



# StorageTek™ Host Software Component (HSC) MSP software

**System Programmer's Guide**

Part Number: 316105901

Revision: A

Version: 6.2



**StorageTek™  
Host Software Component  
(MSP Implementation)**

**System Programmer's Guide**

**Release 6.2**

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## Document Effectivity

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EC Number	Date	Doc Kit Number	Type	Effectivity
132886	September, 2007	---	Revision A	This document applies to the Host Software Component for MSP, Version 6.2.



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## What's New With This Release?

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HSC 6.2 includes the following enhancements and modifications:

Enhancement/Modification	Publication(s)/ Primary Locations																
Guidelines to connect an SL8500 to the HSC.	<i>System Programmer's Guide</i> Appendix A, Connecting the SL8500 to the HSC																
SL8500 support for LSM partitioning.	<p><i>System Programmer's Guide</i> Chapter 3, LMUPATH control statement</p> <p>Chapter 4, SET FREEZE utility</p> <p>Appendix A, Partitioning LSMs (main discussion)</p> <p><i>Operator's Guide</i> Chapter 2, Display Acs, Display Cap, Display Exceptions, Display Lsm</p> <p><i>Messages and Codes</i> Chapter 2, HSC System Messages</p> <table border="0"> <tr> <td><u>New:</u></td> <td><u>Updated:</u></td> </tr> <tr> <td>SLS0073I</td> <td>SLS0653I</td> </tr> <tr> <td>SLS0695I</td> <td>SLS0663I</td> </tr> <tr> <td>SLS4232I</td> <td>SLS1000I</td> </tr> <tr> <td>SLS4412I</td> <td>SLS2008I</td> </tr> <tr> <td>SLS4413I</td> <td>SLS4401I</td> </tr> <tr> <td>SLS4463I</td> <td>SLS4407I</td> </tr> <tr> <td></td> <td>SLS4610I</td> </tr> </table>	<u>New:</u>	<u>Updated:</u>	SLS0073I	SLS0653I	SLS0695I	SLS0663I	SLS4232I	SLS1000I	SLS4412I	SLS2008I	SLS4413I	SLS4401I	SLS4463I	SLS4407I		SLS4610I
<u>New:</u>	<u>Updated:</u>																
SLS0073I	SLS0653I																
SLS0695I	SLS0663I																
SLS4232I	SLS1000I																
SLS4412I	SLS2008I																
SLS4413I	SLS4401I																
SLS4463I	SLS4407I																
	SLS4610I																
Considerations for connecting an SL8500 to multiple hosts or to shared networks.	<i>System Programmer's Guide</i> Appendix A, TCP/IP Communications - Important Considerations																
Procedures to define dual IP connections for the SL8500.	<i>System Programmer's Guide</i> Appendix A, Dual IP Connection																

<b>Enhancement/Modification</b>	<b>Publication(s)/ Primary Locations</b>
SLUADMIN output options, date field formats, and alphabetic data field formats have been expanded to include structured XML and comma-separated values (CSV).	<b><i>System Programmer's Guide</i></b> Chapter 4, "SLUADMIN Output" and "Parameters Controlling Report Headings"
Support for the Unified User Interface (UI) and CSV.	<b><i>NCS/VTCS XML User's Guide</i></b>
Support for T10000 drive encryption recording techniques and model types.	<b><i>System Programmer's Guide</i></b> Chapter 2, T10000 Drive Encryption  Chapter 3, VOLATTR control statement  Chapter 4, EJECT Cartridge and Scratch Redistribution utilities  Appendix G, MOUNT, QDRLIST, QSCRATCH, and SELSCR requests  <b><i>Operator's Guide</i></b> Chapter 2, Display DRives, Display SCRatch, Display THReshld, Eject, Warn commands
The "Serializing CDSs" topic discusses resource serialization using either the IBM Global Resource Serialization (GRS) facility or the Unicenter CA-MIM/MII third-party software. This replaces the "Global Resource Sharing (GRS) and Multi-Image Integrity Manager (MII)" section.	<b><i>System Programmer's Guide</i></b> Chapter 7, Software Interaction
The BACKup utility DD parameter allows a backup to be run on a selected CDS.	<b><i>System Programmer's Guide</i></b> Chapter 4, BACKup utility
The EJECT utility WAITCAP parameter specifies whether a list of ejecting volumes waits for available CAP if one is not available.	<b><i>System Programmer's Guide</i></b> Chapter 4, EJECT utility
The Scratch Conversion utility SLUDRCA1, SLUDRTL, and SLUDRRMM load modules are distributed in the SMC SMCLINK library during SMP/E installation. Previously, the HSC SLULINK library was used.	<b><i>System Programmer's Guide</i></b> Chapter 4, Scratch Conversion utility
The Volume Report utility NOVOL parameter displays summary and/or subpool totals without producing volume detail.	<b><i>System Programmer's Guide</i></b> Chapter 4, Volume Report utility
The Display SCRatch command ALL parameter specifies that all scratch subpool totals, including 0 scratch count values, will be displayed.	<b><i>Operator's Guide</i></b> Chapter 4, Display command
The SCRatch and UNSCRatch operator commands have been added to allow you to scratch or unscratch up to 100 volumes.	<b><i>Operator's Guide</i></b> Chapter 2, SCRatch and UNSCRatch commands

<b>Enhancement/Modification</b>	<b>Publication(s)/ Primary Locations</b>
Support for circumventing the IBM length restriction of 255 characters for a macro parameter.	<p><b><i>Configuration Guide</i></b> Chapter 4, SLIACS macro, LSM2, LSM3, and LSM4 parameters</p> <p><b><i>System Programmer's Guide</i></b> Chapter 4, Reconfiguration utility</p>
The starting column for the control statement information area has been changed from column 2 to column 1.	<p>Control Statement Syntax Conventions, found in the following documents:</p> <p><b><i>System Programmer's Guide</i></b> Appendix C</p> <p><b><i>Operator's Guide</i></b> Appendix C</p> <p><b><i>Reference Summary</i></b></p>



# Preface

---

## Scope

This guide provides information about the Sun StorageTek™ Host Software Component (HSC) and its use with the Automated Cartridge System. Reference information is provided for systems programmers to install, debug, and provide systems support to users of the HSC and the automated library.

## Intended Audience

This guide is intended primarily for systems programmers responsible for installing and maintaining HSC software at their library sites. Library operators and computer system administrators may also find information contained in this guide useful on occasions to review or understand some HSC system concepts.

Users responsible for installation and maintenance of HSC software involving the technical details should be familiar with the following software topics:

- MSP™ operating system
- JES principles and functions
- System Management Facility (SMF)
- System Modification Program (SMP).

## Organization of This Guide

- **Chapter 1, “System Description”** provides a general overview of the Automated Cartridge System (ACS) and the Host Software Component (HSC).
- **Chapter 2, “Host Software Component Functions”** describes major functional components of the HSC.
- **Chapter 3, “HSC Control Statements and HSC Start Procedure”** describes how to define parameter library (PARMLIB) and definition data set control statements and how to start HSC execution.
- **Chapter 4, “Utility Functions”** provides an overview description, syntax, JCL requirements, JCL examples, and a description of output for each HSC utility. Example reports are shown for most utilities.
- **Chapter 5, “Software Diagnostics and Recovery”** describes diagnostic capabilities supported by the HSC (tracing, dumps, and logging failures) and various recovery capabilities including those for control data sets and cartridges.

- **Chapter 6, “Performance Considerations”** provides information on how to control various aspects of library performance. Included is information on how to: maintain and redistribute scratch volumes, define CAP preferences, use SMF records for data collection, define PARMLIB parameters, define HSC in a performance group, set host-to-host communications for high performance, and define control data sets for improved library integrity. In addition, the effects of using the VView command, how to load cartridges in the library, the effect of excessive pass-thrus, and other pertinent topics are included.
- **Chapter 7, “Software Interaction”** provides considerations for interfacing certain third-party software with the HSC.
- **Appendix A, “HSC Support for the SL8500 Library”** describes considerations before you configure the HSC for the SL8500, how the HSC handles differences between SL8500 internal addresses and other library addresses, SL8500 CAP behavior, merging ACSs, removing PTPs and splitting ACSs, and HSC requirements before powering down the SL8500.
- **Appendix B, “HSC Support for Near Continuous Operation (NCO)”** provides procedures for dynamic hardware reconfiguration of the SL8500 library, tape drives, and expansion panels.
- **Appendix C, “Macros, Control Statements, Utilities, and Commands Syntax Reference”** provides syntax conventions, LIBGEN macros, parameter library (PARMLIB) control statements, utilities and operator commands.
- **Appendix D, “Record Formats”** contains record layouts for control data set records, SMF records, and LOGREC records.
- **Appendix E, “Logging ACS Robotics Motion”** contains information about logging library robot motions. Included is the type of information that can be logged, how information is logged, and LMU response codes.
- **Appendix F, “Significant Event Notification Facility (SEN)”** allows an application to request notification of specific HSC and VTCS events.
- **Appendix G, “Programmatic Interface (PGMI)”** describes programmatic interface services, using the interface, request functions, authorization, and interface macros.
- **Appendix H, “Batch Application Program Interface (API)”** explains how to retrieve CDS library element information in batch mode.
- **Appendix I, “Remote-linked Libraries”** presents typical remote-linked library configurations, programming considerations, and operational considerations.

A glossary and index are also included.

## How To Use This Guide

This guide may be read entirely; however, it is more important that you familiarize yourself with the overall organization and location of various information for reference purposes.

Chapters 1 and 2 provide general overview information that is useful to anyone associated with the Automated Cartridge System and the HSC software. It is recommended by StorageTek that these two chapters be read and understood.

Most of the information in this guide is of primary interest to the system programmer and computer system administrator. The *HSC/MSP Configuration Guide* is used when installing the HSC and may be referred to later. The remainder of the guide contains reference information that you will refer to as needed.

## References To HSC Product Releases

The HSC Release 6.2.0 product is referred to as HSC 6.2.

## Related Publications

Some or all of the following documents are referenced in this guide. Additional information may be obtained on specific topics relating to the Automated Cartridge System from these publications.

The following documents are available for MSP operating systems and related miscellaneous topics.

### **NCS 6.2 Publications — MSP Environment**

- *NCS Installation Guide*
- *NCS User Exit Guide*
- *Storage Management Component (SMC) Configuration and Administration Guide*
- *NCS/VTCS XML Guide*

### **HSC 6.2 Publications — MSP Environment**

- *Configuration Guide*
- *Operator's Guide*
- *System Programmer's Guide*
- *Messages and Codes Guide*
- *Reference Summary*



## Additional Information

Sun Microsystems, Inc. (Sun) offers several methods for you to obtain additional information.

