

# ConvexOS Tape System Operator's Guide

*First Edition*



CONVEX COMPUTER CORPORATION



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# ConvexOS Tape System Operator's Guide

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Order No. DSW-397

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United States of America

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Order No. DSW-397

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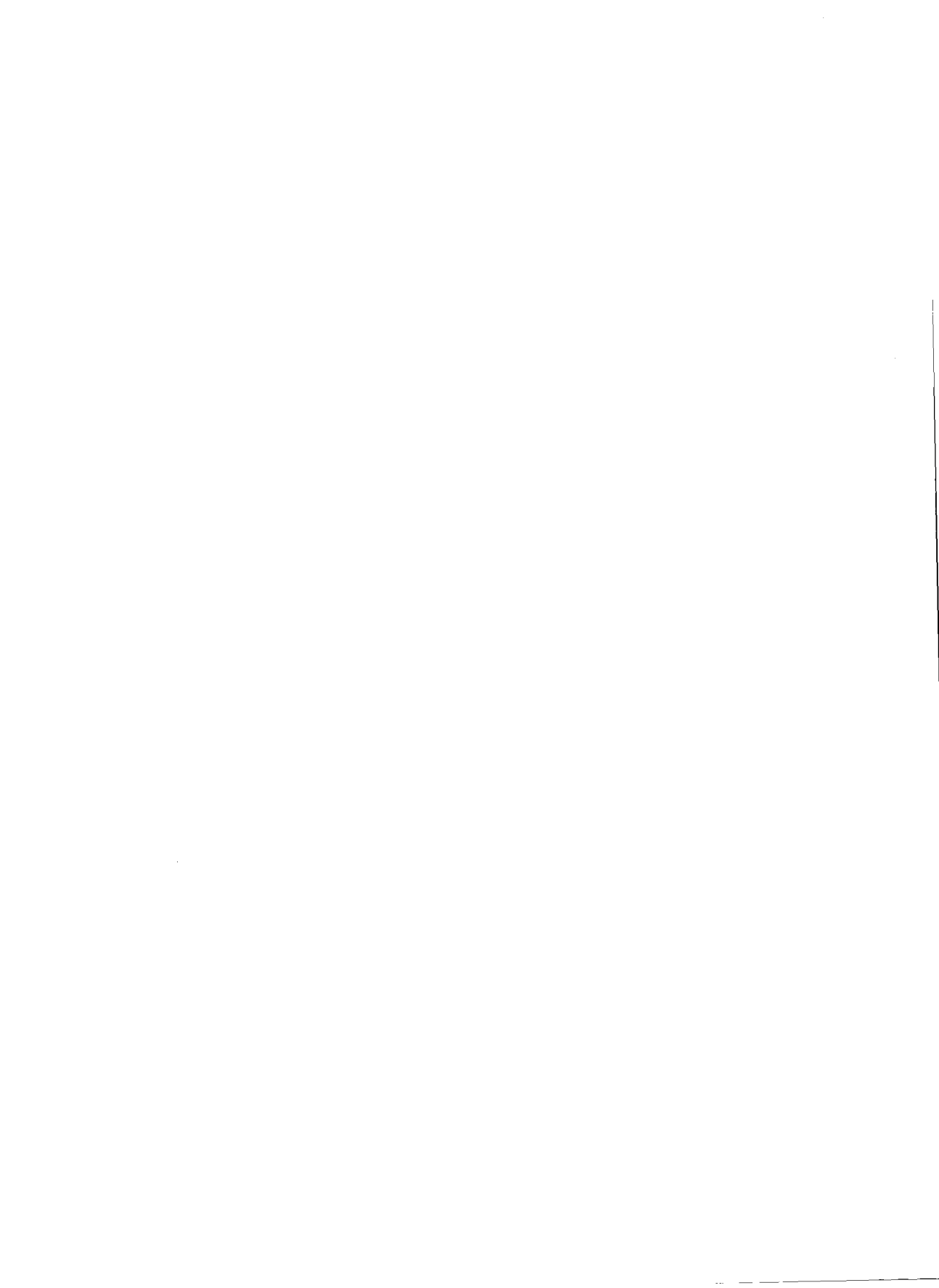
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# Using this guide

The *ConvexOS Tape System Operator's Guide* is a guide and reference for anyone who is an operator for the ConvexOS Tape System. Most of the commands described in this guide require either superuser or operator-type class authorization.

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## Notational conventions

This section describes notational conventions used in this guide. These conventions include:

- Typographical conventions, or what various typefaces mean
- Command syntax and how to distinguish requirements for commands and examples
- Difference between “entering” and “typing” commands
- Identifying cautions

---

## Typographical conventions

The following typefaces have special meaning and are used in this guide:

<b>Bold courier</b>	Identifies user input in examples.
Courier	Identifies input and output, including: Command names System calls Data structures and types Error messages
<i>Italic</i>	Identifies: User-supplied variables in a command-line example New and important terms Titles of documents
<b>KEYCAP</b>	Indicates keyboard keys to be pressed. For example, <b>RETURN</b> refers to the carriage return key. Two <b>KEYCAP</b> terms separated by a hyphen indicate two keys that you must press simultaneously. For example, <b>CTRL-d</b> indicates that you must press the <b>d</b> key while holding down the <b>CTRL</b> key.

---

## Entering versus typing commands

In this guide there is a distinction between entering a command and typing a command. This distinction is:

<i>type</i>	Type in the command at the keyboard without pressing the <b>RETURN</b> key.
<i>enter</i>	Type in the command at the keyboard and follow by pressing the <b>RETURN</b> key.

---

## Command syntax and example conventions

In the following example:

```
command  [options...] {a | b}      filename[...] \
  ①      ②          ③          ④      ⑤
  ⑥ :
```

- ① `command` must be typed as it appears.
- ② Brackets indicate a part of a command that is optional. A horizontal ellipsis indicates that the preceding term can be repeated. The brackets and ellipsis are not typed.
- ③ Braces indicate a part of a command that is necessary, but that there may be a choice in what is supplied. In this example, values for either variable *a* or *b* must be supplied, but not both. The braces and vertical line are not typed.
- ④ In this example, *filename* is a variable that must be supplied. The ellipsis enclosed in brackets indicates additional arguments of the same type can be supplied, but are not necessary. Again, neither the brackets nor the ellipsis is typed.
- ⑤ A backslash (\) at the end of a line indicates that an example continues on the next line of text. If the example is to be entered, do not press RETURN until the entire example is typed.
- ⑥ A vertical ellipsis indicates that part of an example has been omitted. The vertical ellipsis is not typed.

---

## Identifying cautions

“Caution” labels are used frequently throughout this guide. They are of this format and have the following meaning:

---

### Caution

---

A “Caution” label and this typeface highlight procedures or information necessary to avoid damage to equipment, software, or data.

---

## Accessing associated documentation

Using this software may require information not specific to the tasks described in this document. This section describes where to find additional information and assistance.

---

### Accessing man pages

For more information on ConvexOS, use the online man pages. To view a man page enter:

```
man command
```

where *command* is any valid ConvexOS command.

References to man pages throughout this document are in the form:

```
cat(1)
```

where the man page's section number, enclosed in parentheses, follows.

---

### Accessing paper documentation

For more in-depth information on ConvexOS, you can order these books from CONVEX Computer Corporation:

- *ConvexOS Man Pages for System Managers* (DSW-333), *ConvexOS Man Pages for Programmers* (DSW-332), and *ConvexOS Man Pages for Users* (DSW-331), hard copy versions of the ConvexOS man pages
- *ConvexOS Primer* (DSW-133), an introduction to ConvexOS for new users
- *ConvexOS Tape System Manager's Guide* (DSW-398), a guide for configuring and managing the ConvexOS Tape System
- *ConvexOS Tape System Quick Reference* (DSW-391), a quick reference for the ConvexOS Tape System
- *ConvexOS Tape System User's Guide* (DSW-395), a guide and reference for using the ConvexOS Tape System
- *ConvexOS dump and restore Quick Reference* (DSW-392), a quick reference for dumping and restoring file systems
- *Managing ConvexOS: Configuration Guide* (DSW-030), a guide for configuring ConvexOS
- *Managing ConvexOS: Operations Guide* (DSW-031), a guide for ConvexOS maintenance and operations

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## Acquiring 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 to report any problems you may have with ConvexOS or its associated documentation. For more information refer to the `contact(1)` man page in *ConvexOS Man Pages for Users*, or the appendix "Using `contact`" in the *ConvexOS Primer* or *Managing ConvexOS: Operations Guide*.

# Checking on daemons necessary for the tape system

# 1

For the tape system to stay up and running, the following four daemons must be present:

- portmap
- inetd
- opreq\_daemon
- tpdaemon

To check on these daemons, enter the command at your system prompt as shown in Example 1.

## Example 1 Checking on daemons necessary for the tape system

```
% ps aux | egrep "PID|portmap|inetd|opreq_daemon|tpdaemon"
USER PID %CPU %MEM  SZ  RSS  TT  STAT  TIME  COMMAND
root  217  0.0  0.2 276  112  ?   S     0:07  inetd
root  109  0.0  0.1 228   48  ?   S     0:27  /etc/portmap
root  229  0.1  0.3 700  148  ?   S     0:02  /usr/lib/tape/tpdaemon
root  228  0.0  0.1 392   28  ?   S     0:00  /usr/lib/opreq/opreq_daemon
% █
```

Not only must `portmap`, `inetd`, `opreq_daemon`, and `tpdaemon` be present for the tape system to remain functional, but in *most* cases their process IDs (PIDs) should adhere to the following criteria:

- The PID of `portmap` should be less than that of `inetd`.
- The PID of `inetd` should be less than that of `opreq_daemon`.
- The PID of `opreq_daemon` should be less than that of `tpdaemon`.

If you are having problems with the tape system, contact your system manager.



The Operator Request Management utility, `opreq`, is an operator interface for managing users' tape system requests. With `opreq` operators can monitor the status of the tape system and service user requests for tape system resources. You must have superuser authorization or be a member of the group `tapeop` to execute most `opreq` commands. And, under ConvexOS/Secure you must have `tapeop` authorization.

If `opreq` is enabled, tape system resource requests made with the `tpmount` command are stored in the `opreq` queue until the tape operator handles the request.

`opreq` provides a user-interface window so tape operators can view the status of queued requests. This window shows:

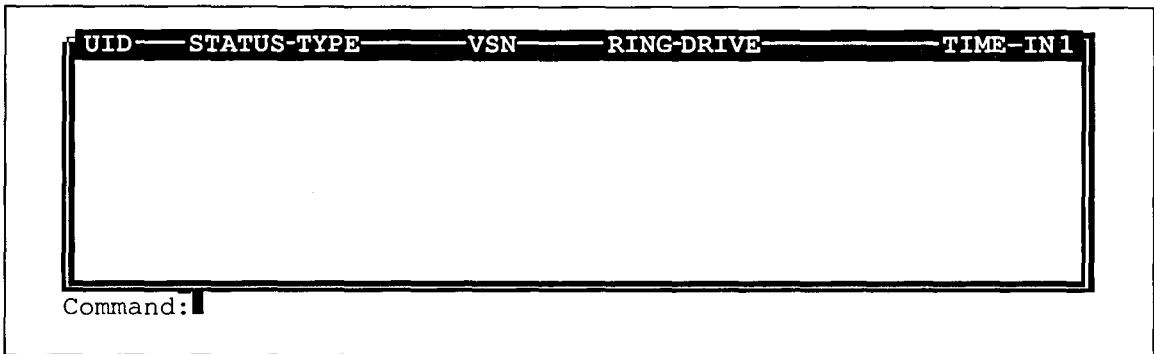
- Requests to mount tapes
- Requests to change volumes in tape sets
- Requests to unmount tapes
- Status of requests

The information displayed for queue entries is configurable through `opreq` so that tape operators can configure their own individual screen.

## The opreq window

The tape operator uses the `opreq` window to manage the tape system. This window is illustrated in Example 2.

Example 2 The `opreq` window



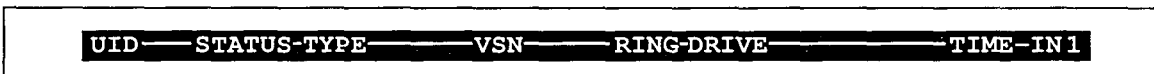
The `opreq` window has three main parts:

- Title bar
- Messages
- Command line

### Title bar

The title bar is a series of labels, such as `UID` and `STATUS`, that appears across the top of each window. These labels refer to the message information shown beneath them. The title bar is configurable and can change from user to user, and site to site. An `opreq` title bar is illustrated in Example 3.

Example 3 The `opreq` title bar



For a description of all the title bar labels that can appear in the title bar, refer to Table 2, on page 14.

More than one `opreq` window can be open on a single terminal at once. The window number shown at the right end of the title bar increments for each additional window. In Example 3, this number is 1.

Although multiple windows can be open on a terminal, only one window can be active at any one time. The active window is always indicated by a highlighted border (reverse video).

---

## Messages

Messages about the status of the tape system and users' tape system requests appear in the window under the title bar.

To act on any request displayed in an `opreq` window, the request must be highlighted (shown in reverse video). Typically, only one request is highlighted at a time. This area of highlighting is called the *selection cursor*.

To highlight items, move around the message screen according to the keystrokes described in Table 1.

**Table 1** `opreq` screen movement keystrokes

Direction	Key or key sequence
Up	↑, <code>k</code> , or <code>CTRL-p</code>
Down	↓, <code>j</code> , or <code>CTRL-n</code>
Left	←, <code>h</code> , or <code>CTRL-b</code>
Right	→, <code>l</code> (lowercase L), or <code>CTRL-f</code>

---

## Command line

You can enter commands to `opreq` at the prompt at the bottom of the screen. The prompt looks like this:

Command: █

To enter commands to `opreq`, simply begin typing, and the text displays on the command line.

There is only one command line, even if multiple `opreq` windows are being displayed on the screen. The command line always applies to the active window (the window with the highlighted border).

## Listing opreq commands

opreq recognizes a number of commands. To display a list of opreq commands, press the question mark key (?) at the command prompt. The output is illustrated in Example 4.

Example 4 The opreq Help Window

```
UID——STATUS-TYPE——VSN——RING-DRIVE——TIME-IN 1

Help Window
configure-drives      configure-status      configure-title
configure-type        display-available-drives display-messages
field-assigned        field-comment          field-drive
field-link            field-mid              field-ring
field-status          field-time-in          field-time-out
field-type            field-uid              field-vsn
lock-data-segment    move-down              move-up
quit                  redraw                 select-cancel
select-done           select-work            update-display
window-close          window-goto            window-open
window-resize

press <return> to continue
```

## Entering opreq commands

When entering opreq commands, it is not necessary to type the complete command. opreq completes words in commands as soon as it recognizes an unambiguous portion of the word. For example, opreq recognizes both `configure-type` and `configure-title` commands. If you type `c`, the word `configure-` appears after the `Command:` prompt, because this is the only command beginning with `c`. If you then type `t`, nothing happens, other than that the letter is added to those on the command line. At this point, the remainder of the command is still ambiguous and opreq does not know how to complete it. (If you are not sure which command you want to enter, you can press the question mark key (`?`) to show all possible command completions.) As soon as you type `y`, the complete command (`configure-type`) appears on the command line.

To execute a command that appears on the command line, press **RETURN**. If you change your mind about executing a command that you have typed before you press **RETURN**, backspace over the command to delete it. To cancel an interactive command that has begun executing, enter **cancel**.

## Displaying message, drive, and field information

You can display additional information in the `opreq` window using the following commands:

- `display-messages`
- `display-avail-drives`
- `field-field_name`

A brief description of each command follows.

## Refreshing the `opreq` screen

To refresh the `opreq` screen, use the `display-messages` command as follows:

Command: **`display-messages`**

Messages with a status of `Done` or `Cancel` are removed when the `opreq` screen is refreshed. If the screen is configured to display canceled messages, they are not removed when the screen is refreshed.

## Listing available drives

To display a list of available drives, use the `display-avail-drives` command as follows:

Command: **`display-avail-drives`**

A transient window displays a list of all available drives. (See Example 5.)

### Example 5 Listing available drives

```
UID-----STATUS-TYPE-----VSN-----RING-DRIVE-----TIME-IN - 1
ann   Ready  Mount-Tape  AX3343   RW   mt:1 @ bluebell  3:22pm Nov 7
joe   Ready  Mount-Tape  AX1745   RW   mt:1 @ bluebell  3:23pm Nov 7

                                     Available Drives
                                     mt0@bluebell
                                     mt1@bluebell

press <return> to continue
```

To exit the Available Drives window and return to the command line, press `RETURN`.

---

## Displaying field information

The `field` command displays detailed information about a message field and has the following syntax:

`field-field_name`

`field_name` can have any of the following values, which represent valid message fields:

- `assigned`
- `comment`
- `drive`
- `link`
- `mid`
- `ring`
- `status`
- `time-in`
- `time-out`
- `type`
- `uid`
- `vsn`

As an example, suppose your `opreq` screen configuration does not display message IDs (MIDs), but in a special case you need to know this information. You can display MIDs by entering the following at the command line:

Command: **`field-mid`**

Information about the requested field is then displayed.

Two of the most used `field` commands, `field-comment` and `field-vsn`, are described in detail in Chapter 4, the section “Displaying a comment sent by a tape user,” on page 27, and “Displaying the VSNs in a tape set,” on page 28, respectively. Sample output for these commands is also shown.

---

## Controlling opreq windows

Three window commands are used to manipulate oreq windows:

- `window_open`
- `window_close`
- `window_goto`

Each of these commands is described in the subsections that follow.

---

### Opening and closing windows

The `window-open` command opens a new oreq window. After you enter this command, a small box appears on the screen. This box marks the position of the upper left corner of the new window. Move the box to the desired location using the cursor keys and press `RETURN`. Next, position the bottom right corner of the new window in the same way.

The `window-close` command closes the active window.

---

### Moving from one window to another

The `window-goto` command moves from one oreq window to another. There are several ways to use this command:

- If there are only two windows, entering the `window-goto` command brings the second window into the foreground.
- If more than two windows are open, entering the number of the desired window with the `window-goto` command moves the specified window to the foreground. The number of each window is in its upper right corner.

For example, to move to window #3, enter the following on the command line:

Command: `3 window-goto`

- If more than two windows are open, a cursor appears when the `window-goto` command is entered. Select a window by placing the cursor over the desired window and pressing the `RETURN` key.

This chapter describes how to configure your `opreq` screen and title bar in two different ways. The first way is by entering commands that configure your title bar and screen for the current session only. The second way is by creating a default file that automatically tells `opreq` how to set up your title bar and window every time you start `opreq`.

## Configuring the `opreq` window for your current session only

This section describes how to configure your current `opreq` session. The changes described in this section are valid only for the duration of the current session.

