Return the 3494 to Auto mode. 8. Resubmit the 3494 request or job after the inventory update is complete.
Locating other Misplaced Volumes Search the database to determine if the 3494 contains any other misplaced volumes.	1. Leave the **Volser:** field blank, select the **Yes** radio button for the **Misplaced** Volser Flag, then select the **Search** push button. The database records, if any, for the misplaced cartridges are shown. 2. Perform the "Specific Misplaced Volume" procedure (see Table 22).

Table 22. Problem Determination Using Search Database for Volumes Window (continued)

Problem Scenario	Action
Locating other Inaccessible Volumes Search the database to determine if the 3494 contains any other inaccessible volumes.	1. Leave the **Volser:** field blank, select the **Yes** radio button for the **Inaccessible** Volser Flag, then select the **Search** push button. The database records, if any, for the inaccessible cartridges are shown. 2. Perform the "Specific Inaccessible Volume" procedure (see Table 22 on page 385).
Locating Misplaced Volumes in other Libraries If an operation on one library failed because the volume was misplaced and you cannot find the volume in that library, check the inventories of the other 3494s to see if it was put in another library by mistake.	1. At each library in the installation, enter the volser of the misplaced volume in the **Volser:** field, then select the **Search** push button. 2. If a database record is found for the volser, eject it from that 3494 and place it in the convenience I/O station of the 3494 with the original error.

Problem Determination Using Whole Queue

When trying to determine why a particular library operation is not completing as expected, you can use the Whole Queue window (see Figure 100 on page 166) to determine what, if anything, needs to be done. This is useful particularly in the absence of any host console messages. Select the **Whole queue...** option in the Queues window. Each 3494 operation in the queue has status that is one of the following:

Queued   The operation has not yet started. Other operations are in the queue that have a higher priority or were placed in the queue first. If you do not want to wait for the operation to progress through the queue, select the **Promote a command in the queue** option in the Commands window and promote the operation.

In-Progress   The operation is being performed. No operator action is needed.

Blocked   The operation is waiting for another operation to complete before it can be started. When the blocking operation completes, the status of the operation changes to in-progress. No operator action is needed.

Intervention-Required Conditions and Actions

When the Library Manager determines that an error or exception condition that requires your assistance to correct has occurred within the 3494, it performs the following actions:

1. Adds the detected condition to the list of outstanding operator intervention-required conditions that the Library Manager maintains.

2. If not previously in the Intervention-Required state, places the library in that state and notifies all attached hosts of the state change. The System Summary window is updated to indicate intervention is required.

   The notification that the 3494 is in the Intervention-Required state generates the following console message for 3494s managed under DFSMS/MVS System-Managed Tape environment: **CBR3762E Library** *library-name* **intervention required**.

   The message stays on the console as long as the 3494 is in the Intervention-Required state.

3. If "Send Interventions to Host Consoles" is enabled in the Operator Intervention window (under the Commands window), a broadcast message of the operator intervention text is sent to all attached hosts.

   For libraries managed under the DFSMS/MVS System-Managed Tape environment, this results in the following message being displayed at the host console: **CBR3750I Message from Library** *library-name: message*.

The *message* provided with the **CBR3750I Message from Library** contains an identifier number and the intervention text. A blank character separates the intervention text from the identifier number (in the form OPxxxx, where xxxx is the intervention number). "Intervention Conditions of 3494 Tape Drives" on page 389 through "Intervention Conditions of a VTS" on page 406 show **Resolution Actions** for the identifier number and the complete intervention text found in a *message*. The intervention text is truncated at 63 characters in early levels of the product.

For other operating systems, consult the associated supporting software publications to determine operator notification methods.

To determine the cause of an intervention-required condition and the steps required for its resolution, select the **Operator intervention...** option in the Commands window on the Library Manager console. Each condition is listed separately and also indicates the date and time that the condition occurred.

Notes:

1. Items starting with an asterisk (*) are cleared automatically when you clear the condition causing the intervention.

2. You can view operator interventions from the Specialist (see "Specialist Features and Functions" on page 332).

The operator intervention conditions are described in the following set of tables. Similar conditions are grouped together in each table to make it easier to find a specific condition. Table 23 on page 388 provides a summary of the grouped conditions:

Quick Reference to Intervention-Required Conditions

Table 23. Quick Reference to Intervention-Required Conditions

Condition Type	Table Location
Conditions relating to tape drives in the 3494	Table 24 on page 389
Conditions relating to other 3494 components	Table 25 on page 390
Conditions relating to I/O stations or facilities	Table 26 on page 394
Conditions relating to external cartridge labels	Table 27 on page 397
Conditions relating to data cartridges	Table 28 on page 402
Conditions relating to cleaner cartridges	Table 29 on page 404
Conditions relating to a VTS in the 3494	Table 30 on page 406

Intervention Conditions of 3494 Tape Drives

Table 24. Intervention-Required Conditions Relating to Tape Drives in the 3494

Intervention-Required Condition	Resolution Actions
Message **OP0017** **Load / unload failure on device xxx. Empty the feed slot.** **Probable Cause** Tape device xxx has failed to load or unload a tape cartridge. The automatic recovery process was not able to unload the cartridge from the device and put it away. The device or cartridge may be defective.	1. Place the 3494 in Pause mode. 2. Open the enclosure. 3. If the cartridge is accessible, remove it. 4. If the cartridge is in a CST- or ECCST-type device (Model C1A or C2A), make the device not ready by pressing the Ready button, press the Unload button to unload the cartridge, remove the cartridge, then make the device ready by pressing the Ready button. 5. If the cartridge is in a CST- or ECCST-type device (Model F1A), press the Load/Unload button to unload the cartridge, then remove the cartridge. 6. If the cartridge is in an HPCT- or EHPCT-type device, select the **Unload** option in the Options window, press **Enter**, then remove the cartridge. 7. If the cartridge is damaged, repair it (for example, reattach the leader block or leader pin). If it cannot be repaired, it should be reinserted, and an eject should be issued from the host. 8. Place the cartridge in the convenience I/O station. 9. Close the enclosure. 10. Place the 3494 in Auto mode. 11. A service call may be needed if the error persists.

Message   **OP0031**
 	
Device xxx is not ready.
 	
Probable Cause
 	
During a previous operator intervention or service action at a tape drive, device xxx was left in the Not Ready state.
	1. Place the 3494 in Pause mode.
	2. Open the enclosure.
	3. If the cartridge is in a CST- or ECCST-type device (Model C1A or C2A), make the device not ready by pressing the Ready button, press the Unload button to unload the cartridge, remove the cartridge, then make the device ready by pressing the Ready button.
	
	   If the drive does not become ready, call your service representative.
	4. If the cartridge is in a CST- or ECCST-type device (Model F1A), press the Load/Unload button to unload the cartridge, then remove the cartridge.
	5. If the cartridge is in an HPCT- or EHPCT-type device, select the **Unload** option in the Options window, press **Enter**, then remove the cartridge.
	
	   If a check code is displayed on the message display, record the code and report it to your service representative.
	6. Place the cartridge in the error recovery cell. The error recovery cell is cell 1 A 1 (cell 1 A 3 if dual grippers are installed in the library).
	7. Close the enclosure.
	8. Place the 3494 in Auto mode.

Intervention-Required Condition	Resolution Actions
Message *OP0035* **A recoverable error occurred on device xxx. A service call may be needed if the error persists.** *Probable Cause* Tape device xxx recovered from a failure to load or unload a tape cartridge.	A service call may be needed if the error persists.
Message *OP0047* **Device xxx has failed. A service call is required.** *Probable Cause* A load or unload failure was detected on tape device xxx, and the automatic recovery process was not able to complete the operation successfully. The device is no longer available for use and requires service.	Although the intervention message can be cleared from the list of actions, the device failure remains. Further attempts to use the device display the Intervention-Required message again.

Intervention Conditions of Other 3494 Components

Table 25. Intervention-Required Conditions Relating to Other 3494 Components

Intervention-Required Condition	Resolution Actions
Message *OP0001* **Gripper failure on gripper x, accessor y.** *Probable Cause* Gripper x, Accessor y has failed repeatedly to release a cartridge. Service is required.	1. Place the 3494 in Pause mode. 2. Open the appropriate enclosure door. 3. Remove the cartridge from the indicated gripper. 4. Place the cartridge in the error recovery cell. The error recovery cell is cell 1 A 1 (cell 1 A 3 if dual grippers are installed in the library). 5. Close the enclosure door. 6. Place the 3494 in Auto mode. 7. Call your service representative.
Message *OP0004* *** The library is full.** *Probable Cause* An attempt was made to insert cartridges into the 3494. There are no available cells in the 3494 other than the convenience I/O station or the high-capacity I/O facility.	1. Cartridges must be ejected from the 3494 before more cartridges can be inserted into the library system. 2. This condition cannot be cleared by selecting it from the list of actions. Instead, the 3494 clears this condition automatically when space becomes available in the 3494. 3. If the Insert operation that filled the 3494 ended with cartridges still in the I/O station, the cartridges must be removed.

Table 25. Intervention-Required Conditions Relating to Other 3494 Components (continued)

Intervention-Required Condition	Resolution Actions
Message *OP0025* **A cartridge could not be released from gripper x, accessor y.** *Probable Cause* The cartridge in gripper x, accessor y remained in the gripper after an attempt was made to put it in a cell or device. This may be because of a damaged cartridge, alignment of the 3494, or a failing gripper. The gripper remains available for use after the cartridge is removed.	1. Place the 3494 system in Pause mode. 2. Open the appropriate enclosure door. 3. Remove the cartridge from the indicated gripper. 4. Place the cartridge in the error recovery cell. The error recovery cell is cell 1 A 1 (cell 1 A 3 if dual grippers are installed in the 3494). 5. Close the enclosure door. 6. Place the 3494 in Auto mode.
Message *OP0026* **A cartridge has been dropped.** *Probable Cause* A cartridge has been dropped.	1. Open the enclosure. 2. Pick up the cartridge from the enclosure floor. 3. Put the recovered cartridge into the error recovery cell. The error recovery cell is cell 1 A 1 (cell 1 A 3 if dual grippers are installed in the 3494). 4. Close the enclosure. 5. Place the 3494 in Auto mode.
Message *OP0028* **An emergency stop has occurred.** *Probable Cause* If an enclosure door is opened while the 3494 is in Auto mode, an emergency stop is performed.	1. Determine what caused the stop. The usual cause is an open enclosure door; check **Enclosure doors** in the System Summary window to determine if one or more doors are open. 2. Close the enclosure door. 3. Place the 3494 in Auto mode.
Message *OP0042* **The system has failed. A service call is required.** *Probable Cause* A major failure of the systems in the 3494 has occurred.	Call your service representative.
Message *OP0043* *** The accessor or gripper configuration has changed. The 3494 must be retaught.** *Probable Cause* The second gripper has either been installed or removed from the library, but the 3494 has not been retaught. Damage to the 3494 can result if the 3494 is not retaught.	1. Call your service representative. 2. The library system must be put in Service mode and retaught to show the current gripper configuration. 3. This condition cannot be cleared by selecting it from the list of actions. Instead, the 3494 clears this condition automatically when it is retaught.
Message *OP0062* **Power failure on accessor x. A service call is required.** *Probable Cause* The failing component could be the accessor's 24 V dc or 36 V dc power supply. See the transaction log for the exact cause of the power failure.	Call your service representative.

Table 25. Intervention-Required Conditions Relating to Other 3494 Components (continued)

Intervention-Required Condition	Resolution Actions
Message OP0063 **Accessor x has failed. A service call is required.** *Probable Cause* An accessor has failed.	Call your service representative.
Message OP0064 **Dual Write has failed. A service call is required.** *Probable Cause* A secondary copy of the Library Manager database has failed when being written.	Call your service representative.
Message OP0065 **An error occurred for cartridge xxxxxx during insert from CIO slot nn to cell yyyy.** *Probable Cause* A failure occurred when moving a cartridge from the convenience I/O station.	1. Locate the cartridge and reinsert into the 3494. The cartridge may be in the destination rack, the gripper, or on the enclosure floor. 2. If the cartridge is unlabeled, insert it using the Insert Unlabeled Cartridges facility. 3. Contact your system administrator.
Message OP0067 **Eject failed for volser xxxxxx. This operation was initiated by the Library Manager.** *Probable Cause* Eject of a volume by the Library Manager has failed.	Call your service representative.
Message OP0068 **A Library Manager switch has completed. This switch was initiated by the operator.** *Probable Cause* None.	None.
Message OP0069 **A Library Manager switch has completed. This switch was due to an error.** *Probable Cause* The Library Manager detected an error from which recovery is not possible.	Call your service representative.
Message OP0070 **A hard drive has failed. Call service.** *Probable Cause* The Library Manager detected a PC hard drive error.	Call your service representative.

Table 25. Intervention-Required Conditions Relating to Other 3494 Components (continued)

Intervention-Required Condition	Resolution Actions
Message **OP0070** **LM-x hard drive failure. Call service. Library is operational but degraded. yyyyyyy hard drive failed.** *Probable Cause* The Library Manager detected an error on the PC's primary or mirror hard drive.	Call your service representative.
Message **OP0071** **Mirroring disabled. Call service. Library is operational but degraded.** Or **LM-x mirroring disabled. Call service. Library is operational but degraded.** *Probable Cause* The Library Manager detected a hard drive mirroring error.	Call your service representative.
Message **OP0072 OP0073** **Barrier door x is not fully retracted. Call service.** *Probable Cause* The Library Manager detected a barrier door error condition.	1. Call your service representative. 2. Attempt to retract the barrier door fully.
Message **OP0074** **Control unit on port xx requires a higher level of Library Manager.** *Probable Cause* The Library Manager detected that the port hardware has been upgraded, but the Library Manager has not been upgraded.	Call your service representative.
Message **OP0075** **Database discrepancies have been found. Call service. Library is still operational.** *Probable Cause* The Library Manager detected database discrepancies.	1. Call your service representative. 2. Open a service window and execute README DB.CMD to correct the database discrepancies.
Message **OP0080** **Error writing to dual write log (on Library Manager A or B).** *Probable Cause* The Library Manager detected an error while writing to the dual write log.	Call your service representative.

Table 25. Intervention-Required Conditions Relating to Other 3494 Components (continued)

Intervention-Required Condition	Resolution Actions
Message OP0081 **An emergency stop has occurred, or accessor A or B has failed. A service call is required.** *Probable Cause* The Library Manager detected an open door, or an accessor has failed.	Call your service representative.
/ **Message** OP0084 / / **Scratch mount performance is degraded. A service** / **call is required.** / *Probable Cause* / Category orders are fragmented in scratch categories.	This Library Manager condition is normally self-correcting. If this message persists, however, call your service representative.

Intervention Conditions of I/O Stations or Facilities

Table 26. Intervention-Required Conditions Relating to I/O Stations or Facilities

Intervention-Required Condition	Resolution Actions
Message OP0003 *** The convenience I/O station is full.** *Probable Cause* All of the cells of the convenience I/O station are full, and at least one additional cartridge is queued to be ejected to the convenience I/O station.	1. Remove all cartridges from the convenience I/O station. 2. This condition cannot be cleared by selecting it from the list of actions. Instead, the library system clears this condition automatically when space becomes available in the convenience I/O station.
Message OP0010 *** The high-capacity output rack is full.** *Probable Cause* All of the cells of the high-capacity facility are full, and at least one additional cartridge is queued to be ejected to the high-capacity facility.	1. Place the 3494 in Pause mode. 2. Open the appropriate enclosure door. 3. Remove all cartridges from the high-capacity facility. 4. Close the enclosure door. 5. Place the 3494 in Auto mode. 6. This condition cannot be cleared by selecting it from the list of actions. Instead, the 3494 clears this condition automatically when it finds empty cells during the Inventory Update operation.
Message OP0018 **An unexpected volser (xxxxxx) was left in the convenience I/O station.** *Probable Cause* An unexpected volume means that the volser could not be found in the database.	1. Remove the cartridge from the convenience I/O station. 2. Determine where the cartridge belongs and take corrective action.

Table 26. Intervention-Required Conditions Relating to I/O Stations or Facilities (continued)

Intervention-Required Condition	Resolution Actions
Message **OP0019** **An unexpected volser (xxxxxx) was left in the high-capacity output rack cell yyyy.** *Probable Cause* An unexpected volume means that the volser could not be found in the database.	1. Place the 3494 in Pause mode. 2. Open the enclosure. 3. Remove the cartridge from the high-capacity output rack 4. Determine where the cartridge belongs and take corrective action. 5. Place the 3494 in Auto mode.
Message **OP0020 OP0021** *** The convenience I/O station door is open.** *Probable Cause* The convenience I/O station door has been left in the open position for greater than five minutes, or there is an eject operation queued for the convenience I/O station and the door is open. This can also occur if an Eject operation is being blocked by the completion of an Insert operation.	1. Close the convenience I/O station door. 2. This condition cannot be cleared by selecting it from the list of actions. Instead, the 3494 clears this condition automatically when the convenience I/O station door is closed. 3. Check for an intervention that may be keeping an Insert operation from completing (such as the library full or a duplicate volser left in the I/O station) and clear the condition.
Message **OP0024** **The convenience I/O station should be empty but is not, visually check the station.** *Probable Cause* When the convenience I/O station Insert operation completed, the cartridge-present sensor indicated that cartridges were still present when none should have been. A cartridge without a label in the station or debris obscuring the cartridge-present sensor can cause this condition.	1. Remove any cartridges from the convenience I/O station and inspect their labels. 2. Remove any debris that may be obscuring the cartridge-present sensor. 3. Check **Convenience I/O** in the System Summary window to verify that the status is **Empty**.
Message **OP0044** *** The top two I/O station cells are inaccessible. Move cartridges to cell 3.** *Probable Cause* In a 3494 that is configured with dual grippers, Gripper 1 has failed, and cartridges were placed in the top two cells of the I/O station. The top two cells of the convenience I/O station are no longer usable until Gripper 1 is repaired.	1. Open the convenience I/O station. 2. Remove the cartridges from the top two cells of the I/O station. 3. Replace the cartridges in the I/O station using cell 3 or below. 4. Close the convenience I/O station. 5. This condition cannot be cleared by selecting it from the list of actions. Instead, the 3494 clears this condition automatically when the cartridges are removed from the top two convenience I/O station cells and the I/O station is closed.
Message **OP0046** **Volser (xxxxxx) cannot be removed from the high-capacity station cell: yyyy.** *Probable Cause* The cartridge accessor tried several times to remove cartridge xxxxxx from the high-capacity facility but failed. This could be caused by a problem with the cartridge, the cell, the gripper, or the alignment of the 3494. The problem cartridge is in high-capacity facility cell yyyy.	1. Place the 3494 in Pause mode. 2. Open the appropriate enclosure door. 3. Remove the cartridge from the high-capacity facility cell. 4. Inspect the cartridge and cell for damage. 5. Close the enclosure door. 6. Place the 3494 in Auto mode. 7. Place the cartridge in the convenience I/O station.

Table 26. Intervention-Required Conditions Relating to I/O Stations or Facilities (continued)

Intervention-Required Condition	Resolution Actions
Message **OP0054** **Volser (xxxxxx) cannot be removed from convenience I/O station.** ***Probable Cause*** The cartridge accessor tried several times to remove cartridge xxxxxx from the convenience I/O station but failed. This could be caused by a problem with the cartridge, the I/O station, the gripper, or the alignment of the 3494.	1. Remove the cartridge from the convenience I/O station. 2. Inspect the cartridge and cell for damage. 3. Place the cartridge in the convenience I/O station.
Message **OP0056** **A volser (xxxxxx) with an unknown media type has been left in the convenience input station.** ***Probable Cause*** The media-type label is damaged.	1. Remove the cartridge from the convenience I/O station. 2. Inspect the cartridge's seventh character. Install the correct seventh character representing the media type. See "Cartridge Tape Media-Type Labeling (3490E and 3590 Drives)" on page 26 for the procedure. 3. Place the cartridge in the convenience I/O station.
Message **OP0057** **A volser (xxxxxx) with an unknown media type has been left in the high-capacity input station.** ***Probable Cause*** The media-type label is damaged.	1. Place the 3494 in Pause mode. 2. Open the enclosure. 3. Remove the cartridge from the high-capacity input rack. 4. Inspect the cartridge's seventh character. Install the correct seventh character representing the media type. See "Cartridge Tape Media-Type Labeling (3490E and 3590 Drives)" on page 26 for the procedure. 5. Place the cartridge in the convenience I/O station. 6. Close the enclosure door. 7. Place the 3494 in Auto mode.
Message **OP0058** **An invalid volser (xxxxxx) has been ejected to the convenience I/O station.** ***Probable Cause*** Invalid volsers contain leading or imbedded blanks or invalid characters. Valid characters are upper case A–Z and numerics 0–9.	1. Remove the cartridge from the convenience I/O station. 2. Determine why the cartridge is invalid and take corrective action.
Message **OP0060** **During an Inventory Update operation, volser xxxxxx was ejected to the convenience I/O station because there were no free cells.** ***Probable Cause*** There were no free cells.	1. Remove the cartridge from the convenience I/O station. 2. Contact your system administrator.

Table 26. Intervention-Required Conditions Relating to I/O Stations or Facilities (continued)

Intervention-Required Condition	Resolution Actions
Message OP0061 **During an Inventory Update operation, volser xxxxxx was ejected to the high capacity station because there were no free cells.** *Probable Cause* There were no free cells.	1. Remove the cartridge from the high-capacity output rack. 2. Contact your system administrator.