### Sun's External Web Site

Sun's external Web site provides marketing, product, event, corporate, and service information. The external Web site is accessible to anyone with a Web browser and an Internet connection.

The URL for the Sun external Web site is: <http://www.sun.com>

The URL for Sun StorageTek™ brand-specific information is:  
<http://www.sun.com/storagetek>

### Customer Resource Center

The Sun StorageTek product Customer Resource Center (CRC) is a Web site that enables members to resolve technical issues by searching code fixes and technical documentation for StorageTek brand products. CRC membership entitles you to other proactive services, such as HIPER subscriptions, technical tips, answers to frequently asked questions, addenda to product documentation books, and online product support contact information. Customers who have a current warranty or a current maintenance service agreement may apply for membership by clicking on the Request Password button on the CRC home page. Sun employees may enter the CRC through the SunWeb PowerPort.

The URL for the CRC is <http://www.support.storagetek.com>

### Partners Site

The StorageTek Partners site is a Web site for partners with a StorageTek Partner Agreement. This site provides information about products, services, customer support, upcoming events, training programs, and sales tools to support StorageTek Partners. Access to this site, beyond the Partners Login page, is restricted. On the Partners Login page, Sun employees and current partners who do not have access can request a login ID and password and prospective partners can apply to become StorageTek resellers.

The URL for the StorageTek Partners site is:  
<http://members.storagetek.com>

The URL for partners with a Sun Partner Agreement is:  
<http://www.sun.com/partners/>

### Hardcopy Publications

Contact a Sun sales or marketing representative to order additional paper copies of this publication or to order other StorageTek brand product customer publications in paper format.

## Customer Support

Customer support is available 24 hours a day, seven days a week, to customers with Sun or StorageTek maintenance contracts and to Sun employees. You can find additional information about customer support on the Customer Resource Center (CRC) Web site at: <http://www.support.storageitek.com>

## Customer-initiated Maintenance

Customer-initiated maintenance begins with a telephone call from you to Sun Microsystems StorageTek Support. You receive immediate attention from qualified Sun personnel, who record problem information and respond with the appropriate level of support.

To contact Sun Microsystems StorageTek Support about a problem:

1. Use the telephone and call:

**☎ 800.872.4786 (1.800.USA.4SUN)** (inside the United States)

**☎ 800.722.4786** (Canada)

For international locations, go to

<http://www.sun.com/service/contacting/solution.html>

for the appropriate telephone number

2. Describe the problem to the call taker. The call taker will ask several questions and will either route your call to or dispatch a support representative.

If you have the following information when you place a service call, the process will be much easier:

Account name	_____
Site location number	_____
Contact name	_____
Telephone number	_____
Equipment model number	_____
Device address	_____
Device serial number (if known)	_____
Urgency of problem	_____
Fault Symptom Code (FSC)	_____
Problem description	_____
	_____
	_____

## Sun's Worldwide Offices

You may contact any of Sun's worldwide offices to discuss complete storage, service, and support solutions for your organization. You can find address and telephone number information on Sun's external Web site at:  
<http://www.sun.com/worldwide/>



# Chapter 1. System Description

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## Automated Cartridge System Overview

The StorageTek Automated Cartridge System (ACS), called the library, is an automated storage and retrieval facility for tape cartridges. The library incorporates the Host Software Component (HSC) to accomplish automated mounting and dismounting of resident cartridges for the library-attached cartridge transports. The library may be attached to a maximum of 16 CPUs (hosts) with an HSC installed on each attached host system.

The library consists of the following major elements:

- Host Software Component (HSC) — functions as the library control component acting as the interface between the SMC and the library hardware.
- Storage Management Component (SMC) — functions as the interface between the host operating system, a tape management system (if applicable), and the HSC.
- Library Storage Module (LSM) — contains storage cells for tape cartridges. The storage capacity of an LSM depends upon the LSM model. There are several LSM models available:
  - Standard (Model 4410)
  - PowderHorn (Model 9310)
  - WolfCreek (Model 9360), which includes:
    - 9360-100 (1,000 cartridge capacity)
    - 9360-075 (750 cartridge capacity)
    - 9360-050 (500 cartridge capacity)
  - TimberWolf (Model 9740)
  - StreamLine (Model 8500).

An attached Library Control Unit (LCU) with associated electronics controls LSM robot movement. The LSM access door, contains a Cartridge Access Port (CAP), for entering or removing tape cartridges from the LSM. The types of CAPs available, depending upon how the LSMs are configured in an ACS, include:

- Standard and Enhanced CAP used in standard (4410) and PowderHorn (9310) LSMs.

- WolfCreek (9360) standard 20-cell and optional 30-cell CAPs. The WolfCreek LSM holds approximately 500, 750, or 1000 cartridges depending on the number of cartridge drives, pass-thru ports, and CAPs installed.
- TimberWolf (9740) 10-cell removable magazine or 14-cell permanent rack CAP.
- StreamLine (8500) includes 3, 13-cell removable magazines. An optional 39-cell CAP can be added.

The complete inventory of each LSM and the storage location for each cartridge is contained in the library control data sets maintained by the HSC.

- Library Management Unit (LMU) — controls the Library Storage Modules (LSMs) in the ACS. The LMU interprets the commands from the host and relays the instructions to an LSM for execution. One LMU can control up to 24 LSMs.
- Tape Cartridge Subsystem — consists of the tape cartridge drives containing tape transports where tape cartridges are placed by the robot for read or write operations.

## Host Software Component Overview

The HSC performs a variety of functions including:

- determining if the requested cartridge is stored within an LSM
- minimizing cartridge enters and ejects
- ensuring the correct media type is mounted on the correct transport type
- intercepting mount and dismount messages
- delivering library mount/dismount instructions to the LMU via a terminal control unit
- providing exits at key points
- providing for operator control of the library through a set of operator commands and utility programs
- determining the LSM location of each library cartridge from the library control data set (CDS)
- providing a programmatic interface for library control.

Integrity of the control data set can be assured through the following techniques employed at an installation:

- allocating secondary (shadow) and standby data sets in addition to the primary control data set
- scheduling regular backups of the control data sets
- utilizing journal data sets to log library transactions.

After the SMC intercepts a mount or dismount message, the HSC issues cartridge movement requests to an LMU station via the terminal control unit. The LMU relays information to the Library Control Unit (LCU) enabling the robot in the LSM to locate and mount/dismount the requested cartridge.

In a dual LMU environment when the master LMU fails, the standby LMU takes over. The standby LMU completes the work in progress and services all future ACS requests.

## HSC Subsystem Components

The HSC is a secondary subsystem as defined by MSP. The HSC contains the following components:

- **External Components** — External components interface with the SMC, an operator, an administrator, and/or a system programmer. The external components consist of an installation component, the initialization/termination component, a command component, the utility component, and an application program interface (Programmatic Interface, a tape management interface component).
- **Common Components** — Common components provide distinct functions required by the external and common components. The common components consist of the mount/dismount components, the CAP component, and the recovery component.
- **Control Components** — Control components provide logical control over system entities used by both common components and external components. The control components consist of the volume/cell control component and the configuration control component.
- **Server Components** — The server components provide physical control of system entities for the control components. The server components consist of the database server, the LMU server, the WTO component, and the address space communications server.

### HSC Architecture

Figure 1 on page 6 is a block diagram of the HSC architecture with the user's address space on the left side and other HSC components located in the HSC address space on the right side.



**Note:** The initialization/termination external component resides entirely in the HSC address space.

The Address Space Communications Server spans both the user's address space and the HSC address space. It handles requests from components in the user's address space that require services from components located in the HSC address space.

The following section briefly describes the functions of each external component.

#### **Job Processing component**

The job processing component traps a console message, then formats an address space communications message and sends it to mount/dismount. Mount/dismount receives the message and performs the requested action. The job processing component uses components residing in the HSC address space.

#### **Transport Allocation component**

The transport allocation component handles requests for transport actions and routes these requests to the appropriate components located in the HSC address space.



**Operator Command component**

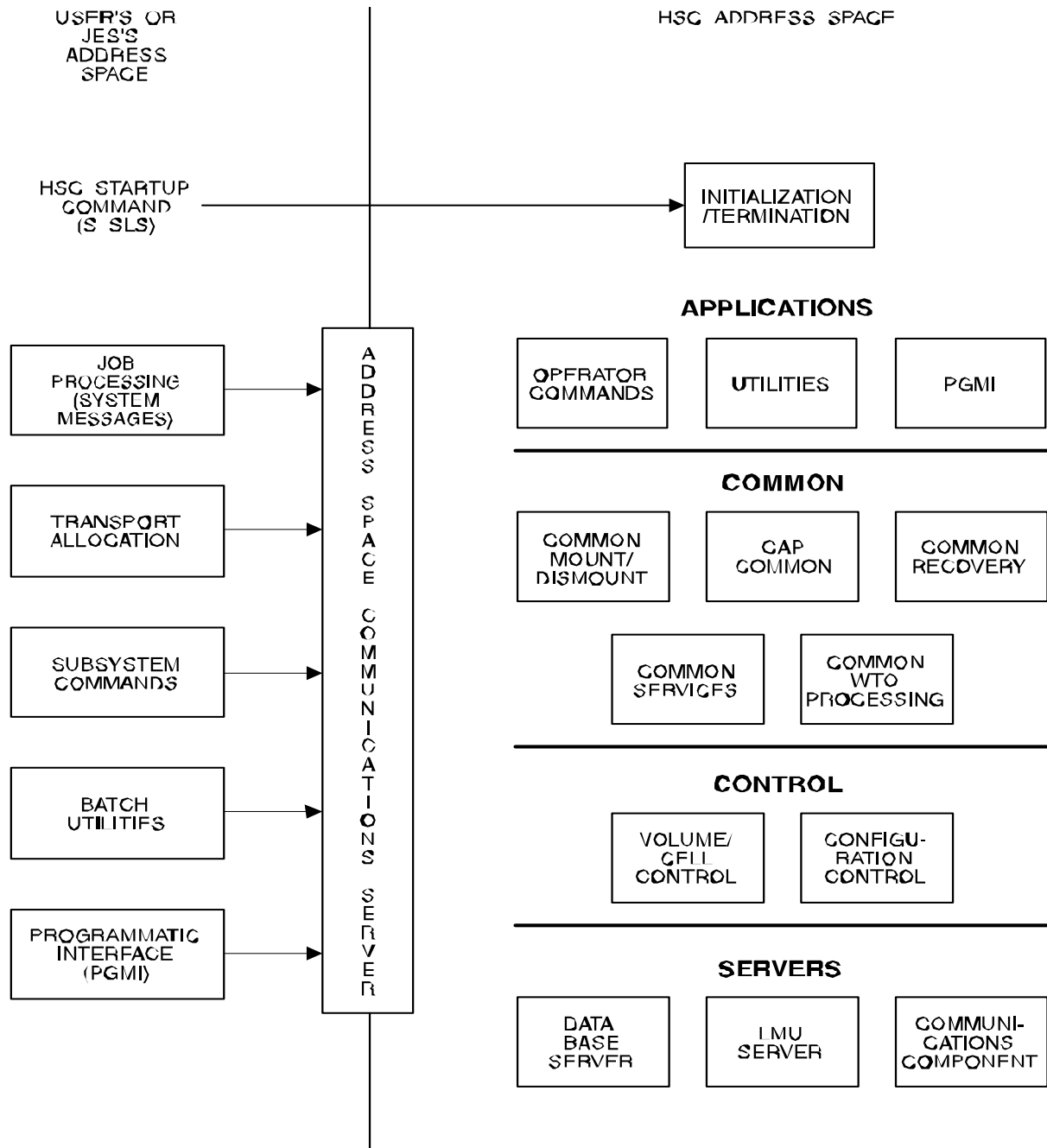
The operator command component receives control from the CONSOLE address space to process a subsystem command. The requests are directed to the appropriate components located in the HSC address space.