Changing the `opreq` window configuration using the configuration commands affects the window configuration only for the current session. When you quit `opreq` and then restart it, the defaults are restored. To make permanent changes to the window configuration, you must change the default values.

For information on how to change your `opreq` window defaults refer to the section “Configuring the `opreq` window for all subsequent sessions,” on page 20.

## Configuring the title bar

Use the `configure-title` command, as described in the following procedure, to select headings displayed under the title bar in the `opreq` window:

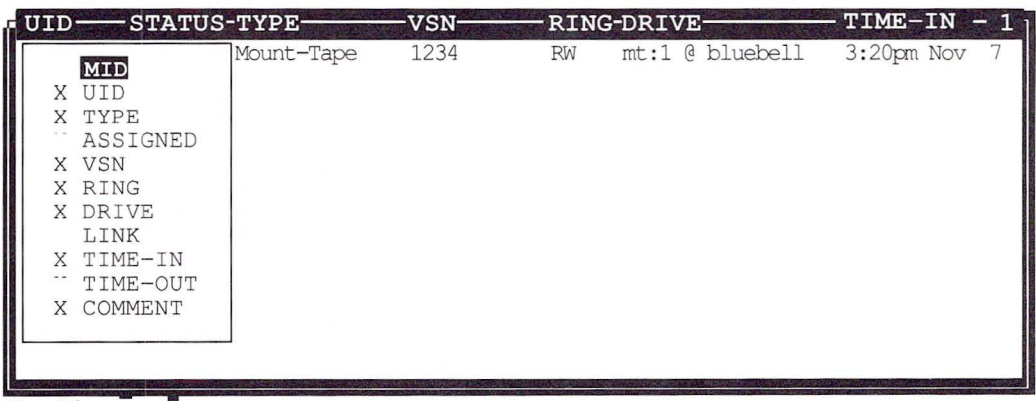
### Step 1

Execute the `configure-title` command from the `opreq` command line, as follows:

Command: **`configure-title`**

The menu shown in Example 6 appears on the left side of the `opreq` window and the command line prompt changes to the Configure prompt.

### Example 6 Selecting title bar labels



The screenshot shows a terminal window with a title bar menu on the left and a data table on the right. The title bar menu is a list of labels with checkboxes, where 'MID' is selected. The data table has columns for UID, STATUS-TYPE, VSN, RING-DRIVE, and TIME-IN. The current session is labeled '1'.

UID	STATUS-TYPE	VSN	RING-DRIVE	TIME-IN	1
MID	Mount-Tape	1234	RW	mt:1 @ bluebell	3:20pm Nov 7

Configure: |

This menu lists the labels that can be displayed on the title bar line. The information displayed with each label is listed in Table 2.

**Step 2** Select the labels you want displayed on the `opreq` window.

If an `X` appears beside a menu item, it is selected for display on the `opreq` window. To select or deselect a menu item, press `RETURN` when the line is highlighted. You can highlight an item by moving to that line using the up or down cursor keys.

**Step 3** When all desired labels are selected, save the current state of the title labels and exit the menu by entering:

Configure: **done**

To cancel all changes you made since you entered configure mode and exit the menu, enter:

Configure: **cancel**

The title bar label selection menu disappears and the command line prompt returns.

If you have selected more labels than can be displayed on the title bar, the first ones counting from the top of the labels menu are displayed.

**Table 2** Title bar labels

Label	Meaning
ASSIGNED	If a message is assigned to a specific operator using the <code>select-work</code> command, the name of the operator to whom the message is assigned.
COMMENT	Any comment the user specified with the <code>tpmount</code> command.
DRIVE	For mount request messages, this is the first drive found by the system on which the tape can be placed. For messages already assigned a tape drive, this is the drive assigned to the entry.
LINK	If the message is linked to another message, the MID of the original message. (For example, if more than one drive is requested with the <code>tpmount</code> command, the messages are linked.)
MID	Each message in the system is automatically assigned a unique message identifier (MID). The MID is provided for compatibility with future features and need not ordinarily be displayed.
RING	<p>Indicates whether or not a 9-track tape should be mounted with a write ring. This can be:</p> <p>RW            Write ring is needed so user can write to the tape.</p> <p>RO            Write ring should be removed so user can only read from the tape.</p>
STATUS	<p>Status of the message. This can be:</p> <p>Cancel        The requested action is canceled. Messages with a status of Cancel continue to display until the operator updates the display with a <code>display-messages</code> command.</p> <p>Done          The requested action has completed. Messages with a status of Done continue to display until the operator updates the display with a <code>display-messages</code> command.</p> <p>New            Message just entered the system.</p> <p>Ready         The message is ready for service; that is, the resources required are available.</p> <p>Waiting       Required action is waiting for a resource.</p> <p>Working       Message is assigned to an operator or is being worked on. The name of the operator assigned to the message appears under the ASSIGN label.</p>
TIME-IN	The time when the message entered the system. Messages are displayed in the order in which they are received.

**Table 2** Title bar labels

Label	Meaning
TIME-OUT	The time when the message leaves the system. The <code>TIME-OUT</code> fields of <code>Cancelled</code> and <code>Done</code> messages are completed.
TYPE	<p>The message type, such as <code>mount tape</code> or <code>unmount tape</code>. This can be:</p> <p><code>Auto-Vol-Rec</code>      Indicates that a tape has been recognized on a device by Automatic Volume Recognition (AVR); generated by the tape subsystem. If the tape has a VSN (that is, it is a labeled tape), the VSN is shown.</p> <p><code>Info</code>                      Message from root as to any status or conditions that may have abnormally or unexpectedly changed.</p> <p><code>Mount-Tape</code>              Request to access a tape; generated when a user issues a <code>tpmount</code> command when <code>opreq</code> is enabled. (Refer to the <code>tpmount (1)</code> man page for more details.)</p> <p><code>Replace-Tape</code>            Notifies the operator that a tape must be replaced; generated by the tape subsystem when a multivolume tape set is being accessed.</p> <p><code>Silo-Enter</code>                Request to enter a tape into an ACS silo.</p> <p><code>Unmount-Tape</code>            Request to unmount a tape; generated when a user issues a <code>tpunmount</code> command or if the system unmounts a tape (for instance, due to a timeout).</p>
UID	The login ID of the user initiating the message (using the <code>tpmount</code> command).
VSN	The volume serial number (VSN) of a tape concerned with a message of the type <code>Mount-Tape</code> , <code>Info</code> , or <code>Replace-Tape</code> .

## Displaying messages according to status

Use the `configure-status` command to configure the `opreq` window so that only messages with a certain status appear. Perform the following steps to configure the `opreq` window for the current session.

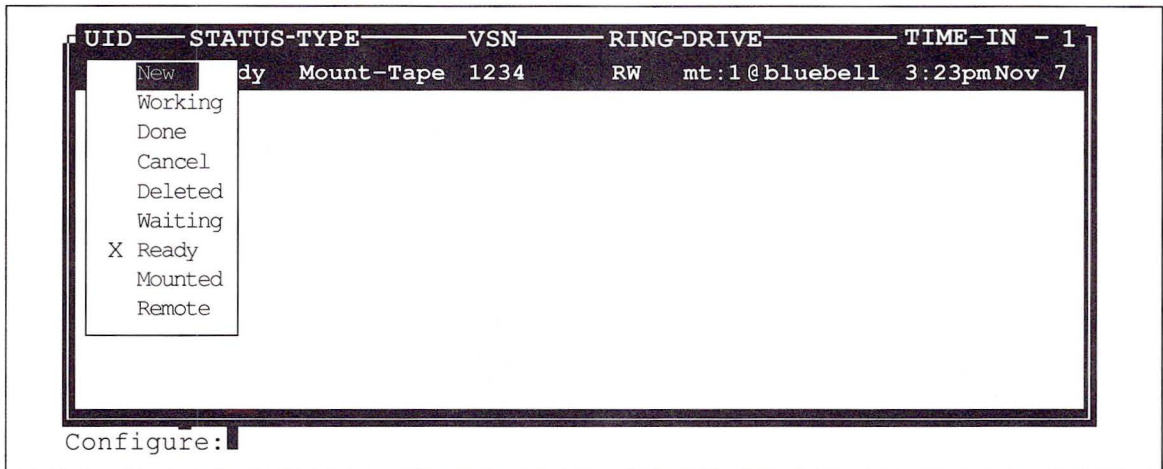
It is recommended that you configure your `opreq` screen to at least show messages with statuses of `Ready` and `Waiting`.

**Step 1** Execute the `configure-status` command from the `opreq` command line as follows:

Command: **`configure-status`**

The menu shown in Example 7 appears on the left side of the `opreq` window. The command line prompt changes to `Configure:`.

**Example 7** Displaying messages by status



This menu lists all possible status types that can be displayed on the message line. After a status type is selected, messages of that status appear in the `opreq` window. The status types are listed under `STATUS` in Table 2 on page 14.

**Step 2** Select the message status type you want displayed on the `opreq` window.

If an `X` appears beside a menu item, it is selected for display on the `opreq` window. Messages sent to your `opreq` screen that are of statuses not marked in this list are not displayed. Once a message is sent to your `opreq` screen, it is still displayed even if its status changes to one that is not configured to be displayed.

To change whether or not a menu item is selected, press **RETURN** when the line is highlighted. You can highlight an item by moving to that line using the up or down cursor keys.

**Step 3** When all desired statuses are selected, save the current state of the message types and exit the menu by entering:

Configure: **done**

To cancel all changes you made since you entered configure mode and exit the menu, enter:

Configure: **cancel**

The message selection menu disappears and the command line returns.

---

## Displaying messages according to type

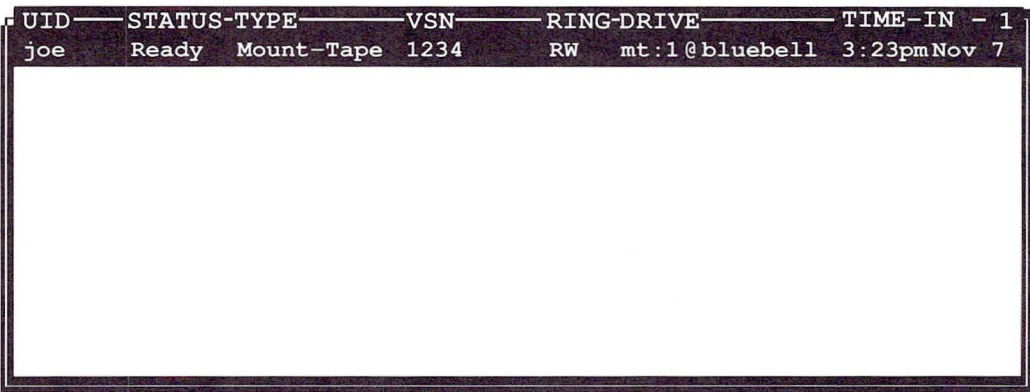
Use the `configure-type` command to configure the `opreq` window so that only messages of a selected type appear. It is recommended that your `opreq` window should at least display messages of the following types:

- Mount-Tape
- Unmount-Tape
- Replace-Tape

Perform the following steps to configure the `opreq` window for the current session:

- Step 1** Execute the `configure-type` command from the `opreq` command line, as shown in Example 8.

### Example 8 Executing the `configure-type` command

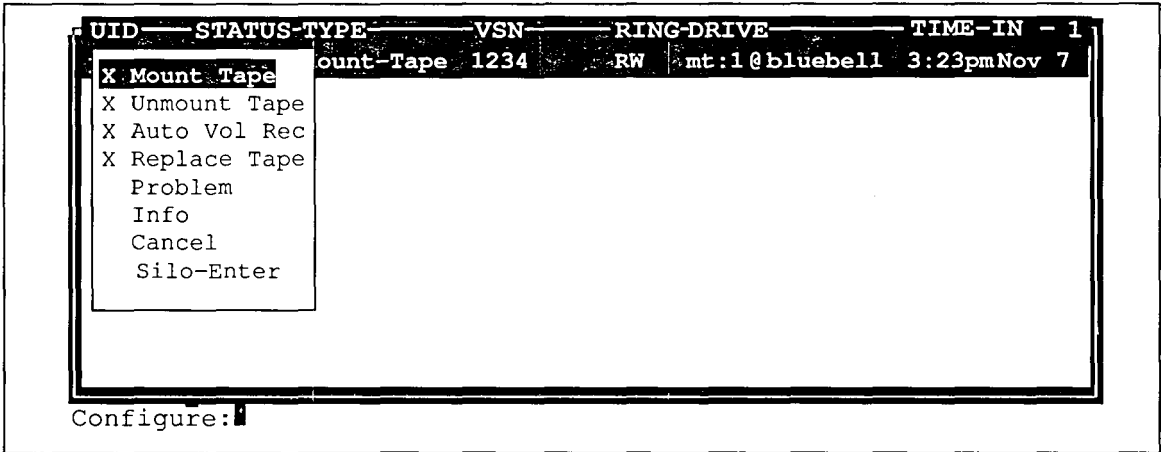


```
UID-----STATUS-TYPE-----VSN-----RING-DRIVE-----TIME-IN - 1
joe    Ready  Mount-Tape 1234      RW  mt:1@bluebell 3:23pm Nov 7
```

Command: `configure-type`

The configure menu shown in Example 9 appears on the left side of the `opreq` window. The command line prompt changes to the Configure prompt.

Example 9 The configure menu



The configure menu lists all possible types of messages that can be displayed on the message line. If a message type is selected, messages of that type appear in the opreq window. The possible types are listed under TYPE in Table 2 on page 14.

**Step 2** Select the message types you want displayed on the opreq window.

If an X appears beside a menu item, it is selected for display on the opreq window. If an X does not appear next to the message type, those messages are not displayed when they are sent to your opreq screen.

To select or deselect a menu item, press RETURN when the line is highlighted. You can highlight an item by moving to that line using the opreq screen movement commands.

**Step 3** When all desired types are selected, save the current state of the message types and exit the menu by entering:

Configure: **done**

To cancel all changes you made since you entered configure mode and exit the menu, enter:

Configure: **cancel**

The message selection menu disappears and the command line returns.

---

## Configuring the opreq window for all subsequent sessions

Default values that control `opreq` window configuration are stored in a file called `.opreqrc`. When `opreq` starts, it first looks in the current directory, then in your home directory for a `.opreqrc` file. If this file doesn't exist, `opreq` uses the file `/usr/lib/opreq/.opreqrc`, which is created and maintained by the system manager.

The `.opreqrc` file contains commands that control the `opreq` window configuration. If you want to specify default values different than those that exist, perform the following steps to modify the `.opreqrc` file to contain the configuration parameters you want.

- Step 1** Copy the `/usr/lib/opreq/.opreqrc` file to your home directory (or to the directory you are in when you invoke `opreq`).

---

**Caution**

---

**Edit only your copy of `.opreqrc` file. Editing the file `/usr/lib/opreq/.opreqrc` changes defaults for all `opreq` users. Only the system manager should edit the file in the `/usr/lib/opreq` directory.**

- Step 2** Edit your `.opreqrc` file to contain the default setup you want. For example, the file may contain the following line:

```
configure-title uid status type vsn ring drive time-in comment
```

This command specifies the labels that are displayed in the title bar of the `opreq` window. Include in this line any titles you want displayed in your `opreq` window.

A more complicated `.opreqrc` file is shown on the following page.

Example 10 shows a .opreqrc file that configures a two-screen display.

**Example 10** .opreqrc file configuring a two-screen display

```
① window-open 0 14 200 9
② configure-status ready waiting
③ configure-type info auto-vol-rec
④ configure-title uid type vsn ring drive comment
⑤ window-open 0 0 200 14
⑥ configure-status ready waiting
⑦ configure-type mount-tape unmount-tape replace-tape silo-enter
```

In Example 10, the following lines of the .opreqrc file are:

- ① `window-open` opens an `opreq` window. The coordinates have the following significance:

Upper left x-coordinate	→	0 14 200 9	←	Length of screen in lines
Upper left y-coordinate	↖		↗	Width of screen in characters

- ② `configure-status` tells `opreq` to display only messages of a specified status.

In this example, `configure-status` tells `opreq` to only show those messages with a status of `ready` or `waiting`.

This command only affects the window opened in line ①.

- ③ `configure-type` tells `opreq` to display only messages of a specified type.

In this example, `configure-status` tells `opreq` to only show those messages of type `info` or `auto-vol-rec`, which do not require operator action.

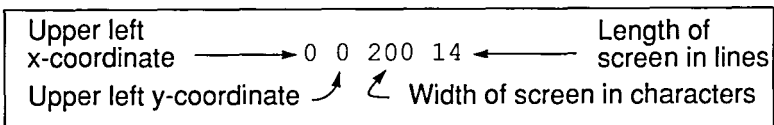
This command only affects the window opened in line ①.

- ④ `configure-title` tells `opreq` to display certain titles in the title bar. Titles label columns that sort information about each message.

In this example, `configure-titles` tells `opreq` to show the following information about each message: `uid`, `type`, `vsn`, `ring`, `drive`, and `comment`. These must be specified because they are different from the default values set by the system manager in the `/usr/lib/opreq/.opreqrc` file.

This command only affects the window opened in line ①.

- ⑤ `window-open` opens a second `opreq` window. The coordinates shown have the following significance:



- ⑥ `configure-status` tells `opreq` to display only messages of a specified status.

In this example, `configure-status` tells `opreq` to only show those messages with a status of `ready` or `waiting`.

This command only affects the window opened in line ⑤.

- ⑦ `configure-type` tells `opreq` to display only messages of a specified type.

In this example, `configure-type` tells `opreq` to only show messages that require some type of operator action.

This command only affects the window opened in line ⑤.

Example 11 shows how the configuration from Example 10 looks when `opreq` is started.

### Example 11 A two-screen display

```

+UID----STATUS--TYPE-----VSN-----RING-DRIVE-----COMMENT----- 2+
|
| This window shows messages that are ready for service or
| are waiting on resources. The window border is in reverse video,
| indicating that the command line only affects this window.
|
| Lines ⑤ through ⑦ in Example 10 configure this window.
|
| Titles in the title bar have not been explicitly set. The titles shown
| are ones that are set in the system default file /usr/lib/opreq/.opreqrc.
|
+UID--TYPE-----VSN-----RING-DRIVE-----COMMENT----- 1+
|
| This window shows messages that give information only. The
| messages in this window require no operator action. This window
| is not highlighted, indicating that the command line does not
| affect it.
|
| Lines ① through ④ in Example 10 configure this window.
|
+-----+
Command: █

```

## Disabling a problematic tape drive

### Step 1

Disable a tape drive that is not performing properly by following this procedure:

Enter the `configure-drives` command:

Command: **configure-drives**

### Step 2

A drive configuration menu pops up in the center of the `opreq` window as shown in Example 12. Drives that are controlled by the tape system are marked with an X. Using the `opreq` window movement keys, select the drive you need to enable or disable. The `RETURN` key toggles the enabling of the drive.