Intervention Conditions of External Cartridge Labels

Table 27. Intervention-Required Conditions Relating to External Cartridge Labels

Intervention-Required Condition	Resolution Actions
Message OP0005 **A duplicate volser (xxxxxx) was ejected to the convenience I/O station.** *Probable Cause* During an Inventory or Inventory Update operation, a cartridge was found whose external volume serial number, xxxxxx, is the same as that of another cartridge in the library. The cartridge was placed in the convenience I/O station. The 3494 does not support more than one cartridge with the same volume serial number.	1. Remove the cartridge from the convenience I/O station. 2. Determine why the cartridge is a duplicate and take corrective action.
Message OP0006 **A duplicate volser (xxxxxx) was left in the convenience I/O station.** *Probable Cause* During an Insert operation, a cartridge was found whose external volume serial number, xxxxxx, is the same as that of another cartridge in the 3494. The library does not support more than one cartridge with the same volume serial number.	1. Remove the cartridge from the convenience I/O station. 2. Determine why the cartridge is a duplicate and take corrective action.
Message OP0007 **An unreadable volser was left in the convenience I/O station.** *Probable Cause* During an Insert operation, the vision system was not able to read the external volume serial number label on the cartridge. The label may not have been installed correctly, is damaged, or is not one of the supported label types.	1. Remove the cartridge from the convenience I/O station. 2. Replace the unreadable label with a readable label. 3. Place the cartridge in the convenience I/O station.

Table 27. Intervention-Required Conditions Relating to External Cartridge Labels (continued)

Intervention-Required Condition	Resolution Actions
Message **OP0009** **An unexpected volser (xxxxxx) was found and ejected to the convenience I/O station.** *Probable Cause* During a 3494 operation other than Inventory or Inventory Update, a cartridge was found whose external volume serial number, xxxxxx, indicates a volser that is not in the Library Manager's database. It is likely that the cartridge was added to the 3494 when one of the doors was open, and an Inventory operation was not performed or Inventory Update has been disabled.	1. Remove the cartridge from the convenience I/O station. 2. Determine where the cartridge belongs and take corrective action.
Message **OP0011** **A duplicate volser (xxxxxx) was left in high-capacity input rack cell yyyy.** *Probable Cause* During an Insert operation, a cartridge whose external volume serial number, xxxxxx, is the same as that of another cartridge in the 3494 was found in high-capacity facility cell yyyy. The 3494 does not support more than one cartridge with the same volume serial number.	1. Place the 3494 in Pause mode. 2. Open the appropriate enclosure door. 3. Remove the cartridge from the high-capacity facility. 4. Determine why the cartridge is a duplicate and take corrective action. 5. Close the enclosure door. 6. Place the 3494 in Auto mode.
Message **OP0012** **An unreadable volser was left in high-capacity input rack cell yyyy.** *Probable Cause* During an Insert operation for the high-capacity facility, the vision system was not able to read the external volume serial number label on the cartridge. The problem cartridge is in cell yyyy. The label may not have been installed correctly, is damaged, or is not one of the supported label types.	1. Place the 3494 in Pause mode. 2. Open the appropriate enclosure door. 3. Remove the cartridge from the high-capacity facility. 4. Close the enclosure door. 5. Place the 3494 in Auto mode. 6. Replace the unreadable label with a readable label. 7. Place the cartridge in the convenience I/O station.
Message **OP0013** **An invalid volser (xxxxxx) was left in high-capacity input rack cell yyyy.** *Probable Cause* During an Insert operation for the high-capacity facility, the vision system read the external volume serial number label on the cartridge, and it contained one or more invalid characters. The label must not contain leading or imbedded blanks or characters other than upper case A–Z and numerics 0–9. The problem cartridge is in cell yyyy.	1. Place the 3494 in Pause mode. 2. Open the appropriate enclosure door. 3. Remove the cartridge from the high-capacity facility. 4. Close the enclosure door. 5. Place the 3494 in Auto mode. 6. Determine why the cartridge is invalid and take corrective action. Invalid volsers contain leading or imbedded blanks or invalid characters. Valid characters are upper case A–Z and numerics 0–9.

Table 27. Intervention-Required Conditions Relating to External Cartridge Labels (continued)

Intervention-Required Condition	Resolution Actions
Message *OP0014* **An invalid volser (xxxxxx) was left in the convenience I/O station.** *Probable Cause* During an Insert operation, the vision system read the external volume serial number label on the cartridge, and it contained one or more invalid characters. The label must not contain leading or imbedded blanks or characters other than upper case A–Z and numerics 0–9.	1. Remove the cartridge from the convenience I/O station. 2. Determine why the cartridge is invalid and take corrective action. Invalid volsers contain leading or imbedded blanks or invalid characters. Valid characters are upper case A–Z and numerics 0–9.
Message *OP0015* **A duplicate volser (xxxxxx) was ejected to high-capacity output rack cell yyyy.** *Probable Cause* During an Inventory or Inventory Update operation, a cartridge was found whose external volume serial number, xxxxxx, is the same as that of another cartridge in the 3494. The convenience I/O station is either not installed, is full, or is unavailable. The cartridge was placed in high-capacity facility cell yyyy. The 3494 does not support more than one cartridge with the same volume serial number.	1. Place the 3494 in Pause mode. 2. Open the appropriate enclosure door. 3. Remove the cartridge from the high-capacity facility. 4. Determine why the cartridge is a duplicate and take corrective action. 5. Close the enclosure door. 6. Place the 3494 in Auto mode.
Message *OP0016* **An unexpected volser (xxxxxx) was ejected to high-capacity output rack cell yyyy.** *Probable Cause* During a 3494 operation other than Inventory or Inventory Update, a cartridge was found whose external volume serial number, xxxxxx, indicates a volser that is not in the Library Manager's database. The convenience I/O station is not installed, is full, or is not available. It is likely that the cartridge was added to the 3494 when one of the doors was open, and an Inventory operation was not performed or Inventory Update has been disabled. The problem cartridge was placed in cell yyyy.	1. Place the 3494 in Pause mode. 2. Open the appropriate enclosure door. 3. Remove the cartridge from the high-capacity facility. 4. Close the enclosure door. 5. Place the 3494 in Auto mode. 6. Determine where the cartridge belongs and take corrective action.
Message *OP0039* **A duplicate Volser has been found at cell yyyy.** *Probable Cause* During an Inventory or Inventory Update operation, a cartridge was found whose external volume serial number, xxxxxx, is the same as that of another cartridge in the 3494. The cartridge was left in the cell where it was found. The 3494 does not support more than one cartridge with the same volume serial number. A convenience I/O station is either not installed, is full, or is unavailable, and a high-capacity output station has not been defined.	1. Place the 3494 in Pause mode. 2. Open the appropriate enclosure door. 3. Remove the cartridge from the rack cell position yyyy. 4. Close the enclosure door. 5. Place the 3494 in Auto mode. 6. Determine why the cartridge is a duplicate and take corrective action. 7. Reinsert the cartridge into the 3494 through available facilities.

Table 27. Intervention-Required Conditions Relating to External Cartridge Labels (continued)

Intervention-Required Condition	Resolution Actions
Message **OP0040** **The cartridge label located at cell yyyy is unreadable.** **Probable Cause** During an Inventory or Inventory Update operation, the vision system was not able to read the external volume serial number label on the cartridge in cell yyyy. The label may not have been installed correctly, is damaged, or is not one of the supported label types. A convenience I/O station is either not installed, is full, or is unavailable, and a high-capacity output station has not been defined.	1. Place the 3494 in Pause mode. 2. Open the appropriate enclosure door. 3. Remove the cartridge from the rack cell position yyyy. 4. Close the enclosure door. 5. Place the 3494 in Auto mode. 6. Determine why the cartridge label is unreadable and take corrective action. 7. Reinsert the cartridge into the 3494 through available facilities.
Message **OP0041** **The cartridge label located at cell yyyy is invalid.** **Probable Cause** During an Inventory or Inventory Update operation, the vision system read the external volume serial number label on the cartridge, and it contained one or more invalid characters. The label must not contain leading or imbedded blanks or characters other than upper case A–Z and numerics 0–9. The problem cartridge is in cell yyyy. A convenience I/O station is either not installed, is full, or is unavailable, and a high-capacity output station has not been defined.	1. Place the 3494 in Pause mode. 2. Open the appropriate enclosure door. 3. Remove the cartridge from the rack cell position yyyy. 4. Close the enclosure door. 5. Place the 3494 in Auto mode. 6. Determine why the cartridge label is invalid and take corrective action. 7. Reinsert the cartridge into the 3494 through available facilities.
Message **OP0048** **A cartridge containing invalid media has been left in device xxx feed slot. Remove the cartridge.** **Probable Cause** During a Mount operation, tape device xxx determined that the cartridge is not of a compatible media type but was not able to unload the cartridge. It is likely that the cartridge has a missing or damaged media-type label, or the media-type label is incorrect for the cartridge's media type.	1. Place the 3494 in Pause mode. 2. Open the appropriate enclosure door. 3. If the cartridge is accessible, remove it. 4. If the cartridge is in a 3490E device, make the device not ready by pressing the Ready switch, press the Unload switch to unload the cartridge, remove the cartridge, then make the device ready by pressing the Ready switch. If the cartridge is in a 3590 device, select the **Unload** option in the Options window, press **Enter**, then remove the cartridge. If you cannot remove the cartridge, call your service representative. 5. Close the enclosure door. 6. Place the 3494 in Auto mode. 7. Inspect the cartridge's seventh character. Install the correct seventh character representing the media type. See "Cartridge Tape Media-Type Labeling (3490E and 3590 Drives)" on page 26 for the procedure. 8. Place the cartridge in the convenience I/O station.

Table 27. Intervention-Required Conditions Relating to External Cartridge Labels (continued)

Intervention-Required Condition	Resolution Actions
Message **OP0049** **An invalid media volser (xxxxxx) has been ejected to the convenience I/O station.** ***Probable Cause*** During an Inventory or Inventory Update operation, the media-type label of a cartridge has a media-type character that the 3494 does not support. Supported media-type characters are **1**, **E**, **J**, and **K**.	1. Remove the cartridge from the convenience I/O station. 2. Inspect the cartridge's seventh character. Install the correct seventh character representing the media type. See "Cartridge Tape Media-Type Labeling (3490E and 3590 Drives)" on page 26. 3. Place the cartridge in the convenience I/O station.
Message **OP0050** **An invalid media volser (xxxxxx) has been ejected to the high-capacity output station.** ***Probable Cause*** During an Inventory or Inventory Update operation, the media-type label of a cartridge has a media-type character that the 3494 does not support. Supported media-type characters are **1**, **E**, **J**, and **K**. Also, the convenience I/O station is either not installed, is full, or is unavailable.	1. Place the 3494 in Pause mode. 2. Open the appropriate enclosure door. 3. Remove the cartridge from the high-capacity facility. 4. Close the enclosure door. 5. Place the 3494 in Auto mode. 6. Inspect the cartridge's seventh character. Install the correct seventh character representing the media type. See "Cartridge Tape Media-Type Labeling (3490E and 3590 Drives)" on page 26. 7. Place the cartridge in the convenience I/O station.
Message **OP0052** **A volser (xxxxxx) with an unknown media type has been ejected to the convenience I/O station.** ***Probable Cause*** During an Inventory or Inventory Update operation, the vision system could not determine the media type of a cartridge, the volser did not fit into an established media-type range, and a default media type was not defined for the 3494.	1. Remove the cartridge from the convenience I/O station. 2. If no seventh character is present, either add one or modify the volser ranges to include this volser. See "Volser Ranges for Media Types" on page 209 on how to modify the volser ranges. 3. Inspect the cartridge's seventh character. Install a readable seventh character representing the media type. See "Cartridge Tape Media-Type Labeling (3490E and 3590 Drives)" on page 26. 4. Place the cartridge in the convenience I/O station.
Message **OP0053** **A volser (xxxxxx) with an unknown media type has been ejected to high-capacity output facility cell: yyyy.** ***Probable Cause*** During an Inventory or Inventory Update operation, the vision system could not determine the media type of a cartridge, the volser did not fit into an established media-type range, and a default media type was not defined for the library. Also, the convenience I/O station is either not installed, is full, or is unavailable. The cartridge is in high-capacity facility cell yyyy.	1. Place the 3494 in Pause mode. 2. Open the appropriate enclosure door. 3. Remove the cartridge from the high-capacity facility. 4. Close the enclosure door. 5. Place the 3494 in Auto mode. 6. If no seventh character is present, either add one or modify the volser ranges to include this volser. See "Volser Ranges for Media Types" on page 209 on how to modify the volser ranges. 7. Inspect the cartridge's seventh character. Install a readable seventh character representing the media type. See "Cartridge Tape Media-Type Labeling (3490E and 3590 Drives)" on page 26. 8. Place the cartridge in the convenience I/O station.

Table 27. Intervention-Required Conditions Relating to External Cartridge Labels (continued)

Intervention-Required Condition	Resolution Actions
Message OP0059 **The cartridge label located at cell yyyy has an unknown media type.** **Probable Cause** During an Inventory or Inventory Update operation, the media-type label of a cartridge has a media-type character that the library does not support. Supported media-type characters are **1**, **E**, **J**, and **K**. A convenience I/O station is either not installed, is full, or is unavailable, and a high-capacity output station has not been defined.	1. Place the library system in Pause mode. 2. Open the appropriate enclosure door. 3. Remove the cartridge from the rack cell position yyyy. 4. Close the enclosure door. 5. Place the library system in Auto mode. 6. Inspect the cartridge's seventh character. Install the correct seventh character representing the media type. See "Cartridge Tape Media-Type Labeling (3490E and 3590 Drives)" on page 26. 7. Reinsert the cartridge into the 3494 through available facilities.

Intervention Conditions of Data Cartridges

Table 28. Intervention-Required Conditions Relating to Data Cartridges

Intervention-Required Condition	Resolution Actions
Message OP0022 **Volser (xxxxxx) could not be put away. It was ejected to the convenience I/O station.** **Probable Cause** During a Demount operation, the cartridge accessor was not able to place the cartridge into its home cell, and there are no other available storage cells in the 3494. The cartridge may be damaged or something is blocking its home cell. If something is blocking its home cell, it is likely to be a cartridge without an external volume serial number label.	1. Remove the cartridge from the convenience I/O station. 2. Place the library system in Pause mode. 3. Open the appropriate enclosure door. 4. Inspect the cartridge's home cell for damage or blockage. 5. Close the enclosure door. 6. Place the 3494 in Auto mode. 7. Inspect the cartridge for damage. 8. Place the cartridge in the convenience I/O station.
Message OP0023 **Volser (xxxxxx) could not be put away. It was ejected to high-capacity output rack cell: yyyy.** **Probable Cause** During a Demount operation, the cartridge accessor was not able to place the cartridge into its home cell, and there are no other available storage cells in the 3494. Also, the convenience I/O station is either not installed, is full, or is unavailable. The cartridge may be damaged or something is blocking its home cell. If something is blocking its home cell, it is likely to be a cartridge without an external volume serial number label. The problem cartridge is in high-capacity facility cell yyyy.	1. Place the library system in Pause mode. 2. Open the appropriate enclosure door. 3. Remove the cartridge from the high-capacity facility. 4. Inspect the cartridge's home cell for damage or blockage. 5. Close the enclosure door. 6. Place the 3494 in Auto mode. 7. Inspect the cartridge for damage. 8. Place the cartridge in the convenience I/O station.

Table 28. Intervention-Required Conditions Relating to Data Cartridges (continued)

Intervention-Required Condition	Resolution Actions
Message **OP0029** **Damaged volser (xxxxxx) ejected to the convenience I/O station.** *Probable Cause* During a Cartridge Load operation on a tape device, the device determined that the cartridge does not have a leader block or that the tape media has a break in it. The cartridge accessor was able to remove the cartridge from the device.	1. Remove the cartridge from the convenience I/O station. 2. Inspect the cartridge for damage. If the leader block is detached from the tape, replace the leader block. See the tape drive Operator Guide for the procedure. 3. Place the cartridge in the convenience I/O station.
Message **OP0030** **Damaged volser (xxxxxx) ejected to high-capacity output facility cell: yyyy.** *Probable Cause* During a Cartridge Load operation on a tape device, the device determined that the cartridge does not have a leader block or that the tape media has a break in it. The cartridge accessor was able to remove the cartridge from the device. In addition, the convenience I/O station is either not installed, is full, or is unavailable. The problem cartridge is in high-capacity facility cell yyyy.	1. Place the 3494 in Pause mode. 2. Open the appropriate enclosure door. 3. Remove the cartridge from the high-capacity facility. 4. Close the enclosure door. 5. Place the 3494 in Auto mode. 6. Inspect the cartridge for damage. If the leader block is detached from the tape, replace the leader block. See the tape drive Operator Guide for the procedure. 7. Place the cartridge in the convenience I/O station.
Message **OP0045** **Volser (xxxxxx) cannot be removed from cell: yyyy.** *Probable Cause* The accessor was not able to remove the cartridge from its home cell. The cartridge or its home cell may be damaged or something is blocking its home cell. The library could be out of alignment, or the gripper is failing. The problem cartridge is in cell yyyy.	1. Place the 3494 in Pause mode. 2. Open the appropriate enclosure door. 3. Remove the cartridge from the indicated cell. 4. Inspect the cell for damage. 5. Close the enclosure door. 6. Place the 3494 in Auto mode. 7. Inspect the cartridge for damage. 8. Place the cartridge in the convenience I/O station.
Message **OP0076 OP0077 OP0078 OP0079** **Volser xxxxxx cannot be found. Check home cell: yyyy and accessor A or B, gripper 1 or 2.** *Probable Cause* The accessor was not able to locate a tape cartridge during error recovery.	1. Check the indicated home cell or the gripper of the accessor. 2. If found, place the tape cartridge in the error recovery cell.

Intervention Conditions of Cleaner Cartridges

Table 29. Intervention-Required Conditions Relating to Cleaner Cartridges

Intervention-Required Condition	Resolution Actions
Message *OP0008* *** The library is out of CST/ECCST cleaner cartridges.** **Probable Cause** A Clean operation for a 3490E-type tape device needs to be performed, but there are no available compatible cleaner cartridges in the 3494. Either no cleaner cartridges have been added to the 3494, or they have all been used and have been ejected.	1. Place 3490E-type cleaner cartridges in the convenience I/O station. 2. Selecting this condition from the list of actions cannot clear it. Instead, the library system clears this condition automatically when you insert cleaner cartridges of the appropriate type.
Message *OP0034* **A mislabeled cleaner cartridge has been left in device xxx feed slot. Remove the cartridge.** **Probable Cause** During a Clean operation, tape device xxx determined that the cleaner cartridge is not compatible with the device but was not able to unload the cartridge. It is likely that the cartridge has a missing or damaged media-type label, or the media-type label is incorrect for the cartridge's media type.	1. Place the 3494 in Pause mode. 2. Open the appropriate enclosure door. 3. If the cartridge is accessible, remove it. 4. If the cartridge is in a 3490E device, make the device not ready by pressing the Ready switch, press the Unload switch to unload the cartridge, remove the cartridge, then make the device ready by pressing the Ready switch. If the cartridge is in a 3590 device, select the **Unload** option in the Options window, press **Enter**, then remove the cartridge. If you cannot remove the cartridge, call your service representative. 5. Close the enclosure door. 6. Place the 3494 in Auto mode. 7. Inspect the cartridge's seventh character. Install the correct seventh character representing the media type. See the tape drive Operator Guide for the procedure. 8. Place the cartridge in the convenience I/O station.
Message *OP0036* **A mislabeled cleaner cartridge has been ejected to the convenience I/O station.** **Probable Cause** An attempt was made to a clean a tape device, but the cartridge was determined to be a data cartridge, not a cleaner cartridge. One of the following conditions caused the problem: • The cartridge was labeled mistakenly with an external volser that falls within the range of volsers designated for cleaner volumes in the 3494. • The ranges set in the library conflict with ranges already in use for data cartridges.	1. Remove the cartridge from the convenience I/O station. 2. Determine if the volser on the cartridge is included in the ranges of volsers defined for cleaner cartridges by selecting the **Cleaner Masks** option in the Commands window on the Library Manager console. 3. Either correct the cleaner masks or relabel the cartridge.