**Batch Utilities external component**

The batch utilities component handles services required by a utility that are requested thru the address space communications server. Responses to those requests are returned to the utility's address space and processing continues.

**Programmatic Interface external component**

The programmatic interface component receives and directs requests for configuration, status, mount, dismount, and other information, from users and programs.



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Figure 1. HSC Architecture

## HSC and Automated Cartridge System Interaction

After the HSC is enabled by the MSP START command and completes full initialization, mount or dismount messages are intercepted, and the library control data set is used to determine the location of the requested cartridge (library-controlled or nonlibrary).

The library control data set is created on a DASD volume when you perform a data set initialization during installation. Figure 2 on page 9 shows that it is necessary to share the control data set between all hosts requiring access to the library.

Automated cartridge mounts/dismounts are performed in response to operator commands, MSP or JES system messages intercepted by the SMC, or requests from the programmatic interface. The HSC determines that a mount/dismount is required for a volume under automated library control (cartridge resides in an LSM storage cell), and it communicates with the appropriate LMU.

If the request is for a mount, the following information is communicated to the LMU:

- the LSM and panel/row/column in which the volume resides
- the destination LSM (where the volume is to be mounted on a transport).

If all drives in an LSM are busy, a cartridge can be moved to another LSM to satisfy the mount request. This action is performed without operator intervention, since the pass-thru port (PTP) makes the cartridge available to the attached LSM.

If the request is for a dismount, this information is passed to the LMU:

- the LSM, cartridge drive, and transport in which the volume resides
- the destination (storage cell, CAP, or PTP) of the cartridge.

### Automated Mount

Figure 2 on page 9 shows the LMU communicating with the LSM through LAN 0. In this illustration, LAN 1 is represented as the backup used in case of a LAN 0 failure.

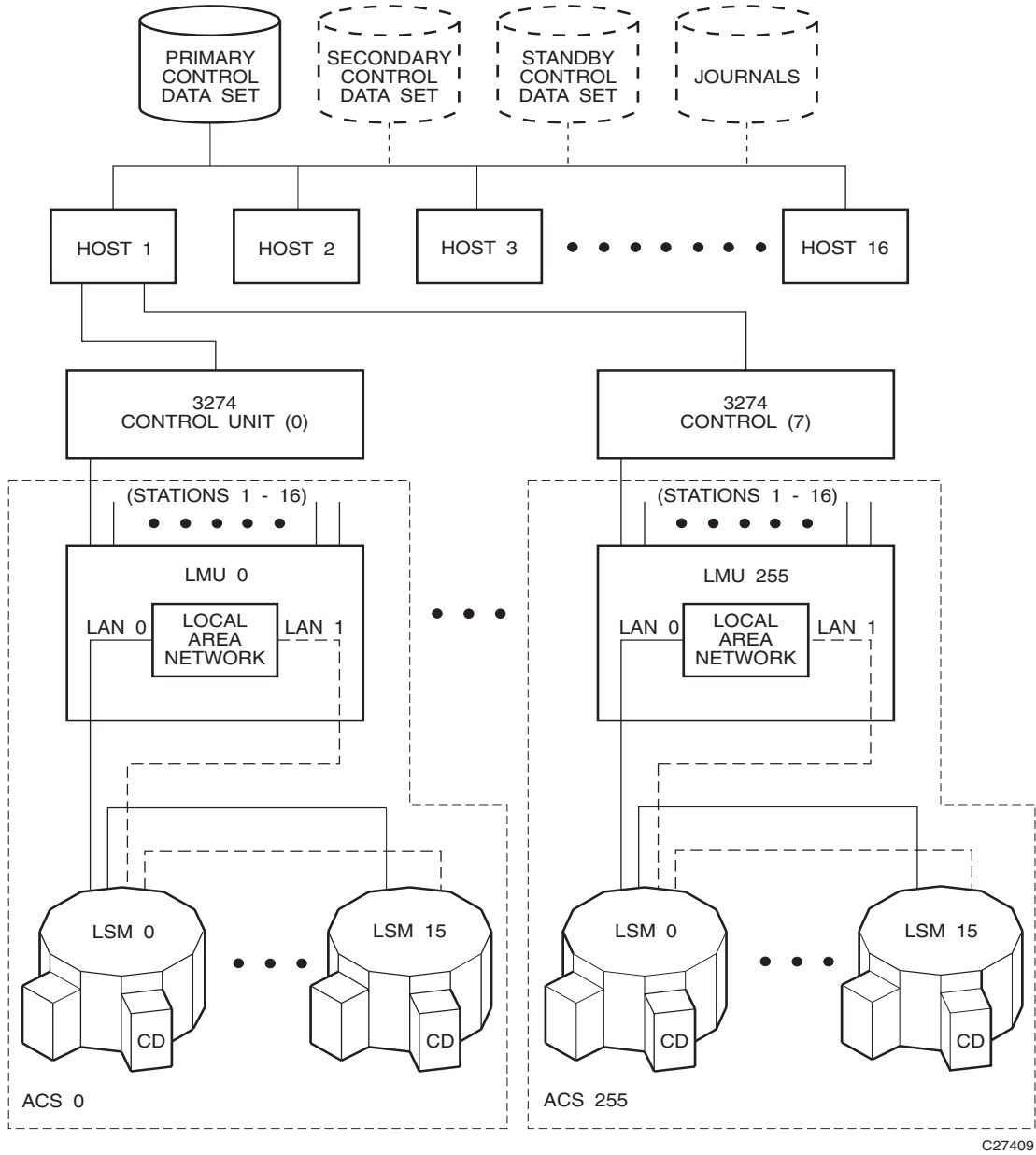
**Note:** The LMU can select either LAN for communications with the LSM(s). Whichever LAN is not picked becomes the backup.

Within the LSM, the robot's hands are positioned to the correct panel/row/column cartridge location. The external Tri-Optic label is verified by the robot's vision system, the robot's hand extends, and the hand grasps the cartridge from its storage cell. The robot's hand retracts with the cartridge and the robot moves to the appropriate position (PTP cell or transport). The robot hand extends and the cartridge is positioned and released at its destination (PTP cell or transport).

If the destination is a PTP cell, the cartridge is made available to the adjacent LSM, and the process repeats until the cartridge is placed in a transport.

## **Automated Dismount**

An automated dismount is the reverse of the mount procedure. The LMU communicates with the LSM via the LAN, and the robot's hands are positioned at the transport to be dismounted. The external Tri-Optic label is verified using the vision system. A hand is extended and the cartridge is grasped from the transport. The hand retracts with the cartridge and the robot is moved to the cartridge's destination. The hand is extended and the cartridge is positioned and released into the storage cell.



**Figure 2. HSC/Automated Cartridge System Interaction**

In a library configuration containing more than one LSM, if a pass-thru operation occurs to obtain the cartridge for mounting, the cartridge may be returned by one of these possible ways:

- If the MNTD Float command is set to ON (the HSC initial value), the cartridge is returned to any new cell location in the LSM containing the tape transport from which it was dismounted. For more information on the MNTD Float command, refer to the *HSC/MSP Operator's Guide*.
- If the MNTD Float command is set to OFF, the cartridge is passed through to the origin LSM and placed into its originating cell location. For more information on the MNTD Float command, refer to the *HSC/MSP Operator's Guide*.
- If the LSM is full, the cartridge is passed thru to another LSM and placed in any cell location
- A temporary enter on a mount operation means an eject upon dismount (the cartridge does not remain in the LSM).

The library control data set is automatically updated to reflect the new location of the cartridge.

## Dual LMU Environment

In a dual LMU environment, the HSC maintains contact with both LMUs. Both LMUs are varied online. One LMU functions as the master LMU and the other functions as the standby LMU. Requests and responses are channeled through station paths on the master LMU. Paths on the standby LMU are online, but not used.

The master LMU continually informs the HSC of the status of the standby LMU. The HSC informs the operator when status changes.

The standby LMU constantly polls the master LMU. If the master LMU fails, the standby LMU informs the HSC that status has changed. The standby becomes the master. The HSC also informs the operator that the previous master LMU is not communicating.



**Note: Automatic LMU switching occurs only when the standby LMU detects problems with the master LMU's core logic and hardware components in an HSC environment.** Switching does not take place if the problem relates to the communications path between the HSC and the LMUs.

At switchover, the HSC:

- notifies the operator that switchover is occurring
- verifies the configuration for the LMU
- sends the new master LMU all the work that was in progress
- terminates ENTER operations.

After switchover, the HSC sends the new master all ACS requests.

Switchover should not affect movement in process. All moves should complete. If not, the cartridges become errant and are found when the LSMs perform “quick initialization” processing. ENTER operations must be restarted after switchover.

## User Control of HSC Functions

Various controls are in place in the HSC software to permit you to select how the HSC functions. Macros, Utilities, HSC control statements, and User Exits are normally used by the systems programmer to tune and customize the system. Commands are normally invoked by a systems operator in the performance of daily operations tasks. A description of the function of each of these available controls follows.

### Macros

Macros are provided primarily to help you set up the library software configuration or library generation (LIBGEN). Refer to the *HSC/MSP Configuration Guide* for detailed information about the LIBGEN macros and how they are used to configure a library.