### Example 12 Disabling or enabling a tape drive

```
UID-----STATUS---TYPE-----VSN-----RING-DRIVE-----TIME-IN---COMMENT---1
brown Ready Mount-Tape MEL921 RW mt:1@bluebell 3:23pm Nov 7

X mt:0 @ bluebell
X mt:1 @ bluebell
X mt:2 @ bluebell

Configure: █
```

### Step 3

To complete the enabling or disabling of the tape drive according to the configuration shown in the menu, enter:

Configure: **done**

To cancel the request, enter:

Configure: **cancel**

---

# Responding to users' tape requests

# 4

If `opreq` queuing is enabled, user mount requests appear as messages in the `opreq` window. This chapter describes the commands that act on the queue entries.

---

## Commands for processing tape requests

The following four commands are used in processing tape requests:

<code>field-comment</code>	Displays any comments sent by the tape user to you.
<code>field-vsn</code>	Displays VSN of a labeled tape or, in the event that a labeled tape set is to be mounted, displays all the VSNs in a tape set.
<code>select-done</code>	Changes the status of a message from <code>Ready</code> to <code>Done</code> , indicating that the request has been fulfilled. If the message is a mount request, <code>select-done</code> displays a menu from which you can allocate an available drive.
<code>select-cancel</code>	Changes the status of a message to <code>Cancel</code> , indicating that the request has not been fulfilled for some reason.

The `select-done` and `select-cancel` commands can only be executed by someone who is logged in as `root` or is a member of the group `tapeop`. Under ConvexOS/Secure, you must have `tapeop` authorization. Contact your system manager if you lack these privileges.

Your site probably has procedures for the following:

- Associating tapes with their owners by using paper labels
- Releasing tapes to their owners only
- Degaussing (erasing) tapes before returning them to the scratch pool

Be certain to review these procedures with your system manager before continuing.

---

### Caution

---

**Before entering any of the `select` commands, be sure to position the selection cursor (the highlighted area) over the message on which you are to operate.**

The following subsections describe each of the commands in greater detail.

## Displaying a comment sent by a tape user

Before responding to a request, you may want to check for a comment that may have been sent by a user who issued a request. To view a comment, perform the following procedure:

- Step 1** Select the message you wish to service by highlighting it using the `opreq` screen movement commands. (See Example 13.)

### Example 13 Selecting a message

UID	STATUS	TYPE	VSN	RING	DRIVE	TIME-IN	- 1
ann	Ready	Mount-Tape	AX3343	RW	mt:1 @ bluebell	3:22pm Nov 7	
joe	Ready	Mount-Tape	AX1745	RW	mt:1 @ bluebell	3:23pm Nov 7	

Command: █

- Step 2** Enter the `field-comment` command at the command line:

Command: `field-comment`

A comment window appears in the `opreq` screen. (See Example 14.)

### Example 14 Displaying a user comment

UID	STATUS	TYPE	VSN	RING	DRIVE	TIME-IN	- 1
ann	Ready	Mount-Tape	AX3343	RW	mt:1 @ bluebell	3:22pm Nov 7	
joe	Ready	Mount-Tape	AX1745	RW	mt:1 @ bluebell	3:23pm Nov 7	

**COMMENT**

This is a new tape

press <return> to continue █

- Step 3** Exit the comment window by pressing `RETURN`.

## Displaying the VSNs in a tape set

Before mounting a tape set, you may want to gather all of the volumes in the set. To display a list of all the VSNs in a tape set, use the following procedure:

- Step 1** Select the message to which you are responding by highlighting it with `opreq` screen movement commands. (See Example 15.)

### Example 15 Selecting a message

```
UID-----STATUS-TYPE-----VSN-----RING-DRIVE-----TIME-IN - 1
ann   Ready   Mount-Tape   AX3343   RW    mt:1 @ bluebell  3:22pm Nov 7
joe   Ready   Mount-Tape   AX1745   RW    mt:1 @ bluebell  3:23pm Nov 7

Command: |
```

- Step 2** Enter the `field-vsn` command at the command line:

Command: `field-vsn`

A VSN window appears in the `opreq` screen, and the command line changes to a `more` message. (See Example 16.)

### Example 16 Listing VSNs in a tape set

```
UID-----STATUS-TYPE-----VSN-----RING-DRIVE-----TIME-IN - 1
ann   Ready   Mount-Tape   AX3343   RW    mt:1 @ bluebell  3:22pm Nov 7
joe   Ready   Mount-Tape   AX1745   RW    mt:1 @ bluebell  3:23pm Nov 7

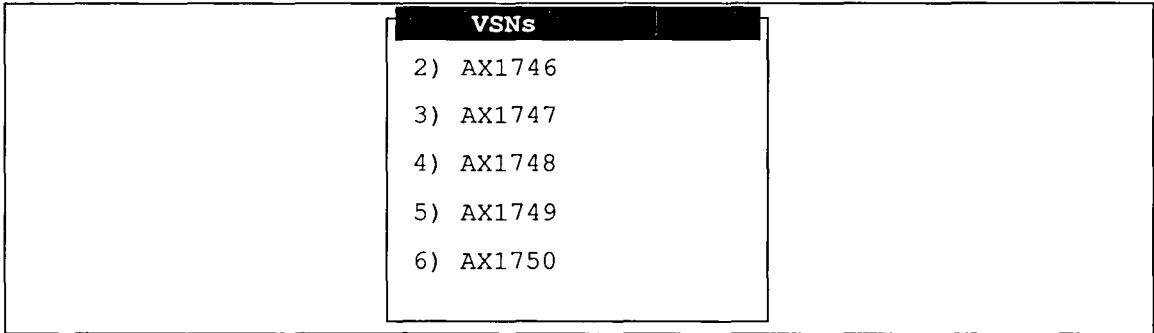
VSNs (top)
-----
1) AX1745
2) AX1746
3) AX1747
4) AX1748
5) AX1749

--more-- |
```

If there are more VSNs than can be displayed on the screen, you can scroll through the list by using the `opreq` screen movement commands. The VSN of the current volume that needs to be mounted is underlined. The message, `(top)`, on the right-hand side of the VSN screen title bar indicates that the list is displayed from the top, and that more VSNs may be displayed that are not currently on the screen.

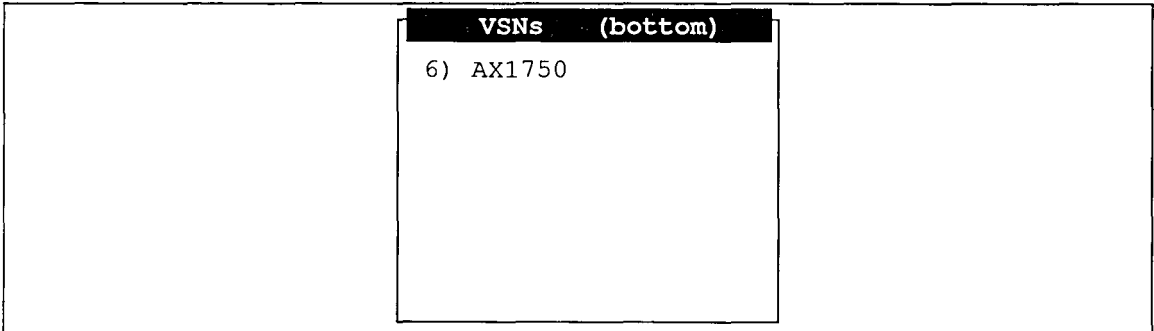
After typing `j`, the VSN screen scrolls down. Note that `(top)` has disappeared, indicating the top of the list is no longer shown. (See Example 17.)

#### Example 17 Scrolling down the VSN window



Once you have reached the last VSN in the list, the VSN screen indicates `(bottom)`. (See Example 18.)

#### Example 18 Displaying the last VSN in a tape set in the VSN window



**Step 3** Exit the VSN window by pressing the `q` key.

---

## Canceling a message

To cancel a selected message that does not already have a status of Done or Cancel, use the following procedure:

- Step 1** Select the message you need to cancel by highlighting it with the `opreq` screen movement commands. (See Example 19.)

### Example 19 Selecting a message

```
UID  STATUS-TYPE  VSN  RING-DRIVE  TIME-IN  - 1
ann  Ready  Mount-Tape  AX3343  RW  mt:1 @ bluebell  3:22pm Nov 7
joe  Ready  Mount-Tape  AX1745  RW  mt:1@bluebell  3:23pm Nov 7

Command: █
```

- Step 2** Enter the `select-cancel` command at the command line:

Command: **select-cancel**

The `select-cancel` command brings up a cancel-comment window so that you can send a message to the user explaining why the message was cancelled. (See Example 20.)

### Example 20 Entering a select-cancel comment

```
UID  STATUS-TYPE  VSN  RING-DRIVE  TIME-IN  - 1
ann  Ready  Mount-Tape  AX3343  RW  mt:1 @ bluebell  3:22pm Nov 7
joe  Ready  Mount-Tape  AX1745  RW  mt:1@bluebell  3:23pm Nov 7

Cancel Comment (type comment and hit <Return>)
You must submit new tapes before █

Command: select-cancel █
```

**Step 3** Exit the cancel-comment window by pressing **RETURN**. The status of the message is changed to **Cancel**, the cancel comment is displayed on the user's display, and the **opreq** command line is cleared. (See Example 21.)

**Example 21** Changing the status of a message to **Cancel**

UID	STATUS	TYPE	VSN	RING	DRIVE	TIME-IN	- 1
ann	Ready	Mount-Tape	AX3343	RW	mt:1 @ bluebell	3:22pm Nov 7	
joe	Cancel	Mount-Tape	AX1745	RW	mt:1@bluebell	3:23pm Nov 7	

Command: █

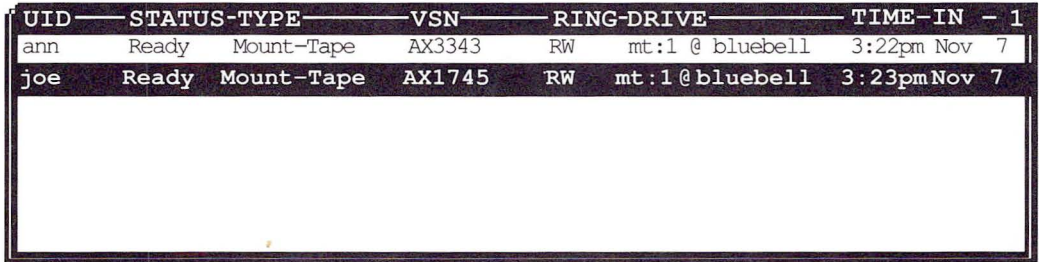
---

## Indicating completion of a message

To change the status of a message to `Done`, indicating an action such as a tape mount has been performed, use the `select-done` command as in the following procedure:

- Step 1** Select the message by highlighting it with the `opreq` screen movement commands. (See Example 22.)

### Example 22 Selecting a message



UID	STATUS	TYPE	VSN	RING	DRIVE	TIME-IN	- 1
ann	Ready	Mount-Tape	AX3343	RW	mt:1 @ bluebell	3:22pm Nov 7	
joe	Ready	Mount-Tape	AX1745	RW	mt:1 @ bluebell	3:23pm Nov 7	

Command: █

- Step 2** Enter the `select-done` command at the command line:

Command: **select-done**

If the message is not a mount request, the status of the message is changed to `Done`, and the command line is cleared. (See Example 24.)

- Step 3** If the message is to mount a tape set, a window appears listing the VSNs in the set. (Refer to the section “Responding to requests to mount and label tape sets,” on page 40, or “Responding to requests to mount and change existing volumes,” on page 45.) Press the `q` key to exit.

- Step 4** A drive-selection window appears displaying the VSN, if the request is to mount a labeled tape, and the drives that are controlled by the tape system. (See Example 23.)

### Example 23 Selecting a tape drive for a mount request

UID	STATUS	TYPE	VSN	RING-DRIVE	TIME-IN	1
ann	Ready	Mount-Tape	AX3343	RW	mt:1 @ bluebe	
Joe	Ready	Mount-Tape	AX1745	RW	mt:0 @ bluebe	

VSN = AX1745  
X mt:0 @ bluebell  
X mt:1 @ bluebell  
X mt:2 @ bluebell

Command: **select-done**

The available drives are marked with an X on the left. The recommended drive is highlighted. In Example 23, all three drives are available, and the mt:0 drive is recommended.

If your tape system has multiple drives, you can change the drive at this time by highlighting it using the `opreq` screen movement commands.

**Step 5** Press RETURN.

The drive selection menu disappears, the drive you highlighted is allocated, and the status of the message changes from `Ready` to `Done`. (See Example 24.)

### Example 24 Changing the status of a message to Done

UID	STATUS	TYPE	VSN	RING-DRIVE	TIME-IN	1
ann	Ready	Mount-Tape	AX3343	RW	mt:1 @ bluebell	3:22pm Nov 7
Joe	Done	Mount-Tape	AX1745	RW	mt:0 @ bluebell	3:23pm Nov 7

Command: |

---

## Assigning a message to yourself

To assign a message to yourself so that other operators know that you are handling it, use the following procedure:

- Step 1** Select the message by highlighting it using the `opreq` screen movement commands. (See Example 25.)

### Example 25 Selecting a message

```
UID-----STATUS-TYPE-----VSN-----RING-DRIVE-----TIME-IN - 1
ann   Ready   Mount-Tape  AX3343   RW   mt:1 @ bluebell  3:22pm Nov 7
joe   Ready   Mount-Tape  AX1745   RW   mt:1 @ bluebell  3:23pm Nov 7

```

Command: █

- Step 2** Enter the `select-work` command at the command line:

Command: **select-work**

The status of the message is changed to `Work`, and the command line is cleared. (See Example 26.)

### Example 26 Changing the status of a message to `Work`

```
UID-----STATUS-TYPE-----VSN-----RING-DRIVE-----TIME-IN - 1
ann   Ready   Mount-Tape  AX3343   RW   mt:1 @ bluebell  3:22pm Nov 7
joe   Work    Mount-Tape  AX1745   RW   mt:1 @ bluebell  3:23pm Nov 7

```

Command: █

## Responding to tape mount requests

If a `Mount-Tape` request is displayed with a VSN, you can use the procedures in this section. If you should happen to receive a mount request that does not specify a VSN, go to the section “Responding to a tape request that does not specify a VSN,” on page 48.

Example 27 shows a `Mount-Tape` request with a VSN.

### Example 27 Recognizing a labeled tape mount request

```
UID      STATUS-TYPE      VSN      RING-DRIVE      TIME-IN - 1
jane     Ready  Mount-Tape  AX1745      RW      mt:1@bluebell 3:23pm Nov 7
```

Command: █

The VSN in the `VSN` field should correspond to the VSN on the paper label on the tape. This is the tape that is to be placed on the tape drive.

## Recognizing labeled tapes mounted by AVR

Automatic Volume Recognition (AVR) engages when a tape label is read immediately after a tape is placed on the drive, and the drive is put online. If your `opreq` screen has been configured to display messages of `TYPE Info`, or `Auto-Vol-Rec` and `STATUS` of `Waiting`, root sends a message of that type to indicate that a tape has been mounted by AVR. (For information on configuring your `opreq` screen to see these messages, go to the section "Displaying messages according to type," on page 18.)

If the following are true, you see a message similar to the one in Example 28:

- You have configured `opreq` to display `Info` messages.
- You have placed the volume on the drive recommended under the `DRIVE` field.
- The tape placed on the drive is a labeled tape whose paper label matches the magnetic label on the tape.

### Example 28 AVR engaging when both `Mount-Tape` and `Info` messages are displayed

UID	STATUS	TYPE	VSN	RING	DRIVE	TIME-IN	- 1
jane	Done	Mount-Tape	AX1745	RW	mt:1@bluebell	3:23pm	Nov 7
root	Ready	Info	AX1745	RW	mt:0 @ bluebell	3:25pm	Nov 7

Command: █

Example 28 shows that the volume was recognized by AVR, and indicates that the mount was completed automatically. The status of the original mount request has been changed to `Done`. No further operator intervention is required.

If you have configured `opreq` to display messages of `TYPE Auto-Vol-Rec` and messages of `STATUS Waiting`, and you place the correct volume on the drive recommended under the `DRIVE` field, you see a message similar to the one in Example 29. This indicates that the mount was completed automatically. The `STATUS` of the original mount request has been changed to `Done`. No further operator intervention is required.

Example 29 AVR engaging when both Mount-Tape and Auto-Vol-Rec messages are displayed

UID	STATUS	TYPE	VSN	RING-DRIVE	TIME-IN	- 1
jane	Done	Mount-Tape	AX1745	RW	mt:1@bluebell	3:23pm Nov 7
root	Waiting	Auto-Vol-Rec	AX1745	RW	mt:0@bluebell	3:25pm Nov 7

Command: █

The STATUS of messages of TYPE Info and Auto-Vol-Rec changes to Done automatically after 2 minutes.

User tape requests

## Responding to single-volume mount requests

To respond to a tape request that has a status of `Ready`, perform the following steps:

- Step 1** Highlight the tape request by using the `opreq` screen movement commands. (See Example 30.)

### Example 30 Selecting a labeled tape mount request

UID	STATUS	TYPE	VSN	RING-DRIVE	TIME-IN	- 1
ann	Ready	Mount-Tape	1234	RW	mt:0 @ bluebell	3:20pm Nov 7
jane	Ready	Mount-Tape	AX1745	RW	mt:1 @ bluebell	3:23pm Nov 7

Command: █

- Step 2** Check the comments field to determine whether or not the request is for a blank tape or an existing tape. Enter:

Command: **field-comment**

The tape user should always provide this information when issuing the `tpmount` request.

- Step 3** Check the `VSN` field to determine whether or not the request has multiple VSNs. Enter:

Command: **field-vsn**

If more than one VSN is listed in the VSN window, the request is for a tape set. If the tape set is to be labeled, refer to the section, "Responding to requests to mount and label tape sets," on page 40. If the tape set already exists, refer to the section, "Responding to requests to mount and change existing volumes," on page 45.

If there is only one VSN in the VSN window, the request is for one volume only. Continue with Step 4.

- Step 4** Check the entry under the `DRIVE` field. This entry indicates the first available drive (and the name of the system on which it resides) found by the tape system. This is only a suggestion. If more than one drive is available, you are not limited to using the one named in the `DRIVE` field.

- Step 5** Place a blank tape on the drive, if the request is for a new tape. If the request is for an existing tape, place that tape on the drive.