Table 29. Intervention-Required Conditions Relating to Cleaner Cartridges (continued)

Intervention-Required Condition	Resolution Actions
Message OP0037 **A mislabeled cleaner cartridge has been ejected to the high-capacity output station.** *Probable Cause* An attempt was made to a clean a tape device, but the cartridge was determined to be a data cartridge, not a cleaner cartridge. The convenience I/O station is either not installed, is full, or is unavailable. The cartridge is in the high-capacity output station. One of the following conditions caused the problem: • The cartridge was labeled mistakenly with an external volser that falls within the range of volsers designated for cleaner volumes in the 3494. • The ranges set in the 3494 conflict with ranges already in use for data cartridges.	1. Place the library system in Pause mode. 2. Open the appropriate enclosure door. 3. Remove the cartridge from the high-capacity facility. 4. Close the enclosure door. 5. Place the library system in Auto mode. 6. Determine if the volser on the cartridge is included in the ranges of volsers defined for cleaner cartridges by selecting the **Cleaner Masks** option in the Commands window on the Library Manager console. 7. Either correct the cleaner masks or relabel the cartridge.
Message OP0051 *** The library is out of HPCT cleaner cartridges.** *Probable Cause* A Clean operation for a 3590-type tape device needs to be performed, but there are no available compatible cleaner cartridges in the library. Either no cleaner cartridges have been added to the 3494, or they have all been used and have been ejected.	1. Place 3590-type cleaner cartridges in the convenience I/O station. 2. Selecting this condition from the list of actions cannot clear it. Instead, the 3494 clears this condition automatically when you insert cleaner cartridges of the appropriate type.
Message OP0400 *** The library is out of ETC cleaner cartridges.** *Probable Cause* A Clean operation for a 3592-type tape device needs to be performed, but there are no available compatible cleaner cartridges in the library. Either no cleaner cartridges have been added to the 3494, or they have all been used and have been ejected.	1. Place 3592-type cleaner cartridges in the convenience I/O station. 2. Selecting this condition from the list of actions cannot clear it. Instead, the 3494 clears this condition automatically when you insert cleaner cartridges of the appropriate type.
Message OP0401 *** xxxxx cleaner cartridge (yyyyyy) was ejected due to maximum use.** *Probable Cause* Either of the following conditions has occurred: • (xxxxx=CST, ECCST, HPCT, or EHPCT; yyyyyy=volser) A 3490E- or 3590-type cleaner cartridge has been used more than the configured maximum number of times • (xxxxx=ETC; yyyyyy=volser) A 3592-type drive has determined that the use count for a 3592-type cleaner cartridge has reached its maximum value	Discard the ejected cleaner cartridge.

Intervention Conditions of a VTS

Table 30. Intervention-Required Conditions Relating to a VTS in the 3494

Intervention-Required Condition	Resolution Actions
Message *OP0055* **Free storage threshold has been crossed for VTS z.** *Probable Cause* The available free space in VTS z has crossed the threshold set through the Set VTS Management Policies window on the Library Manager.	1. Insert more 3590 cartridges into the library. Ensure that their volsers are within the range of stacked volumes defined for the VTS reporting the condition. 2. The VTS Active Data window for the VTS is updated to reflect any newly added stacked volumes on the hour.
Message *OP0066* *** VTS Import: Unassigned volumes have been inserted into the library.** *Probable Cause* The library is in Import mode, and physical volumes have been inserted into the library using the convenience I/O station. These physical volumes have been placed in the "Unassigned" category. They should be moved to the "Import" category or normal "Insert" category.	To move the physical volumes to the proper category, select the **Manage Unassigned Volumes** option under **System management** in the Commands window.
Message *OP0100* **A Read-Only status stacked volume xxxxxx has been ejected. (VTS z)** *Probable Cause* During a previous operation with the stacked volume, the VTS controller encountered an unrecoverable error, indicating that the media of the volume may be damaged. During that operation, data was not recovered fully, resulting in the job ending. The stacked volume was placed in Read-Only status to limit use to recall of other logical volumes only. A field conversion of 3590 Model B1A to E1A or 3590 Model E1A to H1A will have caused partially filled stacked volumes to be placed in Read-Only status also. On an hourly basis, the VTS controller determines whether there are any stacked volumes in Read-Only status and starts a process that moves the valid logical volumes to other stacked volumes, then ejects the stacked volume from the 3494. See message OP0107 *Logical volume xxxxxx was not fully recovered from damaged stacked volume yyyyyy. (VTS z)* on page 408 for logical volumes not recovered and not moved to other stacked volumes.	1. Remove the cartridge from the convenience I/O station. 2. Notify your system administrator. 3. If the cartridge is still within a warranty period and damaged logical volumes are no longer needed, return it to your supplier. 4. If damaged logical volumes must be recovered, call your service representative. 5. When ejected, those partially filled stacked volumes that were in Read-Only status as a result of a recent 3590 Model B1A to E1A or 3590 Model E1A to H1A conversion may be inserted into the library for VTS scratch stacked volume usage. Consult your service representative for a list of these stacked volumes.

Table 30. Intervention-Required Conditions Relating to a VTS in the 3494 (continued)

Intervention-Required Condition	Resolution Actions
Message *OP0101* *** A VTS is out of empty stacked volumes. (VTS z)** *Probable Cause* There are two ways to determine this condition: • Once an hour the VTS checks if there are empty stacked volumes. During that check, VTS z did not have any empty stacked volumes. • An operation that requires an empty stacked volume needs to be performed, and VTS z does not have an empty stacked volume. The operations that need empty stacked volumes are copying data from the tape volume cache or reclamation of unusable space on stacked volumes.	Insert one or more 3590 cartridges that have volume serial numbers within the range of stacked volumes defined for VTS z. **Notes:** 1. When the VTS is out of empty stacked volumes, logical mount requests are queued but not performed. Queued logical mounts are performed when a stacked volume has been inserted. 2. This condition cannot be closed by selecting it from the list of actions. Instead, the 3494 clears this condition automatically when stacked volumes are added for the VTS.
Message *OP0102* **A stacked volume has a label error. Internal: xxxxxx, External: yyyyyy** *Probable Cause* During validation that the correct stacked volume was mounted, the volume serial number read from the media did not match what was expected. The volume is ejected to the convenience I/O station. This is likely caused by human intervention in the library that involved moving physical cartridges between storage cells and, when the 3494 was returned to Auto mode, Inventory Update was disabled. Without performing Inventory Update, the 3494 has no way of updating its database to know where cartridges have been moved.	1. Remove the cartridge from the convenience I/O station. 2. If human intervention in the library is the cause, perform an Inventory Update operation. 3. If human intervention is not the cause, check the external label of the cartridge for damage and relabel if necessary. 4. Place the cartridge in the convenience I/O station.
Message *OP0103* **A permanent, nonrecoverable Tape Volume Cache error has occurred. (VTS z)** *Probable Cause* During the initialization of the VTS z, unrecoverable errors were detected with the tape volume cache. The VTS is unusable. Service is required.	Call your service representative.
Message *OP0104* **An orphaned logical volume (xxxxxx) has been found. Call service.** *Probable Cause* During a check of the VTS database, a reference to logical volume xxxxxx was found, but there is no record of its physical location. This could be the result of a hardware or internal software problem. Any data associated with the logical volume is lost.	1. Notify your system administrator. 2. If this intervention occurs multiple times, call your service representative.

Table 30. Intervention-Required Conditions Relating to a VTS in the 3494 (continued)

Intervention-Required Condition	Resolution Actions
Message **OP0105** **A VTS has a CHECK-1 (xxxx) failure. (VTS z).** ***Probable Cause*** An error was detected in VTS z that cannot be recovered. The error could be a result of hardware or internal software problems. The VTS controller restarts itself automatically. Any host jobs using virtual volumes and devices are aborted, and any data that has not been written to the tape volume cache is lost.	1. Record the error code and call your service representative. 2. The VTS restarts itself. 3. Restart all active host jobs.
Message **OP0107** **Logical volume xxxxxx was not fully recovered from damaged stacked volume yyyyyy. (VTS z)** ***Probable Cause*** During the attempted movement of logical volume xxxxxx from a damaged stacked volume that is in read-only status, a permanent read error was encountered. The error was not recoverable. The data associated with the logical volume was not recovered and was not moved to another stacked volume.	Notify your system administrator.
Message **OP0108** **The Tape Volume Cache is degraded (xxxx). (VTS z)** ***Probable Cause*** A disk drive in one of the tape volume cache storage capacity features of VTS z has failed. Operations with the VTS continue, but performance degradation may be experienced. Service is required.	1. Record the error code, xxxx. 2. Call your service representative.
Message **OP0109** **Database restore from volume xxxxxx failed, attempting restore from next most recent. (VTS z)** ***Probable Cause*** During the disaster recovery process, VTS z could not recover the database from stacked volume xxxxxx successfully. Error recovery was unsuccessful. The media may have been damaged during the disaster.	Notify your system administrator.

Table 30. Intervention-Required Conditions Relating to a VTS in the 3494 (continued)

Intervention-Required Condition	Resolution Actions
Message *OP0110* **Insert of logical volume xxxxxx failed during disaster recovery. (VTS z)** *Probable Cause* During the disaster recovery process, logical volume xxxxxx could not be added to the Library Manager inventory. The cause may be one of the following: • The volser is already in the inventory. • The library is already at the logical volume limit. • The volser conflicts with a physical volume's volser that is already in the 3494.	Notify your system administrator.
Message *OP0111* **Damaged volume xxxxxx ejected during disaster recovery. Could not be read on 2 drives. (VTS z)** *Probable Cause* During the disaster recovery process, VTS z could not read the recovery information on stacked volume xxxxxx. Error recovery was unsuccessful. The media may have been damaged during the disaster. The cartridge is placed in the convenience I/O station.	1. Remove the cartridges from the I/O station. 2. If possible, repair the cartridge and place in the convenience I/O station.
Message *OP0112* **Device xxx has been made unavailable by a VTS. (VTS z)** *Probable Cause* During an operation with device xxx, the VTS controller determined that the device is not operating correctly and requires service. It is likely that the device has excessive read or write errors.	Call your service representative.
Message *OP0113* **A VTS does not have enough available physical drives to continue operation. (VTS z)** *Probable Cause* Physical drives associated with VTS z have become unavailable either due to a drive failure or service representative action. A VTS requires a minimum of two available physical drives for operation.	Call your service representative.

Intervention-Required Condition		Resolution Actions
Message	**OP0114**	Call your service representative.
A VTS attempted unsuccessfully to eject a stacked volume (xxxxxx) during disaster recovery. (VTS z)		
Probable Cause		
During processing of a physical volume during disaster recovery, the VTS determined that the physical volume was damaged and attempted to place the volume in the I/O station, but the attempt failed. The likely reason is that the cartridge has physical damage as a result of the disaster, and it interferes with the cell in the I/O station.		
Message	**OP0115**	Call your service representative.
A VTS attempted unsuccessfully to eject a damaged stacked volume (xxxxxx). (VTS z)		
Probable Cause		
During the last usage of a physical volume, the VTS subsystem determined that the volume was damaged physically. As part of a recovery process, an attempt was made to eject the physical volume that failed. The likely reason is that the cartridge has physical damage as a result of the disaster, and it interferes with the cell in the I/O station.		
Message	**OP0116**	Call your service representative.
VTS physical device xxx is cabled incorrectly. It has been made unavailable. (VTS z)		
Probable Cause		
During the installation of drive xxx, the interface cables between the drive and the Library Manager were installed incorrectly.		
Message	**OP0117**	Call your service representative.
A VTS cannot communicate with device xxx. It has been made unavailable. (VTS z)		
Probable Cause		
Drive xxx has either been powered off or has a failure that does not allow it to respond to requests from the VTS.		

Table 30. Intervention-Required Conditions Relating to a VTS in the 3494 (continued)

Intervention-Required Condition	Resolution Actions
Message *OP0118* **Mount of logical volume xxxxxx failed because physical volume yyyyyy is not in the library. (rc=rrrr) (VTS z)** *Probable Cause* To satisfy a logical volume mount request, the logical volume must be recalled from a physical volume. At the time the logical volume mount request was processed, the physical volume required could not be found in the Library Manager inventory.	1. Call your service representative. 2. Locate the physical volume and insert it into the 3494.
Message *OP0120* **Mount of logical volume xxxxxx failed because physical volume yyyyyy is misplaced. (rc=rrrr) (VTS z)** *Probable Cause* To satisfy a logical volume mount request, the logical volume must be recalled from a physical volume. The mount of the physical volume failed because it was not found in the physical storage cell indicated in the Library Manager inventory.	See the "Problem Determination Using Search Database for Volumes" on page 384 and follow the instructions in the "Specific Misplaced Volume" scenario using the physical volume volser for your search.
Message *OP0121* **Mount of logical volume xxxxxx failed because physical volume yyyyyy is inaccessible. (rc=rrrr) (VTS z)** *Probable Cause* To satisfy a logical volume mount request, the logical volume must be recalled from a physical volume. The mount of the physical volume failed because it is not accessible by the robotics of the library. The two most likely reasons for the volume to be inaccessible are that the volume is loaded in a drive that has failed or is in a gripper that has failed.	See the "Problem Determination Using Search Database for Volumes" on page 384 and follow the instructions in the "Specific Inaccessible Volume" scenario using the physical volume volser for your search.
Message *OP0122* **Mount of logical volume xxxxxx located on physical volume yyyyyy failed. (rc=rrrr) (VTS z)** *Probable Cause* To satisfy a logical volume mount request, the logical volume must be recalled from a physical volume. The mount of the physical volume could not be completed, and the VTS could not determine the exact reason for the failure.	1. Notify your system administrator. 2. For dual Library Manager systems containing a VTS, this intervention may be the result of a Library Manager switchover. When a Library Manager switchover occurs, queued or in-progress logical mounts are not completed. This results in the VTS asking the Library Manager to post this intervention. If this is the case, clear the intervention and re-drive the mount from the host.

Intervention-Required Condition	Resolution Actions
Message **OP0123** **Stacked volume xxxxxx is in Read-Only status with a reason code of yyyyy. (VTS z)** *Probable Cause* During a previous read or write operation with the volume (recall of a logical volume, copying of a virtual volume, or routine reclamation of a stacked volume), the VTS detected a permanent media error, or an excessive number of temporary media errors have occurred. The volume is placed in read-only status to prevent further writing of data. Data already on the volume remains accessible.	This Intervention-Required notification is given for the first volume to be placed in read-only status within a 24-hour period. You should call your service representative only after you have notified your system administrator as described in messages *Logical volume xxxxxx was not fully recovered from damaged stacked volume yyyyyy. (VTS z)* and *A Read-Only status stacked volume xxxxxx has been ejected to the convenience I/O station. (VTS z)*, and it is necessary to recover a damaged logical volume or to obtain the list of stacked volumes that may be inserted into the library for use as VTS scratch stacked volumes.
Message **OP0124** **Stacked volume xxxxxx is unavailable with a reason code of yyyyy. (VTS z)** *Probable Cause* During the reclamation process, a stacked volume was made unavailable. The volume is placed subsequently in read-only status.	This message should be considered informational because the subsequent processing of read-only status volumes may result in transparent recovery. You should call your service representative only when recovery of a logical volume is necessary after having received the message *Logical volume xxxxxx was not fully recovered from damaged stacked volume yyyyyy. (VTS z)*.
Message **OP0125** **VTS controller degraded. Error code yyyyy. Call service. (VTS z)** *Probable Cause* A VTS redundant component has failed. Operation of the VTS is continuing.	Call your service representative.
Message **OP0126** **VTS requested that device xxx be made unavailable but a mount/demount is in progress. (VTS z)** *Probable Cause* The VTS determined that device xxx should be made unavailable; however, the Library Manager found that a mount or demount was in process and could not mark the device as unavailable.	Call your service representative.
Message **OP0127** **Invalid mixture of VTS physical drive types. (VTS z)** *Probable Cause* There can be only one physical drive type in the VTS. For example, the VTS might contain only 3590 Model B1A drives, or only Model E1A drives, or only Model H1A drives, but it could not contain a combination of these models.	Call your service representative.

Table 30. Intervention-Required Conditions Relating to a VTS in the 3494 (continued)

Intervention-Required Condition	Resolution Actions
Message OP0128 *** A VTS does not have enough physical drives to continue operation. (VTS z)** *Probable Cause* Physical drives have been made unavailable, and there are no longer enough drives to continue operation.	Call your service representative.
Message OP0130 **Stacked volume xxxxxx failed scratch mount. Label cannot be read. Tape needs to be re-initialized. (VTS z)** *Probable Cause* Tape may need to be re-initialized.	Call your service representative to re-initialize the tape. To re-initialize the tape yourself: 1. Eject the stacked volume. 2. Insert the volume into a native 3590 library with a compatible device type (typically a 3590 Model Exx tape drive). 3. Use a host utility (such as IEBGENER) to write a new internal tape label. 4. Eject the volume and reinsert it into the VTS.
Message OP0131 **Stacked volume xxxxxx ejected due to incompatible media type. (VTS z)** *Probable Cause* The media type is incompatible.	Call your service representative.
Message OP0132 **Stacked volume xxxxxx could not be ejected because the convenience I/O station is full, or the door is open.** *Probable Cause* The convenience I/O station is full, or the door is open.	Empty the convenience I/O station if it is full, or close the door.
Message OP0134 **Write-protected stacked volume xxxxxx ejected.**	Contact your System Administrator.
Message OP0135 **A VTS unsuccessfully attempted to eject write-protected stacked volume xxxxxx.**	Contact your System Administrator.
Message OP0136 **Stacked volume (xxxxxx) moved to category FF08 — Unreadable internal label.**	Call your service representative.

Table 30. Intervention-Required Conditions Relating to a VTS in the 3494 (continued)

Intervention-Required Condition	Resolution Actions

Message   **OP0138**
 	
The Common Scratch Pool (Pool 00) is out of y media volumes.
	1. Contact your System Administrator.
	2. This intervention will be cleared automatically when the Common Scratch Pool (Pool 00) has scratch stacked volumes of the correct media type.
	3. The scratch volumes can be made available by:
	  • insertion via the Convenience I/O or high capacity rack
	  • moving some scratch volumes from another pool to the CSP
	  • reclaim.

Message   **OP0139**
 	
Storage pool xx is out of scratch volumes.
	1. Contact your System Administrator.
	2. This intervention will be cleared automatically when the indicated Storage Pool has scratch stacked volumes.
	3. The scratch volumes can be made available by:
	  • insertion via the Convenience I/O or high capacity rack
	  • moving some scratch volumes from another pool to this pool
	  • reclaim.

Message **OP0140** **Volser xxxxxx could not be moved from Storage Pool yy to Storage Pool zz.**	Contact your System Administrator.
Message **OP0141** **VTS x was unable to obtain construct information for volser xxxxxx.** ***Probable Cause*** The VTS cannot obtain construct information due to a program error.	Contact your System Administrator.
Message **OP0142** **Stacked volume xxxxxx exists in the VTS database but doesn't exist in the Library Manager database.**	1. Contact your System Administrator. 2. Locate the physical volume and reinsert it into the library via the Convenience I/O or the high capacity rack.
Message **OP0143** **VTS x has completed processing the stacked volumes as part of the Disaster Recovery inventory.**	Proceed with the next step in the disaster recovery which should be the inserting of logical volumes (Commands pulldown).
Message **OP0144** **Eject attempted on stacked volume xxxxxx that contains active data. Eject was failed.**	Contact your System Administrator.
Message **OP0145** **Unable to make stacked volume xxxxxx read-only.**	Contact your System Administrator.
Message **OP0146** **Unable to make stacked volume xxxxxx read-write.**	Contact your System Administrator.

Table 30. Intervention-Required Conditions Relating to a VTS in the 3494 (continued)

Intervention-Required Condition	Resolution Actions
Message **OP0147** **Stacked volume xxxxxx is in an invalid state.**	Contact your System Administrator.
Message **OP0148** **There are stacked volumes in the VTS database that can't be found in the library.**	Contact your System Administrator.
Message **OP0151** **The time on the VTS is incorrect.** *Probable Cause* The time on the VTS could not be adjusted automatically and will require a manual adjustment by the Service Representative.	Contact your Service Representative.
Message **OP0152** **VTS has ejected a volume successfully, but it has active data.** *Probable Cause* The ejected stacked volume may contain logical volumes in the ″private″ category.	1. Determine if the ejected stacked volume contains logical volumes in the ″private″ category. 2. If so, then contact your Service Representative to report that a damaged stacked volume containing one or more logical volumes was ejected.
Message **OP0300** **One or more logical volumes have corrupted tokens. Call service.** *Probable Cause* Code error or token database corruption. During token processing in a PtP VTS, the tokens for at least one volume contained values that are incompatible, such that the data validity of the volume is compromised.	Call your service representative.

VTS Recovery Actions

In the event that a VTS is not usable either due to interruption of utility or communication services to the site or through significant physical damage to the site or to the VTS itself, access to the data that the VTS manages is restored through automated processes designed into the product. The recovery process assumes that the only available elements for recovery are the stacked volumes themselves and further assumes that only a subset of them are undamaged after the event.

Although a service representative initiates the recovery process, there are some user-related actions that are necessary before the recovery can start. The following are user-related actions:

- If the 3494 and the VTS are still functional, ask the service representative to perform a Fast Migrate (VTS code 2.23.xx or higher) operation using the VTS Data Fast Migrate/Backup SMIT panel option from the VTS Control Unit Service Utilities Menu or a Force Migrate (LM code level 525 or below) operation through the Library Manager panel. This ensures that all data has been moved from the tape volume cache to a stacked volume.

- Remove the undamaged 3590 stacked volumes from the 3494 that is no longer usable.

- Take the volumes to another 3494 location that has an empty VTS.

- Inform the service representative that the recovery process can start.

There are two key functions designed into the VTS system to support recovery:

- Automatic VTS database backup

  The VTS controller maintains a database of information about the location and status of logical volumes on the stacked volumes it manages. When a stacked volume has been filled with logical volumes, a backup of the entire database is placed at the end of the filled stacked volume. The database contains a time and date stamp that identifies when the backup was performed.

- Automatic database recovery

  When a restore of the database is required, the Library Manager, in conjunction with the VTS controller, performs the following steps when a service representative initiates them:

  1. Each available stacked volume in the 3494 is mounted and the time and date stamp of the database backup is read. This step finds the most current database for the stacked volumes in the 3494.