### Utilities

Utilities are provided to allow you to manage library resources. The utilities enable you to dynamically:

- perform maintenance on control data sets
- control cartridge and scratch volume functions
- produce performance, activity, and inventory reports relating to a library.

Refer to Chapter 4, “Utility Functions” for detailed information about the HSC utilities and how they are used to manage library resources.

### HSC Control Statements

Two types of control statements are available: PARMLIB, used to set initial values for system functions at HSC initialization, and definition data set, provided to define mixed media and devices. PARMLIB control statements set HSC functions such as:

- host-to-host communications parameters
- definition of scratch subpools
- data set definitions including: the primary, secondary, standby control data sets, and journals
- extended parameter list for startup.

Definition data set control statements allow you to determine that the correct media type and device are selected by defining the following items to the HSC:

- volume attributes
- license keys
- TCP/IP LMU
- scratch subpools.

Refer to Chapter 3, “HSC Control Statements and HSC Start Procedure” for detailed information about control statements and usage.



## Commands

Operator commands are available for Systems Operators to use in daily library operation to perform various tasks. Commands perform such functions as:

- assigning a preference to a specific cartridge access port (CAP)
- displaying system status, such as control data set status, ACS, LSM, and volume status
- entering, ejecting, mounting, and dismounting cartridges
- setting of system parameters.

Refer to “Commands, Control Statements, and Utilities” in the *HSC/MSP Operator’s Guide* for information about HSC operator commands and usage.

## User Exits

User exits are provided with the HSC software so you can customize operation of your library to meet specific requirements. User exits are provided by StorageTek in source and object form on the distribution tapes. It is necessary for you to code routines designed especially for your library. You can then replace the StorageTek provided user exits with these custom-coded routines.



**Note:** User exits 1, 2, 4, 8, 9, 10, 11, 12, and 13 are invoked by the SMC and not directly by the HSC. See the *NCS User Exit Guide* for more information.

User exits permit:

- interfacing the HSC to tape management systems (knowledge of cartridge insert and delete)
- influencing allocation of tape transports
- defining scratch subpools
- implementing authorization checking
- implementing reporting for cartridges added or deleted from the library control data sets
- processing installation-specific messages (special message parsing)
- providing flexibility in user exit processing
- enabling esoteric substitution
- controlling deferred mounting
- controlling unit affinity separation
- controlling GDG separation
- establishing and cleaning up global user information.

Refer to the *NCS User Exit Guide* for detailed information about each user exit. Information includes:

- functional description including entry and return specifications, and return codes
- programming considerations
- restrictions and limitations
- parameter list, DSECT, record layout, and parameter cross reference.

# Chapter 2. Host Software Component Functions

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## Overview of HSC Functions

This chapter describes the basic function of the HSC. Functions for each of the HSC components fit within the architecture structure presented in Figure 1 on page 6. Not all of the components of the architecture structure have capabilities directly visible to you. Only those HSC functions that you can control or those that are operationally apparent are described in this chapter.



**Note: Drive allocation is managed by the Storage Management Component (SMC). Refer to the *SMC Configuration and Administration Guide* for details.**

System functions relating to HSC architecture components represented in Figure 1 include:

- installation
- configuration
- initialization/termination
- allocation
- mount/dismount processing
- volume/cell control
- CAP processing
- near continuous operations
- common recovery
- renaming control data sets
- command
- utility
- LMU server
- communication
- programmatic interface
- batch application program interface.

The Automated Cartridge System provides the facilities and software to perform various functions with or without operator intervention. Such major system functions are described in this chapter.

## Automatic Functions of the HSC

Among the functions handled automatically by the HSC are:

- mounting and dismounting of cartridges
- automatic and manual operating modes
- handling of abnormal situations occurring during mounting or dismounting of cartridge
- Cartridge Access Port processing to allow the operator to enter or eject cartridges
- tape management system assistance
- enhanced device allocation to optimize library performance
- automatic cleaning of tape transports with cleaning cartridges under the control of the HSC and the library
- restricting the write access to volumes in the library through the Virtual Thumbwheel feature that interfaces with the MSP System Authorization Facility (SAF)
- dual LMU support
- control data set recovery.

## Facilities Available for User Control of HSC Functions

There are facilities available for system programmers and operators to use to control various system functions. These include:

- macros
- utilities
- HSC control statements
- operator commands
- programmatic interface (PGMI) requests
- user exits.

## Installation Functions

Installation functions pertain to installation of the HSC subsystem. Refer to the HSC installation section in the *HSC/MSP Installation Guide* for information about installation planning and instructions, including:

- preparing for the HSC installation
- installing the HSC Base Function
- performing post-installation tasks.

## Configuration Functions

Installation functions relate to configuration or reconfiguration processing of the HSC subsystem. The *HSC/MSP Configuration Guide* presents detailed information about configuration planning, including:

- performing preexecution tasks
- defining the library configuration (LIBGEN)
- defining PARMLIB control statements
- initializing the control data sets
- verifying library generation
- starting HSC execution
- testing the installation
- planning and executing cartridge migration into the library
- planning migration to new HSC releases
- performing library modifications
- library configuration checklist.

## Initialization/Termination Functions

Initialization/termination functions control initialization and termination of HSC components. This section describes the major initialization/termination functions.



**Note: An SMC subsystem must be active to influence tape allocations and intercept MSP messages. Refer to the “Starting SMC” chapter in the *SMC Administration and Configuration Guide* for more information.**

**It is not required for the SMC to be initialized before the HSC, and they can run on different hosts. However, if the HSC is brought up without the SMC, the HSC acts as a server only and cannot perform allocations or device preferencing.**

## HSC Service Levels

To provide you with a more flexible, dynamic, automated cartridge mounting execution environment, the HSC has a service level strategy. Operation at either of the two service levels impacts the HSC subsystem. Operation flexibility is provided at a base service level to tolerate failures in certain isolated areas without impacting the functions of other sections of the HSC or your entire data center. Overall, this fault-tolerant HSC gives you

greater availability of your automated library and lessens the need to shutdown and reinitialize. The HSC subsystem operates at two service levels:

#### **Base service level**

provides minimal functionality keeping the HSC running while having the capability of applying software maintenance or altering the subsystem parameters at the same time. This level is the lower level of functionality.

#### **Full service level**

provides full functionality of the HSC.

Normally, the HSC initializes to the full service level when started. HSC can be started at the base service level by coding a parameter field in the MSP START command. Refer to “Starting the HSC at the Base Service Level” on page 138 for information on command syntax.

### **Description of Base Service Level**

The base service level is the nucleus of the HSC subsystem. It involves the functions necessary to execute as an extension of the operating system. The service level and its functions satisfy the requirements defined by the operating environment in place at the time of execution. Base service level functions include the capabilities to:

- issue subsystem commands
- execute certain utilities
- access the control data sets
- support the operating system interfaces and front-ends and maintain HSC host-to-host communications.

All operator commands can be issued with the HSC executing at the base service level. However, the commands which involve library hardware cannot perform their function completely. Table 1 on page 19 indicates which commands have complete functionality at the base service level.

Table 2 on page 20 indicates which utilities can be executed at the base service level.

### **Description of Full Service Level**

The full service level of operation for the HSC provides all of the functions available and necessary to invoke and sustain complete library operations. These functions include:

- mount/dismount processing
- CAP processing
- cartridge and cell inventory management
- LMU access
- library resource recovery
- support for utilities which require services from the hardware
- support for user exits
- support for the programmatic interface.

At initialization, the HSC builds data areas, loads program modules, and sets up the required operating system services to support the two service levels of operation.

Termination of the HSC, including normal termination by issuing the MSP STOP command, and abnormal termination through abends or issuing the MSP CANCEL or FORCE commands, removes the service level structure and services.

On your system with the HSC operating at full service level, all commands, utilities, etc. are fully functional. Should you decide to manually intervene by issuing the Service Level command (SRVlev) to change from full to base service level, the functionality of the HSC is reduced.

See “Starting the HSC at the Full Service Level” on page 138 for information about setting the service level at HSC initialization.

**Table 1. HSC Command Execution at Base and Full Service Levels**

Command	Service Level Execution	
	Base	Full
ALLOC	YES	YES
CAPPref	NO	YES
CDs	YES	YES
CLea	NO	YES
COMMPath	YES	YES
DISMount	NO	YES
Display	YES *	YES
DRAin	NO	YES
EJect	NO	YES
ENter	NO	YES
Journal	YES	YES
MNTD	NO	YES
MODify (F)	NO	YES
MONITOR (MN)	YES	YES
Mount	NO	YES
MOVE	NO	YES
OPTion	YES	YES
RECover	NO	YES
RELease	NO	YES
SENter	NO	YES
SRVlev	YES	YES
STOPMN (PM)	YES	YES

**Table 1. HSC Command Execution at Base and Full Service Levels (Continued)**

Command	Service Level Execution	
	Base	Full
SWitch	NO	YES
Trace	YES	YES
TRACELKP	YES	YES
TREQDEF	YES	YES
UEXIT	YES	YES
UNITDEF	YES	YES
Vary	NO	YES
VIew	NO	YES
VOLDEF	YES	YES
Warn	NO	YES

\* Display options that require hardware interaction are not valid at the base service level

**Table 2. Utility Execution at Base and Full Service Levels**

Command	Service Level Execution	
	Base	Full
ACTIvities	YES	YES
AUDIt	NO	YES
BACKup	YES	YES
EJECT	NO	YES
LIBGen	YES	YES
INITialize	NO	YES
MERGEcds	YES	YES
MOVE	NO	YES
OFFLoad	YES	YES
REPLaceall	YES	YES
RESTore	NO	NO
SCRAtch	YES	YES
SCREdist	NO	YES
SET	YES	YES



**Table 2. Utility Execution at Base and Full Service Levels**

Command	Service Level Execution	
	Base	Full
UNSCratch	YES	YES
UNSElect	YES	YES
VOLRpt	YES	YES

### **Displaying/Setting Service Level**

An HSC operator command, SRVlev, sets a different service level. Refer to “DISPLAY Command” in the *HSC/MSP Operator’s Guide* for information on how to display the current HSC service level.

### **Starting the HSC Subsystem at Base Service Level**

If the HSC and the library are new to your data center, you may want to install the HSC software and start the subsystem at the base service level before your library hardware is physically installed. Starting the HSC at the base service level allows you to perform many of the preliminary tasks involved in configuring your library and performing preliminary tests on basic operation.

Normally the HSC subsystem is initialized to the full service level when started. The HSC can be started at the base service level only by coding PARM=BASE in the MSP START command. Then, the Service Level (SRVlev) command can be used to bring the HSC to full service level whenever you are ready.