**Step 6** Place the tape drive online if you are using a 9-track drive.

For ANSI- or IBM-standard labeled tapes, if the `STATUS` of the message is `Ready`, and the tape is already labeled, AVR mounts the tape. The status changes to `Done`, and no further operator action is required.

If you need to use a drive that is not displayed under the `DRIVE` field, or the tape is not yet labeled, continue with Step 7.

**Step 7** If the tape is unlabeled or is blank and needs to be labeled with an ANSI- or IBM-standard label, enter:

Command: `select-done`

The drive selection menu shown in Example 31 appears in the upper right corner of the `opreq` window.

**Example 31** Selecting a drive for a labeled tape

UID	STATUS	TYPE	VSN	RING	DRIVE	TIME-IN	1
ann	Ready	Mount-Tape	1234	RW	mt:1 @ bluebell		
jane	Ready	Mount-Tape	AX1745	RW	mt:1@bluebell		

VSN = AX1745  
X mt:0 @ bluebell  
X mt:1 @ bluebell  
X mt:2 @ bluebell

Command: `select-done`

This menu shows the VSN of the tape to be mounted, which, in this example, is `AX1745`. It also lists the controlled drives on the tape system. The available drives are marked with an `X` on the left. In this example, all three drives are available.

**Step 8** Use the `opreq` screen movement commands to select (highlight) the proper drive.

**Step 9** Press `RETURN`. The tape is then mounted, and the `STATUS` of the message changes to `Done`.

---

## Responding to requests to mount and label tape sets

When a tape user issues a `tpmount` request that specifies multiple VSNs for multiple blank tapes that must be labeled before they can be used, the tape operator must respond to several `Mount-Tape` and `Replace-Tape` messages. `opreq` displays a message to mount a tape (see Example 32).

### Example 32 Message to mount a labeled tape set

UID	STATUS	TYPE	VSN	RING	DRIVE	TIME-IN	- 1
ann	Ready	Mount-Tape	AX3343	RW	mt:1 @ bluebell	3:22pm	Nov 7
jane	Ready	Mount-Tape	AX1745	RW	mt:0 @ bluebell	3:23pm	Nov 7

Command: █

To respond to a request to mount and label a tape set, follow this procedure:

- Step 1** Highlight the tape request.
- Step 2** Check the entry under the `DRIVE` field. This entry indicates the first available drive (and the name of the system on which it resides) found by the tape system. This is only a suggestion. The operator is not limited to using this drive.
- Step 3** Check the comments field to determine whether or not the request is for a blank tape or an existing tape. Enter:

Command: **field-comment**

When issuing the `tpmount` request, the tape user should send you a comment that the mount request is for a new labeled tape set.

Press **RETURN** to exit the comment window.

- Step 4** Check the `VSN` field so that you can determine the number of blank tapes you need. Enter:

Command: **field-vsn**

The number of VSNs listed in this window is the number of blank tapes you need. If all the VSNs are not visible in one screen, you can scroll the screen down using `opreq` screen movement commands.

Press `q` to exit the VSN window.

**Step 5** Place the first blank tape on a drive.

**Step 6** Enter the `select-done` command.

Command: `select-done`

**Step 7** The VSN window shown in Example 33 appears in the center of the `opreq` window. The VSN that is to be written on the tape is underlined. Press `q` to exit the VSN window.

### Example 33 Displaying the VSNs in a tape set

```
UID      STATUS-TYPE  VSN      RING-DRIVE  TIME-IN  - 1
ann     Ready  Mount-Tape  AX3343     RW    mt:1 @ bluebell  3:22pm Nov 7
jane    Ready  Mount-Tape  AX1745     RW    mt:0 @ bluebell  3:23pm Nov 7

```

```
VSNS (top)
1) AX1745
2) AX1746

```

--more--

**Step 8** The drive selection menu shown in Example 34 appears in the upper right corner of the `opreq` window. After using the `opreq` screen movement commands to select the proper drive, press `RETURN` to exit.

### Example 34 Drive selection window

```
UID-----STATUS-TYPE-----VSN-----RING-DRIVE-----TIME-IN - 1
ann    Ready    Mount-Tape    1234      RW    mt:1 @ bluebe
jane   Ready    Mount-Tape    AX1745    RW    mt:0 @ bluebe

```

```
VSN = AX1745
X mt:0 @ bluebell
X mt:1 @ bluebell
X mt:2 @ bluebell
```

Command: █

**Step 9** The tape user receives a message to label the tape. After the tape user issues the `tplabel` command, you get a message to replace the tape. (See Example 35.)

### Example 35 Message instructing you to replace the first tape with a blank tape

```
UID-----STATUS-TYPE-----VSN-----RING-DRIVE-----TIME-IN - 1
ann    Cancel    Mount-Tape    AX3343    RW    mt:1 @ bluebell  3:22pm Nov 7
jane   Done      Mount-Tape    AX1745    RW    mt:0 @ bluebell  3:30pm Nov 7
jane   Ready     Replace-Tape  AX1746    RW    mt:0 @ bluebell  3:32pm Nov 7

```

Command: █

**Step 10** Remove the first tape from the drive and replace it with a blank tape.

**Step 11** Select the current `Replace-Tape` message and enter the `select-done` command:

Command: **select-done**

**Step 12** The VSN window shown in Example 36 appears in the center of the `opreq` window. The VSN to be written on the tape is underlined. Press `q` to exit the VSN window.

**Example 36** Confirming the VSN

```

UID-----STATUS-TYPE-----VSN-----RING-DRIVE-----TIME-IN - 1
ann   Cancel  Mount-Tape  AX3343   RW   mt:1 @ bluebell  3:22pm Nov 7
jane  Done    Mount-Tape  AX1745   RW   mt:0 @ bluebell  3:30pm Nov 7
jane  Ready  Replace-Tape AX1746   RW   mt:0 @ bluebell  3:32pm Nov 7

```

**VSNs (top)**

1) AX1745

2) AX1746

```

--more--

```

**Step 13** The drive selection menu shown in Example 37 appears in the upper right corner of the opreq window. After using the opreq screen movement commands to select a drive, press RETURN to exit.

**Example 37** Drive selection window

```

UID-----STATUS-TYPE-----VSN-----RING-DRIVE-----TIME-IN - 1
ann   Cancel  Mount-Tape  1234    RW   mt:1 @ bluebe
7
jane  Ready  Mount-Tape  AX1746   RW   mt:0 @ bluebe

```

**VSN = AX1746**

X mt:0 @ bluebell

X mt:1 @ bluebell

X mt:2 @ bluebell

```

Command:

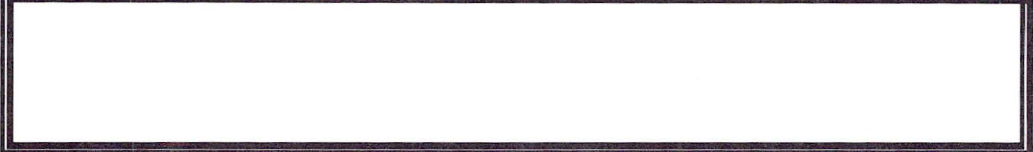
```

User tape requests

**Step 14** The final message to replace the last tape with the first tape, which is now labeled, is displayed. (See Example 38.)

**Example 38** Message to replace the last tape with the first

UID	STATUS	TYPE	VSN	RING	DRIVE	TIME-IN	- 1
ann	Cancel	Mount-Tape	AX3343	RW	mt:1 @ bluebell	3:22pm	Nov 7
jane	Done	Mount-Tape	AX1745	RW	mt:0 @ bluebell	3:30pm	Nov 7
jane	Done	Replace-Tape	AX1746	RW	mt:0 @ bluebell	3:32pm	Nov 7
jane	Ready	Replace-Tape	AX1745	RW	mt:0 @ bluebell	3:34pm	Nov 7



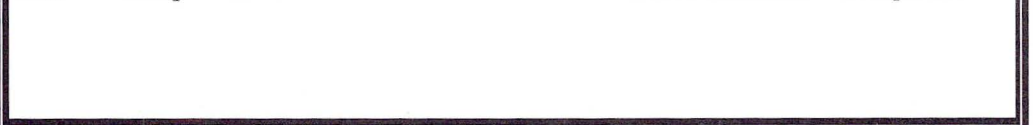
Command: █

**Step 15** Once the physical drive is placed online, AVR allocates the devices and changes STATUS to Done. The tape user can now access the first tape volume.

If your `opreq` screen is configured to show `Info` or `Auto-Vol-Rec` messages, a message is displayed telling you the tape set is now fully mounted and labeled. (See Example 39.)

**Example 39** Message indicating AVR completed the mount

UID	STATUS	TYPE	VSN	RING	DRIVE	TIME-IN	- 1
ann	Cancel	Mount-Tape	AX3343	RW	mt:1 @ bluebell	3:22pm	Nov 7
jane	Done	Mount-Tape	AX1745	RW	mt:0 @ bluebell	3:30pm	Nov 7
jane	Done	Replace-Tape	AX1746	RW	mt:0 @ bluebell	3:32pm	Nov 7
jane	Done	Replace-Tape	AX1745	RW	mt:0 @ bluebell	3:34pm	Nov 7
root	Ready	Info	AX1745	RW	mt:0 @ bluebell	3:35pm	Nov 7



Command: █

---

## Responding to requests to mount and change existing volumes

To mount and change volumes of a tape set that is already labeled, use the following procedure:

- Step 1** Highlight the tape request using the `opreq` screen movement commands. (See Example 40.)

**Example 40** Mount request to mount a tape set

UID	STATUS	TYPE	VSN	RING	DRIVE	TIME-IN	1
ann	Cancel	Mount-Tape	AX3343	RW	mt:1 @ bluebell	3:22pm	Nov 7
jane	Ready	Mount-Tape	AX1745	RW	mt:1@bluebell	3:32pm	Nov 7

Command: █

- Step 2** Check the entry under the `DRIVE` field. This entry indicates the first available drive found by the tape system (and the name of the machine on which it resides). This is only a suggestion. The operator is not limited to using this drive.
- Step 3** Check the comments field to determine whether or not the request is for a blank tape or an existing tape. Enter:

Command: `field-comment`

The tape user should always provide this information when issuing the `tpmount` request.

If the request is for a tape set that must be labeled first, refer to the section, "Responding to requests to mount and label tape sets," on page 40.

Press `RETURN` to exit the comment window.

**Step 4** Check the VSN field so that you can identify and gather all the volumes in the tape set at one time. Enter:

Command: **field-vsn**

The current volume that must be mounted is underlined.

Press **q** to exit the VSN window.

**Step 5** Place the first volume of the tape set on a drive.

If you have placed the correct volume on the drive, the **STATUS** of the **Mount-Tape** message changes to **Done**.

If you have **opreq** configured to show **Info** or **Auto-Vol-Rec** type messages, you receive a message indicating the mount was completed by **AVR**. (See Example 41.)

**Example 41** Message indicating AVR completed the mount

UID	STATUS	TYPE	VSN	RING	DRIVE	TIME-IN	- 1
ann	Cancel	Mount-Tape	AX3343	RW	mt:1 @ bluebell	3:22pm Nov 7	
<u>jane</u>	<u>Done</u>	<u>Mount-Tape</u>	<u>AX1745</u>	<u>RW</u>	<u>mt:1 @ bluebell</u>	<u>3:30pm Nov 7</u>	
root	Ready	Info	AX1745	RW	mt:1 @ bluebell	3:32pm Nov 7	

Command: █

**Step 6** When the current tape reaches end-of-tape (EOT), you get a message to replace the tape. (See Example 42.)

**Example 42** Message to replace a volume in a tape set

UID	STATUS	TYPE	VSN	RING	DRIVE	TIME-IN	- 1
ann	Cancel	Mount-Tape	AX3343	RW	mt:1 @ bluebell	3:22pm Nov 7	
jane	Done	Mount-Tape	AX1745	RW	mt:1 @ bluebell	3:30pm Nov 7	
root	Done	Info	AX1745	RW	mt:1 @ bluebell	3:32pm Nov 7	
<b>jane</b>	<b>Ready</b>	<b>Replace-Tape</b>	<b>AX1746</b>	<b>RW</b>	<b>mt:1 @ bluebell</b>	<b>4:00pm Nov 7</b>	

Command: █

**Step 7** Remove the first tape from the drive and replace it with the next tape in the set. Once the drive is online, AVR detects the proper volume and completes the mount. If you have placed the correct volume on the drive, the STATUS of the Mount-Tape message changes to Done.

If you have opreq configured to show messages of TYPE Info or Auto-Vol-Rec, you receive a message indicating the mount was completed by AVR. (See Example 43.)

**Example 43** Message indicating AVR completed the mount

UID	STATUS	TYPE	VSN	RING	DRIVE	TIME-IN	- 1
ann	Cancel	Mount-Tape	AX3343	RW	mt:1 @ bluebell	3:22pm Nov 7	
jane	Done	Mount-Tape	AX1745	RW	mt:1 @ bluebell	3:30pm Nov 7	
root	Done	Info	AX1745	RW	mt:1 @ bluebell	3:32pm Nov 7	
<b>jane</b>	<b>Done</b>	<b>Replace-Tape</b>	<b>AX1746</b>	<b>RW</b>	<b>mt:1 @ bluebell</b>	<b>4:00pm Nov 7</b>	
root	Ready	Info	AX1746	RW	mt:1 @ bluebell	4:02pm Nov 7	

Command: █

User tape requests

## Responding to a tape request that does not specify a VSN

If a `Mount-Tape` request does not contain a VSN, you know that an unlabeled tape has been requested. Whether or not tape system users must provide VSNs with their mount requests depends on your tape system configuration. Some systems may require specifying a VSN with both labeled and unlabeled tape requests. Labeled tape requests must always supply a VSN.

The highlighted message in Example 44 is a mount request that does not provide a VSN.

**Example 44** A mount request that does not provide a VSN

UID	STATUS	TYPE	VSN	RING	DRIVE	TIME-IN	- 1
ann	Ready	Mount-Tape	AX3343	RW	mt:1 @ bluebell	3:22pm Nov 7	
joe	Ready	Mount-Tape		RW	mt:1 @ bluebell	3:23pm Nov 7	

Command:

Perform the following steps to respond to a tape request that does not specify a VSN:

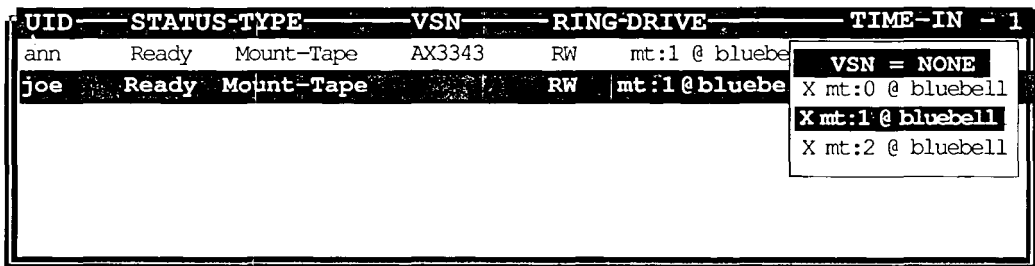
- Step 1** Highlight the tape request by using the `opreq` screen movement commands.
- Step 2** Check the comments field to determine whether or not the request is for a blank tape or an existing tape. Enter:  
Command: `field-comment`  
The tape user should always provide this information when issuing the `tpmount` request.
- Step 3** Check the entry under the `DRIVE` field. This entry indicates the first available drive (and the name of the system on which it resides) found by the tape system. This is only a suggestion. If more than one drive is available, you are not limited to using the one named in the `DRIVE` field.
- Step 4** Place the tape on a drive.
- Step 5** Place the tape drive online if you are using a 9-track drive.

**Step 6** Enter the `select-done` command as follows:

Command: `select-done`

The drive selection menu shown in Example 45 appears in the upper right corner of the `opreq` window.

**Example 45** Selecting a drive for an unlabeled tape



```
UID-----STATUS-TYPE-----VSN-----RING-DRIVE-----TIME-IN - 1
ann    Ready  Mount-Tape  AX3343    RW    mt:1 @ bluebe
joe    Ready  Mount-Tape           RW    mt:1 @ bluebe
                                             VSN = NONE
                                             X mt:0 @ bluebell
                                             X mt:1 @ bluebell
                                             X mt:2 @ bluebell
Command:select-done
```

This menu shows the VSN of the tape to be mounted, which, in this example, is `NONE` because the tape is unlabeled. It also lists all the controlled drives on the tape system. The available drives are marked with an `X` on the left. In this example, all three drives are available.

**Step 7** Use the `opreq` screen movement commands to select (highlight) the proper drive.

**Step 8** Press `RETURN`. The status of the request changes to `Done`.

## Responding to unmount requests

When a tape user is finished with a tape, the tape user issues a `tputmount` request. (See Example 46.) If the status is `Ready`, you know that the tape user is ready for a tape to be unmounted.

### Example 46 Unmount request

UID	STATUS	TYPE	VSN	RING	DRIVE	TIME-IN	- 1
jane	Done	Mount-Tape	1234	RW	mt:0 @ bluebell	3:20pm Nov 7	
ann	Done	Mount-Tape	AX3343	RW	mt:1 @ bluebell	3:22pm Nov 7	
joe	Ready	Mount-Tape	AX1745	RW	mt:0 @ bluebell	3:23pm Nov 7	
ann	Ready	Unmount-Tape	AX3343	RW	mt:1 @ bluebell	3:42pm Nov 7	

Command: █

Perform the following steps to respond to unmount tape requests:

- Step 1** Highlight the tape request.
- Step 2** Remove the tape from the tape drive.
- Step 3** Label the outside of the tape if this is a new tape. Include the following information on the label:
  - Tape owner
  - Tape VSN
- Step 4** Enter the `select-done` command:

Command: **select-done**

The message `STATUS` changes to `Done`.

If you do not enter the `select-done` command, the `STATUS` of the `Unmount-Tape` request changes to `Done` after two minutes.

## Bypassing label restrictions

If you have a labeled tape whose volume number, VSN, or owner is unknown, you can obtain this information by bypassing label access permissions.

To bypass label restrictions you must be logged in as superuser or be in a group that has been authorized to do so. Authorization to bypass label restrictions is set by the system manager through the tape system configuration utility, `tpconfig`. For more information, refer to the *ConvexOS Tape System Manager's Guide* (DSW-398).

Use the following procedure for bypassing label restrictions:

**Step 1** Mount the labeled tape as if it were unlabeled. Enter:

```
% tpmount -b
```

You can use other options in order to specify a particular device, drive, and symbolic-link name. Refer to `tpmount(1)`.

**Step 2** Display the first file on the tape with the `cat` command as follows:

```
% cat TAPE
```

If you named your symbolic link with the `-s` option when you mounted the tape, you must use that name instead of `TAPE`.

