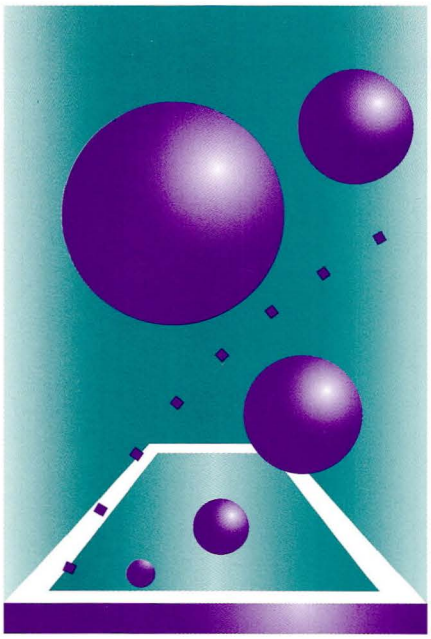

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ConvexTMR Operator's Guide

First Edition

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Order No. DSW-482

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October 1994

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Order No. DSW-482

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Preface

Purpose and audience

The *ConvexTMR Operator's Guide* is for tape operators who perform tape operations with ConvexTMR software on ConvexOS and SPP-UX systems.

Using this guide

This book is organized into the following chapters:

- **Overview**—Introduces ConvexTMR and the fundamentals of tape management. This chapter defines tape library organization and operations, data access methods, tape life cycles, and tape objects. This chapter also outlines steps for getting started and lists operator commands.
- **Enrolling as a tape operator**—Explains how to enroll as a tape operator and describes operator authority levels.
- **Controlling the server**—Explains how to start and stop the ConvexTMR server and describes server modes and domain servers.
- **Operating the request monitor**—Explains how to handle mount requests and other tape services via both the command-line and full-screen interfaces. Device and volume states are also covered.
- **Conducting tape library operations**—Explains how to handle library requests and covers methods of tape identification and storage.
- **Glossary**—Defines terms used in this document.

Notational conventions

This section discusses notational conventions used in this book.

`Bold monospace` In command examples, text shown in **`bold monospace`** identifies user input that must be typed exactly as shown.

`Monospace` In paragraph text, `monospace` identifies:

- Command names
- System calls
- Data structures and types

In command examples, `monospace` identifies command output, including error messages.

In command syntax diagrams, text shown in `monospace` must be typed exactly as shown.

Italic In paragraph text, *italic* identifies:

- New and important terms
- Titles of documents

In command syntax diagrams, *italic* identifies variables that must be supplied by the user.

{ } In command syntax diagrams, text surrounded by curly brackets indicate a choice. The choices available are shown inside the curly brackets and separated by the pipe (|) sign.

The following command example indicates that you can enter either `a` or `b`:

```
command {a | b}
```

[ ] In command syntax diagrams, square brackets indicate optional data.

The following command example indicates that definition of the variable *output_file* is optional:

`command` *input_file* [*output_file*]

...	In command syntax, horizontal ellipsis shows repetition of the preceding item(s). The following command example indicates you can optionally specify more than one *input_file* on the command line. `command` *input_file* [*input_file* ...]
KEYCAP	In paragraph text, text shown in KEYCAP indicates keyboard keys you must press to execute the command. For example, RETURN refers to the carriage return key. Two KEYCAP terms separated by a hyphen indicate two keys that you must press simultaneously. For example, CTRL-d indicates that you must press the d key while holding down the CTRL key.

Notes, cautions, and warnings

This document presents notes, cautions, and warnings in the following formats.

Note

A Note highlights supplemental information.

Caution

A Caution highlights information necessary to avoid damage to the system.

Warning

A warning highlights information necessary to avoid injury to personnel.

Associated documents

Using this software may require information not specific to the tasks described in this document.

For more information on the ConvexOS operating system, you can order these books from CONVEX Computer Corporation:

- *ConvexOS Primer* (DSW-133). This book introduces new users to the ConvexOS operating system.
- *ConvexOS Programmer's Reference* (DSW-332). This book is the standard reference for the ConvexOS operating system.
- SPP-UX System Administration Guide (DSW-853). This book is the standard reference for the SPP-UX operating system.

Ordering documents

To order the current edition of these or any other CONVEX document, send requests to:

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Please include the order number (DSW or DHW number) or the exact title of the document.

Technical assistance

If you have questions that are not answered in this book, contact the CONVEX Technical Assistance Center (TAC) at the following locations:

- Within the continental U.S., call 1 (800) 952-0379.
- From Canada, call 1 (800) 345-2384.
- All other locations, contact the local CONVEX office.

You can also use the `contact` utility, if you would like to report any problems you may have with ConvexTMR or its associated documentation. For more information refer to the contact(1) man page in *ConvexOS Man Pages for Users*, or the appendix "Reporting problems" in the *ConvexOS Primer* or *Managing ConvexOS: Operations Guide.*

Overview

1

Introduction

ConvexTMR is a tape management software system that integrates a full-featured tape manager with powerful cataloging abilities. ConvexTMR offers the following features and services:

- role-based interfaces
- extensive media, device, and recording format options
- interactive and batch tape session support
- data security control
- tape drive arbitration
- complete tape life-cycle management
- operational domain support
- unlimited vaulting and rotation options
- user pool creation options
- comprehensive logging and reporting facilities

The tape manager

This section describes the tape manager.

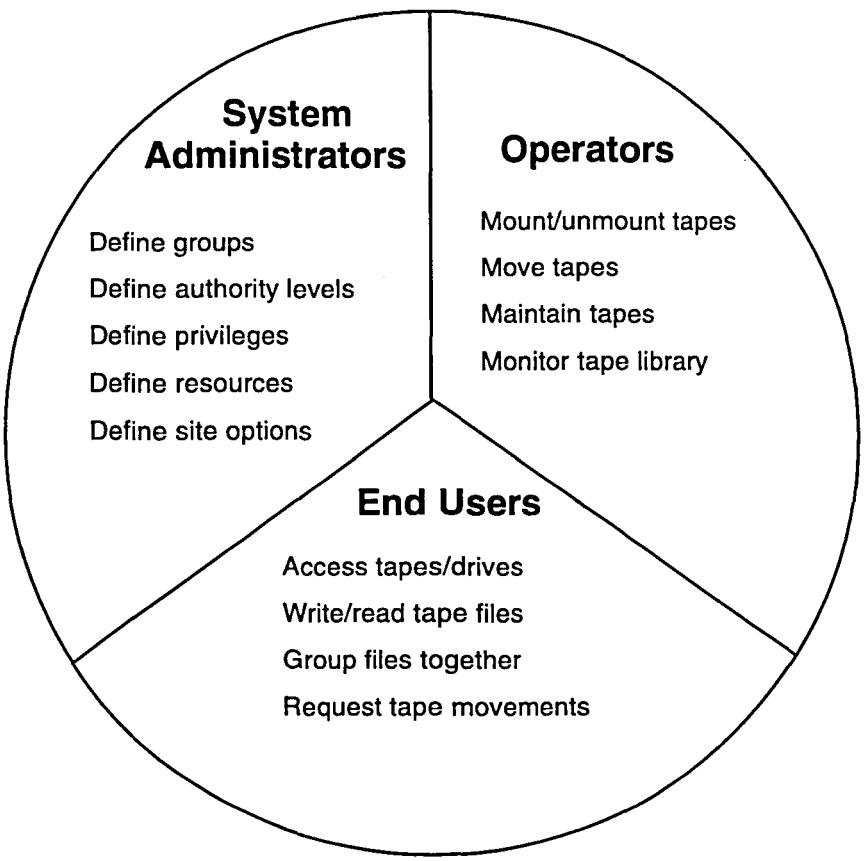
Role-based interfaces

ConvexTMR brings together three distinct role groups: system administrators, operators, and end users. ConvexTMR provides separate interfaces and programs for each of these user groups, each tailored to the specific needs of the particular group.

Figure 1 illustrates how these three groups perform their roles interdependently.

The following sections introduce the three ConvexTMR role groups and list the activities of each.

Figure 1 ConvexTMR role groups



Administrator activities

The ConvexTMR administrator configures the ConvexTMR software and supervises its operation. Administrator activities include

- defining administrator groups and authority levels
- defining operator groups and authority levels
- defining user and group privileges
- defining system resources
- defining site options

Operator activities

The ConvexTMR operator monitors the software operation and performs the day-to-day physical tape library tasks. All mounting, vaulting, and tape management requests are directed to the ConvexTMR operator via the request monitor.

Operator activities include

- mounting and unmounting tapes
- moving tapes to new locations
- performing tape maintenance:
  - cleaning tapes
  - erasing tapes
  - initializing tapes
  - identifying found tapes
- monitoring and controlling the servers
- monitoring and controlling tape devices

User activities

The ConvexTMR user stores and retrieves tape files during tape sessions. Users may control the disposition and access rights to their offline data via the ConvexTMR catalog. User activities include

- accessing tape drives and tapes for tape sessions
- writing and reading tape files
- grouping tape files together in logical ways
- creating and sharing tape pools
- requesting tape movement among library sites

User tape sessions

ConvexTMR supports both interactive tape sessions and batch operations. It collects incoming requests in a prioritized queue, allocates the necessary resources, and directs the operator to perform the needed activities.

ConvexTMR offers two data access methods. In addition to traditional volume-level access, ConvexTMR also provides file-level access.

Volume-level access

In volume-level access, the entire tape volume is accessible to users. Each file access request must include instructions to the tape device to wind or rewind the tape to a specific position.

File-level access

An alternative to volume-level access, file-level access allows the selection of a file by name, as if the tape file were a file on a floppy disk. This frees the user from the tape navigation concerns inherent in volume-level access. With file-level access, it is also possible to make different files on the same volume accessible to discrete user groups.

The catalog

The ConvexTMR online catalog is a comprehensive database that tracks all the objects in the library. The catalog maintains records on many attributes of ConvexTMR objects. Some of these attributes are listed below.

- ownership
- contents
- association with other tapes
- pools
- vaulting
- status

Operating without a catalog

Some ConvexTMR sites choose to use the software without the catalog. Parts of some commands and all of others are inactive in no-catalog mode. These differences are noted throughout the documentation.

Tape naming and identification

ConvexTMR stores identification information for all cataloged volume objects. This allows users to reference volume objects in a variety of ways. Users may reference volume objects by

- relative path name (volumesets only)
- external label
- system-generated database key
- receipt number

In addition, ConvexTMR stores the following identifying information on each cataloged volume:

- volume internal label
- vault slot number
- storage container
- volume fingerprint

The volume fingerprint is an encryption of several key label fields to create a guaranteed unique volume identifier. This fingerprint is checked electronically at the start of the tape session to safeguard against unauthorized tape access.

Data security

ConvexTMR is designed to prevent unauthorized tape access. Ownership of data is confirmed via the catalog for each access request. Other security features include

- command authorization
- electronic fingerprinting
- passwords
- administrator-controlled user privileges
- Access Control Lists (ACLs) for
  - files
  - volumesets
  - pools
  - directories
  - rotations
  - devices

Vault management

ConvexTMR can accommodate multiple storage vaults and tape rotation schedules.

ConvexTMR vaults are defined by the system administrator based on the site's physical resources and organizational and security needs. Tapes are stored according to the vaulting conventions of the particular site.

Users move tapes among vaults in two ways: by making ad-hoc movement requests, and by assigning tapes to customized rotations. A rotation is a schedule of storage locations and durations for each location. Users create ConvexTMR rotations as database objects, and then apply them to specific volumesets.

Tape pools

Tape pools partition the tape library into sublibraries, and provide the library with a logical way to organize groups of tapes. All tapes in the library belong to one and only one pool. The characteristics of a particular pool, such as media type and recording format restrictions, access restrictions, and volume ownership within the pool, are determined by the pool's creator. Pools may be created by library administrators and by users.

Many tape libraries employ default pools. At these libraries, each volume is automatically submitted to a default pool unless another pool is specified. The library may also be configured to create implicit user pools. These are private tape pools automatically created for each library user. Tape libraries that do not employ a default pool or implicit user pools require users to specify a pool each time they submit a tape.

Like rotations, tape pools are database objects which volumes are assigned to. As such, pools represent logical, rather than physical, groups of tapes. The tapes that comprise a single pool are not required to reside in the same vault, and tapes from various pools may occupy a single storage rack.

Library operations

Library operations include:

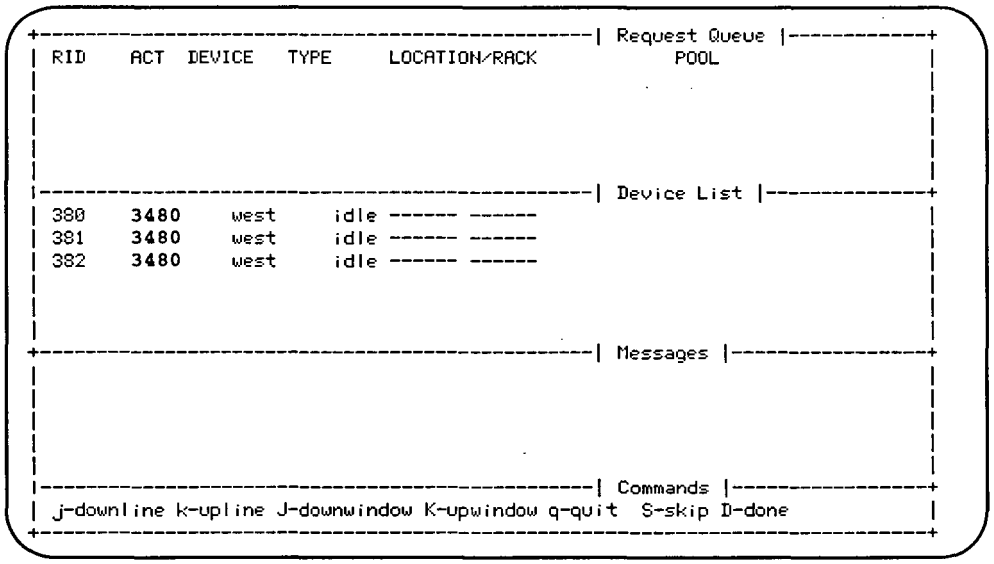
- Taking requests from the request monitor
- Accepting volumes into and returning volumes from the tape library
- Tape maintenance
- Server and device control

The request monitor

The request monitor is the tape operations console for ConvexTMR. ConvexTMR operators receive all mount requests via the request monitor. Operators can also view the current status of tape devices and receive electronic messages via the request monitor.