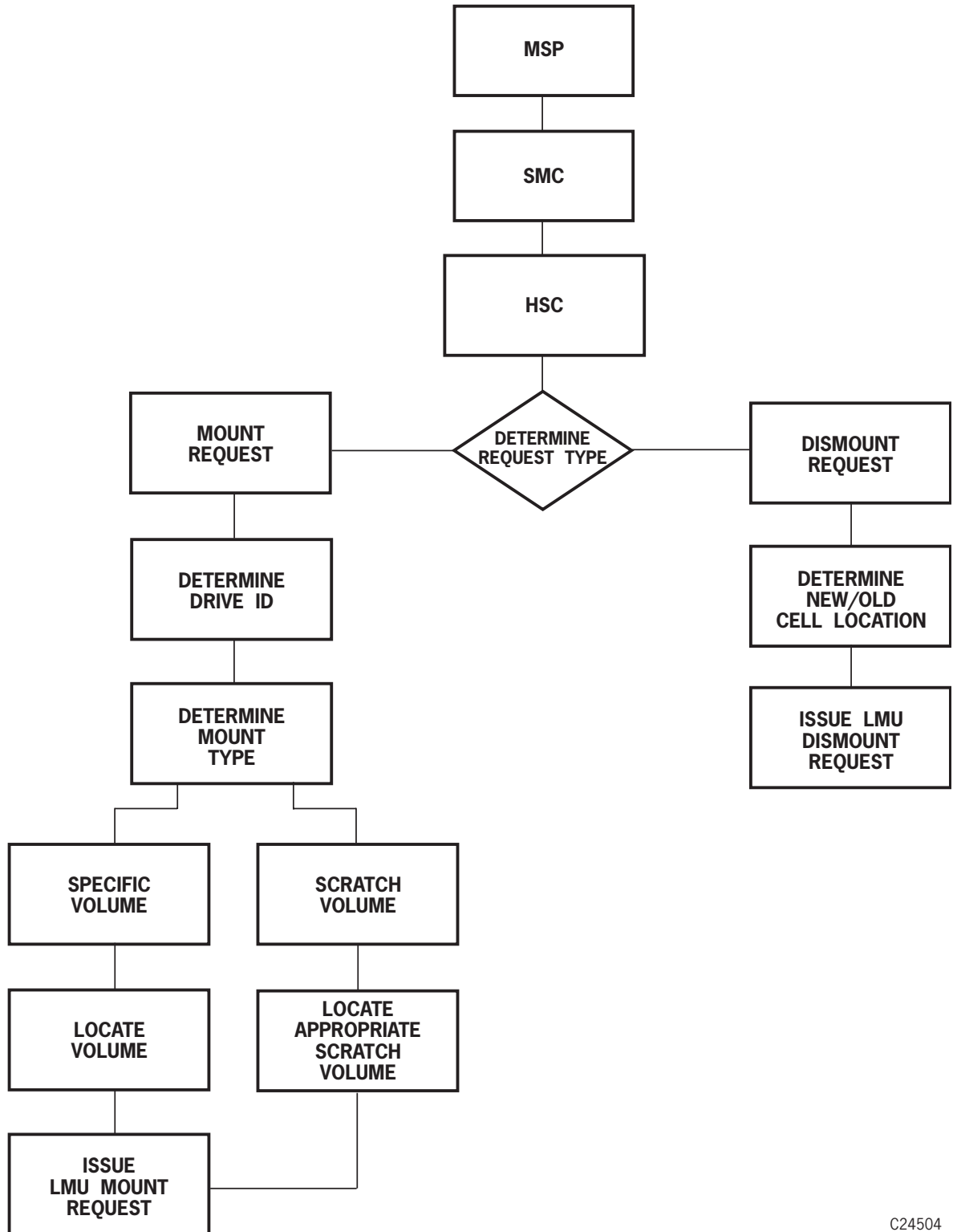
See “Starting the HSC at the Base Service Level” on page 138 for information about setting the service level at HSC initialization.

## Drive Allocation

The SMC subsystem handles all allocation requests. Refer to either “SMC Allocation in a JES Environment” in the *SMC Configuration and Administration Guide* for more information.

### SMC Common Allocation

The Storage Management Component (SMC) manages common allocation. The SMC provides single, consistent functionality between the HSC and MVS/CSC in the JES environment. Refer to the *SMC Configuration and Administration Guide* for more information.



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**Figure 3. HSC Job and Mount/Dismount Processing**

## Common Allocation

Common allocation is the process of influencing MSP allocation to select the most desirable device for a request. The Storage Management Component (SMC) consolidates the allocation components of the HSC and communicates with these subsystems to determine policies, volume locations, and drive ownership. Refer to the *SMC Configuration and Administration Guide* for detailed descriptions of this product.

## Mixing Media Types and Recording Techniques

The HSC supports mixing media types and transport models with different recording techniques in a library environment without requiring the user to change JCL or invoke HSC user exits. The supported media types are standard, ECART, ZCART, helical, STK1 (9840, T9840B, and T9840C), STK2 (T9940A and T9940B), and T10000 (T10000T1, T10000TS).



**Note:** The SL8500 library supports only the T9840A, T9840B, T9840C, T9940B, and T10000 media types and recording techniques.

The supported transports for all libraries except the SL8500 are the StorageTek 18-track model 4480; 36-track models 4490, 9490, and 9490EE; helical model SD-3; model 9840, T9840B, and T9840C; model T9940A and T9940B; and model T10000.

The SL8500 library supports only the T9840A, T9840B, T9840C, T9940B, and T10000 transports.



**Notes:**

- The main physical external difference between standard, ECART, and ZCART cartridges is that the ECART and ZCART housings are two-toned (ECART is black and tan; ZCART is black and red). Since ECARTs are in 36-track format, they cannot be read from or written to on a 4480 (18-track) transport. ZCARTs can be read from or written to only on 9490EE transports.
- Transport models 4490, 9490, 9490EE, SD-3, 9840, T9840B, T9840C, T9940A, and T9940B appear to the operating system as the following types of devices
  - 4490 – 3490E
  - 9490 – 3490E
  - 9490EE – 3490E
  - SD-3 – 3490E or 3590
  - 9840, T9840B, and T9840C – 3490E or 3590
  - T9940A and T9940B – 3490E or 3590
  - T10000 – 3490E or 3590.

## Media Domain Support — T10000 Drives

Media domain support has been extended to the HSC for non-legacy media types. Media domains contain a logical collection of differing media separated into distinct pools known as a domain. All legacy StorageTek media (e.g., ECARTs) belong to domain “0”; non-legacy media belong to other domains as defined in Table 3.

**Table 3. Non-legacy Media Type/Domain Definitions**

Media Name	Media Domain	Media Type
T10000T1	'T'	'1'
T10000TS	'T'	'S'
T10000CT	'C'	'T'

The media domain is shown as part of the external label and is affixed to the outside of the cartridge following the volume serial label. This information is returned to the host as part of an LMU catalog response. Physical move requests for all volumes require a media domain to be supplied as part of the LMU request initiated by the controlling software. Failure to provide the correct domain results in the LMU failing the request.

## **T10000 Drive Encryption**

For NCS 6.1 and later, the T10000 tape drive implements data security through tape drive encryption. In the HSC, you enable encryption by specifying new recording techniques and model types; no special media is needed, so no new media type is provided.

To read encrypted files, you must have access to an encryption key you set up in advance. The key allows you to encrypt the data if you are writing to a tape or decrypt the data if you are reading from a tape.

Refer to the *Crypto Key Management Station User's Guide* for more information.

## **Virtual Storage Manager (VSM) Media/Recording Technique Support**

VSM support for the virtual media and recording technique has been added for certain control statements and operator commands. See the VTCS documentation for more information.

## Definition Data Set Control Statements

Definition data sets contain control statements that can be used to define to the HSC the volume attributes, unit attributes, and tape request characteristics for your data center. The HSC uses this information to make sure that:

- the correct media type is selected to satisfy the request
- the cartridge is mounted on an appropriate transport model (i.e., 4480, 4490, 9490, 9490EE, SD-3, 9840, T9840B, T9840C, T9940A, T9940B, or T10000).

Definition data set control statements include:

- OPTion TITLE, which places an identifying string in a definition data set
- Tape Request (TAPEREQ), which describes the media type and recording technique to be used for a particular data set TAPEREQ is managed by the SMC. Refer to the *SMC Configuration and Administration Guide* for details.
- Tape Request Definition (TREQDEF), which identifies the definition data set containing TAPEREQ control statements. TREQDEF is processed by the SMC. Refer to the *SMC Configuration and Administration Guide* for information.
- Unit Attribute (UNITATTR), which describes the recording technique attributes of library and nonlibrary transports is managed by the SMC. Refer to the *SMC Configuration and Administration Guide* for details.
- Volume Attribute (VOLATTR), which describe the media type and recording technique attributes of cartridge tape volumes
- Volume Attribute Definition (VOLDEF), which identifies the definition data set containing VOLATTR control statements.

See “Definition Data Set Control Statements” on page 99 for additional information.

## **MEDia and RECtech Parameters**

MEDia and RECtech parameters are specified on the TAPEREQ and VOLATTR control statements. Parameter values associated with MEDia and RECtech, and their hierarchy, are shown in Figure 4 on page 29.