  2. The stacked volume with the most current database is again mounted, and the database in the VTS controller is restored.

  3. The VTS then provides information to the Library Manager to rebuild its inventory records for each logical volume found in the database.

When the recovery process has completed, the operator varies the 3494 online at the recovery site host, and the Library Manager inventory of logical volumes is uploaded to the host to synchronize the host catalogs (DFSMS and applicable tape management systems).

At the completion of the recovery process, the VTS and the Library Manager contain database and inventory records and status information for the logical volumes as found in the most recent database backup on the undamaged stacked volumes. Depending on the following conditions, some data and logical volumes may not have been recovered:

- The stacked volumes containing the latest database backups were destroyed.

  Any changes to the location or status of logical volumes since the last found database backup are lost. Some logical volume records may be lost. It is possible, however, that the database contains the location of the previous use of logical volumes and that data is accessible to the host.

- One or more stacked volumes found in the restored database were destroyed during the event.

  Although the VTS database and the Library Manager inventory have a record of the logical volumes that resided on the missing stacked volumes, the data is lost.

- A virtual volume had not been closed at the time of the event.

  The VTS database does not have a record of the virtual volume's location on a stacked volume, and the data is lost.

- Logical volumes were written to a stacked volume between the time the last database backup was made and the event.

  The VTS database does not have a record of the new logical volume locations on the stacked volume, and the data is lost. It is possible, however, that the database contains the location of the previous use of the logical volume, and that data is accessible to the host.

Appendix A. Keyboard Template

The keyboard template shows the function keys on the Library Manager keyboard that you use during normal activity.

You can remove and copy the template, then fold the copy to create a triangular bar shape showing the keys on one face. You can then place the template in a convenient location for quick access to the correct key for a specific function.

Commonly used keys:

Arrows	Home	End	Esc	PgUp	PgDn	Ctrl + PgUp	Ctrl + PgDn	Underlined letter	Shift + Esc or Alt + Space
Move among the choices.	Go to the first choice in a pull-down menu.	Go to the last choice in a pull-down menu.	Cancel the last help window.	Scroll up one window.	Scroll down one window.	Display the text to the left of the window.	Display the text to the right of the window.	Select that choice on the action bar or pull-down menu.	Go to and from the pull-down menu.

Function keys:

F1	F2	F3	Alt + F4	Alt + F5	F6	Alt + F7	Alt + F8	F9	Ctrl + F10	F11	F12
Get the help window.	Get extended help from within any help window.	Perform shutdown.	Close the help window.	Restore the window.		Move the window.	Size the window.	List keys from within any help window.	Activate main menu action bar. **Shift + F10** Get help for help.	Go to help index from within any help window.	

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Appendix B. VTS Export and Import Advanced Function

This appendix describes the VTS Export and Import procedures for the 3494.

Export and Import List Volumes Format

Lists of volumes for export or import are provided to a VTS on logical volumes called the Export List Volume or the Import List Volume, which are resident in the VTS. The following tables define the requirements of the format for the Export List Volume and Import List Volume. There are fields, records, or files of the two formats, which are similar; therefore, only one table for these similar areas is shown. For example, the Import List Volume tables mention an HDR1 table, which is in the Export List Volume section.

Sample JCL for preparing the Export List Volume and Import List Volume is available in the *Object Access Method Planning, Installation, and Storage Administration Guide for Tape Libraries*.

The Export List Volume is an IBM Standard Labeled tape volume, which is selected from the logical volumes in the VTS. Three files are written to the volume. The first file contains logical volume - destination pair records and is called the Export List File. The second file has a minimum of one record and is reserved for future use. The third file is the Export Status File, which the host writes initially without any data records. Upon the completion of the Export operation, the VTS writes status file records for each of the logical volumes listed in the Export List File indicating the processing results.

The Import List Volume is an IBM Standard Labeled tape volume, which is selected from the logical volumes in the VTS. Two files are written to the volume. The first file contains records that specify the Exported Stacked Volumes and logical volume to import or to import all logical volumes. The second file is the Import Status file, which the host writes initially without any data records. Upon completion of the Import operation, the VTS writes status file records indicating the results for each of the logical volumes listed specifically and the logical volumes contained on an Exported Stacked Volume listed when all logical volumes were to be imported.

Export List Volume

Due to the size of a monolithic, detailed format description for the Export List Volume, the format is described in hierarchical form in the tables that follow. Start with Table 31, then proceed as directed to the portions of interest.

All character fields within the volume are in EBCDIC. Field contents specified in quotes are EBCDIC characters. Compression must be turned off when the volume is written. No space is reserved in the records of the list and status files. Expansion for later versions can be accomplished by redefining the file identifier records and data records for the files. Such changes would be reflected in the Record Length entry in the HDR2 and EOF2 records.

Table 31. Export List Volume

Volume Contents	Description
Volume Label	See Table 32 on page 422.
Export List File	See Table 33 on page 422.

Table 31. Export List Volume (continued)

Volume Contents	Description
Reserved File	See Table 37 on page 424.
Export Status File	See Table 38 on page 424.
Tape Mark	

Table 32. VOL1

Bytes	Description	Use
0–2	Label Identifier	Contains "VOL".
3	Label Number	Contains "1".
4–9	Volume Serial Number	The six-character logical volume serial number of the Export List Volume or Import List Volume.
10	Reserved	Retained, not checked.
11–20	VTOC Pointer	Retained, not checked.
21–34	Reserved	Retained, not checked.
35–36	Tape Recording Technique	Retained, not checked.
37–40	Reserved	Retained, not checked.
41–50	Owner Name and Address Code	Retained, not checked.
51–79	Reserved	Retained, not checked.

Table 33. Export List File

Length	Name	Description
80	Data Set Header 1	See Table 41 on page 426.
80	Data Set Header 2	See Table 42 on page 426.
	Tape Mark	
80	Export List File Identifier	See Table 34 on page 423.
80	Export Options 1 Record	See Table 35 on page 423. This record is optional and may only be present if Version '02' is specified in the Export List File Identifier.
N*80	Export List File Records	See Table 36 on page 424.
	Tape Mark	
80	End of File 1	See Table 43 on page 427.
80	End of File 2	See Table 44 on page 427.
	Tape Mark	

Table 34. Export List File Identifier

Bytes	Name	Description
0–10	Title Text	"EXPORT LIST"
11	Delimiter	Blank character
12–13	Version	"01" or "02"
14	Blank	Blank character
15–30	User Field	This 16-byte field is not checked or used by the control unit.
31–79	Retained, not checked.	This field is not checked or used by the control unit.

The format of the Export Options 1 Record is relatively free-form. Fields are separated by comma characters as delimiters and any amount of white space.

Table 35. Export Options 1 Record

Name	Description
Record Identifier	**OPTIONS1** Must be in bytes 0–7.
Media Type	One of the following must be specified: **MEDIAJ** Only High Performance Cartridge Tape (HPCT or ″J″) cartridges are to be used. **MEDIAK** Only Extended High Performance Cartridge Tape (EHPCT or ″K″) cartridges are to be used. **ANYMEDIA** Any media type may be used (This is the default if this record isn't used).

The format of the Export List File record is designed to allow for ease of use. It is expected that you may input the needed information manually and the format needs to be tolerant of the location of the fields in the record. Each list file record contains up to two fields that are separated by a delimiter. The fields "volser" and "destination" must be displayed in that order, separated by a field delimiter. If the record is not equal to 80 bytes, the record is not processed and a Status File record is written with a status code of 24. The first 13 bytes or less of data from the record as read is provided in the Status File record. If only one field is found in the record, it is assumed that a blank destination is desired.

Table 36. Export List File Record

Name	Description
Volser	The volume serial number of a logical volume to be exported. The VTS uses six characters to identify the volser, starting with the first non-blank character and continuing until six non-blank characters have been found. Valid characters are A–Z and numerics 0–9. The search for six non-blank characters continues until a blank or delimiter comma character is found. **Note:** If the volser found is not six characters or contains non-valid characters, a Status File record is written with a status code of 1E and with the first 13 bytes of the list record.
Field Delimiter	Comma character required if a non-blank destination is specified.
Destination	The destination for the logical volume. The control unit uses up to 16 characters, starting with the first non-blank character after the field delimiter and continuing through byte 71, for the destination name. Embedded blanks are allowed in the destination name. Any characters in the record after the destination field are ignored. No validity checking is performed on the name found. A blank destination is also valid; however, all characters after the volser or delimiter comma and throughout byte 71 must be blank.
User Field	Bytes 72–79 of the 80-byte record are not used or checked by the VTS. This field may contain line numbers for volume lists.

Table 37. Reserved File

Length	Name	Description
80	Data Set Header 1	See Table 41 on page 426.
80	Data Set Header 2	See Table 42 on page 426.
	Tape Mark	
recl	Reserved File Identifier	recl>=1. This record must be present; however, neither its length nor contents are checked or used by the control unit. **Note:** The minimum record length written to tape is 18 bytes.
N*recl	Reserved File Records	N is a variable number of file records. N=0 is valid, recl>=1, records not checked or used by the control unit. **Note:** The minimum record length written to tape is 18 bytes.
	Tape Mark	
80	End of File 1	See Table 43 on page 427.
80	End of File 2	See Table 44 on page 427.
	Tape Mark	

Table 38. Export Status File

Length	Name	Description
80	Data Set Header 1	See Table 41 on page 426.
80	Data Set Header 2	See Table 42 on page 426.
	Tape Mark	
80	Export Status File Identifier	See Table 39 on page 425.
N*80	Export Status File Records	N=0 is valid. N is a variable number of file records. See Table 40 on page 425.
	Tape Mark	
80	End of File 1	See Table 43 on page 427.

Table 38. Export Status File (continued)

Length	Name	Description
80	End of File 2	See Table 44 on page 427.
	Tape Mark	

Table 39. Export Status File Identifier

Bytes	Name	Description
0–12	Title Text	"EXPORT STATUS"
13	Field Delimiter	Blank character
14–15	Version	"01"
16	Blank	Blank character
17–32	User Field	This 16-byte field is not checked or used by the control unit.
33–79	Retained, not checked.	This field is not checked or used by the control unit.

Table 40. Export and Import Status File Record

Bytes	Name	Description
For status codes other than 01, 1E, 24, or 25, the bytes 0–12 are defined as follows:		
0–5	Logical Volser	For Export operations, this field contains the volume serial number of the logical volume specified in the Export List File. For Import operations, this field contains the volume serial number of the logical volume explicitly specified in the Import List File or, if only the Exported Stacked Volume to import is specified, a logical volume on the Exported Stacked Volume. When there is a cause for no logical volumes to have been imported from the Exported Stacked Volume given in bytes 7–12, the status file record for the Exported Stacked Volume has blanks in this field.
6	Field Delimiter	Comma character
7–12	Physical Volser	For a successful Export operation (status code=00), this field contains the volume serial number of the Exported Stacked Volume that the logical volume was copied on. If the Export operation was unsuccessful, this field contains all blanks. For Import operation status, this field contains the Exported Stacked Volume specified in the Import List File. This field is right-aligned and padded with blanks.
For status code 01, 1E, 24, or 25, the bytes 0–12 are defined as follows:		
0–12	List File Record data	When a status code of 01, 1E, or 24 is indicated, the Export or Import List File record could not be processed. The first 13 bytes of the list file record are provided here to aid in problem determination.
13	Field Delimiter	Comma character
14–15	Status Code	This field contains a two-character status code number. See "Status Codes in Status File" on page 432 for more information.
16	Field Delimiter	Comma character
17	Exception Indicator	If the Export or Import operation was successful, this field contains the blank character. If the Export or Import operation was unsuccessful, this field contains the asterisk character.

Table 40. Export and Import Status File Record (continued)

Bytes	Name	Description
18–77	Destination/Status Text	For a successful Export operation (status code=00), this field contains up to a 16-character destination name as specified in the Export List File. If the destination was given as all blanks, this field contains 16 question mark characters (??...?). For a successful Import operation (status code=00), this field is all blanks. For an unsuccessful Export or Import operation (status code≠00), this field contains status text indicating the reason the Export or Import operation was not successful. This field is left-aligned and padded with blanks. See "Status Codes in Status File" on page 432 for more information.
78	Reserved	
79	Import Option	For Export operations, this byte is X'00'. For Import operations, this byte is the character "S" when the SCRATCH option was determined in the Import List and is the character "I" when the INITIALIZE option was determined in the Import List.

Table 41. HDR1

Bytes	Description	Use
0–2	Label Identifier	Contains "HDR"
3	Label Number	Contains "1"
4–20	Data Set Identifier	Retained, not checked.
21–26	Data Set Serial Number	Retained, not checked.
27–30	Volume Sequence Number	Retained, not checked.
31–34	Data Set Sequence Number	Retained, not checked.
35–38	Generation Number	Retained, not checked.
39–40	Version Number	Retained, not checked.
41–46	Creation Date	Retained, not checked.
47–52	Expiration Date	Retained, not checked.
53	Data Set Security	Retained, not checked.
54–59	Block Count	Must be "000000"
60–72	System Code	Retained, not checked.
73–79	Reserved	Retained, not checked.

Table 42. HDR2

Bytes	Description	Use
0–2	Label Identifier	Contains "HDR"
3	Label Number	Contains "2"
4	Record Format	Retained, not checked.
5–9	Block Length	Must be equal to the Record Length for the Export List File, Import List File, and Status File. Retained, not checked for the Reserved file.
10–14	Record Length	Must be 80 bytes for the Export List File, Import List File, and Status file. Retained, not checked for the Reserved file.
15	Tape Density	Retained, not checked.
16	Data Set Position	Retained, not checked.
17–33	Job/Job Step Identification	Retained, not checked.

Table 42. HDR2 (continued)

Bytes	Description	Use
34–35	Tape Recording Technique	Retained, not checked.
36	Control Character	Retained, not checked.
37	Reserved	Retained, not checked.
38	Block Attribute	Retained, not checked.
39–46	Reserved	Retained, not checked.
47	Checkpoint Data Set Identifier	Retained, not checked.
48–79	Reserved	Retained, not checked.

Table 43. EOF1

Bytes	Description	Use
0–2	Label Identifier	Contains "EOF"
3	Label Number	Contains "1"
4–20	Data Set Identifier	Retained, not checked.
21–26	Data Set Serial Number	Retained, not checked.
27–30	Volume Sequence Number	Retained, not checked.
31–34	Data Set Sequence Number	Retained, not checked.
35–38	Generation Number	Retained, not checked.
39–40	Version Number	Retained, not checked.
41–46	Creation Date	Retained, not checked.
47–52	Expiration Date	Retained, not checked.
53	Data Set Security	Retained, not checked.
54–59	Block Count	Six-character EBCDIC representation of the decimal number of blocks in the associated file, left-padded with zeros. **Note:** This field is updated by the VTS if it modifies the associated file.
60–72	System Code	Retained, not checked.
73–79	Reserved	Retained, not checked.

Table 44. EOF2

Bytes	Description	Use
0–2	Label Identifier	Contains "EOF"
3	Label Number	Contains "2"
4	Record Format	Retained, not checked.
5–9	Block Length	Must be equal to the Record Length for the Export List File, Import List File, and Status File. Retained, not checked for the Reserved file.
10–14	Record Length	Must be 80 bytes for the Export List File, Import List File, and Status file. Retained, not checked for the Reserved file.
15	Tape Density	Retained, not checked.
16	Data Set Position	Retained, not checked.
17–33	Job/Job Step Identification	Retained, not checked.
34–35	Tape Recording Technique	Retained, not checked.

Table 44. EOF2 (continued)

Bytes	Description	Use
36	Control Character	Retained, not checked.
37	Reserved	Retained, not checked.
38	Block Attribute	Retained, not checked.
39–46	Reserved	Retained, not checked.
47	Checkpoint Data Set Identifier	Retained, not checked.
48–79	Reserved	Retained, not checked.

Import List Volume

Just as with the Export List Volume, the Import List Volume format is described in hierarchical form in the tables that follow. Start with Table 45, then proceed as directed to the portions of interest. All character fields within the volume are in EBCDIC. Field contents specified in quotes are EBCDIC characters. Compression must be turned off when the volume is written.

Table 45. Import List Volume

Volume Contents	Description
Volume Label	See Table 32 on page 422.
Import List File	See Table 46.
Import Status File	See Table 50 on page 431.
Tape Mark	

Table 46. Import List File

Length	Name	Description
80	Data Set Header 1	See Table 41 on page 426.
80	Data Set Header 2	See Table 42 on page 426.
	Tape Mark	
80	Import List File Identifier	See Table 47.
80	Import Options1 Record	See Table 48 on page 429.
N*80	Import List File Records	See Table 49 on page 430. N>0, N<=50K. N is a variable number of file records.
	Tape Mark	
80	End of File 1	See Table 43 on page 427.
80	End of File 2	See Table 44 on page 427.
	Tape Mark	

Table 47. Import List File Identifier

Length	Name	Description
0–10	Title Text	"IMPORT LIST"
11	Field Delimiter	Blank character

Table 47. Import List File Identifier (continued)

Length	Name	Description
12–13	Version	"01": Original Import List File Format "02": Version "02" permits use of the Import Options 1 Record. The VTS must have FC 4001 installed.
14	Blank	Blank character
15–30	User Field	This 16-byte field is not checked or used by the control unit.
31–79	Retained, not checked.	This field is not checked or used by the control unit.

The format of the Import Options 1 Record is relatively free-form. Fields are separated by comma characters as delimiters and any amount of white space.

Table 48. Import Options 1 Record

Name	Description
Record Identifier	**OPTIONS1** Must be in bytes 0–7.
Construct Action	One of the following must be specified: **FAILIMPORT** If the construct name does not exist on the Library Manager, the Import is failed for the associated LVOL. Also, the import is failed if any of the four constructs were defaulted to blanks. For example, No name was specified on the Export Physical Volume or the Import List File. **CREATENAME** If the construct name doesn't exist on the Library Manager, the construct name is created on the Library Manager, assigned default actions for the construct type, and associated with the LVOL being imported. A default construct name of all blanks is permitted with this action. This is the default action if no OPTIONS1 record is included. **USEDEFAULT** If the construct name does not exist, the default construct name (all blanks) is associated with the logical volume being imported.

Table 48. Import Options 1 Record (continued)

Construct Specifications	Any of the following may be specified in any order. The values for the constructs may be up to eight characters long. The keyword, equal sign, and value must not be separate from each other. Any construct values specified in this record are used for all Import List File Records that do not specify the construct. A value of '*RESET*' is used to represent a blank construct. • SC = storage_class • SG = storage_group • MC = management_class • DC = data_class
User Field	Bytes 72–79 of the 80 byte record are not used or checked by the VTS. This field may contain line numbers for volume lists.

The format of the Import List File record is designed to allow for ease of use. It is expected that you may input the needed information manually, and the format must be tolerant of the location of the fields in the record. Each list file record contains up to three fields that are separated by delimiters. The fields "physical volser", "logical volser", and "Import Option" must be displayed in that order, separated by a field delimiter. If the record is not equal to 80 bytes, the record is not processed and a Status File record is written with a status code of 24. The first 13 bytes or less of data from the record as read is provided in the Status File record. If only one field is found in the record, it is assumed to be the "physical volser". If the logical volser is not specified and an Import Option is specified, both delimiter characters are required.

Table 49. Import List File Record

Name	Description
Volser	The volume serial number of an Exported Stacked Volume to be imported. The VTS uses up to six characters to identify the volser, starting with the first non-blank character and continuing until a blank character is found or the field delimiter character is found. Valid characters are A–Z and numerics 0–9. Embedded blanks are not allowed. **Note:** If the volser specified is less than six characters, when used by the VTS, it is padded on the right to form a six-character field. If the volser is greater than six characters, the volume is not imported, and a Status File record is written with a status code of 01 and with the first 13 bytes of the list record.
Field Delimiter	Comma character required if a logical volser or Import Option is specified.
Logical Volser	The volume serial number of a logical volume to be imported. The VTS uses six characters to identify the volser, starting with the first non-blank character after the delimiter comma and continuing until six contiguous non-blank characters are found. Valid characters are A–Z and numerics 0–9. The search for six contiguous non-blank characters continues until a blank or delimiter comma character is found. This field may be all blanks or not contain any characters between the field delimiters, in which case, all logical volumes on the specified Exported Stacked Volume are imported. **Note:** If the volser found is not six characters or contains non-valid characters, a Status File record is written with a status code of 1E and with the first 13 bytes of the list record.
Field Delimiter	Comma character required if an Import Option other than blank is specified.

Table 49. Import List File Record (continued)

Name	Description
Import Option	This field contains blanks or a keyword that defines how the logical volume is to be imported and starts with the first non-blank character found after the second Field Delimiter comma and continues through byte 71 of the record. • If the Field Delimiter comma is not present, only blanks are allowed. If the comma is present and only blanks are found, then the data contents of the logical volume or contents of all logical volumes (if only the physical volser was specified) are copied into the VTS subsystem and fragment file entries and library manager inventory records are created. • If the first non-blank characters found are "SCRATCH", the data contents are not copied, and a fragment file and library manager inventory records are created. The "SCRATCH" option should be used when the data is known to have been expired and not accessed after the logical volume is imported. • If the first non-blank characters found are "INITIALIZE", only library manager inventory records are created. The "INITIALIZE" option should be used when the logical volume is to be re-initialized and any prior data discarded. **Notes:** 1. Characters found in the Import Option field after the keywords of "SCRATCH" or "INITIALIZE" are ignored. 2. If other than all blanks (with or without the second Field Delimiter comma), "SCRATCH" or "INITIALIZE" with characters to be ignored are found before byte 72, the volume is not imported and a Status File record is written with a status code of 25 and with the first 13 bytes of the list record.
Construct Specifications	Any of the following may be specified in any order. The values for the constructs may be up to eight characters long. The keyword, equal sign, and value must not be separate from each other. Any construct values specified in this record are used for all Import List File Records that don't specify the construct. A value of '*RESET*' is used to represent a blank construct. These fields are permitted only if the Import List File Identifier specifies Version '02'. • SC = storage_class • SG = storage_group • MC = management_class • DC = data_class
User Field	Bytes 72–79 of the 80-byte record are not used or checked by the VTS. This field may contain line numbers for volume lists.