ConvexTMR provides both command-line and full-screen request monitor interfaces; both interfaces offer complete functionality. The full-screen request monitor is shown in Figure 2.

Figure 2 The full-screen request monitor



Interacting with the request monitor

The ConvexTMR operator maintains a conversation with the request monitor, servicing user requests for tape media and tape device access and inputting declarations on mount and drive status.

When a service request appears on screen, the operator performs the specified task and then verifies it by issuing the `rldone` command (command-line interface) or by pressing D (full-screen interface).

Accepting volumes to the library

When a user submits a tape to the library, the operator

- receives the volume and external label name from the user
- runs the volume acceptance command and inputs the external label and slot ID for the volume
- physically labels the volume with its slot ID and stores it in the appropriate slot

Returning volumes from the library

When a user retrieves a volume, the operator

- receives a receipt number from the user

- runs the operator retrieval command with the receipt number
- fetches the volume with the slot ID returned by the command
- inputs the external label to confirm the identity of the volume
- presents the volume to the user

Tape maintenance

ConvexTMR automatically schedules maintenance tasks as determined by configurable mount intervals. When a tape has reached it's mount threshold for a particular task, such as cleaning or initialization, it is scheduled for that task the next time it enters the scratch state.

ConvexTMR operators perform these scheduled maintenance tasks. Routine maintenance tasks are listed below.

- cleaning tapes
- certifying tapes
- disposing of tapes
- moving tapes
- erasing tapes
- initializing tapes
- identifying lost and found tapes

Operators can view scheduled maintenance tasks by requesting a maintenance report. This report also shows ad-hoc user requests for tape movement and erasure.

Note

Operators should view the report two or more times daily. After completing a maintenance task the operator confirms the task and updates the catalog by issuing the `rlmaint` command.

Server and device control

Operators are responsible for controlling domains and library devices. This level of control allows an operator to perform periodic and emergency system maintenance as well as an orderly start-up and shutdown of ConvexTMR.

Controlling domain servers

A ConvexTMR operator domain is a set of tape drives and accompanying capabilities. ConvexTMR sites may have one or more domains. The default domain covers all devices and capabilities; other domains may be defined to limit their scope to specific devices and/or specific functions. Operator domains are defined by the library administrator.

Each operator domain has its own server. ConvexTMR operators are responsible for the state of these servers. A server is always either up or down.

The ConvexTMR server can be set to operate in several different modes. The default server mode is one in which new requests are accepted and queued and the queue is processed according to priority rules. The operator controls these modes.

Controlling devices

ConvexTMR operators are also responsible for controlling the status of library devices. Operators may take devices out of service for maintenance or diagnostics. They may also bring devices back into service.

Getting started

ConvexTMR is a comprehensive tape management system and therefore there are many commands, options, and concepts to learn. It is best to read this manual thoroughly before conducting actual tape sessions. To familiarize yourself with ConvexTMR and begin using it quickly, follow these steps.

Step 1 Read Chapter 2, "Enrolling as a tape operator." Your tape administrator should provide you with a group name and password. Enroll in an operator group.

Step 2 Read the section titled "Starting and stopping the server" in Chapter 3, "Controlling the server." Bring up the server.

Step 3 Read Chapter 4, "Operating the request monitor." Start the request monitor.

Step 4 Read Chapter 5, "Conducting library operations. Practice accepting tapes into the library, servicing mount requests, and confirming maintenance tasks.

Command summary

The following table summarizes the commands available to the ConvexTMR operator.

Table 1 ConvexTMR operator commands

Command	Function
`convextmr`	the ConvexTMR server control program
`rlaccept`	accept a user submitted volume
`rlcan`	cancel active tape sessions
`rldev`	ConvexTMR device control command
`rldone`	confirm completion of a tape operator request
`rldop`	command-line tape operator request monitor
`rlhost`	ConvexTMR host control
`rlinit`	initialize tape volumes
`rlmaint`	confirm routine ConvexTMR maintenance
`rlmoved`	confirm volume movement
`ods`	control the domain servers
`rlofree`	free operator device
`rlop`	enroll as a tape operator
`rloreserve`	operator device reservation
`rlpremount`	premount a tape volume
`rlreturn`	return a tape volume to its owner
`rlrm`	ConvexTMR resource manager control program
`rlskip`	cancel an operator action
`rlvop`	full-screen tape operator request monitor

Enrolling as a tape operator 2

Operator groups and levels

To act as a tape operator, you must enroll as an operator in a ConvexTMR operator group. Operator groups define the powers available to the users enrolled in them. Each operator group is assigned one of three authority levels. The authority levels are numbered from 1 (most powerful) to 3 (most restricted). The powers you may exercise are determined by the operator group you enroll in.

The powers of each authority level are listed in Table 2.

Table 2 Operator powers by authority level

Authority Level	Powers
3	• May perform mount services.
2	May perform the above tasks and: • May perform tape library management functions. • May perform tape identify overrides during tape mounts.
1	May perform the above tasks and: • May start and stop the servers. • May change drive assignment and status. • May change host and domain status.

Operator enrollment

The following sections discuss enrollment, enrollment review, and resignation as a ConvexTMR operator.

Enrolling as a tape operator

Enrollment requires an operator group name and password. Your system administrator will provide you with these.

In order to perform operator tasks, you must first enroll. To enroll as a tape operator, follow these steps:

Step 1 Type `rlop` on the command line.

Step 2 Enter the name of the group you intend to enroll in.

A password prompt should appear.

Step 3 Type your password.

Step 4 Press **Return**.

For example, your system administrator supplied you with the group name `group1` and the password `foobar`. To enroll, enter

```
rlop group1
```

The following message will appear on screen:

```
Password:
```

Enter

```
foobar
```

You may enter the operator group and password in the same command. To do this, include the `-P` *password* option in the command before typing the group name. For example, enter

```
rlop -P foobar group1
```

Requesting an enrollment summary: `-s`

To view a list of all currently enrolled administrators and operators and verify that your enrollment was successful, enter

```
rlop -s
```

The `-s` option requests an enrollment summary.

A report similar to the following is displayed:

```
①    ②       ③     ④       ⑤  ⑥
ID   User    Type  Group    L  Message Destination
--   ----    ----  -----    -  -------------------
102  lfw     Oper  group1   1  _NO_MSG
```

①The number recorded in the `ID` column is the request ID of the login session.

②The User column displays the user ID of the enrollee.

③The `Type` column indicates if the group specified is an operator or administrator group.

④The `Group` column displays the group name.

⑤The `L` column indicates the authority level of the specified group.

⑥The `Message Destination` column shows where operator messages will be displayed or stored; in this example, messages are not sent.

Resigning your enrollment: `-x`

To resign an operator enrollment, issue the rlop command with the -x option and identify the enrollment you wish to cancel, by ID number. For example:

```
rlop -x -I 102
```

- The `-x` option requests that the specified operator enrollment be cancelled.
- The `-I` option indicates that the enrollment session to cancel will be identified by session ID number; in this example, session 102 (from the previous example) is selected. If you do not know the ID number of the enrollment you wish to cancel, request an enrollment summary by following the steps outlined in the previous section, "Requesting an enrollment summary."

Message options

When you enroll in an operator group, you may select a destination for operator messages. By default, no messages are sent unless you specify a destination.

ConvexTMR offers four message destination options. Messages may be sent to the following destinations:

- the terminals of all currently active operators (`-t`)
- the specified mail address (`-m` *mail_id*)
- the specified pathname (`-p` *path*)
- the system log (`-S`)

Only one message destination may be specified with each `rlop` command. Additional `rlop` commands may be issued to direct messages to more than one destination.

Route messages to operator terminals: `-t`

To send operator messages to the terminals of all currently active operators (`/dev/tty`), use the `-t` option when issuing the `rlop` command.

For example:

```
rlop -t -P foobar group1
```

Route messages to a specified address: `-m` *mail_id*

To send operator messages via electronic mail to a specified address, use the `-m` option when issuing the `rlop` command. For example:

```
rlop -m fred -P foobar group1
```

Route messages to a specified pathname: `-p` *path*

To send operator messages to a specified pathname, use the `-p` option when issuing the `rlop` command.

For example:

```
rlop -p /home/lfw/msgfile -P foobar group1
```

Route messages to the system log: -S

To send operator messages to the system log, use the -S option when issuing the rlop command. Messages are sent to syslog() using the LOG_TMS facility.

For example:

```
rlop -S -P foobar group1
```

Caution

Sites concerned with maintaining the highest level of security should never use rlop with the -P <password> option. Using rlop with the -P <password> option may allow unauthorized users to view the operator group password.

Controlling the Server

3

Starting and stopping the server

The ConvexTMR server runs in the background to provide tape services. If the server is not running, services are unavailable. The `convextmr` command controls and reports on the status of the server.

Starting the server: `convextmr start`

To start the server, enter

```
convextmr start
```

The following message should appear on screen:

```
ConvexTMR version x.x
Starting Servers:
    rlsvc... complete
```

If the server fails to start, follow the instructions for stopping the server shown in the next section, and try starting the server again. If that fails, contact the Technical Assistance Center (TAC).

Note

The rlsvc server cannot be "warm started." If you want HUP the server to read any new configuration settings, you must first set the server modes to refuse requests and suspend request processing (see "Setting the Pmode: -p {process | hold}" section on page 22 and "Setting the Qmode: -q {queue | refuse}" section on page 23) and then HUP the server. Following the HUP, set the server modes back to accepting and processing requests.

Stopping the server: `convextmr stop`

To stop the server, enter

```
convextmr stop
```

The following message appears on screen:

```
ConvexTMR version x.x
Stopping Servers:
     rlsvc... Stopped
```

Checking server status: `convextmr`

To see if the server is running, enter

```
convextmr
```

If the server is running, the following message will appear on screen:

```
ConvexTMR version x.x
Server Status:
     rlsvc... Up
```

If the server is not running, the following message will appear on screen:

```
ConvexTMR version x.x
Server Status:
     rlsvc... Down
```

Controlling server modes

The ConvexTMR server has two modes (Pmode and Qmode) that can be set to queue and process, or hold and refuse, mount requests. The server modes independently control the processing and queueing of requests. Changing the settings allows the operator to throttle request processing and initiate an

orderly shutdown of the system when necessary. The two server modes and their settings are described in Table 3.

Table 3 Server modes and settings

Mode	Setting	Behavior
Pmode (processing)	process (default)	Queue processed according to priority rules.
	hold	Queue not processed.
Qmode (queueing)	queue (default)	New requests accepted and queued.
	refuse	New requests rejected, not queued; the request issuer is notified.

Displaying the server mode: `rlrm`

To determine the current server mode settings, enter

```
rlrm
```

A report similar to Figure 3 appears on screen:

Figure 3 Server modes

```
Processing Modes:

Qmode: queue
Pmode: process
Device Resource Queue::

Req_id Prio Status User Key Devices
------ ---- ------ ---- --- -------
00254     3  DWAIT  lfw      1
00254     3  DWAIT  lfw      2
00254     3  DWAIT  lfw      3
```

- `Qmode` may be either `queue` or `refuse`. (The `Qmode` is explained in the section "Setting the queue mode" later in this chapter.)

- Pmode may be either process or hold. (The Pmode is explained in the section "Setting the process mode" later in this chapter.)
- The Req_id column displays the ID number of the request.
- The Prio column shows the actual priority of the request. (To change the priority of a request, follow the instructions in the section "Resetting the request priority" later in this chapter.)
- The Status column shows the status of the request. States are defined as follows:
  - HOLD - Pmode set to hold.
  - VWAIT - waiting for media resources.
  - DWAIT - waiting for required device.
  - DONE - request satisfied; resources active.

  The following states are transient states:
  - ERROR
  - FINISH
  - TSOLV
  - AWAIT
  - START
- The User column displays the ID of the user who issued the request.
- The Key column displays the resource key, if assigned. Refer to the rlaccess(1) man page for a complete description of the resource key.
- The Devices column shows the sequential number of the device(s) required to satisfy the request.

Setting the Pmode: -p {process | hold}

The default setting for Pmode is process. When the Pmode is set to process, all requests that are in the queue are processed in their queued order.

When Pmode is set to hold, all requests stored in the queue are held until Pmode is reset to process. You may wish to set the Pmode to hold in order to clear the drives for maintenance or troubleshooting.

To set Pmode to hold, enter

```
rlrm -p hold -O "clearing drives for maintenance"
```

To reset Pmode to process, enter

```
rlrm -p process -O "maintenance complete; begin
processing"
```

- `-p` indicates Pmode.
- `hold` sets the Pmode to the `hold` state.
- `process` resets the Pmode to the `process` state.
- `-O` sends messages to the OPER log to explain the mode change. To view these comments, enter:

```
tail Librarian/REEL/logs/OPER
```

Log entries similar to those shown in Figure 4 appear on screen:

Note

tail is a ConvexOS and SPP/UX command. For more information refer to the tail(1) man page.

Figure 4 OPER log entries for Pmode changes

```
Jun  7 10:00:00> RL5054: Resource process mode:
hold (clearing drives for maintenance)

Jun  7 12:00:00> RL5054: Resource process mode:
process (maintenance complete; begin
processing)
```

The Pmode is a site constant, and its default value can also be set via the `rlcop` command with the keyword `rmpmode`. See the `rlcop`(8) man page for more information.