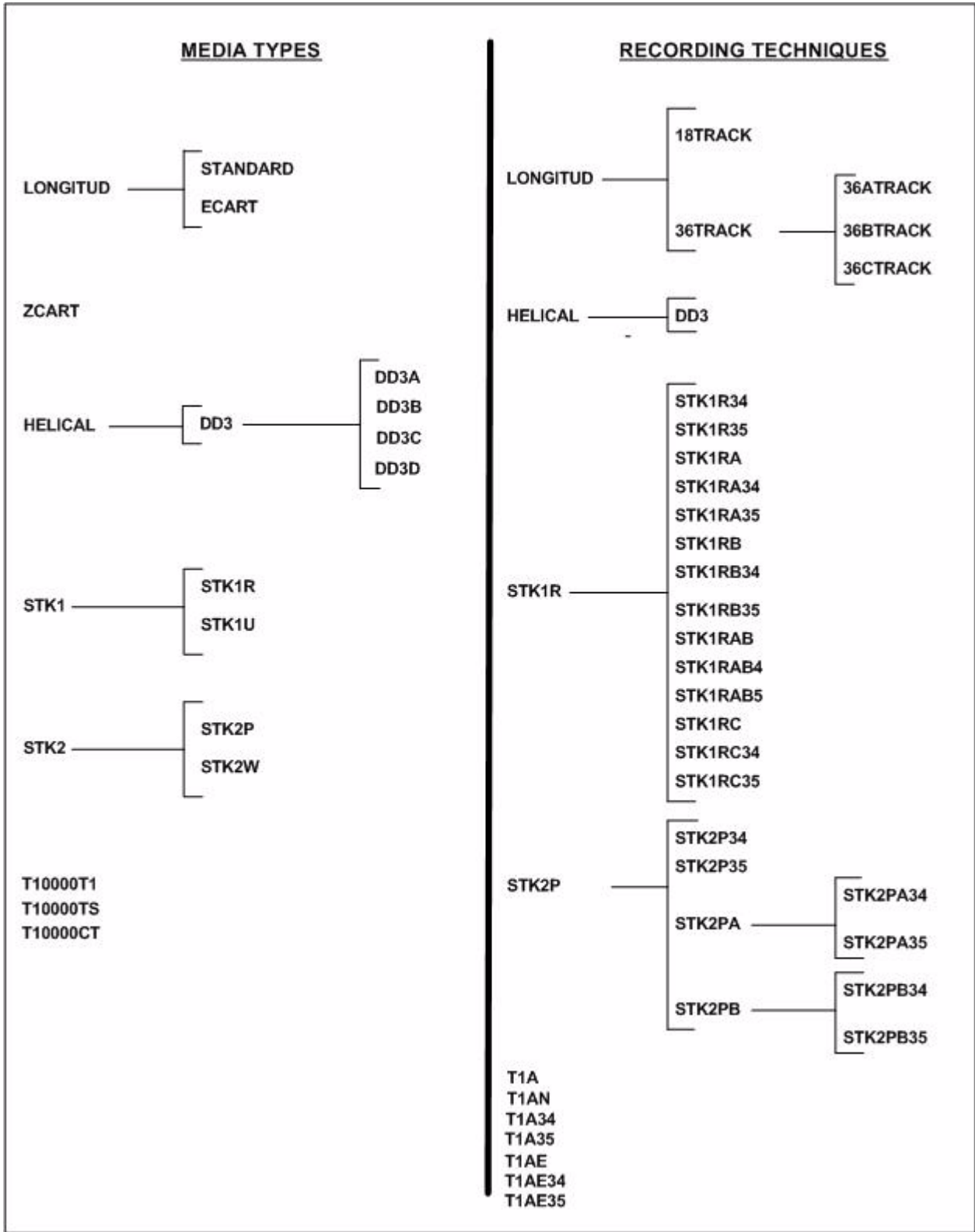


Figure 4. MEDIA/RECtech Hierarchy

## Model Parameter

The MODEL parameter is specified on the TAPEREQ and UNITATTR statements. MODEL values are processed as if they were RECTech values. UNITATTR control statements do not use the RECTech parameter. Table 4 shows the relationship between MODEL and RECTech parameters.

**Table 4. MODEL/RECTech Translation**

<b>MODEL</b>	<b>Resulting RECTech</b>
4480	18track
4490	36Atrack
9490	36Btrack
9490EE	36Ctrack
SD3	DD3
9840	STK1R
984035	STK1R
T9840B	STK1R
T9840B35	STK1R
T9840C	STK1R
T9840C35	STK1R
T9940A	STK2P34
T9940A35	STK2P35
T9940B	STK2PB34
T9940B35	STK2PB35
T1A	T1A34
T1A35	T1A35

## Device Preferencing

Device preferencing is applicable only to library configurations containing a mixture of StorageTek's 36-track 4490, 9490, and 9490EE Cartridge Subsystems and is managed by the Storage Management Component (SMC). Refer to the *SMC Administration and Configuration Guide* for more information.

## Mount/Dismount Functions

Mount and dismount functions consist of the following processing:

- mounting specific volumes
- mounting scratch volumes
- swapping mounted volumes to another tape transport
- dismounting library volumes
- handling abnormal mounts and dismounts
- virtual thumbwheel (VTW)
- automated tape transport cleaning.

The SMC message handling component is driven by operating system message traffic and sends requests to the HSC mount/dismount component to cause tape cartridges to be mounted, dismounted, or swapped. Requests for the same transport are sometimes logically queued until the required physical actions have completed (e.g., tape rewind and dismounted so the next mount can occur) or until the operator has responded to a decision message with a desired action. See Figure 3 on page 23 for an overview of HSC mount/dismount processing.

Several options exist to allow users to specify how they want mount/dismount to react in various situations. Refer to “MNTD (Mount/Dismount Options) Command and Control Statement” in the *HSC/MSP Operator’s Guide* for a description of these options.

### Mount Processing for Specific Volumes

The HSC maintains a record of the library location for each cartridge and instructs the LMU to mount the requested cartridge on the selected transport.

Mount processing occurs as a result of:

- the programmatic interface (PGMI) interpreting a request for library transports, or
- SMC message handling interpreting a WTO/WTOR message for library transports, or
- issuance of the HSC operator Mount command, or
- a clean request.

A volume may be temporarily or permanently entered into the library to satisfy a mount on a library transport. If a volume is temporarily entered into an LSM, a notation is made in the library control data set for this volume to be automatically ejected, via a CAP, when the volume is dismounted.

## Mount Processing for Scratch Volumes

To process scratch mount requests, the HSC determines which volumes within an LSM are considered as scratch volumes. The HSC makes the determination from information contained in the library control data set.



**Note:** A scratch volume is marked as nonscratch when it is mounted, even if it is not written on.

Normally, only requests for nonspecific VOLSERS and the appropriate label type (as defined in the LIBGEN) are considered as requests for scratch volumes. However, the HSC allows selection of scratch volumes from different scratch subpools and different label types via interaction with User Exits 01, 02, and 03, SCRPOOL statements, and the Allocation command LSMpref, LOWscr, and SCRtech options. User Exit 02 is used for JES.

In addition, other means are available for controlling scratch volume activity. These are at the operator command and programmer utility levels. See “Scratch Subpool Management” on page 45 for more information. See the *NCS User Exit Guide* for a more detailed explanation of scratch subpools and controlling user exits.



**Note:** Mount messages that occur without SMC intervention, and that are subsequently redriven while the SMC is active, do not have their subpool specification honored.

To minimize pass-thru movement of the scratch cartridges, the HSC always orders drives for selection in ascending order by scratch count.

The scratch status of cartridges listed in the library control data set is updated through the use of the Scratch Update utility. One part of this function is a Scratch Conversion utility, supporting Computer Associates’ CA-1 and CA-DYNAM/TLMS, which produce a list of scratch volume serial numbers in a format acceptable as input to the Scratch Update utility. No modification of either tape management system is required.

The second part of this function, the Scratch Update utility, accepts a list of volume serial numbers for addition to or deletion from the control data set’s list of scratch volumes.

For other third-party or customized tape management systems, the user must provide the interface routine between the tape management system being used and the Scratch Update function. The source code of the Scratch Conversion utility is provided on the distribution tape for use in developing the interface routine.

## Swap Processing for Swapping Mounted Volumes to Another Tape Transport

Swap processing is initiated by the operator issuing an MSP SWAP command or by the operating system when it detects an error on a particular transport.

The SMC attempts to automate swaps initiated by the operating system when the swap messages specify a library device. Swap processing details can be found in the *SMC Configuration and Administration Guide*.

## Dismount Processing for Library Volumes

The HSC determines when a library volume is to be dismounted from a library transport. Dismount processing occurs as a result of:

- SMC message handling interpreting a keep or retain WTO/WTOR message identifying a library transport, or
- a PGMI request identifying library transports
- issuance of the HSC operator DISMount command
- the completion of a clean operation.

The MNTD Float command is useful for influencing pass-thru operations and returning cartridges to their original cells or to new cells after a mount/dismount request has been completed.

If the MNTD command Float option is on (i.e., MNTD Float(ON)), when a volume is passed to a transport in another LSM, dismount processing frees the original cell location and assigns the volume to a cell in the same LSM as the transport as long as empty cells exist. If no empty cells exist, a location is chosen in the nearest LSM with free cells or volumes can be forced to their original home cell at dismount time. If Float is off, the HSC returns the volume to its original home cell location.

The MNTD PASSTHRU parameter works with SCRDISM by setting the maximum number of pass-thrus that can occur for a cartridge that is to be archived.

Refer to the “MNTD (Mount/Dismount Options) Command and Control Statement” in the *HSC/MSP Operator’s Guide* for a description of all the options associated with this command.

If the dismount occurs for a temporary volume, the volume is ejected through a CAP, and a message informs the operator to retrieve the cartridge.

It may be required to interpret the volume disposition and note if it is to be scratched. If the delete disposition for volumes is SCRATCH (as specified in the SMC MOUNTDEF command), then the SMC examines the dismount message to determine if the volume is to be scratched. To make sure deleted volumes are retained as nonscratch during the TMS grace period, TMS users should specify the following SMC command:

```
MOUNTDEF DISMSCRReal(OFF)
```

You can intervene in how the HSC controls library operation. Tape cartridge movement, as well as many other functions, can be controlled to function in ways that you prefer. Refer to Chapter 4, “Utility Functions” on page 139 for information about utilities that can be used to control HSC operation of the library. Refer to “Commands, Control Statements, and Utilities” in the *HSC/MSP Operator’s Guide* for information about operator commands that can be used for controlling library operation.

## Virtual Thumbwheel (VTW)

Cartridges are usually entered into an LSM with the physical thumbwheel set to the write enabled position. Virtual Thumbwheel is a facility provided with the HSC that allows this physical thumbwheel to be electronically “set” to allow read-only access. This virtual thumbwheel setting to enforce read-only access varies according to the allowed access defined by your security package.

The virtual thumbwheel function allows read-only access to a cartridge in an ACS if the user requesting the tape is not actually authorized to update the volume. This verification of user access authority is accomplished by the SMC subsystem, which calls the MSP System Authorization Facility (SAF) with the appropriate volume serial number.

If the SAF response indicates that the user has authorization to update the cartridge, the SMC requests that the HSC mount the tape cartridge with write enabled; otherwise, the SMC requests that the HSC mount the tape cartridge with read-only access. The HSC cannot enable update ability if the physical thumbwheel is set to write-protect.

If the SAF response indicates that the user is not authorized to update the volume, the HSC mounts the cartridge with the virtual thumbwheel set to write-protect.

## Security Software Requirements

The HSC virtual thumbwheel facility does not add any security controls to the system. The SMC obtains the authority decisions of the SAF interface and passes this to the HSC.

The SMC invokes the SAF interface by issuing a RACROUTE macro with the following parameters:

```
REQUEST=AUTH,  
ATTR=UPDATE,  
CLASS=TAPEVOL,  
ENTITY=tape-volser
```

This is the same type of RACROUTE call that is subsequently issued by the operating system when the tape volume is opened.