Table 50. Import Status File

Length	Name	Description
80	Data Set Header 1	See Table 41 on page 426.
80	Data Set Header 2	See Table 42 on page 426.
	Tape Mark	
80	Import Status File Identifier	See Table 51 on page 432.
N*80	Import Status File Records	N=0 is valid. N is a variable number of file records. See Table 40 on page 425.
	Tape Mark	
80	End of File 1	See Table 43 on page 427.
80	End of File 2	See Table 44 on page 427.
	Tape Mark	

Table 51. Import Status File Identifier

Bytes	Name	Description
0–12	Title Text	"IMPORT STATUS"
13	Field Delimiter	Blank character
14–15	Version	"01"
16	Blank	Blank character
17–32	User Field	This 16-byte field is not checked or used by the control unit.
33–79	Retained, not checked.	This field is not checked or used by the control unit.

Status Codes in Status File

After the completion of an Export or Import operation, you can determine the completion status of each logical volume that was specified for the operation by examining the Status File records. The following table describes the status codes, the probable cause, and the recommended actions for you to take.

Table 52. Status Codes and Status Text

Operation Status	Resolution Actions
Status Code 00 **Status Text** For Export operations, contains the destination name; for Import operations, contains all blanks. **Probable Cause** The volume was successfully exported or imported.	None needed.
Status Code 01 **Status Text** 'Invalid record format, record NNNNN' **Probable Cause** The volume could not be exported or imported because the format of the list file record was invalid.	1. Examine the first 13 bytes of the status record; they contain the input from the list file decimal record number NNNNN as read. 2. Correct the input record and retry the operation. Determine why the operation was canceled and retry it.
Status Code 02 **Status Text** 'Canceled - Host request' **Probable Cause** The volume could not be exported or imported because the host canceled the operation before processing the volume.	Determine why the operation was canceled and retry it.

Table 52. Status Codes and Status Text (continued)

Operation Status	Resolution Actions
Status Code 03 **Status Text** 'Canceled - Library request' **Probable Cause** The volume could not be exported or imported because the operator canceled the operation through the Library Manager console before processing the volume.	Determine why the operation was canceled and retry it.
Status Code 05 **Status Text** Logical volume not in VTS **Probable Cause** The logical volume specified in the Export List is not resident in the VTS in which the Export operation was performed.	This can be a normal status if the list file contains records for more than one VTS or 3494. If this is not the case, determine why the logical volume is not in the VTS in which the operation was performed.
Status Code 06 **Status Text** Exported Stacked Volume not in the 3494 **Probable Cause** The Exported Stacked Volume specified in the Import List (either with a specific logical volume or for import of all logical volumes) is not in the 3494 in which the Import operation was performed.	1. Locate the Exported Stacked Volume needed and insert it into the 3494. 2. Retry the Import operation.
Status Code 07 **Status Text** Logical volume not found on Exported Stacked Volume **Probable Cause** The logical volume specified in the Import List is not resident on the Exported Stacked Volume specified.	1. Use the tape management system or the TCDB records to verify that the logical volume is on the Exported Stacked Volume specified. 2. Correct any errors and retry the Import operation.

Table 52. Status Codes and Status Text (continued)

Operation Status	Resolution Actions
Status Code 08 **Status Text** Exported Stacked Volume not in Import category **Probable Cause** Processing for the Exported Stacked Volume not allowed. The Exported Stacked Volume specified in the Import List is in the library but is not assigned to the Import category.	1. Use the tape management system or TCDB to check that the specified volume is an Exported Stacked Volume. 2. If the volume is an Exported Stacked Volume and is in the Unassigned category, move the volume to the Import category. 3. If the Exported Stacked Volume is found in the Insert category, the volume must be moved to the Eject category and when ejected, it must be reinserted into the convenience I/O station and moved into the Import category. 4. Retry the Import operation. 5. If the volume is not found to be an Exported Stacked Volume, check the source for the Import List Volume contents.
Status Code 09 **Status Text** Logical volume in-use **Probable Cause** The logical volume could not be exported because the volume specified in the Export List was mounted or queued to be mounted when the list was processed as part of the Export operation.	Retry the export of the volume when it is no longer being used.
Status Code 10 **Status Text** Terminated by library error **Probable Cause** The volume could not be exported or imported because the Library Manager detected an unrecoverable (Check-1) error before processing the volume, which ended the operation.	Call your service representative.
Status Code 11 **Status Text** Terminated by VTS error XXXX **Probable Cause** The volume could not be exported or imported because the VTS detected an unrecoverable error before processing the volume, which ended the operation.	Call your service representative. Error XXXX indicates the functional area within the VTS that encountered the unrecoverable error.

Table 52. Status Codes and Status Text (continued)

Operation Status	Resolution Actions
Status Code 12 **Status Text** Duplicate volume in list **Probable Cause** For Export operations, the Export List has more than one entry of a logical volume to be exported. The logical volume is not exported for the destinations provided. A Status File record with status code=12 is written for each of the logical volumes in the Export List that are the same. For Import operations, the Import List has more than one entry of an Exported Stacked Volume with the same or conflicting Logical Volser field values; such as, blanks, the Logical Volser, or blanks and a Logical Volser. Status File records for each Import List record are written with status code=12, and no import processing occur for any records that are the same or conflicting.	Determine why more than one Export or Import List File record specifies the same volume.
Status Code 13 **Status Text** Duplicate volume in 3494 **Probable Cause** The logical volume could not be imported because it already resides in the 3494 inventory. The 3494 inventory includes logical volumes in all VTS within the same physical library and all physical volumes in the 3494.	Determine why the specified volume is a duplicate in the 3494.
Status Code 14 **Status Text** Duplicate volume in the enterprise **Probable Cause** The logical volume could not be imported because the attached hosts determined that it already resides in another 3494.	Determine why the specified volume is a duplicate in the enterprise.
Status Code 15 **Status Text** Library full **Probable Cause** The logical volume could not be imported because the 3494 has reached the maximum number of logical volumes it can support.	1. Export or delete enough logical volumes from the library to provide room for the needed imported volumes. 2. Retry the Import operation.

Table 52. Status Codes and Status Text (continued)

Operation Status	Resolution Actions
Status Code 16 **Status Text** Stacked Volume access failure **Probable Cause** For Export operations, the logical volume could not be exported because the VTS stacked volume containing the logical volume could not be accessed. For Import operations, a logical volume or all logical volumes on the Exported Stacked Volume specified in the Import List File could not be imported because the Exported Stacked Volume could not be accessed.	1. See Figure 104 on page 170. For the Volser indicated, if the Status Flags are Inaccessible or Misplaced, follow instructions in "Problem Determination Using Search Database for Volumes" on page 384. 2. If the volser Status Flags are other than Inaccessible or Misplaced, call your service representative.
Status Code 17 **Status Text** Logical Volume Copy failure **Probable Cause** During an Export operation, the logical volume could not be exported because a permanent error was encountered when copying the volume from the source stacked volume to the Exported Stacked Volume. During an Import operation, the logical volume could not be imported because a permanent error was encountered when copying the volume from the source Exported Stacked Volume to a stacked volume.	Suspected media failure, call your service representative.
Status Code 18 **Status Text** No Data Associated with Logical Volume **Probable Cause** The logical volume could not be exported because there is no data associated with the volume on a stacked volume in the VTS. The most likely reason is that the logical volume has never been used in the VTS before it was specified for export.	Check the logical volume's record in the tape management system to determine if the volume contains active data or not. If it does not, use the logical volume deletion function to remove the volume from the 3494. If it does show that the volume contains active data, call your service representative.
Status Code 19 **Status Text** Logical Volume Copy/Fragment Failure **Probable Cause** The logical volume could not be exported because it is currently resident in the tape volume cache and attempts to copy it to a stacked volume and create its fragment failed.	Call your service representative.

Table 52. Status Codes and Status Text (continued)

Operation Status	Resolution Actions

Status Code
     1A
 	
Status Text
     Logical Volume TVC State Unknown
 	
Probable Cause
     The logical volume could not be exported because its state in the tape volume cache could not be determined.
	Call your service representative.

Status Code
     1B
 	
Status Text
     Logical Volume Processing Error XXXX
 	
Probable Cause
     The logical volume could not be exported or imported because an internal VTS error XXXX was encountered. Internal or host timeout occurrences also result in Export or Import Status file records with this status code for all logical volumes that were not processed successfully.
	Call your service representative. Error XXXX indicates the functional area within the VTS that detected the internal error.

Status Code
     1C
 	
Status Text
     Fragment File Not Readable
 	
Probable Cause
 	
     For Export operations, the logical volume could not be exported because its fragment file in the tape volume cache could not be read.
 	
     For Import operations, the logical volume could not be imported because its fragment information could not be read from the Exported Stacked Volume.
	Call your service representative.

Status Code
     1D
 	
Status Text
     Unable to Write Fragment File
 	
Probable Cause
     The logical volume could not be exported because its fragment file could not be written to the Exported Stacked Volume.
	Call your service representative.

Table 52. Status Codes and Status Text (continued)

Operation Status	Resolution Actions

Status Code
    1E
 	
Status Text
    Invalid Logical Volume, record NNNNN
 	
Probable Cause
    The volser of the logical volume is not six characters or contains characters that are not valid.
	1. Examine the first 13 bytes of the status record. They contain the input from the list file decimal record number NNNNN as read.
	2. Correct the input record and retry the operation.

Status Code
    1F
 	
Status Text
    Logical Volume Recall Failed
 	
Probable Cause
    The fragment file for a logical volume being exported did not contain the logical volume's tape label records so the VTS attempted to perform a recall of the logical volume. The recall failed so the logical volume was not exported.
	1. Check intervention-required messages on the Library Manager console for the reason why the recall failed.
	2. Correct the reason and retry the Export operation.

Status Code
    20
 	
Status Text
    Library Manager Error
 	
Probable Cause
    The logical volume could not be exported because of a Library Manager-reported error during an Export operation.
	Call your service representative.

Status Code
    21
 	
Status Text
    Terminated - out of scratch
 	
Probable Cause
    The logical volume could not be exported or imported because the operation was ended after waiting 60 minutes for a scratch stacked volume to be made available to the VTS.
	1. Add physical volumes to the VTS.
	2. Retry the operation.

Table 52. Status Codes and Status Text (continued)

Operation Status	Resolution Actions
Status Code 22 **Status Text** Terminated - waiting for host response **Probable Cause** For Export operations, the Export operation for the logical volume was not initiated because the Export operation was ended due to host inactivity for 60 continuous minutes while previously processing volumes that were assigned to the Exported category. For Import operations, a logical volume or the logical volumes on an Exported Stacked Volume specified in the Import List File could not be imported because the Import operation was ended due to host inactivity for 60 continuous minutes while previously processing volumes that were assigned to the Insert category. It is likely there are no operational hosts attached to the VTS.	1. Determine why the hosts attached to the VTS are not responding to the request to process volumes that are in the Exported or Insert category. 2. Retry the operation.
Status Code 23 **Status Text** Logical volume left in Insert category **Probable Cause** The Import operation was canceled from the Library Manager console. There is no host attached to the VTS that can process logical volumes assigned to the Insert category, or the Import operation was ended because the host had been inactive for 60 continuous minutes while processing volumes assigned to the Insert category.	None required.
Status Code 24 **Status Text** List File Record Incorrect Length, record NNNNN **Probable Cause** The List File record is not 80 characters.	1. Examine the first 13 bytes of the status record. They contain the input from the list file decimal record number NNNNN as read. 2. Correct the input record and retry the operation.
Status Code 25 **Status Text** Import Option Invalid, record NNNNN **Probable Cause** The Import Option field of the record NNNNN was not all blanks, SCRATCH, or INITIALIZE.	1. Examine the first 13 bytes of the status record. They contain the input from the list file decimal record number NNNNN as read. 2. Correct the input record and retry the operation.

Table 52. Status Codes and Status Text (continued)

Operation Status	Resolution Actions

Status Code
    26
 	
Status Text
    Terminated, fewer than four drives available
 	
Probable Cause
    The volume could not be exported or imported because the operation was ended when fewer than four 3590 drives became available to the VTS.
	Call your service representative.

Status Code
    27
 	
Status Text
    Volume is not a logical volume
 	
Probable Cause
    The Library Manager detected that the volume in the Export List is not a logical volume.
	1. Examine the first 13 bytes of the status record. They contain the input from the list file.
	2. Correct the input record and retry the operation.

Status Code
    28
 	
Status Text
    Exported Stacked Volume processing error
 	
Probable Cause
    For Import operations, the file on the Exported Stacked Volume containing the list of logical volumes stored on the Exported Stacked Volume could not be read without error.
	Suspected media failure, call your service representative.

Status Code
    29
 	
Status Text
    Orphaned logical volume
 	
Probable Cause
    For Export operations, the VTS storage management code does not recognize the logical volume volser; therefore, the logical volume cannot be exported.
	Call your service representative.

Status Code
    30
 	
Status Text
    Logical volume assigned to Insert category
 	
Probable Cause
    For Export operations, the logical volume is assigned currently to the Insert category. A host has not accepted volumes in the Insert category, and they cannot be exported.
	1. Check host systems attached to the VTS to ensure that they are processing volumes in the Insert category.
	2. If this check indicates that at least one host is processing volumes in the Insert category, determine why the specific volume has not been processed.

Table 52. Status Codes and Status Text (continued)

Operation Status	Resolution Actions
Status Code 31 **Status Text** Exported Stacked Volume unload failure **Probable Cause** For Import operations, the Exported Stacked Volume volser found in the Physical Volume field of the Status File record was used for importing logical volumes and could not be demounted from the tape drive and may not have been returned to the Import category.	Call your service representative.

Table 52. Status Codes and Status Text (continued)

Operation Status	Resolution Actions

Status Code
32
 	
Status Text
Invalid container volume
 	
Probable Cause
For Export operations, a cancel that an operator issued from the Library Manager console or a termination because of host inactivity may have resulted in a 'container volume' being shown in the tape management system database for logical volumes that have not been exported from the VTS.
	For each logical volume having this status code, the tape management system data base must be searched and corrected if a 'container volume' is shown.
	
	For DFSMSrmm™, the following steps may be taken:
	
	1. Using the volser of the first volume in the Status File with status code X'32', perform an RMM LISTVOLUME and determine if a container volume is shown. If none is found, proceed with RMM LISTVOLUME for all volumes with status code X'32' until a container is identified.
	
	2. If RMM LISTVOLUME has been performed for all logical volumes with status code X'32' and a container volume has not been found, then further action is not necessary.
	
	3. For those logical volumes with status code X'32' that are found to have a container volume, **it is necessary to change the container volume to blanks**.
	
	4. Using the volser identified as the container volume, search for volumes associated with the container volume and build RMM CHANGEVOLUME commands for each volume. Use the command:
	
	`RMM SEARCHVOLUME VOLUME(*)`
	`OWNER(*) LIMIT(*)`
	`CONTAINER(container_volser)`
	`CLIST('RMM CV',`
	`CONTAINER(" ") FORCE')`
	
	5. Run the CLIST created in step 4 to perform the change to a blank container volume for all volumes found with the identified container volume.
	
	Alternatively, each logical volume with status code X'32' that has a container volume may be changed to a blank container without building a CLIST. After using RMM LISTVOLUME to find logical volumes with a container volume, use the command:
	
	`RMM CHANGEVOLUME volser`
	`CONTAINER(' ') FORCE`
	
	Note: Tape management systems other than DFSMSrmm must facilitate a function to search and change the container volume field to blanks for logical volumes with a status code X'32' in the Status File upon completion of the Export operation.

Status Code 33 **Status Text** Exported Stacked Volume format not supported, error XXXX **Probable Cause** Microcode level is incompatible with the Exported Stacked Volume.	Call your service representative.

Table 52. Status Codes and Status Text (continued)

Operation Status	Resolution Actions
Status Code 34 **Status Text** Fast Ready Scratch Category Logical Volume Exported **Probable Cause** The logical volume that was exported was in a category with the Fast Ready attribute set ON. This is likely to be an error in the Export List.	1. Determine the validity of the Export List record for this logical volume. 2. If this was an erroneous Export operation, it is necessary to import the logical volume from the Exported Stacked Volume.
Status Code 35 **Status Text** Physical volume incompatible with tape drive **Probable Cause** The Physical Volser specified for the import of a logical volume or all logical volumes was written on a tape drive with an incompatible format to the drive attached to the importing VTS.	1. Eject the Exported Stacked Volume from the Import category. 2. Import these volumes into a VTS that has 3590 Model E1A tape drives in the associated Model D1x.

Export and Import Messages from Library

During processing of an Export or Import operation, the VTS generates status messages that indicate the progress of the operation. The message is broadcast to all hosts attached to the VTS. On MVS, OS/390, or z/OS hosts, the message results in a console message being written in the following format:

```
CBR3750I MESSAGE FROM LIBRARY <library-name>: 70 EBCDIC character message
```

The 70-character message contains the status message, which is defined as follows:

Bytes 0–4   Unique Message Code. The unique message code is further defined as a single alphabetic character followed by four numeric characters. The alphabetic character indicates the element or function in the VTS or 3494 that generated the message. The numeric characters are a sequential number for a specific element or function. The element and function codes are defined as follows:

     E   Export

     I   Import

Byte 5   Blank character

Bytes 6–69   Status Message Text

Export Status Messages

Table 53. Export Status Messages

Message Code	Message Text
E0000	EXPORT OPERATION STARTED FOR EXPORT LIST VOLUME XXXXXX This message is generated when the VTS starts the Export operation.

Table 53. Export Status Messages (continued)

Message Code	Message Text
E0001	EXPORT PROCESSING STARTED FOR DESTINATION XXXXXXXXXXXXXXX This message is generated when the VTS starts processing the logical volumes for a specific destination. The 'XX...X' field is replaced with the destination name from the Export List File. The destination name is left-aligned and padded with blanks if the destination name is less than 16 characters. If the destination name in the Export List File is all blanks, a destination name of 16 question mark characters ('??...?') is used. Action: None, status only.
E0002	EXPORTED LOGICAL VOLUMES ON YYYYYY READY FOR HOST PROCESSING This message is generated when all of the logical volumes on an Exported Stacked Volume YYYYYY have been placed in the Exported category and are ready for the host to process. Action: None, status only.
E0003	EXPORT PROCESSING COMPLETED FOR DESTINATION XXXXXXXXXXXXXXX This message is generated when the VTS has completed processing the logical volumes for a specific destination (including the host purging of the exported logical volume from the Library Manager inventory). The 'XX...X' field is replaced with the destination name from the Export List File. The destination name is left-aligned and padded with blanks if the destination name is less than 16 characters. If the destination name in the Export List File is all blanks, a destination name of 16 question mark characters ('??...?') is used. Action: None, status only.
E0004	STACKED VOLUME YYYYYY FOR DEST XXXXXXXXXXXXXXX IN EXPORT-HOLD This message is generated when the 3494 has placed Exported Stacked Volume 'YYYYYY' in the Export-Hold category. The 'XXX...X' field is replaced with the destination name from the Export List File. The destination name is left-aligned and padded with blanks if the destination name is less than 16 characters. If the destination name in the Export List File is all blanks, a destination name of 16 question mark characters ('??...?') is used. Action: You may now use the Library Manager console window, Manage Export-Hold Volumes, to move the Exported Stacked Volume to the Eject category or to the Import category. The Library Manager ejects volumes in the Eject category to the convenience I/O station.
E0005	ALL EXPORT PROCESSING COMPLETED FOR EXPORT LIST VOLUME XXXXXX This message is generated when the VTS completes an Export operation. Action: None, status only.
E0006	Reserved
E0007	Reserved
E0008	Reserved
E0009	Reserved
E0010	EXPORT PROCESSING WAITING FOR HOST RESPONSE This message is generated every ten minutes when there is no host activity to complete the processing of the logical volumes in the Exported category. Action: None, status only.