Setting the Qmode: `-q {queue | refuse}`

The default setting for Qmode is queue. When the Qmode is set to queue, ConvexTMR accepts new requests and places them in the queue.

When Qmode is set to `refuse`, ConvexTMR refuses all requests and notifies the issuer of each request. You may wish to set the Qmode to `refuse` in order to notify customers that the system is not currently processing requests.

To set Qmode to `refuse`, enter

```
rlrm -q refuse -O "queue down for the night"
```

To reset Qmode to queue, enter

```
rlrm -q queue -O "queue back up"
```

- -q indicates Qmode.
- refuse sets the Qmode to the refuse state.
- queue resets the Qmode to the queue state.
- -O sends messages to the OPER log to explain the mode change. To view these comments, enter:

```
tail Librarian/REEL/logs/OPER
```

Log entries similar to those shown in Figure 5 appear on screen:

Note

tail is a ConvexOS and SPP/UX command. For more information refer to the tail(1) man page.

Figure 5 OPER log entries for Qmode changes

```
Jun  7 20:00:00> RL5054: Resource queue mode:
refuse (queue down for the night)

Jun  8 07:00:00> RL5054:  Resource queue mode:
process (queue back up)
```

The queue mode is a site constant, and can also be set via the rlcop command with the keyword rmqmode. See the rlcop(8) man page for more information.

Resetting the request priority: -P

There may be times when you need to reset the priority of requests that are already queued. For example, you may wish to place an urgent request at the beginning of the queue, or you may wish to place a request that will require several devices at the end of the queue.

To change the priority of a queued request, follow these steps:

Step 1 Type rlrm on the command line.

Step 2 Indicate that you wish to change the priority of a request by typing -P.

Step 3 Indicate the new priority level of the request. The number immediately following the -P option specifies the level to change

the request to. In the example below, the request is assigned priority level 1. This is the highest level.

Step 4 Identify the request that you wish to change, either by request number or by user ID. The -r option indicates that what follows is the request number. This number can be found in the resource queue (issue an `rlrm` command to display the queue). The `-u` option indicates that what follows is a user ID. If the user has assigned the job a resource key, include it in the command after the user ID with the `-k` *`reskey`* option. Both the user ID and resource key can be found in the resource queue (issue a `rlrm` command to display the queue).

Step 5 Press **Return.**

The following example changes the priority of the request shown in the section "Displaying the Server Mode" earlier in this chapter.

Enter

```
rlrm -P 1 -r 00254
```

or, alternately, enter

```
rlrm -P 1 -u lfw
```

The domain servers

ConvexTMR employs the concept of operator domains. An operator domain is a set of tasks defined by the ConvexTMR administrator. Operator domains can be serviced by humans or tape robots. Operator domains can overlap. If two domains overlap, the request monitors attached to the domains will have some common requests.

ConvexTMR has a special, built-in, global domain which covers all operator requests for all tape devices and all vaults. The tape administrator may create other operator domains. By default, if an operator domain is not specified, then the request monitor is attached to the global domain. It is important that you know which operator domain to connect to the request monitor. Operator domains are defined in the section "Using operator domains" in Chapter 4.

Operator domains are stored in `dom_map`. `dom_map` resides in the file *dir*`/REEL/Librarian/dom_map`, where *dir* is the `RLLIBDIR` value specified in `/etc/reelenv`. The `/etc/reelenv file` resides in the directory specified for `REELENV` in your environment.

Each operator domain has a unique server, the ods server. The following sections will explain how to control these domain servers.

Checking the domain status

You may not operate in a domain unless that domain is up. To check the status of all registered domains, request a domain report. To do this, enter

```
rlr dom
```

A report similar to Figure 6 appears on screen:

Figure 6 Domain report

```
Domain Status:

     Domain     Qmode      Pmode      State
     ------     -----      -----      -----
     default    refuse     hold       Up
     dsim       refuse     hold       Down
     t1         refuse     hold       Down
     test       refuse     hold       Down
```

If the domain you need to operate in is down, you will need to start the server for that domain. This is explained in the next section.

Starting the domain server: ods (-d *domain*)

To start a domain server, follow these steps:

Step 1 Type ods on the command line.

Step 2 Identify the domain you wish to activate, by name. The -d option indicates that what follows next is a domain name. In the example below, the domain dsim is specified.

If no domain is given, the default domain is assumed. This is true for all ods commands, regardless of options.

Step 3 Press Return.

Enter

```
ods -d dsim
```

The following message appears on screen:

```
Becoming background daemon
```

Stopping the domain server: -x

To stop a domain server, follow these steps:

Step 1 Type `ods` on the command line.

Step 2 Identify the domain you wish to stop, by name (unless stopping the default domain). The `-d` option indicates that what follows next is a domain name. In the example below, the domain `dsim` is specified. If the `ods` command is issued with no options, the default domain is assumed.

Step 3 Include the stop option. The `-x` option requests ConvexTMR to stop the specified domain server. You will be notified if the server is already down.

Step 4 Press **Return**.

Enter

```
ods -d dsim -x
```

A successful request should not elicit any return.

Unregistering the domain server: -u

If the domain server comes down ungracefully, you may wish to unregister the server from the RPC port mapper. Unregistering a failed server eliminates the possibility that a user will unknowingly make a request that cannot be fulfilled.

Do not issue the `ods -u` command while the server is running.

To unregister a domain server, follow these steps:

Step 1 Type `ods` on the command line.

Step 2 Identify the domain you wish to unregister, by name (unless stopping the default domain). The `-d` option indicates that what follows next is a domain name. In the example below, the domain `dsim` is specified. If the `ods` command is issued with no options, the default domain is assumed.

Step 3 Include the unregister option. The `-u` option requests ConvexTMR to unregister the specified domain server from the RPC port mapper.

Step 4 Press **Return**.

Enter

```
ods -d dsim -u
```

Operating the request monitor

4

What is the request monitor?

The operator receives all requests for tape mounts, unmounts, and other tape services via the request monitor. The request monitor consists of three elements:

- the request queue
- the device list
- messages

The request queue

The request queue lists all outstanding operator requests. You may view and process the request queue via the request monitor.

The device list

The request monitor also maintains a list of all configured tape devices and their status.

Messages

All messages directed to you from ConvexTMR software and from users are displayed on the request monitor. ConvexTMR also stores these messages in the OPER log.

Operator interfaces

ConvexTMR provides two operator interfaces, the command-line interface and the full-screen interface. The command-line interface of the request monitor offers complete functionality, but is not as intuitive as the full-screen version. Most operators new to ConvexTMR will be more comfortable with the full-screen interface. The first half of this chapter refers

to the command-line interface. The full-screen interface is described in the second half of this chapter.

Using operator domains

ConvexTMR provides for the establishment of multiple operator domains. An operator domain is an operational center defined to handle specified operator requests for specified tape devices and vaults. An operator domain is self-contained and independent of other domains. The request monitor provides the interface to the operations of the operator domain.

Operator domains can be serviced by humans or tape robots. Operator domains can overlap. If two domains overlap, the request monitors attached to the domains will have some common requests. For more information on starting specific operator domains, refer to the section "The domain servers" in Chapter 3 of this manual.

Command-line request monitor

The command-line request monitor facilitates your dialog with ConvexTMR via your terminal (`/dev/tty`). Table 4 shows commands that control the command-line request monitor.

Table 4 Command-line request monitor commands

Command	Description
`rldop`	Start and stop the command line request monitor.
`rldev`	Display and control the tape device list.
`rldone`	Complete processing of an operator request.
`rlrm`	Display the operator request list and control the disposition of the request queue.
`rlskip`	Reject an operator request.

Starting the command-line request monitor

The command-line request monitor directs information to you via the tty from which you begin the request monitor.

Note

Be sure to issue the start-up command from the terminal session where you want the request monitor to run.

To use the request monitor, you must be enrolled as an operator via the `rlop` command. Refer to Chapter 2 for complete instructions on enrolling as a tape operator. You may not start the command-line request monitor unless the server is up. Refer to Chapter 3 for complete instructions on starting and controlling the server.

To start the command-line request monitor, enter

```
rldop
```

The following message is displayed:

```
Command line request server started
```

By default, `rldop` attaches the request monitor to the default domain. To attach to another domain, specify the domain in the `rldop` command; enter

```
rldop domainA
```

The following message is displayed:

```
Command line request server started
```

You may not start the command-line request monitor unless the server for the specified domain is up. Domain servers are enabled via the `ods` command; refer to the `ods`(8) man page for more information.

Stopping the command-line request monitor

To stop the request monitor, enter

```
rldop -x
```

The following message is displayed:

```
Operator request server going down
```

The request queue report

The request queue report is automatically generated by the request monitor each time a new request is received. The report is illustrated in Figure 7.

Figure 7 Request queue report

```
  ①    ②    ③        ④        ⑤                  ⑥
 RID   ACT  ADN      Type     Location/Rack      Pool
 ---   ---  -------  ------   ----------------   -----------------
01024  DCHK drive1
01025  DCHK drive2
01026  DCHK drive3
```

The request queue report lists each outstanding operator request. Report columns are defined below.

① Request ID — A five-digit number that uniquely identifies the request.

② Action — A four character code that defines the requested action. Action codes are defined in the table below.

③ Tape Device Name — The tape drive targeted for the action.

④ Device Model — The type of tape drive.

⑤ Location/Rack — NO-CATALOG-CASE - The external label of the requested volume.
CATALOG-CASE - the external label, slot, and container of the volume (if recorded in the catalog).

⑥ Pool — CATALOG-ONLY. The pool the requested tape belongs to.

Action codes that appear in the ACT column are defined in Table 5.

Table 5 Action codes

ACT Code	Request
WMNT	Mount a tape with write protection disabled.
RMNT	Mount a tape with write protection enabled.
SCRM	Mount a scratch tape.
UMNT	Unmount a tape.
VCHK	Enter the external label of the volume on the designated drive.
VACC	Verify the named user's access to the named volume.
DCHK	Check the status of the designated drive.
WSTK	Mount a set of tapes in a stacker; write protection disabled.
RSTK	Mount a set of tapes in a stacker; write protection enabled.
SSTK	Stack a single scratch tape.
USTK	Remove all tapes from stacker.
STGE	Prepare tapes for a possible future request.

Confirming a mount request: WMNT, RMNT, and SCRM

When a WMNT, RMNT, or SCRM mount request appears on the monitor, mount the specified tape on the specified drive. If the tape is a scratch tape, you can use any scratch tape from the specified pool.

WMNT indicates that the tape must be write enabled when mounted. RMNT indicates that the tape should be mounted read only.

Follow these steps for conducting tape mounts.

Step 1 Obtain the designated tape; for scratch requests, select a scratch tape from the specified pool.

Step 2 Verify the tape's identity by examining the external label.

Step 3 For `WMNT` and `SCRM` requests, mount the tape with write protection disabled. For `RMNT` requests, mount the tape with write protection enabled.

Step 4 Issue the `rldone` command.

For example, enter

```
rldone -e 123456
```

- `-e` indicates that what follows is the external label of the tape; in this example, the external label is `123456`. This step is required whenever the `SCRM`, `RMNT`, or `WMNT` code appears on the request queue report prefixed by an asterisk (`*`).
- In many cases, the request will disappear from the report automatically. In these cases, it is not necessary to confirm the action.
- You may specify the request by request ID. To do this, include `-R` *req_id* at the end of the `rldone` command. If no request ID is specified, the first request in the queue is assumed.

Rejecting a mount request

If a mount request cannot be performed, use the `rlskip` command. You may attach an explanatory note with the `-O` option, as shown in the example below.

```
rlskip -O "cannot find tape"
```

The message is sent to the user that made the request and is recorded in the log.

Confirming an unmount request: `UMNT`

When an `UMNT` unmount request appears, follow these steps:

Step 1 Unmount the tape from the designated tape drive.

Step 2 Confirm the unmount; enter

```
rldone
```

Confirming a volume check request: VCHK

To satisfy a VCHK volume check request, you must input the volume external label so that the system can confirm the identify of the tape.

When a VCHK volume check request appears, follow these steps:

Step 1 Locate the tape mounted on the designated drive and obtain the external label ID of the tape.

Step 2 If the tape has been unloaded, reload it.

Step 3 Issue the `rldone` command.

Step 4 Confirm the identity of the tape by examining the external label.

For example, enter

```
rldone -e 123456
```

`-e` indicates that what follows is the external label of the tape; in this example, the external label is `123456`.

Confirming a user access check request: VACC

VACC is a NO-CATALOG operator request. If you are operating with a catalog, you will never receive VACC requests.

If user access checking is turned on at your site, you will receive the VACC request every time a user makes an access request. To service this request, follow these steps:

Step 1 Verify the user's identification according to your site's standard operating procedures.

Step 2 Issue the `rldone` command.

Confirming a device check request: DCHK

A DCHK device check request occurs when an abnormal situation arises with a tape device. An operator message accompanies this request that explains the particular problem encountered.

To service this request, follow these steps.

Step 1 Examine the device and tape for any unexpected conditions:

- If the tape is not loaded, load it.
- If the device is broken, take it down; instructions are given in the next section, "Changing Device Status."

Step 2 If the device and tape appear to be in working order, examine the system log for any messages referencing the tape device.

Step 3 After correcting the situation, confirm the request. Enter

```
rldone
```

Step 4 If DCHKs continue to be issued against the device, the device requires diagnostic attention. Bring the device down. Instructions are given in the next section, "Changing Device Status."

Changing device status: `rldev -s` *keyword*

At times, you need to take a device out of service for maintenance or diagnostics. Bringing devices down and up is accomplished via the `rldev` command. `rldev` is a powerful command that provides a variety of device control services. For a comprehensive list of `rldev` functions, refer to the `rldev` (8) man page.