The `cat` command displays the contents of the volume label. Example 47 shows a sample volume label.

### Example 47 Displaying a volume label

```
% tpmount -b
Tape device /dev/rmt20 allocated.
% cat TAPE
VOL1 PLU123 PLUTO 3
HDR1PROG1 PLU12300010001000100 91302 00001 000000CONVEX
HDR2F0204800080 00
% █
```

This is the volume number. If this is not `VOL1`, this tape is not a single-volume tape nor the first volume in a tape set.

This is the volume label of the tape. This string must be specified as the VSN when the tape is mounted by the user.

This is the name of the tape's owner (the user who created the tape).



---

# Backing up and restoring files

# 5

This chapter provides procedures on how to back up to and restore from the following types of tapes:

- Unlabeled tapes
- Labeled tapes and labeled tape sets

---

## Overview of backing up and restoring files

Data stored on disks can be lost due to hardware or software problems with the disk, damage to equipment, or accidental deletion of files. Making back-up tapes of the information on disk on a regular basis ensures against loss of data by allowing you to recover files that are lost or corrupted.

The back-up process uses the `dump` command and copies files from disks to back-up tapes, also known as dump tapes. You can perform either a full dump or incremental dump:

- A full dump backs up all the files in a file system.
- An incremental dump backs up only those files that have changed since the last full or incremental dump, whichever is most recent.

Using the `restore` command, you can recover either individual files or an entire file system from these tapes.

## Creating backups

This section contains procedures for backing up file systems, with the `dump` command or by a script, to the following:

- Unlabeled tapes
- Labeled tapes and labeled tape sets

---

### Backing up files onto unlabeled tapes

Perform the following steps to back up file systems on unlabeled tapes:

**Step 1** If the tape drive you are going to use for the backup is not under control of the tape daemon, skip to Step 3. You do not have to use the `tpmount` command to access tape drives that are not under the control of the tape daemon.

To determine if the tape drive you use for backups is under tape system control, enter at a CONVEX shell prompt:

```
% tpconfig sh dr
```

Each tape drive that is defined in the tape system is set "Controlled" or "Not controlled."

**Step 2** If the drive you are using for the backup is controlled by the tape system, mount a tape by using the `tpmount` command. The format is

```
tpmount [-a dev] [-s symbolic_link vsn[,vsn ...]]
```

which has the following components:

`-a dev`                      Tape device to use, where *dev* is the name of a tape device defined as a node through the tape system for the drive you want to use.

### Caution

To prevent the tape system from rewinding the tape after each file system is dumped, select a device that is "no rewind."

If you do not specify a tape device, `tpmount` allocates a tape device for you according to attributes you have requested.

`-s symbolic_link`          Symbolic link name, where *symbolic\_link* is the name you want to call it. If you do not specify a symbolic link name, it is called "TAPE." Some sites require that you specify a symbolic link name.

*vsn*

Some sites may require that you supply a VSN for unlabeled tapes.

For more information on the `tpmount` command, refer to the *ConvexOS Tape System User's Guide*.

## Caution

**If data exists on the tapes used, the data will be overwritten.**

### Step 3

Dump the desired file systems. If the system manager has set up a script for automating this process, enter the name of the script. For example, if you have a script called `monday` that contains the file systems to dump on Monday, enter:

```
% monday
```

If you do not have a script, use the `dump` command, which has the following format:

```
dump level options filesystem
```

`dump` has the following components:

*level* Dump level, where *level* is an integer between 0 and 9, inclusive. The number 0 specifies a full dump of the file system. The numbers 1 through 9 specify incremental dumps.

*options* How to dump the file system. Some of the more commonly used options are listed below:

**b** Blocking factor the `dump` utility should use. The default for `dump` is 5; for `xdump` it is 10. The recommended blocking factor is 100. For example, to set the blocking factor to 50, enter:

```
% dump b 50
```

**f** Tape device receiving the output of the `dump` program. The default is `/dev/rmt8`, a 1600-bpi device. Use this option or the `G` option to specify a 6250-bpi device. To specify the `/dev/rmt16` device to receive output, enter:

```
% dump f /dev/rmt16
```

If you are using `rdump`, you must specify the system to which the dump is sent. For example, if `convex` is the machine name where you wish to send the dump, enter:

```
% rdump f convex:/dev/rmt16
```

**n** Notify all users in the group operator in the `/etc/group` file when `dump` needs attention.

- s Length of the dump tape in feet. The default is 2300 feet. When the size is reached, dump requests a new tape to be mounted.
- u Write the date and dump level of the tape to the `/etc/dumpdates` file if the dump completes successfully. Because this file tracks dates and levels of dumps for each file system, you should always specify this option when performing regularly scheduled backups.
- G Select a 6250-bpi device with a blocking factor of 100 (`/dev/rmt16`) as the tape device to receive the output of the dump. This option is recommended for all dumps.

See the `dump(8)` man page for specific details on the other options available.

*filesystem* Raw disk partition holding the file system you wish to back up. For example, `/dev/rda0a` is often the root file system. *filesystem* may also be the mount point of the file system you wish to back up.

You will receive the following warning:

```
Can't set async. i/o flags on tape.
```

Ignore this warning.

**Step 4** Respond to any operator messages issued to the system console by the dump utility.

The dump utility requires operator intervention for end of tape, end of dump, or error conditions such as tape write errors, tape open errors, or disk read errors. When intervention is required, dump prompts the operator for information in a form requiring a yes or no response.

Messages from dump include estimates of the number of blocks to write, the number of tapes required, the time to completion, and the time to change a tape. The dump command also reports the first inode number on each tape in a multiple-tape dump. Record these numbers on the tape label with other information to aid in retrieving the correct tape in the event files must be restored.

**Step 5** Using the `restore` command, verify that the dump can be read without error and the file format is correct. Enter:

```
% restore -V
```

**Step 6** If you mounted tapes with the `tpmount` command, deallocate the tape device by entering:

```
% tpunmount
```

**Step 7** Affix a paper label to the outside of the tape. Record at least the following information on the paper label:

- Date of the dump
- File system(s) dumped
- Operator who performed the dump
- Inode number of the first and last files on the tape. You get this number from the `dump` utility during execution.
- Sequence number of the tape, if more than one tape is used for a dump
- Options used to create the tape

---

## Backing up files onto labeled tapes

Perform the following steps to back up file systems on labeled tapes. The tape drive you are using must be under the control of the tape system in order to use labeled tapes.

To determine if the tape drive you use for the backup is under tape system control, enter at a CONVEX shell prompt:

```
% tpcnfig sh dr
```

Each tape drive that is defined in the tape system is set "Controlled" or "Not controlled."

### Caution

If data exists on the tapes used, the data will be overwritten.

**Step 1** Mount a tape by using the `tpmount` command. The format is

```
tpmount [-a dev] -m label [-l label_type] -s symbolic_link vsn[, vsn ...]
```

which has the following components:

`-a dev` Specify a tape device, where *dev* is the name of a tape device defined as a node through the tape system for the drive you want to use. You must select a device that is "no rewind."

If you do not specify a tape device, `tpmount` allocates a tape device for you according to attributes you have requested.

`-m label` Specify labeled tape mode.

The default is character mode, which is used for backups on unlabeled tapes.

`-l label_type` Label type. *label\_type* is one of the following label types: `ansi` or `ibm`.

The default label type is determined by your system manager. If you are using a label type other than your system default, you must specify it with the `-l` option.

`-s symbolic_link` Symbolic link name, where *symbolic\_link* is the name you want to call it. You must specify a symbolic link name when mounting labeled tapes.

*vs*n VSN or list of VSNs.

You must specify a VSN. If you are mounting a tape set, you must specify all the VSNs in the set.

For more information on the `tpmount` command, refer to the *ConvexOS Tape System User's Guide*.

A typical command to mount a three-volume tape set is:

```
% tpmount -a /dev/rmt8 -m label -s drive0 tape1,tape2,tape3
```

**Step 2** If a blank unlabeled tape is mounted, the system sends a message to your console to label the tape using `tplabel`. Enter:

```
% tplabel
```

If you are using a tape set, the system prompts you to mount and label all the volumes in the set. You are then prompted to place the first tape back on the tape drive.

**Step 3** Set tape attributes with the `tpattr` command. Set the attributes to the specified values in the following command:

```
% tpattr -f U -b 10240
```

The `-f` option sets the tape format to non-ANSI unformatted records (ignores record delimiters), and the `-b` option sets the physical tape block size.

**Step 4** Dump the desired file systems. If you have set up a script for automating this process, enter the name of the script. For example, if you have a script called `monday` that contains the file systems to dump on Monday, enter:

```
% monday
```

If you do not have a script, use the `dump` command. Use the format

```
dump level options filesystem
```

which has the following components:

*level* Dump level, where *level* is an integer between 0 and 9, inclusive. The number 0 specifies a full dump of the file system. The numbers 1 through 9 specify incremental dumps.

*options* How to dump the file system. Some of the more commonly used options are listed below:

b Blocking factor the `dump` utility should use. The default for `dump` is 5; for `xdump` it is 10. The recommended blocking factor is 100. For example, to set the blocking factor to 50, enter:

```
% dump b 50
```

- f Tape device receiving the output of the dump program. The default is /dev/rmt8, a 1600-bpi device. Use this option or the G option to specify a 6250-bpi device. To specify the /dev/rmt16 device to receive output, enter:

```
% dump f /dev/rmt16
```

If you are using `rdump`, you must specify the system to which the dump is sent. For example, if `convex` is the machine name where you wish to send the dump, enter:

```
% rdump f convex:/dev/rmt16
```

- n Notify all users in the group operator in the /etc/group file when dump needs attention.
- s Length of the dump tape in feet. The default is 2300 feet. When the size is reached, dump requests a new tape to be mounted.
- u Write the date and dump level of the tape to the /etc/dumpdates file if the dump completes successfully. Because this file tracks dates and levels of dumps for each file system, you should always specify this option when performing regularly scheduled backups.
- G Select a 6250-bpi device with a blocking factor of 100 (/dev/rmt16) as the tape device to receive the output of the dump. This option is recommended for all dumps.

See the `dump(8)` man page for specific details on the other options available.

*filesystem* Raw disk partition holding the file system you wish to back up. For example, /dev/rda0a is often the root file system. *filesystem* may also be the mount point of the file system you wish to back up.

**Step 5** You receive the following warning:

```
Can't set async. i/o flags on tape.
```

Ignore this warning.

**Step 6** Respond to any operator messages issued to the system console by the dump utility.

The dump utility requires operator intervention for end of tape, end of dump, or error conditions such as tape write errors, tape open errors, or disk read errors. When intervention is required, dump prompts the operator for information in a form requiring a yes or no response.

Messages from `dump` include estimates of the number of blocks to write, the number of tapes required, the time to completion, and the time to change a tape. The `dump` command also reports the first inode number on each tape in a multiple-tape dump. Record these numbers on the tape label with other information to aid in retrieving the correct tape in the event files must be restored.

**Step 7** Using the `restore` command, verify that the dump can be read without error and the file format is correct. Enter:

```
% restore -V
```

**Step 8** Deallocate the tape device. Enter

```
% tpunmount
```

and remove the tape from the drive.

**Step 9** Label and archive the tape. Record at least the following information on the label:

- Date of the dump
- File system(s) dumped
- Operator who performed the dump
- Inode number of the first and last files on the tape. You get this number from the `dump` utility during execution.
- Sequence number of the tape, if more than one tape is used for a dump
- Options used to create the tape

---

## Restoring files from tape backups

There are two utilities you can use to restore files from tape: `restore` and `rrestore`. The `rrestore` utility restores files over an Ethernet. The `rrestore` utility is part of the ConvexOS Internet Services, which is an optional product that will not exist on your machine unless you have installed it. In the remainder of this section, references to the `restore` utility also apply to `rrestore`.

The `restore` utility copies entire file systems, directories, or selected files from a tape to disk. You can place copies in the same location they were originally copied from disk, or place them in a different location for verification before moving them to their original locations. File ownership, permissions, and modification and access times are retained.

---

### Restoring files from unlabeled back-up tapes

Perform the following steps to restore files from tape to disk:

- Step 1** Determine what files or file systems you want to restore.
- Step 2** If the drive you are using for the restore is controlled by the tape system, mount a tape by using the `tpmount` command. The format is

```
tpmount [-a dev] [-s symbolic_link vsn[, vsn...]]
```

which has the following components:

- |                               |   |
|-------------------------------|---|
| <code>-a dev</code>           | Tape device to use, where <i>dev</i> is the name of a tape device defined as a node through the tape system for the drive you want to use.<br><br>If you do not specify a tape device, <code>tpmount</code> allocates a tape device for you according to attributes you have requested. |
| <code>-s symbolic_link</code> | Symbolic link name, where <i>symbolic_link</i> is the name you want to call it. If you do not specify a symbolic link name, it is called "TAPE." Some sites require that you specify a symbolic link name.  |
| <i>vsn</i>                    | Some sites may require that you supply a VSN for unlabeled tapes.   |

For more information on the `tpmount` command, refer to the *ConvexOS Tape System User's Guide*.

**Step 3** Change to the directory in which you want the files restored. For example, to recover any files from the /mnt file system to the /mnt directory, enter:

```
% cd /mnt
```

The `restore` utility places restored files in the current working directory. Unlike `dump`, the file system must be mounted when moving files from tape to disk.

**Step 4** Issue the `restore` command using the format

```
restore options [filename]
```

where *options* specifies how to restore the file system. Some of the more commonly used options are listed below:

f Tape device or file containing the input for the `restore` program. To specify the /dev/rmt16 device as the input device, enter:

```
% restore f /dev/rmt16
```

If you are using `rrestore`, specify the system from which the restore is originating. For example, if `convex` is the machine name where you wish to originate the restore, enter:

```
% rrestore f convex:/dev/rmt16
```

i Interactive restoration of files from a dump tape. The `restore` utility reads in directory information from the tape and provides a shell-like interface that allows you to move around the directory tree, selecting files to be restored. See the section titled "Restoring files interactively" for more information on how to use this option.

s Start restore at a specified file on the tape. Use this option when more than one dump is on the tape. Tape files are numbered starting with 1 for the first file. For example, to start the restore at file number 5, enter:

```
% restore s 5
```

t List the specified file names if they are on the tape. If no file names are specified, lists the entire contents of a tape. For a multi-tape dump, you must start with the first tape of the set.

x Restore only the named files from the tape. If no files are named, the entire tape is restored. For example, to restore the file called /smith/file1 and /smith/file2, enter:

```
% /etc/rrestore x ./smith/file1 ./smith/file2
```

- G Select a 6250-bpi device with blocking factor of 100 (/dev/rmt16) as the device from which the files are to be restored. This option is recommended for all restores.

See the restore(8) and rrestore(8C) man pages for specific details on the other options available.

*filename* File, directory, or file system to be restored.

**Step 5** Deallocate the tape device. Enter

```
% tpmount
```

and remove the tape from the drive.

**Step 6** If you performed a full restore of a file system, back up the file system.

---

## Restoring files from labeled back-up tapes

Perform the following steps to restore files from tape to disk.

**Step 1** Determine what files or file systems you want to restore.

**Step 2** Mount a tape by using the `tpmount` command. The format is

```
tpmount [-a dev] -m label [-l label_type] -s symbolic_link vsn [, vsn ...]
```

which has the following components:

`-a dev` Specify a tape device, where *dev* is the name of a tape device defined as a node through the tape system for the drive you want to use. You must select a device that is "no rewind."

If you do not specify a tape device, `tpmount` allocates a tape device for you according to attributes you have requested.

`-m label` Specify labeled tape mode.

The default is character mode, which is used for backups on unlabeled tapes.

`-l label_type` Label type. *label\_type* is one of the following label types: `ansi` or `ibm`.

The default label type is determined by your system manager. If you are using a label type other than your system default, you must specify it with the `-l` option.

`-s symbolic_link` Symbolic link name, where *symbolic\_link* is the name you want to call it. You must specify a symbolic link name when mounting labeled tapes.

*vsn* VSN or list of VSNs.

You must specify a VSN. If you are mounting a tape set, you must specify all the VSNs in the set.

For more information on the `tpmount` command, refer to the *ConvexOS Tape System User's Guide*.

A typical command to mount a three-volume tape set is:

```
% tpmount -a /dev/rmt8 -m label -s drive0 tape1,tape2,tape3
```

**Step 3** Set tape attributes with the `tpattr` command. Set the attributes to the values specified in the following command:

```
% tpattr -f U -b 10240
```

The `-f` option sets the tape format to non-ANSI unformatted records (ignores record delimiters), and the `-b` option sets the physical tape block size.

**Step 4** Change to the directory in which you want the files restored. For example, to recover any files from the `/mnt` file system to the `/mnt` directory, enter:

```
% cd /mnt
```

The `restore` utility places restored files in the current working directory. Unlike `dump`, the file system must be mounted when moving files from tape to disk.

**Step 5** Issue the `restore` command using the format

```
restore options [filename]
```

where *options* specifies how to restore the file system. Some of the more commonly used options are listed below:

**f** Tape device or file containing the input for the `restore` program. To specify the `/dev/rmt16` device as the input device, enter:

```
% restore f /dev/rmt16
```

If you are using `rrestore`, specify the system from which the restore is originating. For example, if `convex` is the machine name where you wish to originate the restore, enter:

```
% rrestore f convex:/dev/rmt16
```

**i** Interactive restoration of files from a dump tape. The `restore` utility reads in directory information from the tape and provides a shell-like interface that allows you to move around the directory tree, selecting files to be restored. See the section titled "Restoring files interactively" for more information on how to use this option.

**s** Start the restore at a specified file on the tape. Use this option when more than one dump is on the tape. Tape files are numbered starting with 1 for the first file. For example, to start the restore at file number 5, enter:

```
% restore s 5
```

t List the specified file names if they are on the tape. If file names are not specified, the t option lists the entire contents of a tape. For a multi-tape dump, you must start with the first tape of the set.

x Restore only the named files from the tape. If no files are named, the entire tape is restored. For example, to restore the file called /smith/file1 and /smith/file2, enter:

```
% /etc/rrestore x ./smith/file1 ./smith/file2
```

G Select a 6250-bpi device with blocking factor of 100 (/dev/rmt16) as the device from which the files are to be restored. This option is recommended for all restores.

See the restore(8) and rrestore(8C) man pages for specific details on the other options available.

*filename* File, directory, or file system to be restored.

**Step 6** Deallocate the tape device. Enter

```
% tpunmount
```

and remove the tape from the drive.

**Step 7** If you performed a full restore of a file system, back up the file system.

## Restoring files interactively

You can restore files interactively if you use the `restore -i` option. This allows you to search directories on the tape, mark files and directories for extraction, then extract only those files and directories with one command.