Table 53. Export Status Messages (continued)

Message Code	Message Text
E0011	EXPORT PROCESSING TERMINATED WAITING FOR HOST RESPONSE This message is generated when the VTS has ended the Export operation because host processing of the logical volumes in the Exported category has been inactive for 60 continuous minutes. Action: Perform analysis of the Status File on the Export List Volume and reissue the Export operation.
E0012	FRAGMENTS FOR STACKED VOLUME XXXXXX NOT DELETED There has been a VTS failure to delete successfully all of the fragments for logical volumes that were otherwise exported successfully. Action: Call your service representative.
E0013	EXPORT PROCESSING SUSPENDED, WAITING FOR SCRATCH VOLUME This message is generated every five minutes when the VTS needs a scratch stacked volume to continue Export operation, and there are none available. Action: None, status only.
E0014	EXPORT PROCESSING RESUMED, SCRATCH VOLUME MADE AVAILABLE This message is generated when, after the Export operation was suspended because no scratch stacked volumes were available, scratch stacked volumes are again available, and the Export operation can continue. Action: None, status only.
E0015	EXPORT PROCESSING TERMINATED, WAITING FOR SCRATCH VOLUME This message is generated when the VTS has ended the Export operation because scratch stacked volumes were not made available to the VTS within 60 minutes of the VTS readiness to copy logical volumes to an Exported Stacked Volume. Action: You should make more VTS stacked volumes available, perform analysis of the Status File on the Export List Volume, and reissue the Export operation.
E0016	COPYING LOGICAL EXPORT VOLUMES FROM CACHE TO STACKED VOLUMES This message is generated when the VTS starts, and every ten minutes during, the process of copying or fragmenting logical volumes that are still in the tape volume cache and must be on a stacked volume before proceeding to copy them to an Exported Stacked Volume. Action: None, status only.
E0017	COMPLETED COPY OF LOGICAL EXPORT VOLUMES TO STACKED VOLUMES This message is generated when the VTS has completed the copy of logical volumes to VTS stacked volumes, allowing the continuing process of copying to the Exported Stacked Volumes. Action: None, status only.
E0018	EXPORT TERMINATED, EXCESSIVE TIME FOR COPY TO STACKED VOLUMES The Export operation has been ended because the logical volumes could not be copied to VTS stacked volumes or fragmented within ten hours from the start of the Export operation. Action: Perform analysis of the Status File on the Export List Volume and reissue the Export operation.
E0019	Reserved

Table 53. Export Status Messages (continued)

Message Code	Message Text
E0020	Reserved
E0021	Reserved
E0022	EXPORT RECOVERY STARTED A VTS error or a power-off condition for which recovery is being attempted has interrupted the Export operation. Action: None, status only.
E0023	EXPORT RECOVERY COMPLETED The recovery attempt for interruption of an Export operation has been completed. Action: Perform analysis of the Status File on the Export List Volume and reissue the Export operation, if necessary.

Import Status Messages

Table 54. Import Status Messages

Message Code	Message Text
I0000	IMPORT OPERATION STARTED FOR IMPORT LIST VOLUME XXXXXX This message is generated when the VTS starts the Import operation.
I0001	IMPORT PROCESSING STARTED FOR EXPORTED STACKED VOLUME YYYYYY This message is generated when the VTS has started processing Exported Stacked Volume YYYYYY. Action: None, status only.
I0002	IMPORTED LOGICAL VOLUMES FROM YYYYYY READY FOR HOST PROCESSING This message is generated when all of the logical volumes on an Exported Stacked Volume YYYYYY have been placed in the Insert category and are ready for the host to process. Action: None, status only.
I0003	PROCESSING ON VOLUME YYYYYY HAS COMPLETED This message is generated when the VTS completes Import processing of the Exported Stacked Volume whose volser is YYYYYY. Action: None, status only.
I0004	ALL IMPORT PROCESSING COMPLETED FOR IMPORT LIST VOLUME XXXXXX This message is generated when the VTS completes an Import operation. Action: None, status only.
I0005	PROCESSING ON VOLUME YYYYYY TERMINATED, INCOMPATIBLE FORMAT This message is generated when an Exported Stacked Volume that is specified for import of a logical volume or all logical volumes was recorded on a drive with an incompatible media format (typically higher density) than the drives attached to the importing VTS. Action: Upon completion of the Import operation, eject the Exported Stacked Volume from the Import category.
I0006	Reserved

Table 54. Import Status Messages (continued)

Message Code	Message Text
I0007	Reserved
I0008	Reserved
I0009	IMPORT PROCESSING WAITING FOR HOST RESPONSE This message is generated every ten minutes when there is no host activity to complete the processing of the logical volumes placed in the Insert category during an Import operation. Action: None, status only.
I0010	IMPORT PROCESSING TERMINATED WAITING FOR HOST RESPONSE This message is generated when the VTS has ended the Import operation because host processing of the logical volumes in the Insert category has been inactive for 60 continuous minutes. Action: Perform analysis of the Status List file on the Export List Volume and reissue the Import operation.
I0011	Reserved
I0012	IMPORT PROCESSING SUSPENDED, WAITING FOR SCRATCH VOLUME This message is generated every five minutes when the VTS needs a scratch stacked volume to continue Import processing, and there are none available. Action: None, status only.
I0013	IMPORT PROCESSING RESUMED, SCRATCH VOLUME MADE AVAILABLE This message is generated when, after the Import operation was suspended because no scratch stacked volumes were available, scratch stacked volumes are again available, and the Import operation can continue. Action: None, status only.
I0014	IMPORT PROCESSING TERMINATED, WAITING FOR SCRATCH VOLUME This message is generated when the VTS has ended the Import operation because scratch stacked volumes were not made available to the VTS within 60 minutes of the VTS need for a scratch volume to copy imported logical volumes on. Action: Make more VTS stacked volumes available, perform analysis of the Status File on the Export List Volume, and reissue the Import operation.
I0015	IMPORT RECOVERY STARTED A VTS error or a power-off condition for which recovery is being attempted has interrupted the Import operation. Action: None, status only.
I0016	IMPORT RECOVERY COMPLETED The recovery attempt for interruption of an Import operation has been completed. Action: Perform analysis of the Status File on the Export List Volume and reissue the Import operation, if necessary.
I0017	IMPORT PROCESSING SUSPENDED, WAITING FOR SCRATCH VOLUME IN POOL n Similar to I0012, but specifies the volume pool that needs additional scratch. Action: None, Status only.

Table 54. Import Status Messages (continued)

Message Code	Message Text
I0018	IMPORT PROCESSING RESUMED, SCRATCH VOLUME MADE AVAILABLE IN POOL n Similar to I0013, but specifies the volume pool that was freed from the out-of-scratch condition. Action: None, Status only.
I0019	IMPORT PROCESSING TERMINATED, WAITING FOR SCRATCH VOLUME IN POOL n Similar to I0014, but specifies the volume pool that needs additional scratch. Action: See I0014.

Export/Import List Volumes Failure-Reason Text

If the VTS subsystem was unable to process the Export or Import List Volume, the host generates message CBR3858I. The reason the list volume could not be processed is included as a text string. The following table defines the failure-reasons returned, the probable cause, and the recommended actions for you to take.

In Table 55, the symbols <VOLSER>, <File>, <Record>, and <Field> are replaced in the message text as appropriate to describe the location of the error found:

- **<VOLSER>**, the logical volser that was provided in the Export or Import operation.
- **<File>**, Export List File, Import List File, Reserved File, or Status File.
- **<Record>**, within a <File>, HDR1, HDR2, EOF1, EOF2, Identifier, or Record.
- **<Field>**, within a <Record> Label Identifier, Block Count, Record Length, Block Length, Title Text, or Version.

Table 55. Export-Import List Volumes Failure Reason Text

Failure-Reason Text — Probable Cause	Recommended Action
Volume <VOLSER> has not been written The Export or Import operation specified an Export or Import List Volume that has not been created (written).	You should check for the correct identity of the Export or Import List Volume and, if necessary, execute the JCL that prepares a logical volume as the Export or Import List Volume.
Volume <VOLSER> could not be opened VTS failure.	Call your service representative.
Volume <VOLSER> could not be rewound VTS failure.	Call your service representative.
Volume <VOLSER> could not be closed VTS failure.	Call your service representative.
Volume <VOLSER> unable to locate Export List Records No records were found in the Export List File on the volser specified.	Check the source data used for preparation of the Export List Volume or Import List Volume.

Table 55. Export-Import List Volumes Failure Reason Text (continued)

Failure-Reason Text — Probable Cause	Recommended Action
Volume <VOLSER> unable to locate Import List Records No records were found in the Import List File on the volser specified.	Check the source data used for preparation of the Export List Volume or Import List Volume.
Volume Label, read error Volume Label record could not be read successfully.	Call your service representative.
Volume Label, compacted Volume Label record was compacted data.	Check the JCL that prepared the Export or Import List Volume.
Volume Label, error converting Label Identifier The EBCDIC field did not convert to ASCII correctly.	Check the JCL that prepared the Export or Import List Volume.
Volume Label, incorrect Label Identifier The characters 'VOL1' were not found in the Label Identifier and Label Number fields of the Volume Label.	Check the JCL that prepared the Export or Import List Volume.
Volume Label, error converting volser The EBCDIC field did not convert to ASCII correctly.	Check the JCL that prepared the Export or Import List Volume.
Volume Label, volser mismatch The volser found in the Volume Label does not match the volser specified in the Export or Import operation.	Call your service representative.
Volume Label, found tape mark instead Tape Mark was found that is not in the correct format sequence.	Check the JCL that prepared the Export or Import List Volume.
Volume Label, unexpected End of Tape The End of Tape was reached unexpectedly when attempting to read the Volume Label.	Check the JCL that prepared the Export or Import List Volume.
Volume Label, record is not 80 bytes The Volume Label record is not 80 bytes.	Check the JCL that prepared the Export or Import List Volume.
<File> <record>, read error When attempting to read the indicated record from the tape volume cache, a read error occurred.	Call your service representative.
<File> <Record>, found tape mark instead A tape mark was read instead of the File and Record indicated.	Check the JCL that prepared the Export or Import List Volume.
<File> <Record>, unexpected End of Tape The End of Tape was reached on the tape volume unexpectedly.	Check the JCL that prepared the Export or Import List Volume.
<File> <Record>, compacted The Record in the file indicated was compacted.	Check the JCL that prepared the Export or Import List Volume.

Table 55. Export-Import List Volumes Failure Reason Text (continued)

Failure-Reason Text — Probable Cause	Recommended Action
<File> <Record>, error converting <Field> The EBCDIC Field in the file and record indicated did not convert to ASCII correctly.	Check the JCL that prepared the Export or Import List Volume.
<File> <Record>, incorrect <Field> The Field indicated in the file and record indicated did not have the correct contents.	Check the JCL that prepared the Export or Import List Volume.
<File> <Record>, invalid Record Length The Record Length field of the HDR2 or EOF2 record in the file indicated is not equal to 80 characters.	Check the JCL that prepared the Export or Import List Volume.
<File> <Record>, Block and Record Length mismatch The Block Length and Record Length fields of HDR2 or EOF2 are not equal in the file and record indicated.	Check the JCL that prepared the Export or Import List Volume.
<File> <Record>, record is not 80 bytes The length of the HDR1, HDR2, EOF1 or EOF2 record is not equal to 80 bytes in the file and record indicated.	Check the JCL that prepared the Export or Import List Volume.
<File>, missing a tape mark For the file indicated, a tape mark was not found as expected in the format.	Check the JCL that prepared the Export or Import List Volume.
<File>, internal processing error MMMM VTS error. MMMM is a decimal number that indicates the internal functional area encountering the error.	Call your service representative.
<File>, more than max allowed records For the Export List File or Import List File as indicated, there are more than 50 000 records.	Check the source data used for preparation of the Export or Import List Volume.
<File>, number of records=0 For the Export List File or Import List File as indicated, the number of records was found to be zero.	Check the source data used for preparation of the Export or Import List Volume.
Reserved File, Identifier not found The Identifier record for the Reserved File was not found.	Check the JCL that prepared the Export or Import List Volume.
Construct overrides, Policy Management not supported The Import List File specified construct overrides, but the VTS does not have FC 4001 or policy management is not enabled.	Check JCL which prepared the Import List Volume. Check VTS and LM code levels installed. Install FC 4001 on VTS. Enable policy management.
Import List File Identifier, unsupported Version The Version field did not have '01' or '02' specified.	Check JCL which prepared the Import List Volume.
Import Options 1 Specifier, error parsing record The record is not specified correctly.	Check JCL which prepared the Import List Volume.

Category Recovery

Errors may be made when placing cartridges in the convenience I/O station and moving them into other categories from the Unassigned Category when the Advanced Function feature is installed on at least one VTS in a 3494. The error scenarios and recovery actions are described in Table 56.

Table 56. Category Recovery Error Scenarios

Error Scenario	Recovery Actions
Error Scenario An Exported Stacked Volume with logical volumes that have not been imported has been assigned to the Insert category. The volume serial number falls within a range defined for VTS stacked volumes. **Resultant Library Action** The library/VTS subsystem adds the volume as a scratch stacked volume. **Note:** Data on a volume are overwritten when the volume is selected for use by the VTS.	1. Eject the volume through the Library Manager console using the Eject a Stacked Volume function. 2. If the Exported Stacked Volume is needed for an Import operation, reinsert the volume into the convenience I/O station. Use the Manage Unassigned Volumes window to assign the volume to the Import category.
Error Scenario An Exported Stacked Volume with logical volumes that have not been imported has been assigned to the Insert category. The volume serial number does not fall within a range defined for VTS stacked volumes. **Resultant Library Action** The library assigns the volume to the Insert category for 3590 native use and notifies all attached hosts. **Note:** Data on a volume is overwritten when the volume is selected for use by a host.	1. Eject the volumes from the library through host console command, ISMF or tape management system command. 2. If the Exported Stacked Volume is needed for an Import operation, reinsert the volume into the convenience I/O station. Use the Manage Insert Volumes window to assign the volume to the Import category.
Error Scenario An Exported Stacked Volume has been assigned to the Import category and has not been required for the Import operation. **Resultant Library Action** The volume remains in the Import category.	Use the Manage VTS Import Volumes window to eject the volume.
Error Scenario An HPCT volume (not an Exported Stacked Volume) that is needed as a scratch stacked volume or native 3590 volume has been assigned to the Import category. **Resultant Library Action** The volume remains in the Import category until you take action.	Use the Manage VTS Import Volumes window to move the volume to the Insert category defined by volser ranges, or eject the volume if it is not desired in the 3494.

Reuse of Exported Stacked Volumes

When all of the logical volumes on an Exported Stacked Volume have been imported into a VTS, the Exported Stacked Volume can be reused for any 3590 application. No cleanup or special processing is required; however, the Exported Stacked Volumes remain in the Import category until you take action. It is up to you to determine when all of the logical volumes on an Exported Stacked Volume have been imported or are no longer needed and that the physical volume can be reused as a stacked volume in a VTS or for native use on a 3590 subsystem. This would be determined normally by using the tape management system to check that there are no logical volumes contained on a physical volume used previously as an Exported Stacked Volume. For example, the **RMM SEARCHVOLUME** command can be used to make this determination as follows:

```
RMM SV CONTAINER(xxxxxx)
```

where **xxxxxx** is the volser of the Exported Stacked Volume in question.

If no volumes are returned, all of the logical volumes on the Exported Stacked Volume have been imported, and the volume may be reused.

Reuse of the physical volumes is accomplished with operator action by using a Library Manager console **Manage Import Volumes** window to move the Exported Stacked Volumes out of the Import category (see Figure 139 on page 222). When they are moved out of the Import category, one of the following happens:

- The volumes are moved into the Insert category if they are to be used as scratch stacked volumes in a VTS within the current physical library. The volser of the physical volumes must fall in the range assigned for stacked volumes in the library partition into which the volumes are to go. If they are not in a range assigned for stacked volumes, the volumes are entered into the 3494 for native 3590 usage as the default.

- The volumes are moved into the Insert category if they are to be used as native 3590 cartridges. The volsers of the physical volumes must fall in the range assigned for native 3590 use. If they are not in a range assigned for 3590 native use, the volumes are entered into the 3494 for native 3590 usage as the default.

- Otherwise, the volumes are ejected for other use or later disposition. Exported Stacked Volumes may be placed in the convenience I/O station at any time. They are moved into the 3494 in the Unassigned category. You may then use the Manage Unassigned Volumes window to change the category to Import or Insert or to eject the volume.

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4. (a) ensure all information about identified or identifiable individuals (Personal Data) is deleted from the Machine (to the extent technically possible), (b) allow IBM, your reseller or an IBM supplier to process on your behalf any remaining Personal Data as IBM or your reseller considers necessary to fulfill its obligations under this Statement of Limited Warranty (which may include shipping the Machine for such processing to other IBM service locations around the world), and (c) ensure that such processing complies with any laws applicable to such Personal Data.

Limitation of Liability

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

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

Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), except for any liability that cannot be waived or limited by applicable laws, IBM is liable for no more than

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

2. the amount of any other actual direct damages, up to the charges (if recurring, 12 months' charges apply) for the Machine that is subject of the claim. For purposes of this item, the term ″Machine″ includes Machine Code and Licensed Internal Code (″LIC″).

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

UNDER NO CIRCUMSTANCES IS IBM, ITS SUPPLIERS OR RESELLERS LIABLE FOR ANY OF THE FOLLOWING EVEN IF INFORMED OF THEIR POSSIBILITY: 1) THIRD PARTY CLAIMS AGAINST YOU FOR DAMAGES (OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE); 2) LOSS OF, OR DAMAGE TO, DATA; 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; OR 4) LOST PROFITS, BUSINESS REVENUE, GOODWILL OR ANTICIPATED SAVINGS.

SOME STATES OR JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU. SOME STATES OR JURISDICTIONS DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

Governing Law

Both you and IBM consent to the application of the laws of the country in which you acquired the Machine to govern, interpret, and enforce all of your and IBM's rights, duties, and obligations arising from, or relating in any manner to, the subject matter of this Statement of Limited Warranty, without regard to conflict of law principles.

THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE OR JURISDICTION TO JURISDICTION.

Jurisdiction

All of our rights, duties, and obligations are subject to the courts of the country in which you acquired the Machine.

Part 2 - Country-Unique Terms

AMERICAS
ARGENTINA

Governing Law: *The following is added after the first sentence:*

Any litigation arising from this Statement of Limited Warranty will be settled exclusively by the Ordinary Commercial Court of the city of Buenos Aires.

BRAZIL

Governing Law: *The following is added after the first sentence:*

Any litigation arising from this Statement of Limited Warranty will be settled exclusively by the court of Rio de Janeiro, RJ.

PERU

Limitation of Liability: *The following is added at the end of this section:*

In accordance with Article 1328 of the Peruvian Civil Code the limitations and exclusions specified in this section will not apply to damages caused by IBM's willful misconduct (″dolo″) or gross negligence (″culpa inexcusable″).

NORTH AMERICA

How to Obtain Warranty Service: *The following is added to this section:*

To obtain warranty service from IBM in Canada or the United States, call
1-800-IBM-SERV (426-7378).

CANADA

Limitation of Liability: *The following replaces item 1 of this section:*

1. damages for bodily injury (including death) or physical harm to real property and
tangible personal property caused by IBM's negligence; and

Governing Law: *The following replaces "laws of the country in which you acquired
the Machine" in the first sentence:*

laws in the Province of Ontario.

UNITED STATES

Governing Law: *The following replaces "laws of the country in which you acquired
the Machine" in the first sentence:*

laws of the State of New York.

ASIA PACIFIC
AUSTRALIA

What this Warranty Covers: *The following paragraph is added to this section:*

The warranties specified in this Section are in addition to any rights you may have
under the Trade Practices Act 1974 or other similar legislation and are only limited
to the extent permitted by the applicable legislation.

Limitation of Liability: *The following is added to this section:*

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

Governing Law: *The following replaces "laws of the country in which you acquired
the Machine" in the first sentence:*

laws of the State or Territory

CAMBODIA, LAOS, AND VIETNAM

Governing Law: *The following replaces "laws of the country in which you acquired
the Machine" in the first sentence:*

laws of the State of New York, United States of America

CAMBODIA, INDONESIA, LAOS, AND VIETNAM

Arbitration: *The following is added under this heading:*

Disputes arising out of or in connection with this Statement of Limited Warranty shall be finally settled by arbitration which shall be held in Singapore in accordance with the Arbitration Rules of Singapore International Arbitration Center (″SIAC Rules″) then in effect. The arbitration award shall be final and binding for the parties without appeal and shall be in writing and set forth the findings of fact and the conclusions of law.

The number of arbitrators shall be three, with each side to the dispute being entitled to appoint one arbitrator. The two arbitrators appointed by the parties shall appoint a third arbitrator who shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the SIAC. Other vacancies shall be filled by the respective nominating party. Proceedings shall continue from the stage they were at when the vacancy occurred.

If one of the parties refuses or otherwise fails to appoint an arbitrator within 30 days of the date the other party appoints its, the first appointed arbitrator shall be the sole arbitrator, provided that the arbitrator was validly and properly appointed.

All proceedings shall be conducted, including all documents presented in such proceedings, in the English language. The English language version of this Statement of Limited Warranty prevails over any other language version.

HONG KONG S.A.R. OF CHINA AND MACAU S.A.R. OF CHINA

Governing Law: *The following replaces* ″*laws of the country in which you acquired the Machine*″ *in the first sentence:*

laws of Hong Kong Special Administrative Region of China.

INDIA

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

Arbitration: *The following is added under this heading:*

Disputes arising out of or in connection with this Statement of Limited Warranty shall be finally settled by arbitration which shall be held in Bangalore, India in accordance with the laws of India then in effect. The arbitration award shall be final and binding for the parties without appeal and shall be in writing and set forth the findings of fact and the conclusions of law.

The number of arbitrators shall be three, with each side to the dispute being entitled to appoint one arbitrator. The two arbitrators appointed by the parties shall appoint a third arbitrator who shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the Bar Council of India. Other

vacancies shall be filled by the respective nominating party. Proceedings shall continue from the stage they were at when the vacancy occurred.