To change the status of a device, follow these steps:

Step 1 Type `rldev` on the command line.

Step 2 Indicate that you wish to change status attribute. The `-s` option indicates that you wish to change a device attribute.

Step 3 Set the attribute. The keyword `status=` indicates the device status. The value `down` takes the device out of service. Values for `status=` include:

- `up` makes the device available for use.
- down makes the device unavailable for use.
- `pdown` causes the device to be taken down as soon as it is free.
- `reset` causes a software reset. If the device is in use, the session is aborted and the user receives a message.

Step 4 Specify the device. The device name is supplied immediately after the keyword value. In the example below, `tc7` is affected. More than one device may be specified with a space-separated list.

For example, enter

```
rldev -s status=down tc7
```

A message similar to the following appears on screen:

```
Device: tc7 Updating...Device request accepted
```

Confirming a stacker request: WSTK and RSTK

WSTK stacker requests indicate that tapes must be write enabled when mounted. RSTK stacker requests indicate that tapes must be mounted read only.

When WSTK or RSTK stacker requests appear, mount the specified tapes on the specified device. For scratch requests, use any scratch tapes that belong to the specified tape pool.

Stacker requests are always proceeded by a mount request for the first needed volume. However, the volume specified for the mount request should not be placed in the device until all of the volumes specified for the stack request have been mounted.

To service WSTK and RSTK requests, follow these steps:

Step 1 Get the specified tapes.

Step 2 For WSTK requests, mount the tapes with write protection disabled. Mount the tapes in the slots in the order that they are requested. Leave the top slot open for the volume specified by the mount request.

Step 3 For RSTK requests, mount the tapes with write protection enabled. Mount the tapes in the slots in the order that they are requested. Leave the top slot open for the volume specified by the mount request.

Step 4 Mount the volume specified by the mount request in the top stacker slot.

Step 5 Review the request queue report; if the request is still active, issue the `rldone` command.

In many cases, the request will disappear from the report. In these cases, it is not necessary to confirm the action.

You may specify the request by request ID. To do this, include `-R` *req_id* at the end of the `rldone` command. If no request ID is specified, the first request in the queue is assumed.

Confirming a scratch stack request: SSTK

SSTK requests indicate that a single scratch tape should be placed in the stacker. To satisfy this request, follow these steps:

Step 1 Get a suitable scratch tape.

Step 2 Mount the tape in the empty slot that will be accessed first on the specified stacker. (Usually this is the empty slot nearest the top of the stacker).

Step 3 Issue the `rldone` command.

Confirming an unstack request: USTK

If tapes are left in the stacker after a user session employing a stacker is complete, you will receive the USTK request. To service this request, follow these steps:

Step 1 Remove all tapes from the specified device.

Step 2 Handle the tapes according to your site's operating procedures.

Step 3 Issue the `rldone` command.

Confirming a stage request: STGE

If volume staging is turned on at your site, you will receive the STGE request every time a user makes an access request. To service this request, follow these steps:

Step 1 Get the specified tapes.

Step 2 Issue the `rldone` command.

The device list report

The device list report lists all tape devices under ConvexTMR's control and displays status information. To generate the report, enter

```
rldev
```

The report is shown in Figure 8.

Figure 8 Device list report

```
Current device status;
   ①       ②       ③        ④     ⑤       ⑥          ⑦     ⑧  ⑨      ⑩
Device    Model   Status    Tape  INTLBL  EXTLBL     ReqID  Dn User    Key
------    -----   ------    ----  ------  ------     -----  -- ----    ---
drive3    3480    nitemare  idle  ------  ------
drive2    3490    nitemare  idle  ------  ------
drive1    3490    nitemare  idle  ------  ------
```

Report columns are defined below.

① Tape Drive Name
The name of the tape device.

② Device Model — The tape device model.

③ Tape Device Status
The status of the tape device. These states are defined in the table on the next page. In this example "nitemare" is the *_hostname* that the shared device is currently attached to.

④ Tape Volume Status
The status of the volume. These states are defined in the table below.

⑤ Internal Label — The internal label of the mounted volume.

⑥ External Label — The external label of the mounted volume.

⑦ Request ID — The request ID of the request engaging the specified device.

⑧ Device Number — The device number in a multiple drive request. For requests using only one drive, this field is blank.

⑨ User — The ID of the user of the device.

⑩ Resource Key — The resource key associated with the request, if applicable.

Tape device states that appear in the `Status` column are defined in Table 6.

Table 6 Tape device states

Status	Definition
`hostname`	device statically attached to the specified host
`reclaim`	device being reclaimed from a user assignment
`shared`	shared device not in use
`assign`	shared device being assigned
`foreign`	shared device in use by foreign host
_hostname	shared device currently attached to the specified host
`unassign`	shared device unattached to host
`cfgdown`	device configured down
`hstdown`	device attached to a host that is down
`dmstart`	waiting for device manager to start
`dmstop`	waiting for device manager to stop

If the status is prefixed by `!`, the device is down pending. If the status is prefixed by >, the device has a configuration change pending.

Tape volume states that appear in the `Tape` column are defined in Table 7.

Table 7 Tape volume states

Tape	Definition
`idle`	not currently in use
`rmnt`	awaiting write disabled mount
`wmnt`	awaiting write enabled mount
`vrfy`	attempting to verify volume identity

Table 7 Tape volume states **(continued)**

Tape	Definition
`init`	initializing volume
`dchk`	awaiting device check
`vchk`	awaiting volume check
`user`	mounted tape currently under user control
`strt`	in startup initialization phase
`onln`	tape volume has just come on line
`rwnd`	tape is rewinding
`rpmt`	write disabled premount
`wpmt`	write enabled premount
`ejct`	ejecting tape cartridge
`unrc`	unrecognized volume on line
`scrm`	scratch mount pending
`vald`	revalidating that tape still mounted
`indx`	index request outstanding on the stacker

Viewing operator messages

The request monitor displays operator messages that originate from either the ConvexTMR software or from users. Messages are sent to all active operators and are also recorded in the OPER log.

The system displays the operator message as soon as it arrives. An example is shown below.

```
RLOP: RL5168: sam:lfw:/dev/ttypb:rlopmsg:
beware!
```

If you wish to review recent messages, request a `tail` report for `Librarian/REEL/logs/OPER`, as shown below.

```
tail -30 Librarian/REEL/logs/OPER
```

The following message is displayed:

```
Jun 8 10:25:57> RL5253: Device drive2, added
Jun 8 10:25:57> RL5252: Device drive2,
configuration updated
.
.
.
Jun 11 10:58:21> RL5256: Device drive3,
request reset
Jun 11 11:24:01> RL5168:
sam:lfw:/dev/ttypb:rlopmsg: beware!
```

Note

`tail` is a ConvexOS and SPP-UX command; for more information, refer to the tail(1) man page.

The full-screen request monitor

The full-screen request monitor combines all the functionality of the command-line request monitor with an easy-to-use interface.

Starting and stopping the full-screen request monitor

The full-screen request monitor directs information to you via the tty from which you begin the request monitor. Be sure to issue the start-up command from the terminal session where you want the request monitor to run.

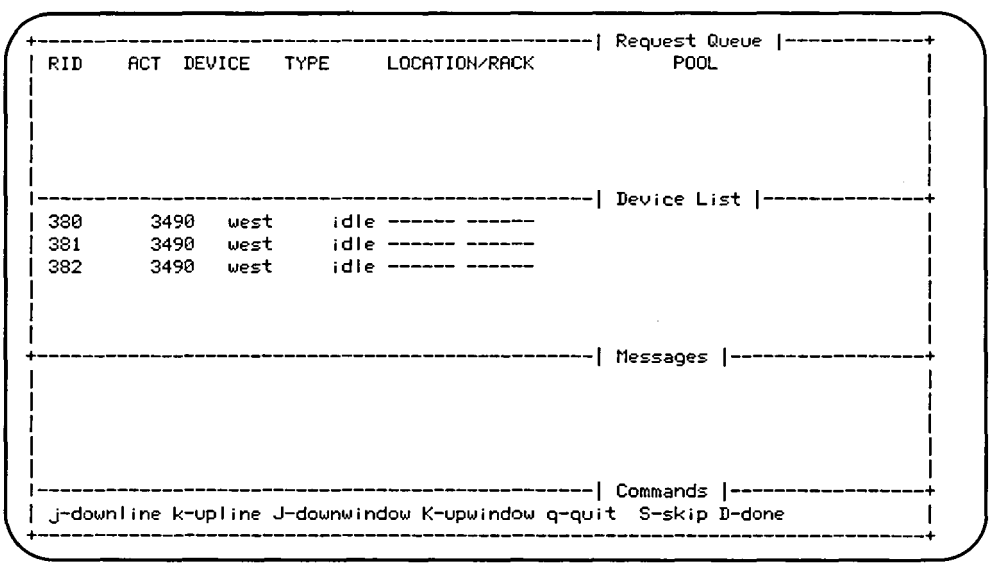
To use the full-screen request monitor, you must be enrolled as an operator via the `rlop` command; refer to Chapter 2 for complete instructions on enrolling as a tape operator. You may not start the full-screen request monitor unless the server is up; refer to Chapter 3 for complete instructions on controlling the server.

To start the full-screen request monitor, enter

`rlvop`

A sample monitor screen is shown in Figure 9.

Figure 9 Full-screen request monitor



To exit the monitor at any time, press `q`.

Navigating the full-screen request monitor

Like the command-line interface, the full-screen request monitor displays the request queue, the device list, and messages. However, these reports appear in separate windows on the same screen, so that you can scroll through them easily.

The request queue window

The top window contains the request queue. This window displays the outstanding operator requests in order of priority. This report's components are described in the earlier section, "The request queue report."

The device list window

The middle window contains the device list. This window displays a list of tape drives on the system. This report's components are described in the earlier section, "The device list report."

The message window

The message window contains a record of recent operator messages. Operator messages are explained in the earlier section, "Viewing operator messages."

Directional keys are listed in Table 8.

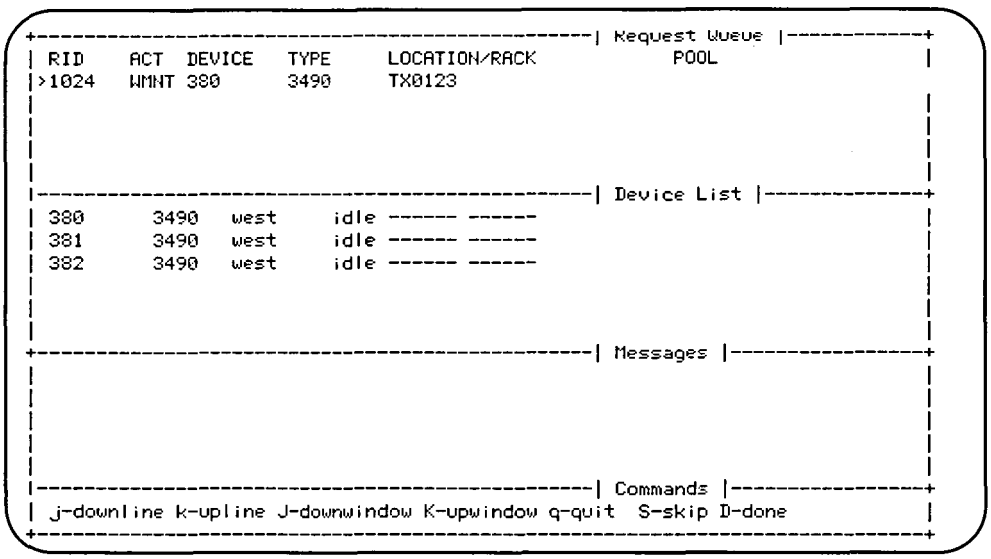
Table 8 Full-screen request monitor directional keys

Key	Function
`j`	Move down one line within the window.
`k`	Move up one line within the window.
`J`	Move down one window.
`K`	Move up one window.
`q`	Quit the monitor.
`S`	Skip the current request.
`D`	Confirm the performance of the current request.

Confirming a mount request: WMNT, RMNT, and SCRM

Mount requests appear in the top window as they are received. The screen in Figure 10 shows an RMNT request.

Figure 10 Confirming a mount request



Follow these steps for conducting tape mounts.

Step 1 Obtain the designated tape; for scratch requests, select a scratch tape from the specified pool.

Step 2 For WMNT and SCRM requests, mount the tape with write protection disabled. For RMNT requests, mount the tape with write protection enabled.

Step 3 Verify that the request is selected with the > symbol.

Step 4 Press D. In many cases, the request will disappear from the report automatically. In these cases, it is not necessary to confirm the action.

Step 5 Enter the external label in the pop-up window. (This step is required whenever the SCRM, RMNT, or WMNT code appears on the request queue report prefixed by an asterisk.)

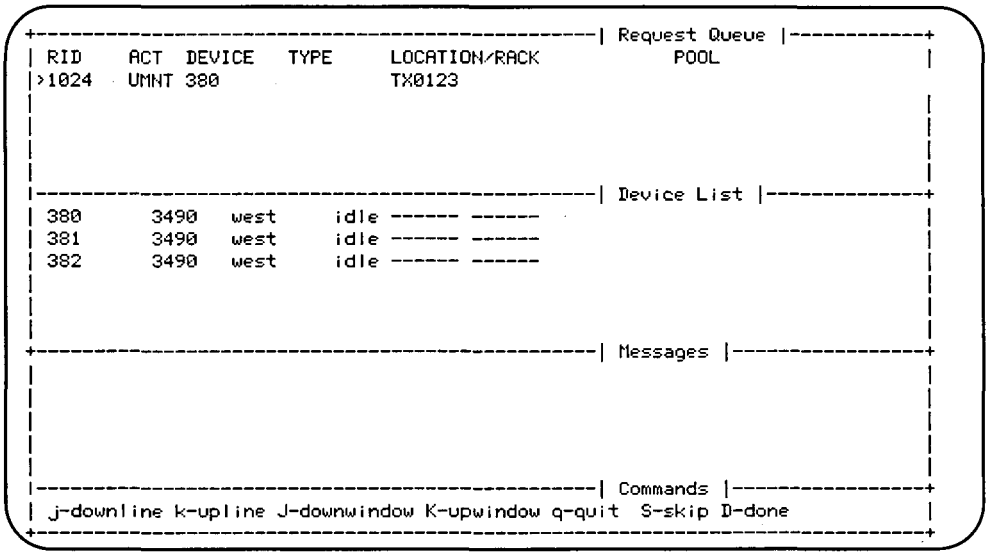
Rejecting a mount request

If a mount request cannot be performed, reject it by pressing S. You will be prompted for an explanation to be sent to the user.