**Step 1** Enter the following to start an interactive restore session:

```
% restore -i
```

After reading the index information, the system issues the following prompt:

```
restore>
```

**Step 2** At this point, you can execute any of the following commands:

<code>add</code>	Add a file to the extraction list.
<code>delete</code>	Remove a file from the extraction list.
<code>ls</code>	List a directory's contents.
<code>pwd</code>	Display the current working directory.
<code>verbose</code>	Shows inode numbers.
<code>cd</code>	Change the current directory.
<code>extract</code>	Extract the marked files.
<code>quit</code>	Exit the <code>restore</code> interactive session.

Example 48 illustrates a sample interactive `restore` script.

### Example 48 Sample interactive `restore` script

```
% /etc/restore -i  
restore> ls  
tsmith/ mjones/ lost+found/  
restore> cd tsmith  
restore> ls  
.cshrc .login .msgsrc file1 file1.backup  
.exrc .logout a.out  
restore> add file1 file1.backup  
restore> extract  
You have not read any tapes yet.  
restore> quit  
% █
```



# Operating the ACS silo

The StorageTek Automated Cartridge System (ACS) silo is a cluster of one to sixteen Library Storage Modules (LSMs) each of which can contain nearly six thousand 3480 tape cartridges; two to sixteen StorageTek 4480 tape cartridge drives; and a robot arm for loading and unloading tapes in the system, and mounting and unmounting cartridges on the tape drives.

This chapter describes how to do the following tasks through the ACS:

- Enter a tape into the silo
- Eject a tape from the silo
- Manually mount a tape cartridge on a silo drive
- Manually dismount a tape cartridge from a silo drive
- Report the status of a silo component

For more information on these utilities, refer to the `silomount(8)`, `silodismount(8)`, `siloenter(8)`, `siloeject(8)`, and `siloquery(8)` man pages. These man pages are also included in the book *ConvexOS Man Pages for System Managers* (DSW-333).

---

## Setting your environment variable, SILOHOST

To use the ACS commands

- silodismount
- siloeject
- siloenter
- silomount
- siloquery

you must set your environment variable `SILOHOST` to the host name of the Sun workstation that controls ACS on your CONVEX system.

For example, if you use `cs`, and your host name is "jupiter" enter:

```
% setenv SILOHOST jupiter
```

If you use `sh` or `ksh`, enter:

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

You should add the appropriate command to your `.login` or `.profile` file, depending on the shell you use.

## CONVEX ACS coordinates

ACS drive coordinates tell the mechanical tape operator the position occupied by the drive in the ACS tape library. This enables the ACS to enter, eject, mount, and dismount tape cartridges. The ACS drive coordinates indicate:

0, 0, 0, 0

① ② ③ ④

- ① StorageTek unit number, if units are separated (ACS number)
- ② StorageTek unit number, if units are connected (LSM number)
- ③ StorageTek panel number (inside the unit)
- ④ StorageTek drive position number (on the panel)

## Reporting ACS component status

Determine the status of any ACS component by using the `siloquery` utility. The status of the following ACS components can be queried:

- ACS
- Controlled Access Ports (CAPs)
- Library Management Unit (LMU) ports
- Library Storage Modules (LSMs)
- Mounts for specific cartridges
- Requests
- Server
- Specific cartridges that are stored
- Tape drives

The syntax for the `siloquery` utility is

`siloquery command`

where *command* can be any of the commands described in Table 3.

**Table 3** `siloquery` utility and its commands

Command	Description
<code>acs [acsID...]</code>	Reports the status of all ACS silos controlled by the server, unless one or more ACS IDs are specified. <i>acsID</i> is the ID of a specific ACS silo. If one or more ACS IDs are specified, only information about those ACS silos are reported.
<code>cap [capID...]</code>	Reports the status of all CAPs controlled by the server, unless one or more CAP IDs are specified. <i>capID</i> is the ID of a specific CAP. If one or more CAP IDs are specified, only information about those CAPs are reported.
<code>drive [driveID...]</code>	Reports the status of all tape drives in the ACS silo controlled by the server, unless one or more tape drive IDs are specified. <i>driveID</i> is the ID of a specific tape drive. If one or more drive IDs are specified, only information about those tape drives are reported.
<code>lsm [lsmID...]</code>	Reports the status of all LSMs controlled by the server, unless one or more LSM IDs are specified. <i>lsmID</i> is the ID of a specific LSM. If one or more LSM IDs are specified, only information about those LSMs are reported.

Table 3 siloquery utility and its commands

Command	Description
mount <i>VSN</i> [ <i>VSN...</i> ]	Reports the status of all tape drives and the specified cartridges controlled by the server. At least one <i>VSN</i> must be specified.
port [ <i>portID...</i> ]	Reports the status of all LMU ports controlled by the server, unless one or more port IDs are specified. <i>portID</i> is the ID of a specific LMU port, which is a serial communication line from the server to an LMU. If one or more port IDs are specified, only status of those ports are reported.
request [ <i>requestID...</i> ]	Report the status of all server requests currently being executed, unless one or more request IDs are specified. <i>requestID</i> is the ID number of a server request. If one or more request IDs are specified, only information about those requests are reported.
server	Report the status of the StorageTek Sun server.
<div data-bbox="27 889 370 949" style="border: 1px solid black; padding: 5px; width: fit-content;"> <b>Caution</b> </div> 	<p>Report the <i>VSN</i> and location of every cartridge contained in the ACS silo, unless one or more <i>VSNs</i> are specified. If one or more <i>VSNs</i> are specified, only information about those <i>VSNs</i> are reported.</p> <p><b>This command can take considerable time, especially if there are many cartridges in the ACS silo. To avoid ACS server software problems, do not attempt to terminate the process by pressing CTRL-c or by any other means of interruption.</b></p>

---

## Reporting ACS status

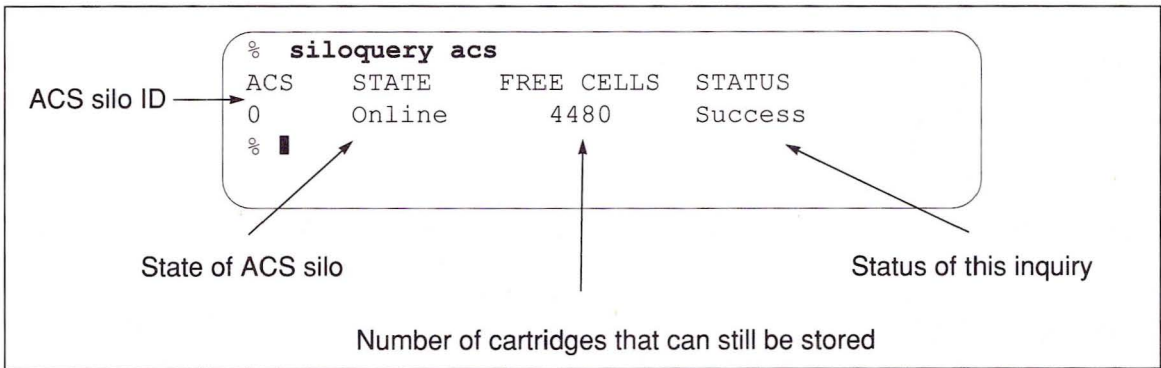
To report status information about an ACS silo, use the `siloquery acs` command. `siloquery acs` has the following syntax:

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

*acsID* is an integer representing the ACS silo's identification number. The first ACS silo that is installed is typically numbered "0," the second "1," the third "2," and so on. If you do not specify an ACS ID, `siloquery acs` reports the status of all ACS silos in your system.

Example 49 shows how to report ACS status.

### Example 49 Reporting general ACS silo status



---

## Reporting CAP status

To report status information about an ACS silo CAP (Control Access Port), use the `siloquery cap` command.

`siloquery cap` has the following syntax:

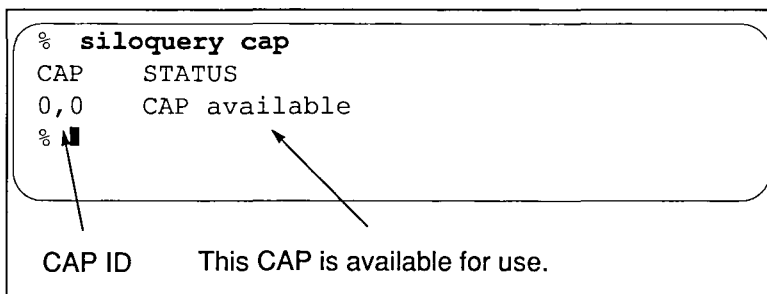
```
siloquery cap [capID...]
```

*capID* is the ACS silo's CAP ID. The first CAP in the first ACS silo is generally numbered "0,0", the second CAP in the first ACS silo is numbered "0,1", the first CAP in the second ACS silo (if there is one) is numbered "1,0", and so on. If you do not specify a CAP ID, `siloquery cap` reports the status of all CAPs in your system.

Example 50 shows how to report ACS silo CAP status.

### Example 50 Reporting ACS silo CAP status

```
% siloquery cap
CAP    STATUS
0,0    CAP available
% █
```



CAP ID      This CAP is available for use.

## Reporting tape drive status

To report status information about an ACS tape drive, use the `siloquery drive` command. The `siloquery drive` command has the following syntax:

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

`driveID` is the tape drive's ID as specified in the `ioconfig` file. If you do not specify a tape drive ID, `siloquery drive` reports the status of all tape drives in the ACS. If you need more information about finding out drive names or displaying information about drives, refer to Appendix B, "Tape drives and nodes," on page 109.

Example 51 shows how to report tape drive status.

### Example 51 Reporting tape drive status

```
% siloquery drive
DRIVE    DRIVE ID  STATE    VSN      STATUS
rtc0     0,0,10,0 Online    JUP010   Drive in use
rtc1     0,0,10,2 Offline
% █
```

The diagram illustrates the output of the `siloquery drive` command. It shows a table with five columns: DRIVE, DRIVE ID, STATE, VSN, and STATUS. Two rows of data are shown: one for drive `rtc0` (Online, VSN JUP010, Drive in use) and one for drive `rtc1` (Offline, Drive available). Arrows point from labels below to specific fields in the output: 'Tape drive name' points to the DRIVE column; 'Tape drive ID (location)' points to the DRIVE ID column; 'Tape drive state (online or offline)' points to the STATE column; 'Volume Serial Number of the cartridge, if one is mounted' points to the VSN column; and 'Tape drive in use or available' points to the STATUS column.

DRIVE	DRIVE ID	STATE	VSN	STATUS
rtc0	0,0,10,0	Online	JUP010	Drive in use
rtc1	0,0,10,2	Offline		Drive available

## Reporting Library Storage Module status

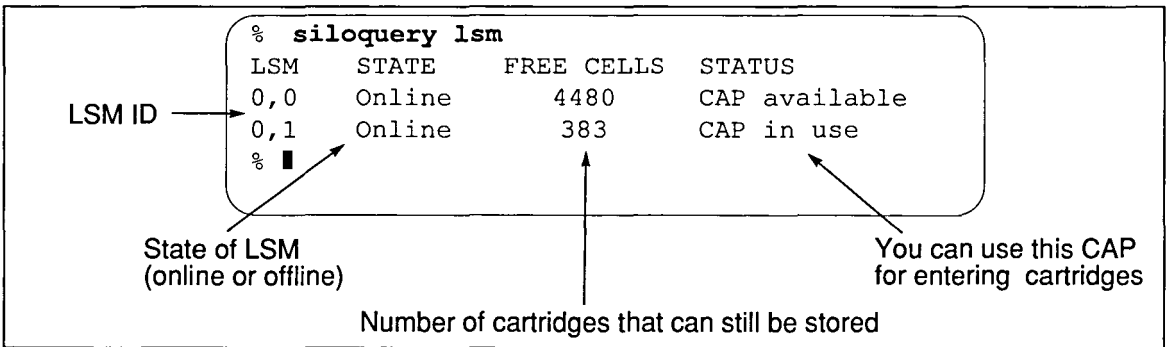
To report status information about a Library Storage Module (LSM), use the `siloquery lsm` command. `siloquery lsm` has the following syntax:

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

*lsmID* is one or more LSM IDs. The first LSM in the first ACS is generally numbered "0,0", the second LSM in the first ACS is numbered "0,1", the first LSM in the second ACS (if there is one) is numbered "1,0", and so on. If you do not specify an LSM ID, `siloquery lsm` reports the status of all LSMs in your system.

Example 52 shows how to report LSM status.

### Example 52 Reporting LSM status



## Reporting mount and tape drive status

To report status information about a cartridge that is mounted and the tape drives, use the `siloquery mount` command. `siloquery mount` has the following syntax:

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

VSN is the Volume Serial Number of a cartridge you want queried. You can specify one or more VSNs, but you must specify at least one.

Example 53 shows how to report mount and tape drive status.

### Example 53 Reporting mount and tape drive status

Information about cartridges		Information about drives				
<pre>% siloquery mount JUP010 SM0500</pre>						
VSN	STATUS	DRIVE	DRIVE ID	STATE	VSN	STATUS
JUP010	Volume in drive	: tc:0	0,0,10,0	Online		Drive available
		: tc:1	0,0,10,2	Online	JUP010	Drive in use
SM0500	Volume home	: tc:0	0,0,10,0	Online		Drive available
		: tc:1	0,0,10,2	Online	JUP010	Drive in use

Annotations:

- Volume Serial Number of specified cartridge (points to JUP010 and SM0500)
- Tape drive name (points to tc:0 and tc:1)
- Tape drive status (online or offline) (points to Online)
- Whether or not the tape drive is available (points to Drive available and Drive in use)
- Where a specified cartridge is currently located in the ACS silo (points to 0,0,10,0 and 0,0,10,2)
- Tape drive ID (location) (points to 0,0,10,0 and 0,0,10,2)
- If a cartridge is mounted, this is its VSN. (points to JUP010)



## Reporting request status

To report status information about an ACS request, use the `siloquery request` command. `siloquery request` has the following syntax:

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

*requestID* is the number assigned to a request when it is submitted. If you do not specify one or more request IDs, `siloquery request` reports information about all current requests.

Example 55 shows how to report request status.

### Example 55 Reporting request status

% <b>siloquery request</b>		
REQUEST	COMMAND	STATUS
1863	Query	Pending
1862	Dismount	Current
1861	Query	Current

% █

Request ID                      Type of request                      Status of this request

---

## Reporting server status

To report status information about the ACS server, use the following command:

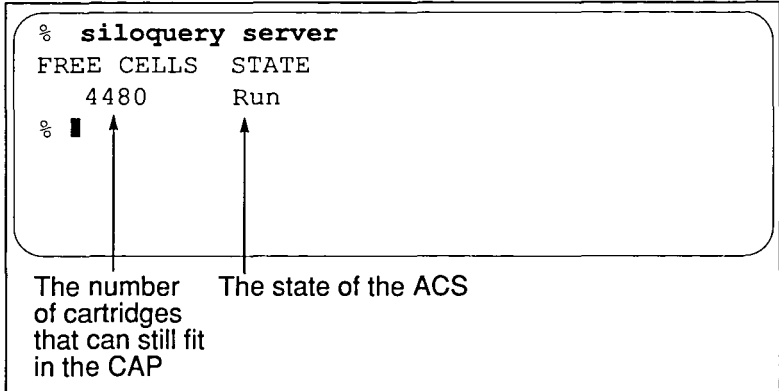
```
siloquery server
```

Example 56 shows a server status report.

### Example 56 Reporting server status

```
% siloquery server
FREE CELLS STATE
      4480   Run
% █ ↑      ↑
```

The number of cartridges that can still fit in the CAP      The state of the ACS



## Reporting volume status

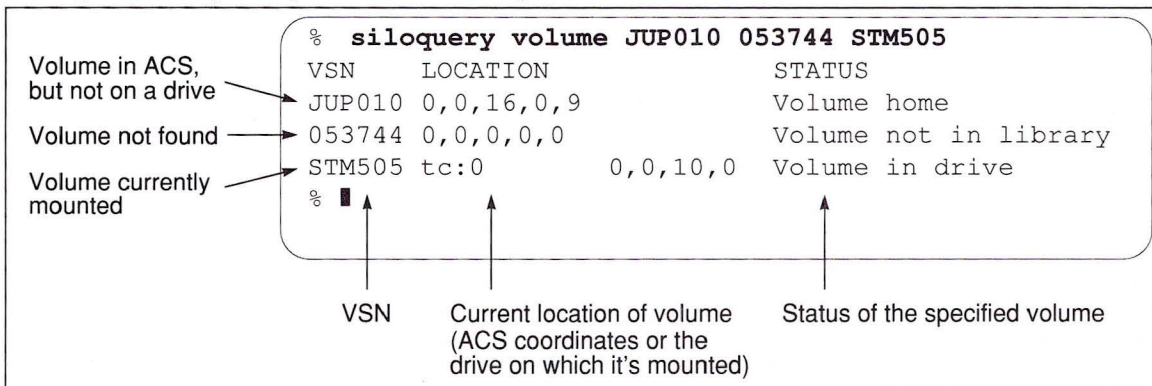
To report status information about any or all cartridges in the ACS silo, use the `siloquery volume` command. `siloquery volume` has the following syntax:

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

VSN is the Volume Serial Number of a specific cartridge. If you do not specify one or more VSNs, `siloquery volume` reports the status of all cartridges in the ACS.

Example 57 shows volume status reports.

### Example 57 Reporting status of a cartridge volume

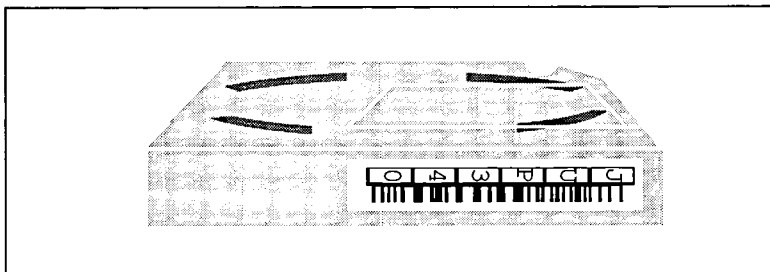


## Entering cartridges into the ACS

To enter up to twenty-one 3480 tape cartridges into the ACS, use the following procedure:

- 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 ACS silo.

### Example 58 Valid bar code label



Any cartridge that does not have a valid label or cannot be read by the robot camera is rejected by the ACS silo during the entry process.

- Step 2** Use the following command to inform the ACS that you are entering some new cartridges and identifying the Controlled Access Port (CAP) that you are using:

```
silolenter CAPid
```

Example 59 shows how this command is used.