If one of the parties refuses or otherwise fails to appoint an arbitrator within 30 days of the date the other party appoints its, the first appointed arbitrator shall be the sole arbitrator, provided that the arbitrator was validly and properly appointed.

All proceedings shall be conducted, including all documents presented in such proceedings, in the English language. The English language version of this Statement of Limited Warranty prevails over any other language version.

JAPAN

Governing Law: *The following sentence is added to this section:*

Any doubts concerning this Statement of Limited Warranty will be initially resolved between us in good faith and in accordance with the principle of mutual trust.

MALAYSIA

Limitation of Liability: *The word "***SPECIAL***" in item 3 of the fifth paragraph is deleted.*

NEW ZEALAND

What this Warranty Covers: *The following paragraph is added to this section:*

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

Limitation of Liability: *The following is added to this section:*

Where Machines are not acquired for the purposes of a business as defined in the Consumer Guarantees Act 1993, the limitations in this Section are subject to the limitations in that Act.

PEOPLE'S REPUBLIC OF CHINA (PRC)

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*

laws of the State of New York, United States of America (except when local law requires otherwise).

PHILIPPINES

Limitation of Liability: *Item 3 in the fifth paragraph is replaced by the following:*

SPECIAL (INCLUDING NOMINAL AND EXEMPLARY DAMAGES), MORAL, INCIDENTAL, OR INDIRECT DAMAGES FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; OR

Arbitration: *The following is added under this heading:*

Disputes arising out of or in connection with this Statement of Limited Warranty shall be finally settled by arbitration which shall be held in Metro Manila, Philippines in accordance with the laws of the Philippines then in effect. The arbitration award shall be final and binding for the parties without appeal and shall be in writing and set forth the findings of fact and the conclusions of law.

The number of arbitrators shall be three, with each side to the dispute being entitled to appoint one arbitrator. The two arbitrators appointed by the parties shall appoint a third arbitrator who shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the Philippine Dispute Resolution Center, Inc. Other vacancies shall be filled by the respective nominating party. Proceedings shall continue from the stage they were at when the vacancy occurred.

If one of the parties refuses or otherwise fails to appoint an arbitrator within 30 days of the date the other party appoints its, the first appointed arbitrator shall be the sole arbitrator, provided that the arbitrator was validly and properly appointed.

All proceedings shall be conducted, including all documents presented in such proceedings, in the English language. The English language version of this Statement of Limited Warranty prevails over any other language version.

SINGAPORE

Limitation of Liability: The words ″**SPECIAL**″ and ″**ECONOMIC**″ in item 3 in the fifth paragraph are deleted.

EUROPE, MIDDLE EAST, AFRICA (EMEA)
THE FOLLOWING TERMS APPLY TO ALL EMEA COUNTRIES:

The terms of this Statement of Limited Warranty apply to Machines purchased from IBM or an IBM reseller.

How to Obtain Warranty Service:

If you purchase a Machine in Austria, Belgium, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, Norway, Portugal, Spain, San Marino, Sweden, Switzerland, United Kingdom or Vatican State, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM, provided the Machine has been announced and made available by IBM in the country in which you wish to obtain service. If you purchased a Personal Computer Machine in Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Federal Republic of Yugoslavia, Former Yugoslav Republic of Macedonia (FYROM), Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, or Ukraine, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM.

If you purchase a Machine in a Middle Eastern or African country, you may obtain warranty service for that Machine from the IBM entity within the country of purchase, if that IBM entity provides warranty service in that country, or from an IBM reseller, approved by IBM to perform warranty service on that Machine in that country. Warranty service in Africa is available within 50 kilometers of an IBM approved service provider. You are responsible for transportation costs for Machines located outside 50 kilometers of an IBM approved service provider.

Add the following paragraph in **Western Europe** (*Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Monaco, Netherlands, Norway, Portugal, Spain, San Marino, Sweden, Switzerland, United Kingdom, Vatican State*): The warranty for Machines acquired in Western Europe shall be valid and applicable in all Western Europe countries provided the Machines have been announced and made available in such countries.

Governing Law:

The phrase ″the laws of the country in which you acquired the Machine″ *is replaced by*:

1) ″the laws of Austria″ in **Albania, Armenia, Azerbaijan, Belarus, Bosnia-Herzegovina, Bulgaria, Croatia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, FYR Macedonia, Moldova, Poland, Romania, Russia, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan,** and **FR Yugoslavia**; 2) ″the laws of France″ in **Algeria, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo Republic, Djibouti, Democratic Republic of Congo, Equatorial Guinea, French Guiana, French Polynesia, Gabon, Gambia, Guinea, Guinea-Bissau, Ivory Coast, Lebanon, Madagascar, Mali, Mauritania, Mauritius, Mayotte, Morocco, New Caledonia, Niger, Reunion, Senegal, Seychelles, Togo, Tunisia, Vanuatu**, and **Wallis** & Futuna; 3) ″the laws of Finland″ in **Estonia, Latvia**, and **Lithuania**; 4) ″the laws of England″ in **Angola, Bahrain, Botswana, Burundi, Egypt, Eritrea, Ethiopia, Ghana, Jordan, Kenya, Kuwait, Liberia, Malawi, Malta, Mozambique, Nigeria, Oman, Pakistan, Qatar, Rwanda, Sao Tome, Saudi Arabia, Sierra Leone, Somalia, Tanzania, Uganda, United Arab Emirates, the United Kingdom, West Bank/Gaza, Yemen, Zambia**, and **Zimbabwe**; and 5) ″the laws of South Africa″ in **South Africa, Namibia, Lesotho** and **Swaziland**.

Jurisdiction: *The following exceptions are added to this section*:

1) In **Austria** the choice of jurisdiction for all disputes arising out of this Statement of Limited Warranty and relating thereto, including its existence, will be the competent court of law in Vienna, Austria (Inner-City); 2) in **Angola, Bahrain, Botswana, Burundi, Egypt, Eritrea, Ethiopia, Ghana, Jordan, Kenya, Kuwait, Liberia, Malawi, Malta, Mozambique, Nigeria, Oman, Pakistan, Qatar, Rwanda, Sao Tome, Saudi Arabia, Sierra Leone, Somalia, Tanzania, Uganda, United Arab Emirates, West Bank/Gaza, Yemen, Zambia**, and **Zimbabwe** all disputes arising out of this Statement of Limited Warranty or related to its execution, including summary proceedings, will be submitted to the exclusive jurisdiction of the English courts; 3) in **Belgium** and **Luxembourg**, all disputes arising out of this Statement of Limited Warranty or related to its interpretation or its execution, the law, and the courts of the capital city, of the country of your registered office and/or commercial site location only are competent; 4) in **France, Algeria, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo Republic, Djibouti, Democratic Republic of Congo, Equatorial Guinea, French Guiana, French Polynesia, Gabon, Gambia, Guinea, Guinea-Bissau, Ivory Coast, Lebanon, Madagascar, Mali, Mauritania, Mauritius, Mayotte, Morocco, New Caledonia, Niger, Reunion, Senegal, Seychelles, Togo, Tunisia, Vanuatu**, and **Wallis & Futuna** all disputes arising out of this Statement of Limited Warranty or related to its violation or execution, including summary proceedings, will be settled exclusively by the Commercial Court of Paris; 5) in **Russia**, all disputes arising out of or in relation to the interpretation, the violation, the termination, the nullity of the execution of this Statement of Limited Warranty shall be settled by

Arbitration Court of Moscow; 6) in **South Africa, Namibia, Lesotho**, and **Swaziland**, both of us agree to submit all disputes relating to this Statement of Limited Warranty to the jurisdiction of the High Court in Johannesburg; 7) in **Turkey** all disputes arising out of or in connection with this Statement of Limited Warranty shall be resolved by the Istanbul Central (Sultanahmet) Courts and Execution Directorates of Istanbul, the Republic of Turkey; 8) in each of the following specified countries, any legal claim arising out of this Statement of Limited Warranty will be brought before, and settled exclusively by, the competent court of a) Athens for **Greece**, b) Tel Aviv-Jaffa for **Israel**, c) Milan for **Italy**, d) Lisbon for **Portugal**, and e) Madrid for **Spain**; and 9) **in the United Kingdom**, both of us agree to submit all disputes relating to this Statement of Limited Warranty to the jurisdiction of the English courts.

Arbitration: *The following is added under this heading:*

In **Albania, Armenia, Azerbaijan, Belarus, Bosnia-Herzegovina, Bulgaria, Croatia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, FYR Macedonia, Moldova, Poland, Romania, Russia, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan**, and **FR Yugoslavia**, all disputes arising out of this Statement of Limited Warranty or related to its violation, termination or nullity will be finally settled under the Rules of Arbitration and Conciliation of the International Arbitral Center of the Federal Economic Chamber in Vienna (Vienna Rules) by three arbitrators appointed in accordance with these rules. The arbitration will be held in Vienna, Austria, and the official language of the proceedings will be English. The decision of the arbitrators will be final and binding upon both parties. Therefore, pursuant to paragraph 598 (2) of the Austrian Code of Civil Procedure, the parties expressly waive the application of paragraph 595 (1) figure 7 of the Code. IBM may, however, institute proceedings in a competent court in the country of installation.

In **Estonia, Latvia**, and **Lithuania** all disputes arising in connection with this Statement of Limited Warranty will be finally settled in arbitration that will be held in Helsinki, Finland in accordance with the arbitration laws of Finland then in effect. Each party will appoint one arbitrator. The arbitrators will then jointly appoint the chairman. If arbitrators cannot agree on the chairman, then the Central Chamber of Commerce in Helsinki will appoint the chairman.

EUROPEAN UNION (EU)

THE FOLLOWING TERMS APPLY TO ALL EU COUNTRIES:

Consumers have legal rights under applicable national legislation governing the sale of consumer goods. Such rights are not affected by the warranties provided in this Statement of Limited Warranty.

How to Obtain Warranty Service: *The following is added to this section:*

To obtain warranty service from IBM in EU countries, see the telephone listing in Part 3 - Warranty Information.

You may contact IBM at the following address:

IBM Warranty & Service Quality Dept.
PO Box 30
Spango Valley
Greenock
Scotland PA16 0AH

AUSTRIA, DENMARK, FINLAND, GREECE, ITALY, NETHERLANDS, NORWAY, PORTUGAL, SPAIN, SWEDEN, AND SWITZERLAND

Limitation of Liability: *The following replaces the terms of this section in its entirety:*

Except as otherwise provided by mandatory law:

1. IBM's liability for any damages and losses that may arise as a consequence of the fulfillment of its obligations under or in connection with this Statement of Limited Warranty or due to any other cause related to this Statement of Limited Warranty is limited to the compensation of only those damages and losses proved and actually arising as an immediate and direct consequence of the non-fulfillment of such obligations (if IBM is at fault) or of such cause, for a maximum amount equal to the charges you paid for the Machine. For purposes of this item, the term ″Machine″ includes Machine Code and Licensed Internal Code (″LIC″).
   The above limitation shall not apply to damages for bodily injuries (including death) and damages to real property and tangible personal property for which IBM is legally liable.
2. **UNDER NO CIRCUMSTANCES IS IBM, ITS SUPPLIERS OR RESELLERS LIABLE FOR ANY OF THE FOLLOWING, EVEN IF INFORMED OF THEIR POSSIBILITY: 1) LOSS OF, OR DAMAGE TO, DATA; 2) INCIDENTAL OR INDIRECT DAMAGES, OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; 3) LOST PROFITS, EVEN IF THEY ARISE AS AN IMMEDIATE CONSEQUENCE OF THE EVENT THAT GENERATED THE DAMAGES; OR 4) LOSS OF BUSINESS, REVENUE, GOODWILL, OR ANTICIPATED SAVINGS.**

FRANCE AND BELGIUM

Limitation of Liability: *The following replaces the terms of this section in its entirety:*

Except as otherwise provided by mandatory law:

1. IBM's liability for any damages and losses that may arise as a consequence of the fulfillment of its obligations under or in connection with this Statement of Limited Warranty is limited to the compensation of only those damages and losses proved and actually arising as an immediate and direct consequence of the non-fulfillment of such obligations (if IBM is at fault), for a maximum amount equal to the charges you paid for the Machine that has caused the damages. For purposes of this item, the term ″Machine″ includes Machine Code and Licensed Internal Code (″LIC″).
   The above limitation shall not apply to damages for bodily injuries (including death) and damages to real property and tangible personal property for which IBM is legally liable.
2. **UNDER NO CIRCUMSTANCES IS IBM, ITS SUPPLIERS OR RESELLERS LIABLE FOR ANY OF THE FOLLOWING, EVEN IF INFORMED OF THEIR POSSIBILITY: 1) LOSS OF, OR DAMAGE TO, DATA; 2) INCIDENTAL OR INDIRECT DAMAGES, OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; 3) LOST PROFITS, EVEN IF THEY ARISE AS AN IMMEDIATE CONSEQUENCE OF THE EVENT THAT GENERATED THE DAMAGES; OR 4) LOSS OF BUSINESS, REVENUE, GOODWILL, OR ANTICIPATED SAVINGS.**

THE FOLLOWING TERMS APPLY TO THE COUNTRY SPECIFIED:

AUSTRIA

What this Warranty Covers: *The following replaces the first sentence of the first paragraph of this section:*

The warranty for an IBM Machine covers the functionality of the Machine for its normal use and the Machine's conformity to its Specifications.

The following paragraphs are added to this section:

The warranty period for Machines is 12 months from the date of delivery. The limitation period for consumers in action for breach of warranty is the statutory period as a minimum. In case IBM or your reseller is unable to repair an IBM Machine, you can alternatively ask for a partial refund as far as justified by the reduced value of the unrepaired Machine or ask for a cancellation of the respective agreement for such Machine and get your money refunded.

The second paragraph does not apply.

What IBM Will Do to Correct Problems: *The following is added to this section:*

During the warranty period, transportation for delivery of the failing Machine to IBM will be at IBM's expense.

Limitation of Liability: *The following paragraph is added to this section:*

The limitations and exclusions specified in the Statement of Limited Warranty will not apply to damages caused by IBM with fraud or gross negligence and for express warranty.

The following sentence is added to the end of item 2:

IBM's liability under this item is limited to the violation of essential contractual terms in cases of ordinary negligence.

EGYPT

Limitation of Liability: *following replaces item 2 in this section:*

as to any other actual direct damages, IBM's liability will be limited to the total amount you paid for the Machine that is the subject of the claim. For purposes of this item, the term ″Machine″ includes Machine Code and Licensed Internal Code (″LIC″).

Applicability of suppliers and resellers (unchanged).

FRANCE

Limitation of Liability: *The following replaces the second sentence of the first paragraph of this section:*

In such instances, regardless of the basis on which you are entitled to claim damages from IBM, IBM is liable for no more than: (items 1 and 2 unchanged).

GERMANY

What this Warranty Covers: *The following replaces the first sentence of the first paragraph of this section:*

The warranty for an IBM Machine covers the functionality of the Machine for its normal use and the Machine's conformity to its Specifications.

The following paragraphs are added to this section:

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

The second paragraph does not apply.

What IBM Will Do to Correct Problems: *The following is added to this section:*

During the warranty period, transportation for delivery of the failing Machine to IBM will be at IBM's expense.

Limitation of Liability: *The following paragraph is added to this section:*

The limitations and exclusions specified in the Statement of Limited Warranty will not apply to damages caused by IBM with fraud or gross negligence and for express warranty.

The following sentence is added to the end of item 2:

IBM's liability under this item is limited to the violation of essential contractual terms in cases of ordinary negligence.

HUNGARY

Limitation of Liability: *The following is added at the end of this section:*

The limitation and exclusion specified herein shall not apply to liability for a breach of contract damaging life, physical wellbeing, or health that has been caused intentionally, by gross negligence, or by a criminal act.

The parties accept the limitations of liability as valid provisions and state that the Section 314.(2) of the Hungarian Civil Code applies as the acquisition price as well as other advantages arising out of the present Statement of Limited Warranty balance this limitation of liability.

IRELAND

What this Warranty Covers: *The following is added to this section:*

Except as expressly provided in these terms and conditions, all statutory conditions, including all warranties implied, but without prejudice to the generality of the foregoing all warranties implied by the Sale of Goods Act 1893 or the Sale of Goods and Supply of Services Act 1980 are hereby excluded.

Limitation of Liability: *The following replaces the terms of section in its entirety:*

For the purposes of this section, a ″Default″ means any act, statement, omission, or negligence on the part of IBM in connection with, or in relation to, the subject matter of this Statement of Limited Warranty in respect of which IBM is legally liable to you, whether in contract or tort. A number of Defaults which together result in, or contribute to, substantially the same loss or damage will be treated as one Default occurring on the date of occurrence of the last such Default.

Circumstances may arise where, because of a Default, you are entitled to recover damages from IBM.

This section sets out the extent of IBM's liability and your sole remedy.

1. IBM will accept unlimited liability for death or personal injury caused by the negligence of IBM.

2. Subject always to the **Items for Which IBM is Not Liable** below, IBM will accept unlimited liability for physical damage to your tangible property resulting from the negligence of IBM.

3. Except as provided in items 1 and 2 above, IBM's entire liability for actual damages for any one Default will not in any event exceed the greater of 1) EUR 125,000, or 2) 125% of the amount you paid for the Machine directly relating to the Default.

Items for Which IBM is Not Liable

Save with respect to any liability referred to in item 1 above, under no circumstances is IBM, its suppliers or resellers liable for any of the following, even if IBM or they were informed of the possibility of such losses:

1. loss of, or damage to, data;

2. special, indirect, or consequential loss; or

3. loss of profits, business, revenue, goodwill, or anticipated savings.

SLOVAKIA

Limitation of Liability: *following is added to the end of the last paragraph:*

The limitations apply to the extent they are not prohibited under §§ 373-386 of the Slovak Commercial Code.

SOUTH AFRICA, NAMIBIA, BOTSWANA, LESOTHO, AND SWAZILAND

Limitation of Liability: *The following is added to this section:*

IBM's entire liability to you for actual damages arising in all situations involving nonperformance by IBM in respect of the subject matter of this Statement of Warranty will be limited to the charge paid by you for the individual Machine that is the subject of your claim from IBM.

UNITED KINGDOM

Limitation of Liability: *The following replaces the terms of this section is in its entirety:*

For the purposes of this section, a ″Default″ means any act, statement, omission, or negligence on the part of IBM in connection with, or in relation to, the subject matter of this Statement of Limited Warranty in respect of which IBM is legally liable to

you, whether in contract or tort. A number of Defaults which together result in, or contribute to, substantially the same loss or damage will be treated as one Default.

Circumstances may arise where, because of a Default, you are entitled to recover damages from IBM.

This section sets out the extent of IBM's liability and your sole remedy.

1. IBM will accept unlimited liability for:
   a. death or personal injury caused by the negligence of IBM; and
   b. any breach of its obligations implied by Section 12 of the Sale of Goods Act 1979 or Section 2 of the Supply of Goods and Services Act 1982, or any statutory modification or reenactment of either such Section.

2. IBM will accept unlimited liability, subject always to the **Items for Which IBM is Not Liable** below, for physical damage to your tangible property resulting from the negligence of IBM.

3. IBM's entire liability for actual damages for any one Default will not in any event, except as provided in items 1 and 2 above, exceed the greater of 1) Pounds Sterling 75,000, or 2) 125% of the total purchase price payable or the charges for the Machine directly relating to the Default.

These limits also apply to IBM's suppliers and resellers. They state the maximum for which IBM and such suppliers and resellers are collectively responsible.

Items for Which IBM is Not Liable

Save with respect to any liability referred to in item 1 above, under no circumstances is IBM or any of its suppliers or resellers liable for any of the following, even if IBM or they were informed of the possibility of such losses:

1. loss of, or damage to, data;
2. special, indirect, or consequential loss; or
3. loss of profits, business, revenue, goodwill, or anticipated savings.

Part 3 - Warranty Information

This Part 3 provides information regarding the warranty applicable to your Machine, including the warranty period and type of warranty service IBM provides.

Machine Type: IBM TotalStorage Enterprise Automated Tape Library (3494)

Warranty Period: One (1) year on-site service.

Warranty service may be provided by your reseller if approved by IBM to perform warranty service. IBM or your reseller will either repair or exchange the failing Machine at your location and verify its operation. You must provide suitable working area to allow disassembly and reassembly of the IBM Machine. The area must be clean, well lit, and suitable for the purpose. For some Machines, certain repairs may require sending the Machine to an IBM service center. Scheduling of service will depend upon the time of your call and is subject to parts availability. Service levels are response time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations, additional charges may apply outside IBM's normal service area, contact your local IBM representative or your reseller for country and location specific information.

Warranty Contact Information

The IBM Machine Warranty worldwide web site at
`http://www.ibm.com/servers/support/machine_warranties/`provides a worldwide
overview of IBM's Limited Warranty for Machines, the Glossary of IBM definitions,
Frequently Asked Questions (FAQs) and Support by Product (Machine) with links to
Product Support pages. **The IBM Statement of Limited Warranty is also
available on this site in 29 languages.** To obtain warranty service, contact IBM or
your IBM reseller. In Canada or the United States, call 1-800-IBM-SERV
(426-7378). In the EU countries, see the telephone numbers below.

EU Country Telephone List

Phone numbers are subject to change without notice.