Confirming an unmount request: UMNT

The screen in Figure 11 shows a UMNT request.

Figure 11 Confirming an unmount request



When an UMNT request occurs, follow these steps.

Step 1 Unmount the tape from the specified device.

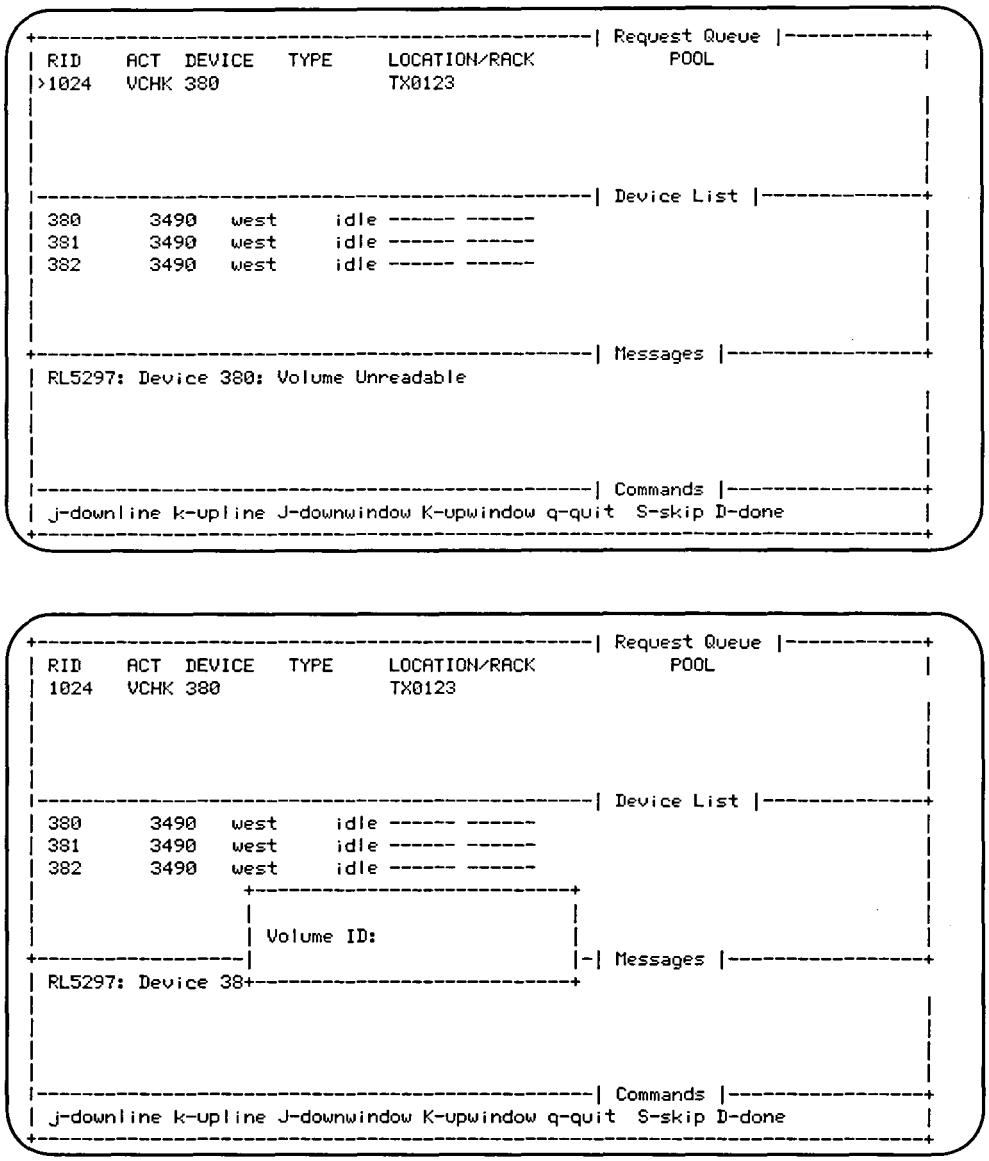
Step 2 Verify that the request is selected.

Step 3 Press D.

Confirming a volume check request: VCHK

Figure 12 illustrates a volume check request.

Figure 12 Confirming a volume check request



To satisfy this request, follow these steps.

Step 1 Locate the tape mounted on the designated device and determine the external label of the tape.

Step 2 If the tape has been unloaded, reload it.

Step 3 Make sure the request is selected (use the `j` or `k` keys to move up and down the list). Press `D`.

Step 4 Enter the external label in the pop-up window.

Step 5 Press **Return**.

Confirming other requests

Satisfy the following requests by following the instructions provided in the command-line section of this chapter. In each case press **D** to confirm the request instead of using the `rldone` command.

- `DCHK`
- `WSTK`
- `SSTK`
- `USTK`
- `STGE`

Viewing operator messages

Referring back to Figure 12, a recent system message appears in the message window. To scroll through a longer list, press the directional keys **j** (down one line) and **k** (up one line).

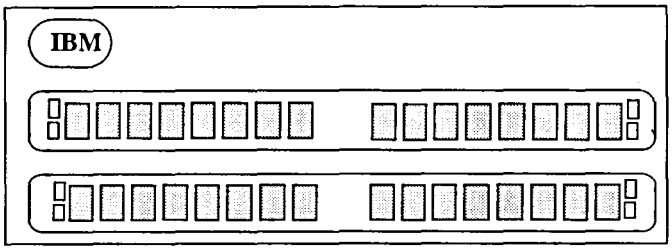
The Device Display Panel

ConvexTMR utilizes the IBM 3480 and 3490 device display panels to inform library operators of pending requests. ConvexTMR device display messages appear in the eight-character display to alert the operator to the following circumstances:

- pending mount requests
- pending scratch mount requests
- pending volume check requests
- pending unmounts
- pending device checks

The IBM 3490 device display panel is shown in Figure 13.

Figure 13 IBM 3490 device display panel



The two lights at the sides of each eight-character LED display are the attention (top) and access (bottom) lights. The attention light is on whenever a mount or volume check request is pending. The access light is on whenever the device is active.

ConvexTMR messages are overridden by the following hardware-generated messages:

- REWINDNG
- UNLOADNG
- ■■■■■■■■ ■■■■■■■■ (hardware error with each character display lit)

Device display syntax

Pending mount requests

Pending mount requests blink as they appear on the 8-character device display. The syntax is shown below.

Mext_lbl{U|F}, where

U	unprotected (write protection disabled)
F	protected (write protection enabled)

When the tape is loaded and is awaiting confirmation, the leading character M changes to an asterisk (*). After confirmation the external label continues to be displayed (nonblinking) to indicate that the correct tape is mounted and recognized.

Pending scratch mount requests

Pending scratch mount requests blink as they appear on the 8-character device display. The syntax is shown below.

MSCRMNT{I|A|U}, where

I	IBM
A	ANSI
U	no label

Pending volume check requests

Pending volume check requests blink as they appear on the 8-character device display. The syntax is shown below.

V*ext_lbl*

When the tape is loaded and is awaiting confirmation, the leading character V changes to an asterisk (*).

Pending unmount requests

Pending unmount requests blink as they appear on the 8-character device display. The syntax is shown below.

D*ext_lbl*

Pending device check requests

Pending device check requests blink as they appear on the 8-character device display. The syntax is shown below.

*DCHECK

Conducting library operations

5

Tape identification and storage

Because there are many different tape identification and storage conventions, the ConvexTMR software can recognize volumes several different ways. Volumes in the tape library may be identified in any of the following ways

- external label
- internal label
- storage slot
- storage container
- receipt number

Vault names can also be helpful when trying to locate specific volumes. The commands described in this chapter can be used with or without the catalog unless specifically identified as "catalog only" when used.

External label

The volume external label is, in most environments, the primary way to identify a volume. It is a user-defined, unique string of up to 12 characters. The external label must meet the label criteria specified by the site constants. To view ConvexTMR site constants, request a "site constants" report:

```
rlr constants
```

The following values, as displayed on the site constants report, establish the criteria for a volume external label:

`exmaxc`	maximum allowable number of characters
`exminc`	minimum allowable number of characters
`exalpha`	specific allowable characters
`exregx`	specific allowable regular expression

For example, for a site with the constants:

```
exmaxc=12
exminc=4
exalpha=
exregx=
```

all external labels for that site must be from 4 to 12 characters in length; any alphanumeric characters are acceptable, in any arrangement.

When used to specify a volume, the external label is preceded by `:e`, as shown in the example in the section "Vaulting: rlmoved (catalog only)" section on page 54.

Internal label

The volume internal label is the string of characters recorded in the VOL1 label of all IBM and ANSI formatted volumes. At many, but not all, ConvexTMR sites, the internal and external labels are identical.

If the site constant `slbinindex` (internal label is equal to external label) is set to `yes`, external labels must match the internal label.

Volume internal labels should also be unique in the library, and can be no more than 6 characters long. Internal labels must also meet the criteria specified by the site constants.

The following values, as displayed on the site constants report, establish the criteria for a volume internal label:

`inmaxc`	the maximum allowable number of characters
`inminc`	the minimum allowable number of characters
`inalpha`	specific allowable characters
`inregx`	specific allowable regular expression

Storage slot

The volume storage slot is the address of the volume in the storage vault. At some, but not all, sites, volumes are organized in the vault by external label rather than by slot.

Storage slots can be no more than 12 characters in length and must meet the criteria specified by the site constants report.

The following values, as displayed on the site constants report, establish the criteria for a storage slot:

`slmaxc`	the maximum allowable number of characters
`slminc`	the minimum allowable number of characters
`slalpha`	specific allowable characters
`slregx`	specific allowable regular expression

At most sites that employ slot addresses, the storage slot and container given together uniquely identify the volume.

Container

The volume storage container identifies the container in which a volume is stored in the storage vault. The volume storage container is often the container in which several volumes were shipped to the vault.

Storage containers can be no more than 12 characters in length and must meet the criteria specified by the site constants report.

The following values, as displayed on the site constants report, establish the criteria for a storage container:

`comaxc`	the maximum allowable number of characters
`cominc`	the minimum allowable number of characters
`coalpha`	specific allowable characters
`coregx`	specific allowable regular expression

The container value is only intended to be useful when given with the slot value or external label.

Vault

The storage vault, unless otherwise specified, is the vault where the volume is currently stored. A site constant ("vault") determines the default storage vault, however, the directory a volume resides in can override the default setting.

Receipt

For certain procedures, such as returning a volume to an owner or accepting a user-submitted volume, the easiest way to specify a volume is by volume receipt number. A volume receipt number is the random string of five numeric characters proceeded by `R` that is returned to the user after a successful `rlvolsubmit` or `rlretrieve` command.

When used to specify a volume, the receipt number is proceeded by `:r`, as shown in the example in the section "Tape entry into the library" later in this chapter.

Library operations

The following sections describe operator commands that allow you to perform ConvexTMR library operations on user tapes. The operations are:

- Tape vaulting
- Tape entry into the library
- Tape initialization
- Removing tapes from the library
- Tape maintenance
- Reserving scratch tapes

Vaulting: `rlmoved` (catalog only)

To confirm a user's volume movement request, follow these steps after moving the volume or volumes according to your site's vaulting procedures:

Step 1 Type `rlmoved` on the command line.

Step 2 Specify the vault that the volume was moved to. The `-l` option (alphanumeric) indicates that what follows is the name of the vault the volumes were moved to.

Step 3 Specify the container and/or slot the volume was moved to (optional). The `-c` option indicates that what follows is the

container which holds the specified volumes. In the example below, `-s slot` is not provided because the command confirms the movement of more than one volume.

Step 4 Identify the volume that was moved by external label. In the example below `:e000100 :e000101 :e000102` is a space-separated list of the volumes that were moved. Using `:e` tells the ConvexTMR software that the string of characters which follows is an external label.

Step 5 Press Return

For example, enter

```
rlmoved -l offsite -c 123456 :e000100 :e000101
:e000102
```

Tape entry into the library: `rlaccept` (catalog only)

To accept a user-submitted volume, follow these steps:

Step 1 Type `rlaccept` on the command line.

Step 2 Specify any volume attributes that are not consistent with site defaults (optional). See the rlaccept(8) man page for details. The `-m` option indicates that what follows is the media type of the submitted volume. An operator would only supply a volume attribute if it were inconsistent with site defaults.

Step 3 Identify the volume or volumes by the submission receipt number or numbers provided by the user. In the example below `R49287` is the submission receipt number. Using `:r` tells the ConvexTMR software that the string of characters which follows is a receipt number. If you are accepting more than one volume, receipt numbers should be given in a space-separated list.

Step 4 Press Return

For example, enter

```
rlaccept -m 3490 :rR49287
```

Tape initialization: `rlinit`

To initialize a scratch volume, follow these steps:

Step 1 Reserve a device for operator use.

Step 2 Mount the volume to be initialized on the correct device.

Step 3 Type `rlinit` on the command line.

Step 4 Identify the device. `-d 3490` identifies the device to use for initialization, by the device address. Devices may also be specified by stanza name. See the `rlinit`(8) man page for details.

Step 5 Indicate what information should be included on the volume label.