Virtual thumbwheel does not have any effect on mount processing unless there is a data security program product installed that uses the SAF interface to protect tapes at the volume level (CLASS=TAPEVOL). If a data security product is installed, refer to the product documentation or contact the product vendor to determine if it meets these criteria.



## HSC Mount Command Support

The Mount command provides support for virtual thumbwheel. The Readonly operand for the Mount command enables a volume to be mounted with the virtual thumbwheel set to write protect.

### Example of Mount Command with Readonly Operand

```
MOUNT VOL001,B00,,READONLY
```



**Note:** Operands for operator commands are positional. In the example above, two commas must follow the drive operand to indicate that the *host-id* operand is not specified.

This command option is provided to respond to a situation where the security environment changes between the time the SMC issues its RACROUTE request (when the mount message is issued) and the time when MSP issues its RACROUTE (when the volume is opened). It is possible that the rules governing the tape volume could change during this interval, so when the volume is opened the user is no longer authorized to update the volume. In this case, MSP dismounts the volume and issues a message, requesting that the volume be remounted with write disabled.

If this situation occurs, or if a message is issued for any other reason, the operator can issue the Mount command with the Readonly option specified to remount the volume with the virtual thumbwheel set to write-protect.

## Tape Transport Cleaning

The HSC allows you to automate the cleaning process or to manually clean library-attached tape transports. When a library transport needs to be cleaned, it informs the LMU, which broadcasts a “drive needs cleaning” message to all connected hosts. The LMU broadcast causes the HSC to issue a console message indicating that a transport needs cleaning. Until a cleaning cartridge is loaded, future mounts continue to initiate this message.

If auto-cleaning is disabled, HSC processing is complete, and the transport must be cleaned manually. To manually clean a transport, see “Manual Tape Transport Cleaning” on page 43 for more information.



**Note:** The initial value for transport cleaning is for automated cleaning to be disabled.

### Automated Tape Transport Cleaning

If auto-cleaning is enabled, the HSC sets the transport to “needs cleaning” status. The next time a mount is issued for that tape transport, the following cleaning process is invoked prior to mounting the requested cartridge:

1. The HSC selects a cleaning cartridge from the pool of compatible cleaning cartridges in the LSM that contains the tape transport that needs cleaning (or from the closest LSM that contains a compatible cleaning cartridge).
2. The cleaning cartridge is mounted.
3. The tape transport is cleaned.
4. The cleaning cartridge is dismounted.

When the cleaning process is complete, the original requested cartridge is mounted on the transport.

If auto-cleaning is enabled, cleaning can also be scheduled for a transport by issuing the CLean command. See “Activating Automated Cleaning” for additional information.

### Activating Automated Cleaning

The MNTD AUtocln command is used to turn auto-cleaning on or off on a host-by-host basis. The following example shows how to activate automatic cleaning.

```
MNTD AUTOCLN(ON)
```



**Note:** It is probably more useful to have automated cleaning on for all hosts in a JES installation unless library transports are allocatable only by some hosts.

Once auto-cleaning is activated, the CLean command can be issued to initiate cleaning of specified drives on specified hosts. An example of issuing the CLean command is:

```
CLEAN 582 MSPA
```



**Notes:**

1. The MNTD AUtocln command must be set to ON before attempting to use the CLean command.
2. The CLean command sets the transport to “needs cleaning” status. The cleaning process is not initiated until the next mount is issued against the transport. Refer to the *HSC/MSP Operator’s Guide* for an explanation of the CLean command.

### Identifying Cleaning Cartridges

Cleaning cartridges are identified to the HSC by a unique three-character alphabetic prefix, followed by three required numeric values, in their volsr. All cartridges identified with that prefix, which are valid cleaning media, make up a pool of cleaning cartridges in each LSM.

The parameter CLNPRFX, contained in the LIBGEN SLILIBRY macro, specifies the volsr prefix for cleaning cartridges. CLNPRFX must be three alphabetic characters, and identifies cleaning cartridges associated with the library. The default is CLN. Refer to “SLILIBRY Macro” in the *HSC/MSP Configuration Guide* for additional information.



**Notes:**

1. Any cartridges identified by the cleaning prefix are treated exclusively as cleaning cartridges; they cannot be scratched or initialized by HSC utilities.
2. Extra overhead can be avoided if the range of cleaning cartridge volsers in an LSM and ACS is both narrow and dense. For example, if three cleaning cartridges are in a single LSM, labels of CLN020, CLN021 and CLN022 would cause less processing overhead than if they were labeled CLN001, CLN501 and CLN901.
3. The cleaning prefix can be changed using the SET CLNPRFX utility. However, before the cleaning prefix is changed, all cleaning cartridges must be ejected from all ACSs. See the description of the SET utility for the complete procedure.

## Cleaning Media and Drive Compatibility

Tape transports must be cleaned with cleaning cartridges of a compatible cleaning media type. Table 5 lists cleaning media for each type of transport.

**Table 5. Transport Cleaning Media**

Transport Type	Cleaning Media
Longitudinal	Longitudinal cleaning media
Helical	DD3D
9840, T9840B, T9840C	STK1U
T9940A, T9940B	STK2W
T10000	T10000CT



### Notes:

1. Different cleaning cartridge media types may have different maximum cleaning usage limits. Grouping cleaning cartridges of different media types into different volsers ranges makes it easier to specify these limits with the VOLATTR control statement MAXclean parameter(s). For example, if the helical cleaning cartridges have volsers between CLN500 and CLN599, the following VOLATTR statement can be used to set a different maximum cleaning usage limit for this range of helical cleaning cartridges:

```
VOLATTR SERIAL(CLN500-CLN599) MAXclean(nn)
```

2. Contact your StorageTek Customer Services Engineer for appropriate MAXclean values for different cleaning media types.

## Limits on the Use of Cleaning Cartridges

Cleaning cartridges should only be used a limited number of times. The MNTD MAXclean command globally specifies how many cleaning operations are allowed before a cleaning cartridge should be removed from the ACS and replaced (the default is 100 uses). This maximum cleaning usage limit can be different for different cleaning media. Use the VOLATTR MAXclean parameter to specify a different maximum cleaning limit for different cleaning cartridge media.



### Notes:

1. Refer to “MNTD (Mount/Dismount Options) Command and Control Statement” in the *HSC/MSP Operator's Guide* and to “Volume Attribute (VOLATTR) Control Statement” on page 115 for additional information about the MAXclean value.
2. Ejecting and reentering used cleaning cartridges should be avoided. When a cartridge is ejected and reentered, its select count is set to zero. The select count is used to track the number of times a cleaning cartridge has been used. Used cleaning cartridges which are reentered will be used more times than specified by the applicable MAXclean value.

Each cleaning media type is used in a different way to clean tape transports. Some media types use the same cleaning surface many times, while other media types use the cleaning surface only once. Some media types use the cleaning material fewer times before they are unable to clean a tape transport.

When a cleaning cartridge is no longer able to adequately clean a tape transport, it is over-use.

### **Over-use (Over-limit and Spent) Cleaning Cartridges**

An *over-use* cleaning cartridge means either that the usage (select) count is over the MAXclean value (“over-limit”) or all of its cleaning material is used or “spent.”

- An *over-limit* cleaning cartridge has been used more than the value (limit) specified by either the MNTD MAXclean or VOLATTR MAXclean settings. This cleaning cartridge may not be able to adequately clean a tape transport. If an over-limit cleaning cartridge is mounted on a tape transport, the cleaning process is attempted and may succeed.
- A *spent* cleaning cartridge’s cleaning material is completely used up or exhausted and can no longer be used for cleaning. When a spent cleaning cartridge is mounted on a transport, the LMU automatically returns it to its source location before notifying the HSC. The HSC will not use spent cleaning cartridges during automated tape transport cleaning.

Over-use cleaning cartridges should be removed from the LSM and replaced with new cleaning cartridges. By default, the HSC ejects all over-limit cleaning cartridges that it finds during tape transport cleaning. The default can be changed by using the MNTD EJctauto command.

### **Managing Over-use Cleaning Cartridges**

If an operator is not available to empty a CAP, it may be desirable to retain over-use cleaning cartridges in the LSM for later removal.

The MNTD EJctauto command allows you to control processing of over-use cleaning cartridges.

Options for this command include:

#### **ON**

Use this option when operators are available to remove cleaning cartridges from a CAP during automated tape transport cleaning. ON is the initial value for the HSC.

#### **MSg**

Use this option when operators are available to respond to console messages during automated tape transport cleaning.

#### **OFF**

With this option, no operator intervention is required for automated tape transport cleaning.

When the HSC is searching for a cleaning cartridge to clean a tape transport, it skips all over-use cleaning cartridges that are detected in the ACS until it finds a compatible cleaning cartridge.

If no compatible cleaning cartridges are found in the ACS, the HSC prompts the operator to enter a cleaning cartridge or skip the clean process.

If compatible over-limit cleaning cartridges are found in the ACS, the HSC acts based on the MNTD EJctauto setting.

- If MNTD EJctauto(ON) or (MSg) are set, an operator prompt is issued. The operator can reply to use one of these over-limit cleaning cartridges, enter a cleaning cartridge, or skip the clean process.
- If MNTD EJctauto(OFF) is set, a compatible over-limit cleaning cartridge is automatically selected to clean the transport.

When the clean process is finished, the cleaning cartridge is dismounted from the tape transport. If the cleaning cartridge is over-limit, the HSC acts based on the MNTD EJctauto setting.

- If MNTD EJctauto(ON) is set, the cleaning cartridge is automatically ejected from the ACS.
- If MNTD EJctauto(MSg) is set, an operator prompt is issued. The operator can reply to eject the cleaning cartridge from the ACS or keep the cleaning cartridge in the ACS.
- If MNTD EJctauto(OFF) is set, the cleaning cartridge is automatically kept in the ACS.

Messages are written to the console if any over-use cleaning cartridges are found in the ACS, how many were found, and if an over-use cleaning cartridge has been kept in the ACS. These messages help the operator manage cleaning cartridges in the ACS.

## **Managing Cleaning Cartridges**

Appropriate numbers of compatible cleaning cartridges must be available to clean the transports attached to an LSM. While there is no minimum number of cleaning cartridges, optimally, each LSM should contain multiple cleaning cartridges for each type of transport attached to the LSM. This ensures that automated cleaning avoids pass-thrus for cleaning cartridges.