### Example 59 Entering cartridges into the ACS

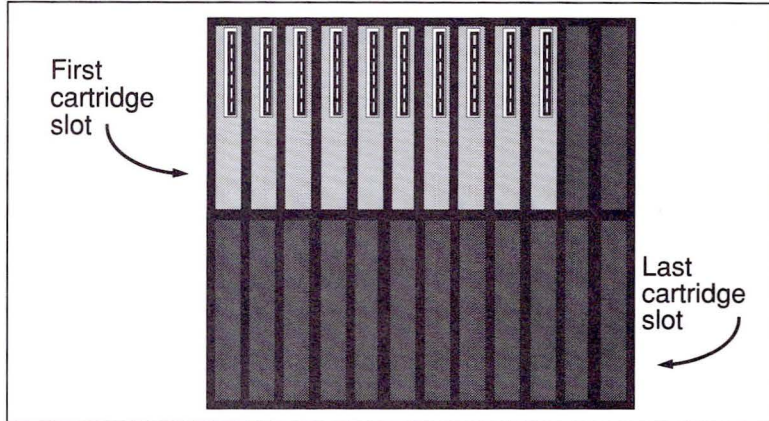
```
% silolenter 0,0
```

```
█
```

This command unlocks the CAP door that corresponds to the CAPid you have specified. The "CAP enter" light above the CAP is illuminated. The tape system waits until the next two steps are completed before continuing.

**Step 3** Open the CAP door and insert the cartridges into the slots from left to right, starting with the top row. Do not leave any slots empty between the first and last cartridges. See Example 60.

**Example 60** Loading cartridges into the ACS silo's CAP



**Step 4** Close the CAP door.

The ACS 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 LSMs.

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

If the "CAP locked" light above the CAP is once again illuminated, the entry process is finished. A list of the VSNs of the newly entered cartridges and their statuses is displayed on the screen. See Example 61.

**Example 61** Completion of cartridge entry into the ACS

```
% siloenter 0,0
VOLUME STATUS
JUP010 Success
JUP200 Success
MEL001 Success
% █
```

- Step 5** If any cartridges have been 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 of the newly entered cartridges and their status is displayed on the screen. See Example 61 on page 86.

## Ejecting cartridges from the ACS

To remove up to twenty-one 3480 tape cartridges from the ACS, use the following procedure:

### Step 1

Use the `siloeject` command to inform the ACS that you are ejecting some cartridges and identifying the Controlled Access Port (CAP) that you are using. The `siloeject` command has the following syntax:

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

`CAPid` corresponds to the CAP ID of the CAP you are using, and `VSN` is the Volume Serial Number (VSN) of the cartridge you are ejecting.

### Example 62 Ejecting a cartridge from the ACS silo

```
% siloeject 0,0 000100 000200 000300
% █
```

This command unlocks the CAP door that corresponds to the `CAPid` you have specified. The “CAP eject” light above the CAP is illuminated. The tape system waits until the next two steps are completed before continuing.

### 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 of the newly ejected cartridges and their statuses is displayed on the screen as shown in Example 63.

### Example 63 Completion of cartridge ejection from the ACS

```
% siloeject 0,0 JUP010 JUP200 MEL001
VOLUME STATUS
JUP010 Success
JUP200 Success
MEL001 Success
% █
```

## Bypassing the ConvexOS tape system and mounting a cartridge with the ACS

The `silomount` command bypasses the ConvexOS tape system to mount a cartridge with the ACS. Normally, `tpmount` is used.

The `silomount` command informs the ACS of the VSN of the cartridge you want mounted and the tape device you want to use.

The `silomount` command has the following syntax:

```
silomount VSN tapedevice
```

*VSN* is the VSN of the cartridge you want mounted, and *tapedevice* is the name of the tape device you want the ACS to use.

Example 64 shows how to bypass the tape system when mounting a cartridge with the ACS.

### Example 64 Bypassing the ConvexOS tape system and mounting a cartridge with the ACS

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

For help with selecting an appropriate tape device, refer to Appendix B, "Tape drives and nodes," on page 109.

---

## Bypassing the ConvexOS tape system and dismounting a cartridge with the ACS

The `silodismount` command bypasses the ConvexOS tape system to unmount a cartridge with the ACS. Normally, `tpunmount` is used.

The `silodismount` command informs the ACS of the Volume Serial Number (VSN) of the cartridge you want unmounted and the tape device it is currently using.

The `silodismount` command has the following syntax

```
silodismount [-force] VSN tapedevice
```

which has the following components:

- `-force`      Execute the dismount immediately regardless of the state of the tape drive.
- `VSN`            VSN of the cartridge you want dismounted
- `tapedevice`    Name of the tape device the cartridge currently is using

Example 65 shows how to bypass the tape system when dismounting a tape with the ACS.

**Example 65** Bypassing the ConvexOS tape system and dismounting a cartridge from the ACS

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

---

# Tape system accounting

# 7

This chapter describes general tape system and `opreq` accounting, and the files in which accounting is kept.

## General tape system accounting

Tape system use is logged in the `/usr/adm/tp-acct` file. This file is a text file and can be viewed using the `cat`, `less`, or `more` utilities. Example 66 illustrates a sample `tp-acct` file.

**Example 66** Sample `/usr/adm/tp-acct` file

allocated	507507897	/dev/rmt16	311	49	0	mt:0
deallocated	507507923		311	49	0	mt:0
allocated	507568225	/dev/rmt20	0	58	0	mt:1

↑	↑	↑	↑	↑	↑	↑
Event	Time of event	Tape device	UID	GID	Activity	Drive

This file contains the following fields from left to right:

- Whether tape drive was allocated or deallocated
- Time tape drive was mounted or unmounted
- Tape device
- User ID (UID)
- Group ID (GID)
- Activity ID
- Tape drive type and unit number

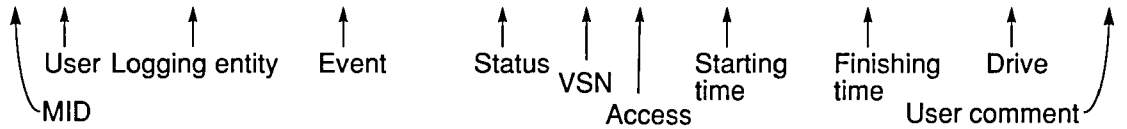
The `tp-acct` file must be trimmed periodically because it grows as entries are added automatically. These entries are *not* deleted automatically by the system.

## opreq accounting

opreq use is logged in the /usr/adm/opreq-acct file. This file is a text file and can be viewed using the cat, less, or more utilities. Example 67 illustrates a sample opreq-acct file.

### Example 67 Sample /usr/adm/opreq-acct file

```
6 pat  Tape-System Mount-Tape  CancelVOL1 RW 686694202 686694557 mt:0@orion #
8 root Tape-System Auto-Vol-RecDone  None RW 686702297 686702313 mt:0@orion #
7 chris Tape-System Mount-Tape  Done  VOL1 RW 686702207 686702317 mt:0@orion #
```



This file contains the following fields from left to right:

- The opreq message ID (MID)
- The user who currently has control of the drive
- The entity that completed the request
- The event that was terminated
- The status of the request at termination
- The VSN of the tape, if there was one on the drive
- Access permissions that were set on the tape (R for readable, W for writable)
- Time request was made
- Time the request was completed
- Tape drive type and unit number
- Any comments that were sent to the operator by the user

The opreq-acct file must be trimmed periodically because it grows as entries are added automatically. These entries are *not* deleted automatically by the system.



---

# Tape system error messages

# A

This appendix contains a description of error messages that can be returned by the tape system. Because it is impossible to describe all combinations of circumstances that can result in error messages, this list is not exhaustive.

Error messages in this appendix are organized as follows:

- General tape system error messages
- `tpconfig` error messages
- `opreq` error messages

These error codes are either displayed or sent to the error log file (usually `/usr/adm/log/tapelog`), or both.

---

## **Tape system error message labels in the tapelog file**

Messages recorded in the /usr/adm/log/tapelog file will usually be labeled to indicate their severity. The following labels may be used:

EMERG	System is unusable.
ALERT	Action must be taken immediately.
CRIT	Critical conditions
ERR	Error conditions
WARNING	Warning conditions
NOTICE	Normal but significant condition
INFO	Informational; no action required.
DEBUG	For debugging only; normally should not be seen.

## General tape system error messages

This section alphabetically lists and describes some of the error messages you may receive when encountering problems while using the tape system. Error messages may be sent by the tape system to your terminal screen or to a log file in the form:

*command*: *error\_message*

*command* is the command you were using when the error occurred, and *error\_message* is the reason the error occurred.

Each error message entry suggests a possible solution. This solution is provided for the most common occurrences and may not be valid in all situations.

`ambiguous request`

The tape system cannot distinguish the tape and drive on which to take action. Specify the symbolic-link name of the device with the appropriate option.

`can't create symbolic link`

You may not have write permissions for the directory from which you have invoked `tpmount`, or a file exists with the same name as the requested symbolic link to the tape device.

You must change to a directory that you can write to or change the permissions of the current working directory, or specify a unique symbolic-link name with the `tpmount -s` option.

`can't create symbolic link to stacker`

The symbolic link to the stacker device could not be created. The reason for the failure is appended. For example:

```
tpmount: can't create symbolic link to \  
stacker /mnt/guest/TAPE.STK: File exists
```

In this case, a file called "TAPE.STK" already exists; you should use `-s` with `tpmount` to specify a different link name.

`can't establish connection with label daemon`

The label daemon for the label type you have requested doesn't exist.

If the label type is a valid label type that is supported by CONVEX, check if it has been defined with `tpconfig`:

```
% tpconfig show labels
```

If the label type is not defined contact your system manager or bypass label restrictions and copy the contents of the tape to another tape that has a proper label. Refer to the section, "Bypassing label restrictions," on page 51.

can't get current working directory

The directory you are currently in has been deleted. Change to another directory to issue your mount request.

device and mode requested do not match

You have specified character or label access mode to `tpmount` and the specified device access mode is block.

device is opened by another process

The device you have attempted to deallocate is currently in use by a process. You must wait until the process closes the tape device to deallocate it.

empty request

You have not specified a tape in your `tpmount` library call.

EOT seen

The utility you are using has encountered the end of the tape. If there is still more tape, this indicates there is a bad spot on it.

file exists

The symbolic link displayed with this error message exists, so it cannot be created as you have specified in your mount request.

Specify a unique symbolic-link name with the `tpmount -s` option.

internal tape system error

There is currently an internal problem with the tape system. Contact your system manager.

invalid drive name specified

You have specified a drive name in your `tpmount` request that is not defined for your system.

Use the `tpconfig show drives` command to list defined drives.

**invalid drive type**

You have specified a drive type in your `tpmount` request that is not defined for your system.

To display defined drives, enter:

```
% tpconfig show drives
```

**invalid label type**

You have specified a label in your `tpmount` request that is not defined for your system.

Use the `tpconfig show labels` command to list defined label types.

**invalid path to symbolic link**

The path you have specified to your symbolic link is not a valid path. One or more of the directories in the path do not exist.

Reissue your mount request after determining a proper path for the symbolic link.

**labeled tapes only**

`tpconfig labeled-mode-only` is enabled which requires tapes to be mounted in labeled mode. Only users with bypass access may mount tapes in character or block mode.

**magnetic vsn doesn't match visual vsn**

The VSN or VSNs you have specified in your mount request do not match the VSN or VSNs on the tape.

If you do not know the proper VSN or VSNs for the tape, and you are the owner or root, remount the tape in unlabeled mode and bypass the label with the `tpmount -b` option. View the first file on the tape, which contains a field listing the proper VSNs. Refer to the section, "Bypassing label restrictions," on page 51.

If you are using a tape set, you must list all the VSNs in the set with the `tpmount -s` option.

**mount not yet complete**

You have entered a command before your tape has been mounted.

If you placed your mount request in the background with the `tpmount -B` option, use the `tpwait` command to bring it to the foreground.

If you haven't placed your mount request in the background, wait until the mount is complete.

mount request failed

You have passed a null pointer as an option in your `tpmount` library request.

mount request failed - tape is labeled

You have probably tried to mount a labeled tape with a block device or tried to mount a labeled tape in character or block mode without bypassing the label.

To display a list of available character devices you should use with labeled tapes, enter:

```
% tpconfig show nodes | grep "rewind Char"
```

To bypass a tape label (if you are the owner of the tape or have superuser privileges only), mount the labeled tape with the `tpmount -b` option. Otherwise, mount the labeled tape in labeled mode with the `tpmount -m` option.

no access

You are not on the user or group access drive list for the specified drive.

no alloc access

You are not on the user or group allocate drive list for the specified drive. You cannot reserve the drive and must specify a particular tape to mount.

no authorization

The drive you have selected is not controlled, or you have attempted to unmount a tape without proper authorization. You must either select a controlled tape drive or unmount the tape as the appropriate user, respectively.

For help in selecting a proper drive that is controlled, enter:

```
% tpconfig show drives | grep Cont
```

To display a list of tape devices that have been allocated locally and by whom, enter:

```
% tpqueue -l
```

no bypass access

You specified `tpmount -b` to bypass label processing, but are not on the user or group bypass labels list for the drive.

no drives meet the required speed density and type

You have specified attributes that do not correspond to a defined device. For help in selecting a proper device enter:

```
% tpconfig show nodes
```

no entry in password file

Your ID is not in the password file /etc/passwd.

no input

You have attempted to use `tar -t` to list files in an archive on a tape that is at EOT.

Reposition the tape using `mt` commands.

no matching drives are available at this time

You have specified attributes that correspond to a defined device that is currently in use.

To display a list of tape devices that have been allocated locally and by whom, enter:

```
% tpqueue -l
```

For help in selecting a proper device, enter:

```
% tpconfig show nodes
```

no such request

You have issued a tape command that is invalid either for the type of tape you have mounted or for the current situation.

no such file or directory

The file you are trying to read from an archive doesn't exist.

Use a command to list the files on the labeled tape, if using a labeled tape, or use a command to list the files in the archive, if trying to access an archive. If you are trying to read from disk, list the directory you are trying to read from.

no such tape

You have requested a tape to be mounted that is not currently included in the tape library. Enter the proper tape.

queueing is disabled - please specify device with `tpmount -a` option

A device cannot be selected for you by the tape operator. You must select your own device with the `tpmount` option `-a`. For help in selecting a proper device enter:

```
% tpconfig show nodes
```

Read error

The utility you are using cannot read from the tape. This is probably because you do not have the proper device mounted, or you have not selected the proper tape attributes (if you are using a labeled tape).

server didn't respond

`tpdaemon` has not responded to your request due to network problems. This message is accompanied by an RPC (remote procedure call) error message.

tape cannot be labeled

You have attempted to label a tape not mounted in labeled mode.

First, be certain the correct tape is on the tape drive. If it is the correct tape, unmount it, remount it in labeled mode, and then label it. Any information that is on a tape at the time of labeling is no longer accessible after labeling.

tape cannot be unlabeled

You have attempted to unlabeled a tape not mounted in labeled mode.

First, be certain the correct tape is on the tape drive. If it is the correct tape, unmount it, remount it in labeled mode, and then unlabeled it. Any information that is on a tape at the time of labeling is no longer accessible after labeling.

tape change in progress

The tape operator is changing the tapes. Wait until the change operation is complete to continue.

tape forward error

When using the `tar -t` command to view files in an archive, this message means that the tape is at EOT. This happens when listing files in the last archive on a tape.

tape device must be no-rewind for labeled tapes  
You have requested a rewind device. Rewind devices are not compatible with labeled tapes.

Select a device that is no-rewind. For help in selecting a proper no-rewind device, enter the following:

```
% tpconfig show nodes | grep No
```

tape drive is not on-line or not ready

The tape drive is probably not online yet; or, you have issued a mount request for a labeled tape without an operator, and the tape has not yet been placed on the drive.

For 9-track tape drives, the online button on the tape drive probably needs to be pressed. For cartridge tapes, ensure the tape has been inserted properly.

If you are using labeled tapes, you must place the tape on the drive and put the drive online before issuing a mount request.

tape is already in use

You have specified a tape that is already in use.

To display a list of tape devices that have been allocated locally and by whom, enter:

```
% tpqueue -l
```

tape is already labeled

You have attempted to label a tape that is already labeled.

First, be certain the correct tape is on the tape drive. If it is the correct tape, use `tpunlabel` to unlabel it and then relabel it. Any information that is on a tape at the time of labeling is no longer accessible after labeling.

tape is already unlabeled

You have attempted to unlabel a tape that is not labeled, but is mounted in labeled mode.

tape is mounted read only

The tape you have mounted as read-and-write is physically set for reading only.

The tape should be unmounted, taken from the drive, and have its write authorization affixed. You can then remount it with read and write permissions.

tape is mounted read/write

The tape you have mounted as read-only is physically set for reading and writing.

The tape should be unmounted, taken from the drive, and have its write authorization removed. You can then remount it as read-only.

tape is not known to tape system

You have requested a tape that is not currently in the tape library. Enter the proper tape.

tape is not labeled; use `tplabel` to label tape  
You have mounted an unlabeled tape in labeled mode.

First, be certain you have mounted the correct tape. Once you label a tape, any information on it is lost. If you get this message, you must label the tape in order to use it further.

tape mount canceled by operator

There is a problem with your tape, tape drive, or request. This message may be followed by a comment from a tape operator. If not, contact them.

tape must be mounted as labeled to use this command

You have attempted to use labeled-tape utilities on an unlabeled tape.

First, be certain the correct tape is on the tape drive. If the correct tape is on the tape drive, you must unmount the tape, remount it in labeled mode, and label it before using labeled-tape utilities. Any information that is on a tape at the time of labeling is no longer accessible after labeling.

unable to connect to server

There is a problem connecting to your server.

unable to set attributes

You have attempted to set attributes on a tape that is not labeled. You must label the tape first with the `tplabel` command. Any information that is on an unlabeled tape at the time of its labeling is not accessible after it is labeled.

Warning: tape is not labeled; use tplabel to label tape

You have mounted an unlabeled tape in labeled mode.

First, be certain you have mounted the correct tape. Once you label a tape, any information on it is lost. If you get this message, you must label the tape in order to use it further.

Write error

The utility you are using cannot write to the tape. This is probably because you do not have the proper device mounted, or you have not selected the proper tape attributes (if you are using a labeled tape).

---

## tpconfig error messages

The following error messages may appear on your screen while you are running `tpconfig`:

Ambiguous command.

Ambiguous keyword match

Not enough characters were given to distinguish the command or keyword from another command or keyword. Enter a more complete form of the command.

Cannot create new database.

The database `/usr/lib/tape/config.db` does not exist, and you do not have permission to create a new database. Make sure that you are logged on as root.

Cannot open database: `/usr/lib/tape/config.db`

The indicated database could not be opened. Check the access permissions of the database with `ls`.

Database access is read-only.