Step 6 Identify the volume or volumes to be initialized.

- The `-e` option requests erasure of the volume before initialization.
- `In the example below, -n 12` is a repetition count. It indicates that 12 volumes are to be initialized, beginning with the external label specified and incrementing the label by one for each consecutive volume.
- In the example below, `2020` is the external label of the first volume mounted for initialization.

Step 7 Press **Return.**

Step 8 Free the device that was reserved.

For example, enter

```
rloreserve tc0

rlinit -d tc0 -e -n 12 2020

rlofree tc0
```

The `rlinit` command has many options. Refer to the `rlinit`(8) man page for a complete list of all options.

If ConvexTMR is operating with a catalog, and the volume is expired, the volume label is rewritten according to the label description options given on the command line. If the label description options are not given, the tape is initialized based on its entry in the volume catalog.

If the volume is not expired, an identification summary, including the actual and cataloged fingerprint values, label type, and internal label, appears on the operator's screen. The operator is given the option to either update the catalog record to reflect the actual values, or to reject the volume.

If ConvexTMR is operating without a catalog, `rlinit` sequences through each volume and initializes them according to the label description options given on the command line. If the label description options are not given, the tape is initialized according to system defaults.

Tape exit from the library: `rlreturn` (catalog only)

To return a volume to its owner after the owner has issued a `rlretrieve` command, follow these steps:

Step 1 Type `rlreturn` on the command line.

Step 2 Identify the volume or volumes to be returned by the receipt number or numbers provided by the user. In the example below, `:rR38409` is a receipt number. Using `:r` tells the ConvexTMR software that the string of characters which follows is a receipt number. If returning more than one volume, receipt numbers should be given in a space-separated list, as shown below.

Step 3 Press **Return**.

For example, enter

```
rlreturn :rR38409 :rR90876
```

Tape maintenance: `rlmaint` (catalog only)

This command is only available at sites that operate with a catalog.

The `rlmaint` command is a comprehensive command for recording volume maintenance tasks in the catalog. These tasks are listed, with their option indicators, below:

- cleaning `-c`
- certification `-C`
- removal `-r`
- erasure `-e`
- finding `-f`
- checking in `-i`
- checking out `-o`
- replacement `-R`

To confirm that a maintenance task has been performed, follow these steps:

Step 1 Type `rlmaint` on the command line.

Step 2 Specify which task has been performed.

- `-c` is the `rlmaint` option that indicates cleaning.

- `-O` indicates that what follows is an operator comment. Comments are limited to 80 characters and should be enclosed in quotation marks.

Step 3 Attach a comment regarding the maintenance task (optional).

Step 4 Identify the volume that was the object of the maintenance by external label. In the example below, `:e200100` is the external label of the volume that was cleaned. Using `:e` tells the ConvexTMR software that the string of characters which follows is an external label. If performing the maintenance task to more than one volume, external labels should be given in a space-separated list.

Step 5 Press **Return**.

For example, enter

```
rlmaint -c -O "Last cleaned 09/30/95" :e200100
```

Reserving scratch tapes: `rlopscr` (catalog only)

This command is only available at sites that operate with a catalog.

The `rlopscr` command may be used to reserve scratch tapes for operator use. Tapes reserved for operator use are not available for user requests.

To reserve scratch tapes for operator use, follow these steps:

Step 1 Type `rlopscr` on the command line.

Step 2 Indicate the total number of operator scratch tapes needed. In the example below, `-n5` indicates that a total of five tapes are needed inthe specified recording format and media type.

Step 3 Specify the desired media type. The `-m` option indicates that what follows next is the desired media type.

Step 4 Specify the desired recording format. The `-f` option indicates that what follows next is the desired recording format.

Step 5 Press **Return**.

Five 3490 operator scratch tapes are needed. You do not know that three tapes of this type are already reserved for operator use. To check availability and reserve the needed tapes, enter

```
rlopscr -n5 -f3490 -m3490
```

A message similar to the following appears on screen

```
(409)<44>123465
```

```
(409)<45>123466
* 60006
* 60007
* 60008
```

- External labels that are returned proceeded by an asterisk (*) represent tapes currently in operator scratch state that can satisfy the request.
- Newly-created operator scratch tapes are displayed without the proceeding asterisk. Container and slot numbers are also displayed, when available. Container numbers appear in parentheses; slot numbers appear in angle brackets.

It is possible to override site constants for label type, vault, and pool. An option is also available to return tapes to user scratch state. Refer to the `rlopscr`(8) man page for details and instructions.

Monitoring and maintaining silo components

6

The CONVEX Tape Library Interface (TLI) allows CONVEX C2, C3, and C4 Series machines to connect to the StorageTek automated cartridge system (ACS), commonly referred to as the *silo*. The silo is an automatic cartridge system that stores and tracks the location of thousands of tape cartridges. Within the silo, a robot arm mounts and unmounts tapes on the available drives without operator intervention as they are needed.

When a tape request is made, the electromechanical robotic arm locates the requested tape by bar code and delivers it to the cartridge tape drive or passes it to another silo. When the tape is no longer needed, the arm removes it from the drive and returns it to its library slot.

This chapter describes how to monitor and maintain the silo components.The preferred method for monitoring and maintaining silo components is to use the software provided by StorageTek located on the Sun server. However, if the Sun is not available to you, you can use the procedures described in this chapter.

The tasks described in this chapter use commands that require a `SILOHOST` environment variable definition. The `SILOHOST` environment defines the host name of the Sun workstation that controls the silo on your CONVEX system. So, before attempting to perform any task in this chapter, be sure to set the `SILOHOST` environment variable in your login file. For example, if you use `csh`, and the host name of the Sun CPU that controls the silo is jupiter, enter the following line to your .cshrc file:

```
setenv SILOHOST jupiter
```

If you use `sh` or `ksh`, enter the following line to your .login or .profile file depending on the shell you use.

```
SILOHOST=jupiter; export SILOHOST
```

Silo components

The automatic cartridge system, or silo, is comprised of many components. These components are explained in this section.

Library storage module

The basic hardware component of the silo is the library storage module (LSM). The library storage module is a structure containing

- Storage cells for tape cartridges
- A robot that retrieves and moves the cartridges

LSMs can be interconnected to form a single silo. Pass-thru ports (PTPs) exist in the walls of adjacent LSMs, through which cartridges can be passed from one LSM to another.

The robot can retrieve any cartridge in the LSM and deliver it to another cell, a tape drive, or a pass-thru port. It identifies the correct cartridge by its external bar-code label.

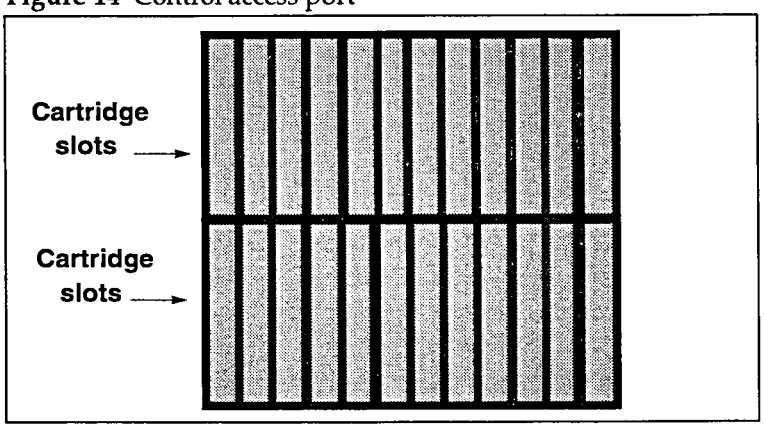
Library management unit

The library management unit (LMU) is a serial communication line from the server to the LSM. It serves all the LSMs in a single silo, so, there is only one LMU per silo.

Control access port

Each LSM has a door in the outer wall allowing access to the interior. This access door contains a cartridge access port (CAP). Tapes are entered to and removed from the silo tape library through the CAP connected to the silo. The CAP is shown in Figure 14.

Figure 14 Control access port



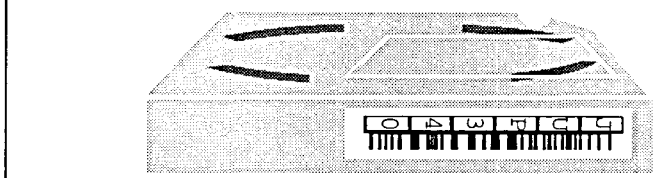
Cartridge tape drives

Each silo contains from one to four cartridge drive units. Each unit contains two or four tape drives. These drives are attached to an LSM and are controlled by the server rather than by an operator. All drives connected to the silo can be operated concurrently.

Tape cartridges

The silo supports 3480and 3490 tape cartridges. Each cartridge entered into the library must contain a valid bar code label containing a unique volume serial number (VSN). The first six characters of the bar code must match the magnetic volume serial number of the tape. Figure 15 shows the bar code label and its placement on the 3480 tape cartridge.

Figure 15 Valid bar code label



Sun server

The silo and all its components are served by a Sun workstation. A single Sun workstation can serve multiple silos. Each silo can contain multiple CAPs, LSMs, tape cartridges, and tape drives.

Because there can be more than one of each of these components, each component is assigned a unique identification number by the system manager. These IDs are used to reference the component when querying its status. The following sections describe how to query the status of these components. If you are

not familiar with the IDs of the components you work with, see your system manager.

Monitoring status

The status of each of these components can be monitored using the `siloquery` utility on your workstation. The syntax is

`siloquery` *command*

where *command* can be

`acs`	Reports the status of a silo
`cap`	Reports the status of a cartridge access port
`drive`	Reports the status of a tape drive
`lsm`	Reports the status of an library storage module
`mount`	Reports the status of a mounted tape and the drive on which it is mounted
`port`	Reports the status of an library management unit port
`request`	Reports the status of a server request
`server`	Reports the status of the Sun server where the query is made
`volume`	Reports the location of a tape

The following sections describe the syntax for each command.

Reporting silo status

The syntax for reporting silo status is

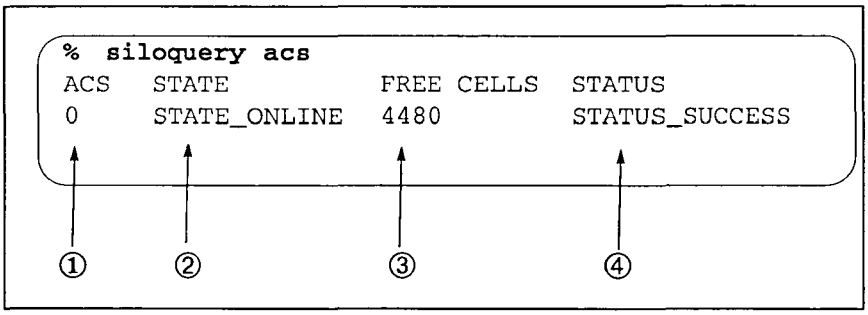
`siloquery acs [`*acsID ...*`]`

where *acsID* is an integer or list of integers referencing silos controlled by this server. The first silo that is installed is typically numbered 0, the second 1, the third 2, and so on.

If no ID is specified, the statuses for all silos controlled by this server are reported.

Figure 16 shows output for this command.

Figure 16 Reporting general ACS silo status



① Identification number assigned to this silo.

② State of this silo. This can be either online or offline.

③ Number of cartridges that can still be stored in this silo.

④ Status of this inquiry. This can be either successful or unsuccessful.

Reporting CAP status

The cartridge access port (CAP) is where tapes are entered and removed from the silo tape library. The syntax for reporting CAP status is

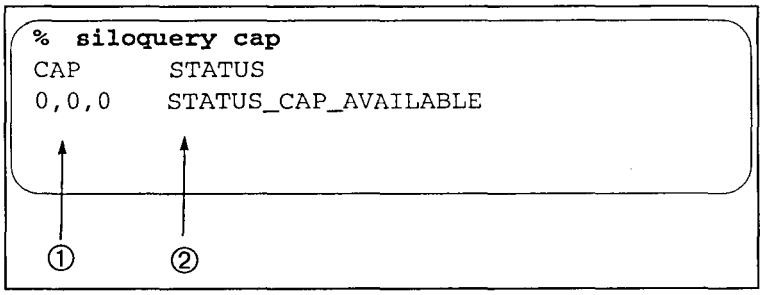
`siloquery cap [`*capID* `...]`

where *capID* is the ID or list of IDs for CAPs controlled by this server. The first CAP in the first silo is generally numbered 0,0,0; the second CAP in the first silo is numbered 0,0,1; the first CAP in the second silo (if there is one) is numbered 1,0,0; and so on.

If no ID is specified, the statuses for all CAPs controlled by the server are reported.

Figure 17 shows output for this command.

Figure 17 Reporting ACS silo CAP status



① Identification number assigned to this cartridge access port.

② State of this cartridge access port. This can be either available or not available. If available, you can use this CAP to enter or remove tapes from the silo.

Reporting tape drive status

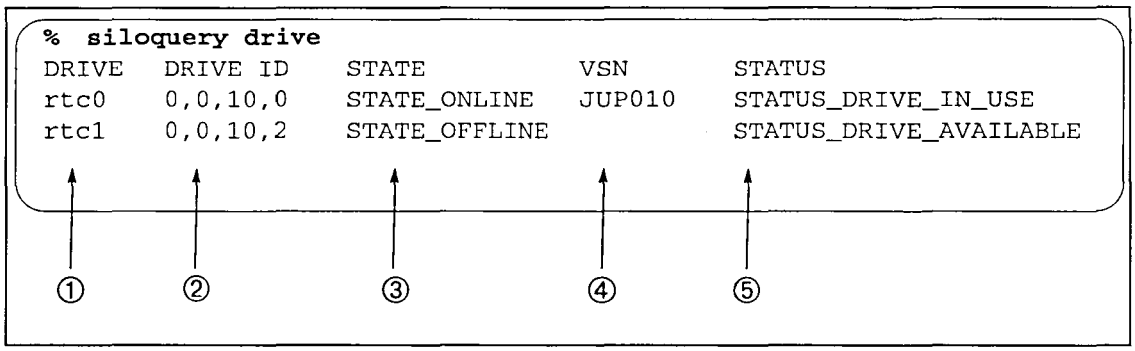
The syntax for reporting tape drive status is

`siloquery drive [`*driveID* `...]`

where *driveID* is the ID or list of IDs for drives controlled by this server. If no ID is specified, the statuses for all drives controlled by the server are reported.