Table 57. EU Country Telephone List

Austria: 43–1–24592–5901	Italy: 39–02–482–9202
Belgium: 02–718–4339	Luxembourg: 352–360385–1
Denmark: 4520–8200	Netherlands: 020–514–5770
Finland: 358–9–4591	Portugal: 351–21–7915–147
France: 0238–557–450	Spain: 34–91–662–4916
Germany: 07032–15–4920	Sweden: 46–8–477–4420
Greece: 30–210–688–1220	United Kingdom: 01475–555–055
Ireland: 353–1–815–4000	

Glossary

This glossary defines the special terms, abbreviations, and acronyms used in this publication. If you do not find the term you are looking for, see the index or the *IBM Dictionary of Computing*, New York: McGraw-Hill, 1994.

Numerics

3490E. The term used to mean a 3490E tape subsystem.

3494. (1) The term used to mean a collection of tape cartridges. Within the 3494, it describes the set of cartridges contained within the enclosure. (2) An automated tape library (for example, the 3494) that consists of cartridge storage frames, tape subsystems, and controlling hardware and software. The 3494 performs host-directed tape cartridge mounts and demounts without operator intervention.

3590. The term used to mean a 3590 tape subsystem.

A

ACL. See *automatic cartridge loader*.

action bar. In the Library Manager application, the area at the top of the primary window that contains keywords that give users access to actions available in that window. After users select a choice in the action bar, a window extension opens.

active accessor. The accessor being used currently to move cartridges within the 3494.

active Library Manager. The Library Manager controlling 3494 operation currently.

active window. In the Library Manager, the window that is in use currently and that receives keyboard or mouse input.

advanced program-to-program communication. A protocol that allows systems or tape drives to be attached to the token-ring network so that they can communicate and process the same programs.

APPC. See *advanced program-to-program communication*.

automatic cartridge loader. A device that allows multiple cartridges to be loaded and unloaded from a tape drive without operator intervention.

auto mode. An operating mode in which the attached host systems directs the operation of the 3494 without operator interaction. The library is in Auto mode when accessor motion is allowed or enabled.

availability. For a storage subsystem, the degree to which a data set can be accessed when requested by a user.

available. The term used to indicate that a component is available for use by the Library Manager. Components in the 3494 (such as cartridge accessor, grippers, I/O facilities, and tape drives) are either available or unavailable for use. Compare with *online*. Contrast with *unavailable*.

B

backstore. The physical tape devices used to store VTS data.

bar code. A code representing characters by sets of parallel bars of varying thickness and separation.

bar code label. The label attached to the end of tape cartridges, containing a code representing characters by sets of parallel bars of varying thickness and separation.

bar code reader. See *vision system*.

barrier door. Used by service personnel to separate the service bay from the main aisle of the 3494. This allows concurrent service to the accessor and the associated hardware. This feature is available only in the HA1 Frames.

borrow. When a storage pool is out of scratch stacked volumes, scratch volumes will be borrowed from the Common Scratch Pool.

C

cache. A high speed buffer storage that contains frequently accessed instructions and data; it is used to reduce access time. See *tape volume cache*.

cartridge. The term used to mean the IBM Cartridge System Tape, the IBM Enhanced Capacity Cartridge System Tape, the IBM High Performance Cartridge Tape, or the IBM Extended High Performance Cartridge Tape.

cartridge accessor. The physical mechanisms within the 3494 that identify, retrieve, and move tape cartridges. It consists of a gripper, vision system, picker, and accessor mechanism.

cartridge automation. The process in which the 3494 performs actions for inserting, ejecting, mounting, demounting, loading, and unloading of tape cartridges automatically.

cartridge system tape. The base tape cartridge media that is used with 3480 and 3490 Magnetic Tape Subsystems.

category. A grouping of volumes with a common attribute, such as volumes to eject, volumes newly added to the 3494, and volumes to clean tape drives.

caution notice. A special note in text that calls attention to a situation that is potentially hazardous to people because of some existing situation. See also *danger notice*.

cell. See *storage cell*.

check box. On the Library Manager display, a control that consists of a displayed square box and selectable text. It acts as a switch.

click. With the Library Manager, the act of pressing a button on a pointing device while holding the pointing device pointer on the selected text. See also *double-click*.

client area. The area in the center of a window that contains the main information of the window.

code. The term used to mean the internal programs that comprise the Library Manager application.

command. A control signal that initiates an action or the start of a sequence of actions.

component. A part of a functional unit. For example, the gripper mechanism is a component of the cartridge accessor.

composite library. In a PtP VTS, the single virtual library presented in the virtual view to the host.

construct. A storage group, storage class, management class, or data class name and associated actions. Used by the host to control volumes.

control program. The program in the host system that schedules and supervises the execution of application programs.

convenience input. The term used when loading small numbers of tape cartridges into the 3494 using the convenience I/O station. See *convenience I/O station*.

convenience I/O station. An optional feature of the 3494 used to load or unload small numbers of cartridges into or out of the 3494. The station supports only one type of operation at a time, either input or output.

convenience output. The term used when unloading small numbers of tape cartridges from the 3494 using the convenience I/O station. See *convenience I/O station*.

CST. See *cartridge system tape*.

D

DAA. See *dual active accessors*.

danger notice. A special note in text that calls attention to a situation that is potentially lethal or extremely hazardous to people. See also *caution notice*.

database. A collection of data that can be accessed by a data processing system for a specific purpose.

DCAF. See *distributed console access facility*.

degraded. A mode of 3494 operation in which some element of the 3494 has failed. Some performance degradation may be experienced.

demount. A host command to unload a cartridge from a tape drive.

device. A generic term used to mean an item of other equipment attached to the 3494, such as tape drives, optical storage, and so on.

direct attach port . Ports that provide a control path for 3494 functions between an open systems host and the Library Manager.

diskette. A thin, flexible magnetic disk and a protective jacket, in which the disk is permanently enclosed. Contrast with *hard disk*.

distributed console access facility. A feature that allows the operator to control or monitor 3494 operations from a remote location.

distributed library. In a PtP VTS, one of the physical libraries. Note that each distributed library is actually a partition in separate 3494s.

double-click. With the Library Manager, the act of pressing a pointing device button twice within a time limit while holding the pointing device pointer on the selected item. See also *click*.

dual active accessors. The Dual Active Accessors feature consists of two cartridge accessors and microcode that enables them to be active at the same time. In normal operation, both accessors are active when this feature is installed.

dual Library Manager. The dual Library Manager consists of two Library Managers. In normal operation, one Library Manager is the active Library Manager, and the other Library Manager is the standby Library Manager.

dump. To record data, at a particular instant, for the purpose of safeguarding or analyzing.

E

ECCST. See *enhanced capacity cartridge system tape*.

EHPCT. See *extended high performance cartridge tape*.

eject. The operation of moving a cartridge to an output station in the 3494. Contrast with *insert*.

emergency power off. A switch that removes all power from the equipment in the 3494 but does not affect power to lighting circuits.

enable. To provide the means or opportunity. The modification of system, control unit, or device action through the change of a software module or a hardware switch (circuit jumper) position.

enclosure interlock. The mechanism that locks the 3494 door.

enhanced capacity cartridge system tape. Cartridge system tape with increased capacity that can be used only with 3490E enhanced capability models. Visually identified by a two-tone cartridge case.

Enterprise. An automated tape library consisting of mechanical components, cartridge storage frames, IBM tape subsystems, and controlling hardware and software. The tape library performs tape cartridge mounts and demounts without operator intervention.

Enterprise Systems Connection. A set of IBM products and services that provide a dynamically connected environment within an enterprise.

EPO. See *emergency power off*.

ESCON. See *Enterprise Systems Connection*.

Ethernet. A local area network (LAN) that allows multiple stations to access a data transmission without prior coordination.

export. The VTS Export operation allows logical volumes to be moved from a VTS to another VTS. The destination VTS can be in the same 3494 or in a different 3494.

exported stacked volume. A physical volume managed by a VTS that contains logical volumes that can be removed from the VTS.

extended high performance cartridge tape.
Cartridge system tape with increased capacity that can be used only with 3590 tape subsystems. Visually identified by a green leader block and two green inserts with identification notches on the edge of the cartridge case.

F

Fiber Connectivity (FICON). A high-speed input/output (I/O) interface for mainframe computer connections to storage devices.

FICON. See *Fiber Connectivity*.

file-protected. Pertaining to a tape volume that data can only be read from. Data cannot be written on or erased from the tape.

fixed cell mode. The mode where the home cell for a tape volume will not move, it will remain static.

floating cell mode. The mode where the home cell for a tape volume will move, it will not remain fixed.

frame. (1) A housing for device elements. (2) The hardware support structure, covers, and all parts mounted therein that are packaged as one entity for shipping.

G

gripper. A part attached to the picker mechanism of the cartridge accessor, which loads, unloads, and moves cartridges between storage cells, tape drives, and the convenience I/O station.

H

hard disk. A rigid, non-removable disk residing in the Library Manager.

high availability unit. A second Library Manager, a second accessor, and service bay frames, which improve 3494 availability.

high-capacity I/O facility. The part of the 3494 used to load and unload large numbers of cartridges from the 3494.

high-capacity output facility. The part of the 3494 used to unload large numbers of cartridges from the 3494.

high performance cartridge tape. Cartridge system tape with increased capacity that can be used only with 3590 tape subsystems. Visually identified by a blue leader block and two blue inserts with identification notches on the edge of the cartridge case.

home cell. A fixed location that is assigned to a cartridge when it is first inserted into the 3494.

home position. A position the cartridge accessor goes to when entering Pause mode. Home position is located at the far left side of the control unit frame.

host system. A data processing system that is used to prepare programs and the operating environments for use on another computer or controller.

HPCT. See *high performance cartridge tape*.

I

icon. A pictorial representation of an object or a selection choice. Icons can represent objects that users want to work on or actions that users want to perform. See *system menu icon*.

IDRC. See *improved data recording capability*.

import. The VTS Import operation allows logical volumes to be moved to a VTS from another VTS. The source VTS can be in the same 3494 or in a different 3494.

improved data recording capability. A data recording mode that, if installed and enabled on the 3490E Magnetic Tape Subsystem, can increase the effective cartridge data capacity and the effective data rate if started.

initial program load. The initialization procedure that causes an operating system to start operation.

insert. The operation of adding cartridges to the 3494. Contrast with *eject*.

internet protocol. A form of LAN communications protocol.

inventory. The operation of identifying the location of each tape cartridge contained in the 3494.

I/O. Input or output or both.

IP. See *internet protocol*.

IPL. See *initial program load*.

K

Keep. When a stacked physical volume is borrowed from the Common Scratch Pool (CSP) and it is not to be returned to the CSP when it is reclaimed.

L

LAN. See *local area network*.

LED. See *light emitting diode*.

Library Manager. The controller for the 3494. It manages the location of tape cartridges, monitors performance, issues commands to the hardware, displays status, and performs other functions. It communicates with host systems through the tape control unit in each library or, in AS/400 and iSeries,

directly through the RS-232 interface. The Library Manager also provides operator and service panel functions.

light emitting diode. (1) A semiconductor chip that emits visible or infrared light when activated. (2) A light that signals a change in status or the presence of a certain predefined condition.

load. (1) The process, performed by an operator or by the cartridge accessor, of placing a cartridge into a location within the 3494 for later use or retrieval. (2) The term used when describing the action of the tape transport when it removes the leader block from a cartridge and threads the media through the internal tape path.

local area network. A computer network located on a user's premises within a limited geographical area. Communication within a LAN is not subject to external regulations; however, communication across a LAN boundary may be subject to regulation.

logical library. A logical library represents a set of tape volumes and tape drives that are a subset of all tape volumes and drives in a 3494. Each logical library within a 3494 has a unique library sequence number identifying the logical library.

logical volume. A logical volume is a data volume that is stored on a stacked volume. A logical volume is not directly accessible by a host program. The volume serial number of the logical volume is not externally visible to a human or device.

M

magazine. A container residing in a storage frame. Each container consists of storage cells for holding tape cartridges.

manual mode. A mode of operation, where the operator, under the direction of the Library Manager, locates and moves tape cartridges to and from storage cells and tape units manually. This mode allows data to be retrieved when normal 3494 operations are interrupted by unexpected conditions.

menu. A panel containing a list of functions available for selection.

migrate. Move virtual volume data from the VTS cache to a physical stacked tape.

mount. A host command to load a cartridge into a tape unit.

mount from input station. A function available through the Commands window on the Library Manager. It allows transient cartridges outside the library to be mounted on devices within the 3494. It is used to

support stand alone programs that do not require the support of a full operating system.

N

no borrow. When a storage pool is out of scratch stacked volumes, no volumes will be borrowed from the Common Scratch Pool.

non-user interface VTS. The VTS in a PtP VTS configuration that was not selected as the user interface VTS. The non-user interface VTS is the secondary VTS in the configuration. User applications do not recognize the non-user interface VTS.

O

offline. Pertaining to the operation of a unit when not under the direct control of a host system. Compare with *unavailable*. Contrast with *online*.

OK. With the Library Manager, a standard button that causes the application to accept any changed information and closes the window.

online. Pertaining to the operation of a unit when under the direct control of a host system. Compare with *available*. Contrast with *offline*.

P

panel. (1) A control area on a device that allows user interaction with the device. (2) The information that is displayed on a screen.

park. An operation the cartridge accessor performs when entering Pause mode. The cartridge accessor moves to the home position, and the picker lowers. See also *home position*.

pause mode. An operating mode in which all host requests that require movement of cartridges are queued until the 3494 is returned to Auto mode. The cartridge accessor is parked, and the library doors may be opened.

PtP VTS. A VTS configuration in which copies of data in newly created or updated tape volumes are created or updated automatically in each of two interconnected VTSs. This dual-volume copy functionality improves data availability and data recovery, while being transparent to user applications and host processor resources.

picker. The picker provides a mounting platform for the gripper and the bar code reader.

primary window. The window on the Library Manager display in which the main dialog between users and the Library Manager occurs.

push button. On the Library Manager display, a shaded rectangle, containing text and used in windows to initiate actions. Selecting a push button causes an action to take place immediately.

R

rack. See *wall*.

radio button. On the Library Manager display, a control that consists of a circle and text. Radio buttons are combined in groups to show users a fixed set of choices that are mutually exclusive. Clicking on a radio button causes that choice to be selected and all others in its group to be deselected.

recall. Move data from a stacked physical tape to the VTS cache.

reclaim. Move active data onto fewer physical tapes and allow extra tapes to be reused.

reconcile. The process of determining what is active data and what is inactive data.

reduced instruction set computer. A computer that uses a small, simplified set of frequently used instructions for rapid execution.

remote Library Manager console. The Remote Library Manager Console feature permits control or monitoring of the Library Manager from a location that is remote from the 3494.

return. When a stacked physical volume is borrowed from the Common Scratch Pool (CSP) and it is to be returned to the CSP when it is reclaimed.

RISC. See *reduced instruction set computer*.

S

screen. The viewing area of a workstation's display.

secondary window. A window on the Library Manager display that is movable and sizeable and is always associated with a primary window.

selection list. On the Library Manager display, a control that contains choices from which users can select one choice.

service bays. Frames attached to either end of the library to allow for storage and containment of the hot standby library controller and cartridge accessor.

setup. The preparation of a computing system to perform a job or job step.

shortcut key. A combination of keys that a user can press to perform an action that is available from a

menu. For example, the Ctrl + C combination causes the Library Manager to display the task list.

Specialist. The name of the Web interface used on several IBM storage products that allows monitoring of the system using a Web browser.

stacked volume. A physical volume that is managed exclusively by a VTS and contains one or more logical volumes. It is not a user-accessible volume.

standby accessor. The accessor not being used currently to move cartridges when the HA1 Frames are installed.

standby Library Manager. The standby Library Manager can take control of all operations in the 3494. Its hardware consists of a controller, a display, a pointing device, and a keyboard. This feature is available only in the HA1 Frames configuration.

storage. (1) A device in which recorded information can be entered, retained, and processed, and from which recorded information can be retrieved. (2) The action of placing data into a storage device. (3) A facility in which data can be retained.

storage cell. A location in the 3494 where a cartridge can be loaded or unloaded. This includes the storage cells in a storage frame and the convenience I/O station.

system menu. On the Library Manager display, the menu in the upper left corner of a window, which allows users to restore, close, move, size, minimize, and maximize the window. The system menu is referenced by the system menu icon.

system menu icon. The term for the symbol located in the upper left corner of some windows that is used to control the presence and appearance of those windows. See *system menu*.

T

tape drive. A device that is used for moving magnetic tape. It includes the mechanisms for writing and reading data to and from tape. See also *tape unit* and *transport*.

tape management software. A program that controls the scratch status of tape volumes.

tape unit. A device that contains tape drives and their associated power supplies and electronics.

tape volume cache. The tape volume cache is a major component of a VTS and is a combination of RAID storage devices, RAM buffering, and internal licensed code that stores and manages virtual volumes.

TCP. See *transmission control protocol*.

teach. The process that allows the Library Manager, using the cartridge accessor, to *learn* the exact physical locations of each major unit within the 3494.

title bar. The area at the top of each window that contains the window title and system menu icon. When appropriate, it also contains the minimize, maximize, and restore icons.

token-ring network. A local area network (LAN) that uses ring topology, where tokens are passed from node to node. A node that is ready to send can capture a token and insert data for transmission.

transient cartridges. Cartridges that reside in a user's library that are not stored within the confines of the automated tape library and are not recorded as part of the automated library's inventory.

transient mount. See *mount from input station*.

transmission control protocol. A communications protocol used in the Internet and in any network that follows the Internet Engineering Task Force (IETF) standards for internetwork protocol. TCP provides a reliable host-to-host protocol between hosts in packet-switched communications networks and in interconnected systems of such networks. It uses the Internet Protocol (IP) as the underlying protocol.

transport. The mechanism inside a tape drive that moves tape media. It is comprised of loading, threading and guiding mechanisms and motors.

U

UEPO. See *unit emergency power off*.

unavailable. A term used to mean that a component in the 3494 (for example, the cartridge accessor) is not available for use by the Library Manager. Compare with *offline*. Contrast with *available*.

unit. (1) An entity that can accomplish a specific purpose, for example, a 3490E tape drive. (2) An individual piece of the 3494 that can be added to or deleted from a 3494 configuration, for example, 3490E control unit, 3490E tape unit, storage frame, or convenience I/O station.

unit emergency power off. The control unit switch that, when operated in an emergency, causes all subsystem frames to be disconnected from the ac power source.

unit power off. A switch that removes all power from a specific unit of the 3494.

unload. To remove cartridges from a device in the 3494.

UPO. See *unit power off*.

user interface VTS. During the library installation Teach operation, the service representative selects one of the VTSs in a Peer-to-Peer VTS configuration to be the user interface VTS. This is the VTS that the user has designated to perform library console operations, such as logical volume volser creation.

V

virtual tape drive. A virtual tape drive is a representation of the functionality of a 3490E class tape drive as viewed by the host control program. The data from and to the drive is directed to the tape volume cache, and all drive related commands are emulated through the internal licensed code in the VTS controller.

virtual tape server. A VTS is comprised of a VTS controller, 3590 tape devices, and the 3494. Together, they manage the utilization of the cartridge storage capacity and performance capabilities of the 3590 tape technology transparently to host software and applications.

virtual telecommunications access method. IBM software that controls communication and the flow of data in an SNA network by providing the SNA application programming interfaces and SNA networking functions. An SNA network includes subarea networking, Advanced Peer-to-Peer Networking (APPN), and High-Performance Routing (HPR). Starting with Release 5 of the OS/390 operating system, the VTAM for MVS/ESA function was included in Communications Server for OS/390; this function is called Communications Server for OS/390 - SNA Services.

virtual volume. A user-accessible volume that exists in the tape volume cache of a VTS. When a virtual volume is copied from the tape volume cache to a stacked volume, it becomes a logical volume. When a logical volume is recalled from a stacked volume to the tape volume cache, it becomes a virtual volume.

vision system. A Class II laser bar code reader that is mounted on the cartridge accessor picker. It is used to read the bar code labels on the tape cartridges.

volser. Volume serial identifier. The physical label on the cartridge. Also, the same or different identifier encoded on the magnetic tape.

volume. See *cartridge*.

VTAM. See *virtual telecommunications access method*.

VTS. See *virtual tape server*.

W

wall. Walls located inside the 3494 house the cartridge storage cells. The walls on the front doors of the 3494 are labeled with even numbers, and the walls on the rear of the 3494 are labeled with odd numbers.

window. On the Library Manager display, a selectable area in which users provide information that is required by an application so it can continue a user's request.

/ **Write Once, Read Many (WORM).** A technology that
/ allows data to be written only once to certain 3592 tape
/ cartridges. After being written, the data cannot be
/ altered, but can be read any number of times.

Index

Numerics

Readers' Comments — We'd Like to Hear from You

IBM TotalStorage
Enterprise Automated Tape Library (3494)
Operator Guide

Publication No. GA32-0449-04

Overall, how satisfied are you with the information in this book?

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Overall satisfaction	☐	☐	☐	☐	☐

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Easy to understand	☐	☐	☐	☐	☐
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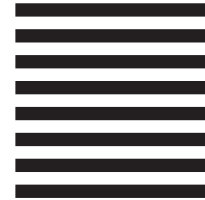Fold and Tape   **Please do not staple**   Fold and Tape

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3494 Operator Guide

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