You do not have permission to make changes to the tape system configuration database. (Only root has permission.) You may, however, read information from the database. Only the `show` commands work when the database is read-only.

Database does not exist. Creating new database.

Because `/usr/lib/tape/config.db` did not exist, a new database is being created.

Database is readonly.

The user issued a command to change the configuration but only has read-only access. (Only root has permission to change the database.)

Error reading defaults

Error reading drives

Error reading labels

Error reading node

The configuration database is corrupted. Check for other error messages. The problem can be fixed by removing the old configuration file and creating a new one.

Error writing defaults

Error writing drives

Error writing labels

Error writing nodes

A write error occurred while writing out a new configuration. These messages are always accompanied by a system error message.

Interrupt.

The keyboard interrupt character (usually **CTRL-c**) was typed. If you want to exit `tpconfig`, type the EOF character (usually **CTRL-d**).

Missing quote.

Somewhere on the command line there is a mismatched quote character.

Node must be either block special or character special.

Only character special files and block special files can be given as a node in the `add node` command.

readdrives: malloc failed

readlabels: malloc failed

readnodes: malloc failed

There is not enough memory available for `tpconfig`.

readnodes: stat failed on `/dev/rmt?`

One of the nodes defined in the database no longer exists. You should delete that node with the `delete node` command.

The database is being modified by another person.

The configuration database is locked. You cannot edit the `tpconfig` database because another user has it currently open.

Access is read-only.

The configuration database is locked. You cannot edit the `tpconfig` database because you do not have authorization.

Unable to write out configuration.

`tpconfig` could not write the configuration back to `/usr/lib/tape/config.db`. Verify that you still have write permission and that the disk is not full.

Warning: Invalid daemon path.

The daemon specified with `add label` does not exist.

---

## **opreq error messages**

The following error messages may be displayed on your screen or sent to the log file to indicate error conditions while you are using `opreq`.

At limit

An attempt was made to move past the edge of the screen.

Invalid command

A command was issued that `opreq` does not recognize.

Invalid drive

The selected drive cannot be mounted.

Invalid window

An attempt was made to select a window that is not available.

No current message

A message operation has been attempted, but no message is currently selected. Move the selection cursor over the desired message.

No current window

An operation was attempted that requires a window to be active, but no window is active.

No other window

An attempt was made to move to another `opreq` window; no other window exists.

Not implemented

You have attempted to use an unimplemented command or feature.

Not ready

A `select-done` command was attempted on a message that is not in "Ready" status.

Restricted command

You do not have permission to carry out the command. To use its full capabilities, you must run `opreq` as root or be in the group `tapeop`.

Tape server: `opreply()` failed

Internal error: an attempt to send a message via `opreply()` has failed.

Tape server: timed out

The tape drive has not been used for longer than the defined idle time; it has been unmounted.

# Tape drives and nodes

# B

Tape device files, which are associated as nodes to tape drives, are located in the /dev directory. Their names may vary from site to site and are configurable. To display tape devices defined as nodes of drives on your system, enter at your shell prompt:

```
% tpconfig show nodes
```

Table 4 describes standard CONVEX tape drive names and their associated nodes.

Table 4 Standard CONVEX names of tape drives and node names and their attributes

Tape drives and associated nodes						Node attributes			
dat:0 <sup>†</sup>	mt:0	tc:0 <sup>†</sup>	dat:1 <sup>†</sup>	mt:1	tc:1 <sup>†</sup>	Density	Rewind Status	Mode	Buffered?
	mt8			mt9		1600	Rewind	Block	
	mt12			mt13		1600	No rewind	Block	
dat0u	mt16	tc0u	dat1u	mt17	tc1u	6250	Rewind	Block	
dat0nu	mt20	tc0nu	dat1nu	mt21	tc1nu	6250	No rewind	Block	
dat0		tc0	dat1		tc1	6250	Rewind	Block	Buffered
dat0n		tc0n	dat1n		tc1n	6250	No rewind	Block	Buffered
	rmt8			rmt9		1600	Rewind	Char	
	rmt12			rmt13		1600	No rewind	Char	
rdat0u	rmt16	rtc0u	rdat1u	rmt17	rtc1u	6250	Rewind	Char	
rdat0nu	rmt20	rtc0nu	rdat1nu	rmt21	rtc1nu	6250	No rewind	Char	
rdat0		rtc0	rdat1		rtc1	6250	Rewind	Char	Buffered
rdat0n		rtc0n	rdat1n		rtc1n	6250	No rewind	Char	Buffered

<sup>†</sup> When an "i" is appended to these node names, it indicates that data compression is offered.



---

# Glossary

---

**A access**  
Read or write data through a tape device and drive, and to a tape.

**allocate**  
Operation of establishing a symbolic link to a tape device (and, by extension, to a tape drive) and changing its ownership so that it can be accessed.

**attribute**  
A characteristic of a tape drive, device, or labeled tape that affects how data is written to and retrieved from the tape.

**AVR**  
An acronym for "automatic volume recognition," the capability of the tape system to recognize a labeled tape when it is placed on a drive.

---

**B block**  
A chunk of data containing a predetermined number of bytes. See also *tape block*.

**block newline record delimiter**  
A record delimiter that indicates to the tape system to write a record to a tape block every time a newline character is encountered and to fit as many of these records as possible into a block before writing the block to a tape.

**block size**  
An integer representing the number of bytes in a block.

**blocking factor**  
Integer representing the number of blocks that fit into a tape block.

---

**C cat**  
Catenate and print. Command that catenates one or more files. Can also be used to view a short file.

**close**  
Storing a file after reading from or writing to it. In order for a file to be read from or written to, it must first be opened. After reading from or writing to it, it is then closed.

**controlled tape drive**  
A tape drive that is configured to respond to the tape system.

**cp**  
Command that copies one or more files.

**cpio**  
Copy files in and out. Command that archives files to tape or extracts files from a cpio archive.

---

**D decimal-based variable record format**  
Refer to *variable-length record format*.

**density**  
Integer representing the bytes-per-inch of information recorded on a tape.

**device**  
Logical device, device file, or special file such as `/dev/mt4`, through which a mechanical tape drive, and consequently a tape, is accessed. Not to be confused with a mechanical device, such as a tape drive. See also *node*.

**drive**

Mechanical device on which a tape is placed. A tape drive contains the physical apparatuses used to move, read from, and write to a tape.

---

**E end-of-file (EOF)**

A marker that indicates the end of a file.

**end-of-tape (EOT)**

A marker that indicates the end of a tape.

---

**F fixed-length record format**

A record that is always of a size specified by *record size*. When a specified record delimiter is encountered, the fixed-length record is padded with blanks until it is the proper record size and then is written to the tape block.

---

**I input**

Data read from tape.

**ips**

Inches-per-second

---

**L label**

Configuration information recorded on the tape header. This is also sometimes referred to as a *magnetic label*. References to labels on the tape reel are explicitly *paper labels*.

**logical link**

Refer to *symbolic link*.

---

**M magnetic label**

See *label*.

**mt commands**

A set of commands by which a tape can be advanced forward file by file, rewound, taken offline, or have its status reported.

**mount**

Operation of establishing a symbolic link to a device file and changing its ownership so that you can access it.

A tape drive is also *mounted* when a tape device that controls it is allocated, and a tape on a mounted tape drive is also mounted.

To avoid confusion, *mount* is not used in this guide as referring to placing a tape on a tape drive, even though popular use of this word encompasses this meaning.

---

**N newline record delimiter**

A record delimiter that indicates to the tape system to write a record to a tape block every time a newline character is encountered and to write only one record into a block before writing the block to a tape.

**node**

A minor device that has been defined (with the `tpconfig` command) to be associated with a tape device.

**no-rewind**

An attribute of a tape device that directs not to rewind a magnetic tape once it is closed. Also refer to *close*.

---

**O open**

To retrieve and prepare a file for reading and writing.

**operator**

A human or robot who allocates tape devices, and handles and places tapes on tape drives.

**opreq**

Operator Request management utility. An interface that aids a tape system operator in tracking and fulfilling various tape operations.

**option**

A nonessential switch used with a command to perform a specific task.

**output**

Data written to tape.

---

---

**R record**

Chunks of data that make up a tape block on labeled tapes. A record is defined by a *record delimiter* and a *record format*. If a record may be of a specified *record size* as well.

**record delimiter**

A determiner of when a record is written to a tape block. When the tape system encounters a particular record delimiter, it writes the record to a tape block. Record delimiters are *block newline*, *newline*, and *syscall*.

**record format**

A type of record that indicates how a record is to be written to a tape block. The record formats are *fixed length*, *unformatted*, and *variable length*.

**record size**

A variable representing the number of bytes in a record of *fixed-length* format or the maximum size of a record of *variable-length* format.

**rewind device**

A tape device that directs the tape drive to rewind the magnetic tape upon closing a file. See also *close*.

---

**S set**

Refer to *tape set*.

**speed**

Integer representing inches-per-second of tape that passes under the tape head.

**symbolic link**

A connection that associates a file with a tape device.

**syscall record delimiter**

A record delimiter that indicates to the tape system to write a record to a tape block every time a write call is closed by a utility.

---

**T tape attribute**

Refer to *attribute*.

**tape block**

A chunk of data that consists of a defined number of bytes and is stored in a buffer until written to tape in its entirety. With labeled tapes, a tape block consist of records.

**tape density**

Refer to *density*.

**tape device**

Refer to *device*.

**tape drive**

Refer to *drive*.

**tape operator**

Refer to *operator*.

**tape set**

Two or more tapes that are defined as a set on the tape header or label. Information can span from one volume to another. Tape sets can be either labeled or unlabeled.

**tape speed**

Refer to *speed*.

**tar**

Program that archives files to and extracts files from `tar` archives.

**tpattr**

Program with which tape attributes are set or changed.

**tpconfig**

Program with which system manager's can configure the tape system, and with which users can display information about the tape systems and its default settings.

**tplabel**

Program by which tapes are labeled and access attributes are set.

**tplist**

Program by which tape volume and file labels are listed.

**tpmount**

Program allocates tape devices, reserves tape drives, and prepares the tape system for using single or multiple tapes.

**tpqueue**

Program by which tape queues are displayed.

**tpunlabel**

Program by which tape labels are removed.

**tpunmount**

Program by which tape devices are deallocated, tape drives are freed, and tapes are unmounted.

---

**U unformatted records**

A record that does not have a defined structure. The tape system does not pad an unformatted record or prefix a record length to it. Generally, unformatted records are used when working with binary files and when working with system calls.

---

**V variable-length record format**

A record that is not of a fixed size, but has a maximum size defined by *record size*. When a specified record delimiter is encountered, the variable-length record is prefixed with an index containing its record size. It is then written to the tape block. Variable-length records are not padded with blanks.

**VSN**

An acronym representing "volume serial number," an identifier for a tape. A VSN can be "paper," an identifier recorded on the paper label on a tape for the convenience of the operator, or it can be "magnetic." Magnetic VSNs are part of the information recorded in the label of ANSI-labeled tapes.

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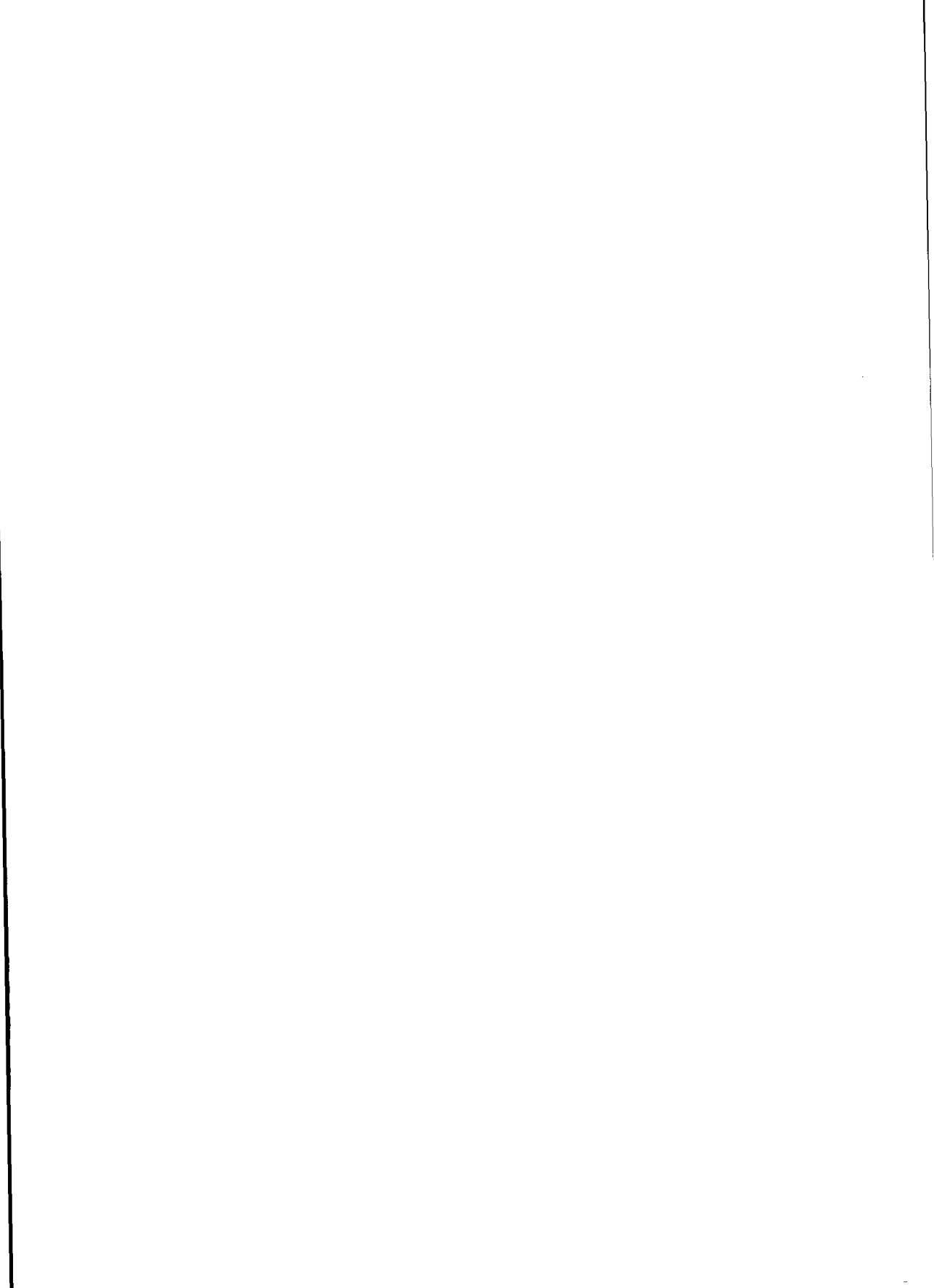
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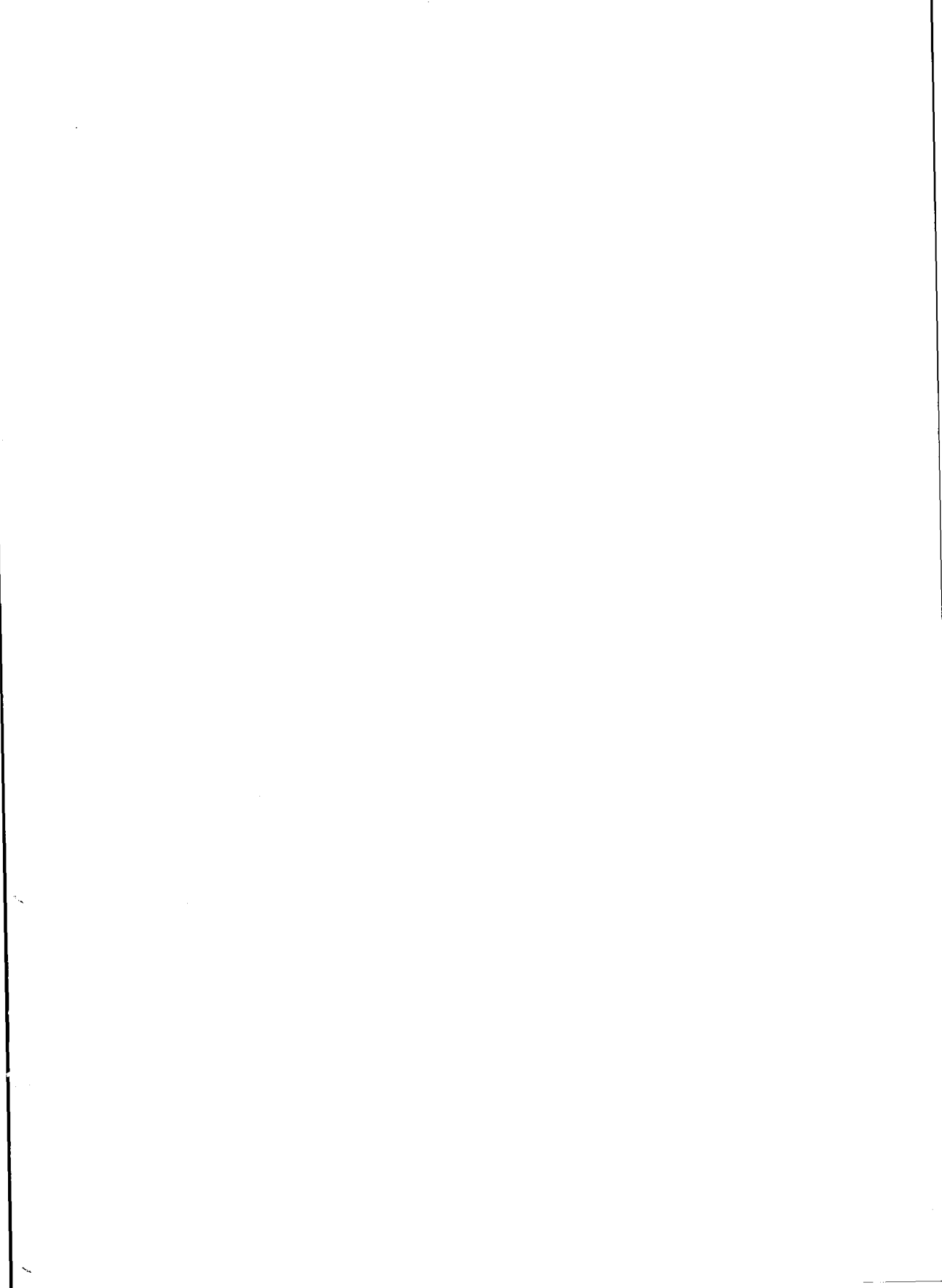
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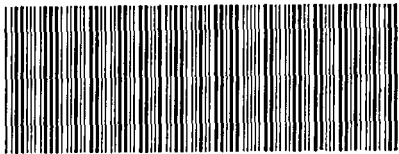
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