Figure 18 shows output for this command.

Figure 18 Reporting tape drive status



① Name assigned to this drive.

② Identification number assigned to this drive.

③ State of this cartridge access port. This can be either on-line or off-line.

④ Volume serial number currently mounted on drive, if there is one.

⑤ Status of drive. This can either be in use or available.

Reporting library storage module status

Library storage modules (LSM) store 3480 tape cartridges.The syntax for reporting LSM status is

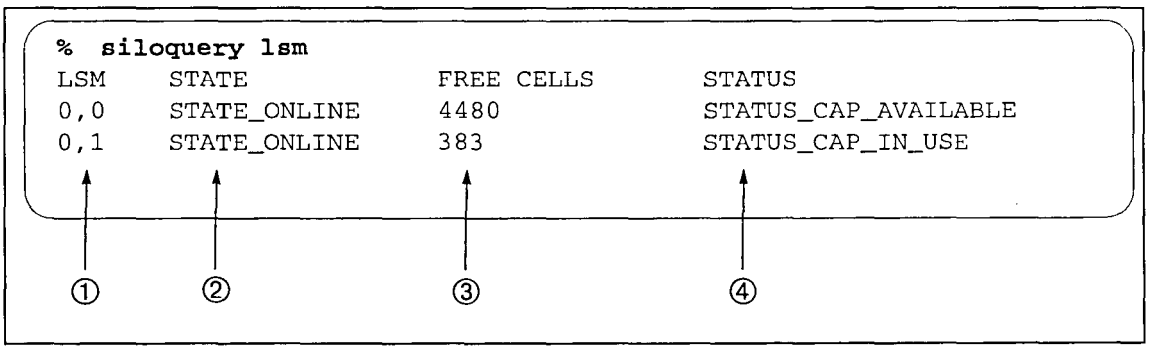
`siloquery lsm [`*lsmID* `...]`

where *lsmID* is the ID or list of IDs for LSMs controlled by this server. The first LSM in the first silo is generally numbered 0,0; the second LSM in the first silo is numbered 0,1;, the first LSM in the second silo (if there is one) is numbered 1,0; and so on.

If no ID is specified, the statuses for all LSMs controlled by the server are reported.

Figure 19 shows output for this command.

Figure 19 Reporting LSM status



① Identification number assigned to this library storage module.

② State of the library storage module. This can be online or offline.

③ Number of cartridges that can still be stored in this library storage module.

④ Status of the cartridge access port. This can be either available or not available. If available, you can use this CAP to enter or remove tapes from this library storage module.

Reporting tape and tape drive status

The syntax for reporting status on tapes that are mounted and the drive on which it is mounted is

`siloquery mount [`*VSN* `...]`

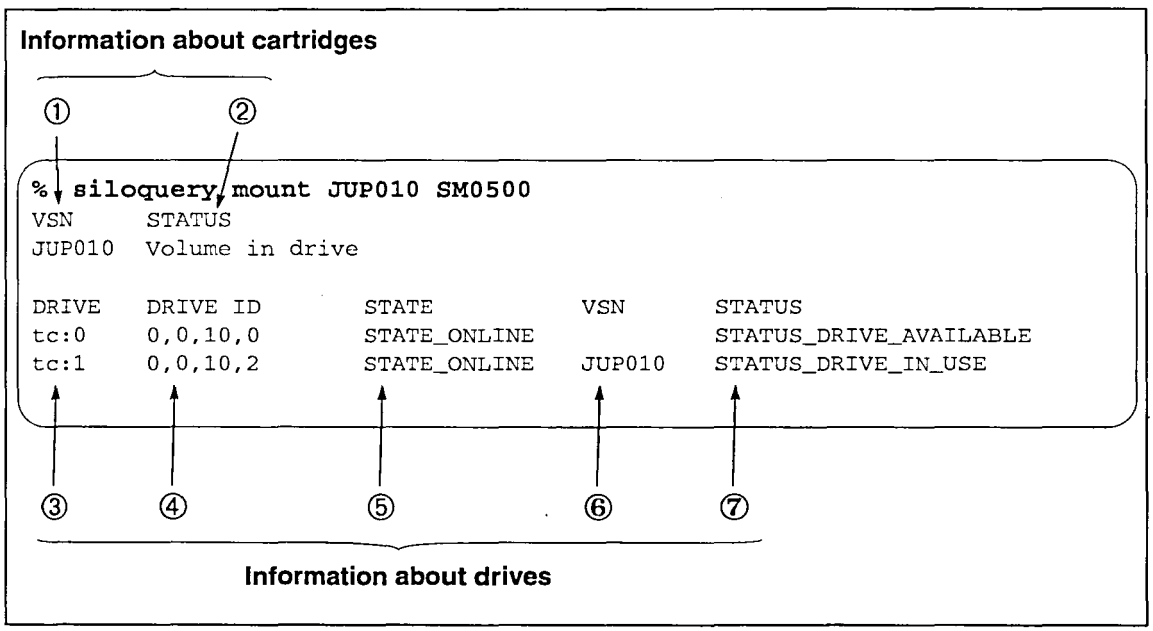
where *VSN* is the volume serial number or list of numbers on which to report.

Note

If no *VSN* is specified, the status for all mounts and tape drives controlled by the server are reported. This could take considerable time.

Figure 20 shows output for this command.

Figure 20 Reporting mount and tape drive status



① Volume serial number specified for inquiry.

② Status of the cartridge containing the requested VSN.

③ Drive or drives associated with the requested VSN.

④ Identification number assigned to drive associated with the requested VSN.

⑤ State of drive. This can be either online or offline.

⑥ Cartridge currently mounted on drive.

⑦ Status of drive. This can be either available or in use.

Reporting port status

A port is a serial connection line from the server to a library management unit (LMU). The syntax for reporting port status is

`siloquery port [`*portID* `...]`

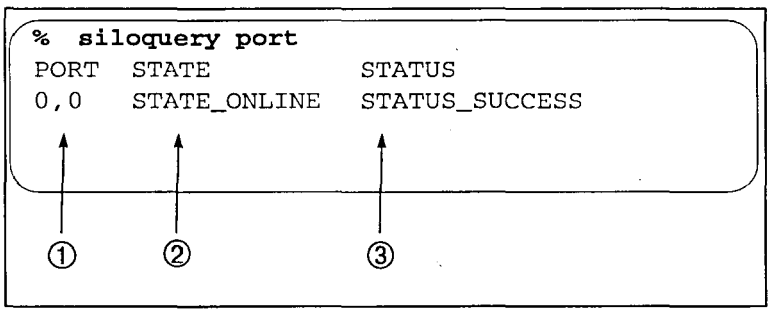
where *portID* is the ID or list of IDs for ports controlled by this server. The first port in the first silo is generally numbered 0,0; the second port in the first silo is numbered 0,1; the first port in the second silo (if there is one) is numbered 1,0; and so on.

Note

If no ID is specified, the status for all LMU ports controlled by the server are reported.

Figure 21 shows output for this command.

Figure 21 Reporting port status



① Identification number assigned to this port.

② State of the port. This can be either online or offline.

③ Status of this request. This can be either success or failure.

Reporting request status

The syntax for reporting the status for server requests is

`siloquery request [`*requestID ...*`]`

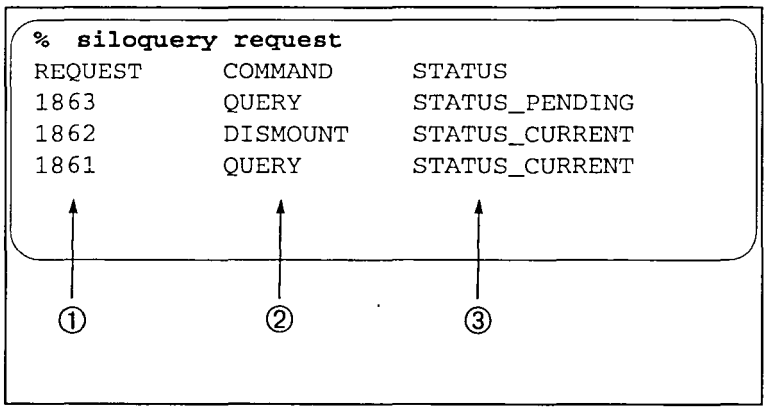
Reports the status of a server request, where *requestID* is the ID or list of IDs for requests made to this server. The *requestID* is assigned to a request when it is submitted.

Note

If no ID is specified, the statuses for all requests for the server are reported.

Figure 22 shows output for this command.

Figure 22 Reporting request status



① Identification number assigned to this server request.

② Type of request made.

③ Status of request.

Reporting server status

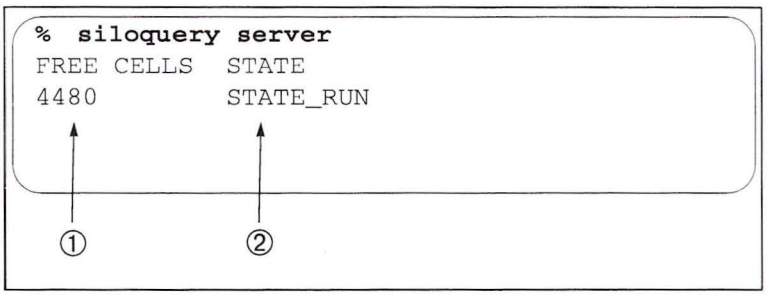
A Sun workstation acts as a server for the ACS. The syntax for reporting server status is

```
siloquery server
```

Reports the status of Sun server where the query is made.

Figure 23 shows output for this command.

Figure 23 Reporting server status



① Number of cartridges that can still fit in all the silos controlled by this server.

② State of the server.

Reporting volume status

The syntax for reporting the location of cartridges in the silo is

`siloquery volume [`*VSN*`...]`

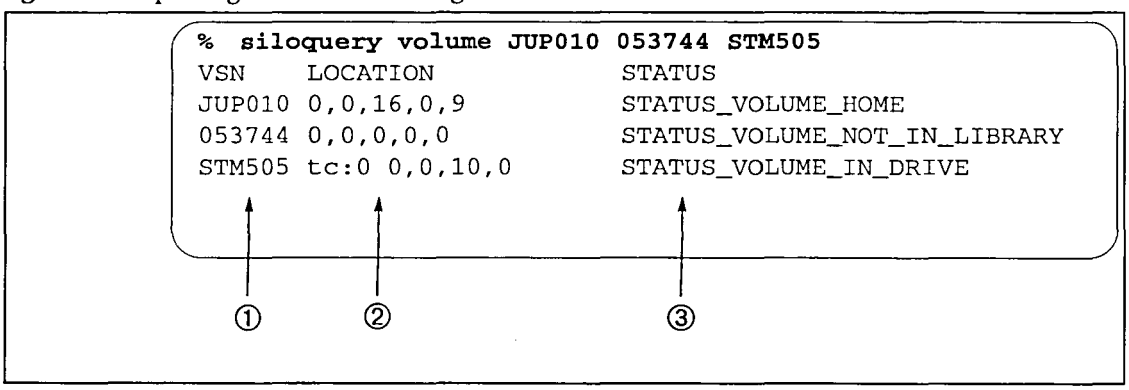
where *VSN* is the volume serial number or list of numbers on which to report.

Note

If no VSN is specified, siloquery reports the location of every cartridge contained in the silo controlled by this server. This command can take considerable time, especially if there are many cartridges in the silos controlled by this server.

Figure 24 shows output for this command.

Figure 24 Reporting status of a cartridge volume



① Volume serial number of cartridge stored in the silo.

② Current location of volume. This is either the coordinates of the cell where the cartridge is stored or the drive it is mounted on.

③ Status of volume.

Mounting tapes using ACS

Typically tapes are mounted on tape drives using the `rlaccess` command. However, ACS provides an alternate method to mount tapes on drives for situations when `ConvexTMR` may not be running and it is imperative to mount a tape.

The `silomount` command bypasses ConvexTMR to mount a cartridge. The syntax is

`silomount [-r]` *VSN drive*

where

-r	mount the tape in the drive for read-only access
VSN	is the volume serial number of the cartridge you want mounted.
drive	is the name of the drive with the characteristics you want to use.

Figure 25 shows an example `silomount` command and the output generated by the command.

Figure 25 Using the `silomount` command

```
% silomount JUP340 /dev/rtc0
Volume JUP340 mounted on drive /dev/rtc0 (0,0,10,0)
```

Unmounting tapes using ACS

Typically tapes are unmounted from tape drives using the `rlrelease` command. However, ACS provides an alternate method for unmounting tapes on drives for situations when `ConvexTMR` may not be running and it is imperative to unmount a tape.

The `silodismount` command bypasses ConvexTMR to unmount a cartridge with the ACS. The syntax is

`silodismount [-f]` *VSN drive*

where

`-f` forces the unmount immediately regardless of the state of the drive. Use this option with extreme caution.

VSN is the volume serial number of the cartridge you want unmounted.

drive is the name of the drive with the drive characteristics you want to use.

Figure 26 shows an example `silodismount` command and the output generated by the command.

Figure 26 Using the `silodismount` command

```
% silodismount JUP340 /dev/rtc0
Volume JUP340 dismounted from drive /dev/rtc0 (0,0,10,0)
```

Entering tapes to the silo library

This section describes how to enter tapes to the silo tape library. Once entered to the library, tapes can be accessed by the robotic arm and mounted on tape drives connected to the silo. Perform the following steps to enter cartridge tapes to the silo tape library.

Step 1 Ensure that each cartridge has a bar-code label on the outside. Each label should have a unique volume serial number (VSN) and should be readable by the robot camera that is inside the silo. Any cartridge that does not have a valid label or cannot be read by the robot camera is rejected by the silo during the entry process.

Step 2 Unlock the CAP door with the following syntax:

`siloenter` *CAPid*

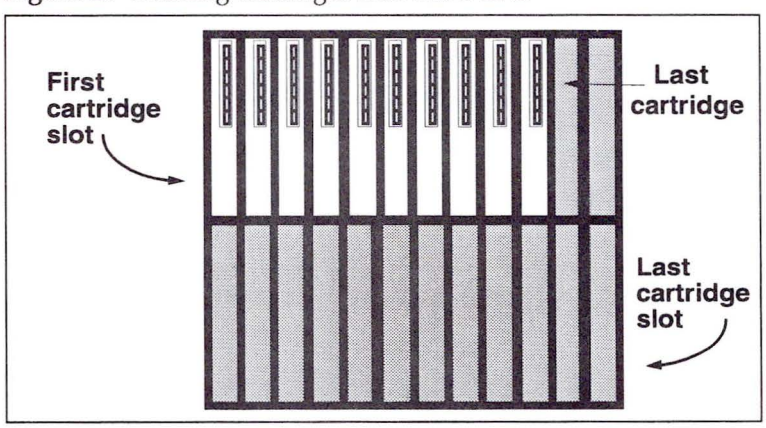
where *CAPid* identifies the control access port (CAP) that you are using. For example, to unlock the CAP door with an ID of 0,0, enter

```
siloenter 0,0,0
```

The CAP door associated with the ID is unlocked and the "CAP enter" light above the CAP is illuminated.

Step 3 Open the CAP door and insert the 3480 cartridges into the slots from left to right, starting with the top row. Even though all slots do not have to be filled, do not leave any slots empty between the first and last cartridges. For example, Figure 27 shows entering ten cartridges to the silo tape library. These ten cartridges are placed in the first ten slots of the CAP.

Figure 27 Loading cartridges into silo's CAP



Step 4 Close the CAP door.

The silo robot camera verifies that each tape cartridge has a readable label and a unique VSN, and the robot arm stores the tape cartridges into the library storage modules (LSM).

If all the cartridges are accepted, the "CAP locked" light above the CAP is illuminated and the entry process is finished. A list of the VSNs accepted by the silo is displayed on the terminal screen. Figure 28 shows this output.

Figure 28 Completion of cartridge entry into silo

```
% siloenter 0,0,0
VOLUME STATUS
JUP010 STATUS_SUCCESS
JUP200 STATUS_SUCCESS
MEL001 STATUS_SUCCESS
```

Any tape cartridges whose labels are not readable or have invalid VSNs are returned to the CAP door.

Step 5 If any cartridges are rejected, the "CAP eject" light above the CAP is illuminated. After the "CAP eject" light is illuminated, remove any rejected cartridges. Do not leave any cartridges in the door.

Step 6 Close the CAP door after all the cartridges have been removed.

The robot arm verifies that the top left-hand slot of the CAP door is empty. When the "CAP locked" light above the CAP is once again illuminated, the entry process is finished. A list of the VSNs accepted by the silo is displayed on the terminal screen. Figure 28 shows this output.

Removing tapes from the silo library

This section describes how to remove tapes from the silo tape library.

Step 1 Identify the tape cartridge or cartridges you want to remove from the silo tape library. The syntax is

`siloeject` *CAPid VSN* `[`*VSN* `...]`

where

CAPid is the identification number of the CAP you are using.

VSN is the volume serial number or list of serial numbers of the cartridge you are ejecting.

For example, to remove tapes with VSNs JUP010, JUP200, and MEL001 using the CAP with an ID of 0,0, enter

```
siloeject 0,0 JUP010 JUP200 MEL001
```

The CAP door associated with the ID is unlocked and the "CAP eject" light above the CAP is illuminated.

Step 2 When the "CAP eject" light above the CAP is illuminated, open the CAP door and remove all the ejected cartridges. Do not leave any cartridges in the door.

Step 3 Close the CAP door after all the cartridges have been removed.

The robot arm verifies that the top left-hand slot of the CAP door is empty. When the "CAP locked" light above the CAP door is once again illuminated, the ejection process is finished.

A list of the VSNs ejected by the silo is displayed on the terminal screen. Figure 29 shows this output.

Figure 29 Completion of cartridge ejection from silo

```
% siloeject 0,0  JUP010 JUP200 MEL001
VOLUME STATUS
JUP010 STATUS_SUCCESS
JUP200 STATUS_SUCCESS
MEL001 STATUS_SUCCESS
```

Glossary

A

ACL
Access Control List; a list of user and group IDs and access permissions associated with a ConvexTMR object. The ACL of a ConvexTMR object determines what kind of access specific users and groups have to the object. Viewed via `rllsacl`; controlled via `rlchacl`.

accept state
A tape life cycle state. A tape is in the accept state after possession has been transferred from the user to the tape library. Once a tape is accepted, its catalog record may be appended or edited.

access permissions
A string of alphabetic characters associated with a user or group ID that controls access to a ConvexTMR object. An element of the access control list (ACL).

active state
A tape life cycle state. An active tape stores wanted data that has not expired. These tapes may be involved in frequent tape sessions, or they may reside in the library's archive and remain unaccessed for long periods of time.

administrator groups
A group of administrators assigned a specified authority level, name, and password. An administrator must be enrolled in a group to perform administrative tasks.

authority levels
A hierarchical division of powers; administrator groups are always assigned an authority level.

B

BLP
Bypass Label Processing; a processing mode that ignores the volume and file tape labels. Tape positioning and navigation occur as under standard label processing, but the labels are ignored. A ConvexTMR privilege.

C

catalog
A database that tracks all of the objects in the ConvexTMR library. Catalog records are maintained on ownership, contents, pools, vaulting, status, and many other details.

command line interface
The interface to the ConvexTMR mount request system that accepts ConvexTMR commands at the command line.

container
The container in which a volume is shipped and/or stored. Often included in the *vol_def*.

ConvexTMR objects
Objects that can be referenced or manipulated with the ConvexTMR software. These objects include files, volumes, volumesets, pools, and rotations.

D

database key
A system-generated string of characters that uniquely identifies a ConvexTMR file, volume, volumeset, pool, or rotation.

dataset
See tape file.

device
A tape drive. Specific devices are referenced by *dev_name*.

dev_name
A name for a specific tape device. A device can be identified by the device's special file pathname.

display panel
The eight-character LED display panel on IBM 3480/90 devices. ConvexTMR utilizes this panel to inform library operators of pending requests.

domain
A set of tasks and devices defined by the ConvexTMR administrator. ConvexTMR has a global domain that covers all requests. Multiple, custom domains are also supported.

domain server
A server that controls a specific operator domain.

E

EOV
End-of Volume; the physical end of a tape.

external label (*ext_lbl*)
The user-defined, unique string of from 4 to 12 characters that identifies the volume.The external label name is often recorded on a sticker on the outside of the volume.

ESL
Exceeding site resource limits for the number of devices that can be allocated simultaneously to one user or allocated under one resource key; a ConvexTMR privilege.

F

file
See tape file.

file access mode
Accessing tape data on a file basis only. When a tape is accessed in this manner, no other portion of the tape can be accessed.

file section
The segment of a tape file which resides on a single volume. If a tape file spans three tape volumes, then it has three file sections.

fileset
A set of associated, adjacent files residing on a volume or volumeset.

file_spec
A very specific method of file referencing recognized by the ConvexTMR catalog. For an expanded definition, see the `rlflc`(1) manpage.

fingerprint
A string of characters, calculated from label data and recorded in the ConvexTMR catalog, used to electronically identify volumes when they are mounted.

full-screen interface
An easy-to use alternative to the command-line interface, comprised of three windows: the request queue window, the device list window, and the message window.

G

generation
An instance of a file or volumeset. Generations allow multiple instances of a file or volumeset to exist at the same time and to be referenced independently. Newer instances are given higher generation numbers. A file with the name `payroll:G2:V1`, is the second instance, or generation, of the file payroll. The number proceeded by "G" is the generation number; the number proceeded by "V" is the version number (see version).

H

header labels
Electronic labels at the beginning of volumes (volume header labels) and tape files (file header labels) that contain identification and other data.

hold state
A tape life cycle state. A tape is in the hold state if the user wishes to scratch it but reserve it for future use. For example, a user may request that a multiple-volume volumeset be scratched, but that the individual volumes not be made available for other mount requests.

I

implicit pools
A site configuration that creates private user pools for all library users. Indicated by the tag `dpool=IMPOOL` in the site constants report.

initialization
The process by which labels are written to ConvexTMR tape volumes; accomplished via `rlinit`.

internal label (*`int_lbl`*)
The string of characters recorded in the VOL1 label of all IBM and ANSI volumes; often referred to as the volume serial number (VSN). In many tape libraries, internal and external labels are identical. Maximum length for an internal label is 6 characters.

K

key
See database key.

L

labels
See header, trailer, user, internal, or external labels.

LIBDIR
The RLLIBDIR value specified in the file /etc/`reelenv`, or the directory specified for REELENV in your environment profile.

low water mark
A number that, if set, is the lowest number of scratch volumes ConvexTMR will allow in a pool without sending warning messages to the pool owner. This number is set via `rlpoolc` or `rlpoole`.

M

maintenance state
A tape life cycle state. Tape maintenance is tracked by the ConvexTMR software and performed by the tape operator. A tape is in this state whenever it is undergoing any maintenance task. These tasks are discussed in greater detail later in this chapter.

mask
An ACL entry that specifies the maximum permissions allowed to all users and groups. The mask entry overrides all specific user and group entries, but does not override the entry for other users.

O

OBO
Initiating and controlling tape sessions "on behalf of" other users; a ConvexTMR privilege.

OSH
Off-line storage hierarchy; the ConvexTMR directory structure. The OSH is not specific to a particular UNIX shell or process; do not confuse the OSH with your UNIX directory structure.

operator groups
A group of operators assigned a specified authority level, name, and password. An operator must be enrolled in a group to perform operator tasks.

P

pathname
A ConvexOS directory or file name. Examples: /usr, /etc/passwd, ./passwd.

permissions
See access permissions.

PDA
Accessing specific physical devices by name; a ConvexTMR privilege.

physical volume
A single volume, (see volume).

pools
A group of volumes. Tape pools partition the tape library into sub-libraries.

R

receipt number
A five-digit, random number proceeded by "R." Receipts are generated by the ConvexTMR software when volumes are submitted to or retrieved from the tape library. Receipt numbers can be used to reference volumes and volumesets.

request ID (*reqid*)
A five-digit, sequential number assigned to a `rlaccess` or `rlnext` request. Request IDs appear on the request monitor and can be used to reference specific ConvexTMR requests.

request monitor
The monitor through which the operator views and services ConvexTMR requests, messages, and device status; command-line and full-screen interfaces are available.

request queue
The list of all outstanding operator requests that displays on the request monitor.

resource key (*reskey*)
A user-defined alpha-numeric sequence of up to twelve characters that distinguishes a tape session from other sessions under the same user ID. Tape requests made under the same resource key affect the same tape session. Tape requests made by the same user ID under a different resource keys affect different sessions.

retension
To re-wrap tape on its storage spool to avoid loose spooling; a maintenance procedure to safeguard against tape breakage.

return state
A tape life cycle state. A tape is in the return state after possession has been transferred from the library to the user. A tape in this state is not tracked by the ConvexTMR catalog.

rewind
To position to the beginning of a tape.

role groups
See operator or administrator groups.

rotations
A list of vault locations and durations assigned to a volumeset. Rotations are ConvexTMR database objects.

S

scratch state
A tape life cycle state. A scratch tape is not in current use, and any data written to it has expired. Scratch tapes contain no wanted data and are available for assignment to a volumeset. You may think of a scratch tape as a blank tape. Scratch tapes may reside in the library, or may be brought to the tape session.

session
The period during which a user accesses a tape or tapes on one or more drives using the same resource key.

slot
The unique address of a volume in the storage vault. At some sites tapes are organized by external label rather than slot. Often included in the `vol_def`.

T

tape file
A set of related bits written to tape. Tape files can span multiple volumes within a volumeset.

tape mark
A delimiter used to indicate end of tape files.

trailer labels
Electronic labels at the end of volumes (volume trailer labels) and tape files (file trailer labels) that contain identification and other data.

U

user labels
Electronic labels reserved for user or application data; user labels follow the file header labels.

user possession state
A tape life cycle state. A tape in user possession may or may not contain active data. The user cannot access data on this tape at a ConvexTMR site until the tape is submitted to the library.

V

vault
The storage location for a group of volumes; ConvexTMR supports multiple vaults.

version
An instance of a generation of a file or volumeset; versions allow another level of object subscripting beyond generations. Newer versions are assigned higher numbers. A file with the name `payroll:G2:V1`, is the first instance, or version, of the second generation of the file `payroll`. The number proceeded by "V" is the version number; the number proceeded by "G" is the generation number (see generation).

vol_def
A method of volume referencing that may include any or all of the following values: internal label, external label, slot, container. *`vol_def`* is used to reference uncataloged volumes.

vol_spec
A very specific method of volume referencing recognized by the ConvexTMR catalog. For an expanded definition, see the `rlvsc`(1) manpage.

vs_spec
A very specific method of volumeset referencing recognized by the ConvexTMR catalog. For an expanded definition, see the `rlvsc`(1) manpage.

volume
A single tape.

volume access mode
Accessing an entire volumeset. When a volume is accessed in this manner, any and all files on the volumeset can be accessed.

volumeset
A logical volume consisting of one or more physical volumes.

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