If all transports in an LSM are scheduled for cleaning at the same time (by a scheduled or operator-entered CLean command), each LSM should contain one cleaning cartridge for every tape transport attached to the LSM.

Managing cleaning cartridges is especially important when automatic ejection of over-use cleaning cartridges has been disabled by the MNTD EJctauto command. On a regular basis, these cleaning cartridges must be identified, ejected from the ACS, and replaced with new cleaning cartridges.

Use the Volume Report utility to identify over-use cleaning cartridges. Select the cleaning cartridges by volser range and sort the output by use:

```
VOLRpt VOLser(CLN000-CLN999) SORT(USE) DEScend
```

The “Cln Use” column on the report identifies:

**N** = Not usable cartridges (including spent cleaning cartridges)

**M** = Over MAXclean, for over-limit cleaning cartridges

Spent and over-limit cleaning cartridges are also identified on the SLSCDATA flat file requested by the VOLDATA parameter. Volume data is mapped by the SLUVVDAT macro. Volumes that are not usable (i.e., spent) are identified by **VOLNOUSE**. The MAXclean value that applies to a cleaning cartridge is carried in the **VOLMXCLN** field.

## Manual Tape Transport Cleaning

If auto-cleaning is disabled, tape transports must be cleaned manually. This process can be performed without entering the LSM.



**Note:** StorageTek recommends using automated cleaning instead of manual cleaning because automated cleaning respects the maximum cleaning limits for different cleaning cartridges and does not select spent cleaning cartridges.

Two methods that can be used to accomplish this task are:

- issue a Mount command to mount a cleaning cartridge on the transport. When cleaning is complete, enter a DISMount command to remove the cleaning cartridge from the transport.
- use an automated operations package to mount and dismount the correct cleaning cartridge(s) on the transport(s). Coordination and setup is required to implement this solution. This task can be used to initiate the clean process for all drives at a predetermined time.

## Volume/Cell Control Functions

Volume/cell control functions coordinate and control the location of tape cartridges in the library.

Volume/cell control functions described in this section include:

- moving volumes within the library
- scratch subpool management
- scratch threshold task restart.

### Moving Volumes within the Library

Often there is need to move a single volume, several volumes, or a range of volumes to other locations within a library. The destination for the volume(s) may be within the same LSM or different LSM(s). The Volume Move function provides you with the capability to move volumes at your discretion. Volume movement may be required because of:

- changes in your library hardware configuration. Addition of tape transports or LSMs to a library configuration often requires that volumes be moved to accommodate the new hardware configuration. Panels can be frozen to prevent allocation of new volumes to those panels. It is not necessary to move volumes that reside on a panel before it is frozen, however, volumes should be moved off frozen panels that will be changed.
- the need to achieve better control over library tape activity.

Volumes can be moved by any of the following methods:

- MOVE operator command
- MOVE utility
- programmatic interface MOVE request
- tape management interface MOVE request
- Scratch Redistribution utility.

These methods provide you with the operational flexibility often needed within a library installation.



## Scratch Subpool Management

Management of scratch subpools within the library is an important function affecting library performance and your ability to have greater control over scratch volume activity.

The HSC provides support for mounting of scratch volumes from subpools resulting from MSP mount messages. You can effectively manage your scratch subpools by several available means. These include:

- **Defining subpool information** — Scratch subpools can be defined using either Scratch Subpool (SCRPOol) PARMLIB control statements or User Exit 03.



**Note:** Using the SCRPOol control statement is preferable to specifying User Exit 03.

SCRPOol permits you to enter the following information for each subpool:

- a subpool name
  - the range of volume serial numbers
  - the label type
  - the HOSTID.
- **Enabling scratch subpools** — Scratch subpools specified by SCRPOol are defined in the SLSSYSxx command list and are executed when the HSC is initialized. Refer to “Scratch Subpool Control Statement” on page 96 for detailed information on how to implement scratch subpooling using the SCRPOol control statement. (The syntax for the SCRPOol PARMLIB control statement is also contained in Appendix C, “Macros, Control Statements, Utilities, and Commands Syntax Reference” on page 483).

User Exit 03 is also used to define scratch subpools and is called at HSC initialization. Refer to the *NCS User Exit Guide* for more information.

- **Implementing scratch subpool user exits** — User Exits 01, 02, and 04 are used to implement the operational portion of scratch subpooling.



**Note:** User Exit 01 must be coded to allow the HSC to select the volume from the correct subpool. If you do not assign a subpool using User Exit 01, the HSC selects a qualifying scratch tape from its general subpool (subpool 0), which includes all scratch tapes in the ACS including those scratch tapes in named subpools.

User Exit 02 and 04 selects the tape transport in the LSM that has the most scratch volumes of the correct subpool type. Refer to the *NCS User Exit Guide* for additional information about these user exits.

- **Specifying scratch subpool parameters with operator commands** — Several commands are available for controlling scratch subpools. Complementing these commands are scratch subpool parameters in two utilities. The syntax for each operator command is contained in Appendix C, “Macros, Control Statements, Utilities, and Commands Syntax Reference” on page 483.

The commands that can be used to display scratch subpool information include:

- Display SCRatch and Display THREShold commands
- Warn command.

Commands that include scratch subpool parameters are:

- Eject
- ENter
- Mount.

Utilities that include scratch subpool parameters are:

- Scratch Redistribution (SCREdist) control statement
- EJECT utility.

Refer to the *HSC/MSP Operator's Guide* for detailed information about operator commands and to Chapter 4, "Utility Functions" on page 139 for information about utilities.

## Scratch Threshold Task Restart

The scratch threshold task is a function within the HSC that maintains a count of scratch volumes that are available within a library. Should this task fail, the HSC is unaware of the number of scratch volumes available. Thus, a failure of this task could result in impairing any library processing relying on scratch volumes.

The HSC provides automatic recovery and reinstatement of this task if a failure occurs. This recovery and reinstatement is transparent to users except for a message displayed on the system console indicating that the task is reinstated.

In the event, because of unusual circumstances, that the task is not reinstated, a message on the system console also informs you of the condition and appropriate action to take.

Refer to "WARN Command" in the *HSC/MSP Operator's Guide* for information about the Warn operator command used to dynamically modify scratch threshold values.

## Cartridge Access Port (CAP) Processing Functions

CAP processing functions control cartridge enter and eject functions. The HSC provides operator commands and utilities which permit you to:

- enter cartridges into the library
- eject cartridges from the library.

The CAP is the focal point for the activities of entering or ejecting cartridges. At least one CAP is located on the access door of every LSM, and indicators are provided for the operator to identify what CAP operations are active. At some points, operator interaction is required. Refer to your ACS *Hardware Operator's Guide* for more information about CAPs.

CAP processing functions described in this section include:

- entering cartridges into the library using the ENter command.
- ejecting cartridges from the library using either the Eject command or EJECT utility
- CAP exception processing
- releasing an allocated CAP.

Enter and eject operations are accomplished concurrently with other normal LSM operations: automated mounts, automated dismounts, pass-thrus, and so forth.

For multiple CAPs, each enter and eject operation is processed separately. The user can run concurrent tasks against CAPs on a single LSM.

PCAPs are used for single cartridge enter and eject operations. These are controlled by the user through the PGMI or user exits.

Operator commands and detailed instructions for controlling CAP processing functions are described in the *HSC/MSP Operator's Guide*; utilities are discussed in Chapter 4, "Utility Functions" in this document.

### Entering Cartridges into the Library

To enter cartridges into the library, execute the HSC ENter or SENter command and identify which CAP is to be used for the operation. Specifying the *cap-id* is optional for the ENter command. Following the procedures described in the *HSC/MSP Operator's Guide*, open the CAP door, place cartridges into the CAP cells, and close the CAP door.

The CAP automatically locks when the door is pushed closed. The robot scans the Tri-Optic label (must be unique) of a cartridge, and the cartridge is moved by the robot to an empty cell in one of the LSM panels.

For a CAP in automatic mode, do not issue an ENter command. The operator need only open the door, insert cartridges, and close the door. No other operator intervention is required.

## Ejecting Cartridges from the Library

Cartridges are ejected from the library by using either the EJECT command or the EJECT utility. Either a single cartridge, a range of cartridges, or a list of cartridges can be identified for removal from the library. The robot locates the appropriate storage cell, withdraws the cartridge from its cell, and moves it to an available cell in a CAP.

The operator must remove cartridges from the library through the CAP. All cartridges contained in the CAP must be removed once they are placed in the CAP by the robot. Refer to the *HSC/MSP Operator's Guide* for operator procedures for CAP processing.

## CAP Mode Considerations

Unlike manual mode CAPs which are allocated for enters from specific hosts, automatic mode CAPs may be serviced by any active host. Placing a CAP in automatic mode improves CAP performance and is best utilized when:

- operator intervention is not required
- it is acceptable to receive and respond to HSC WTORs from any active host console.

Entering cartridges that require operator intervention may create problems in library configurations utilizing automatic mode CAPs, especially if you enter many cartridges without external Tri-Optic labels. WTORs are issued by the host currently servicing the automatic mode CAP which may present an inconvenience if you are expecting the WTORs at a specific host console, but they are being directed to an unattended host console. If you require WTORs to be returned to a specific host console, you must allocate one or more manual mode CAPs and use the Enter command from that host.

## CAP Exception Processing

Enter and eject processes are based on a cartridge-by-cartridge basis. This affords a significant amount of isolation between requests. However, in certain cases redundant errors may be incurred due to abnormal conditions external to an individual request. Mechanisms have been provided to help when these situations arise:

- Releasing a CAP may be necessary to free up cartridge and CAP resources and to end an enter or eject process.
- Modifying a CAP offline isolates it from being used until the error is corrected.
- The next use of the CAP invokes CAP cleanup and recovery, which requests that the operator check the CAP for cartridges.



**Note:** If an enter process has not moved all cartridges from a CAP or an eject process has moved cartridges to the CAP when a release occurs, the cartridges are left in the CAP but are not in the control data set. Refer to the *HSC/MSP Operator's Guide* for more details on the CAP.

## Releasing an Allocated CAP

The RELEase *cap-id* operator command allows you to release a CAP that is allocated to a failed host.

A CAP can be left allocated to a system if the HSC terminated without recovery while the CAP is active.

When you issue the command, appropriate messages inform you of conditions and actions to take. You are prompted by an initial message to confirm or terminate release of the specified CAP. This confirmation prevents the release of a CAP that is currently being used by the system.

This feature is of significant importance to you by giving you control to release a CAP without having to recycle all of the HSCs that share control data sets.

Refer to the *HSC/MSP Operator's Guide* for additional information.

## Near Continuous Operation (NCO) of the SL8500 Library

Near Continuous Operation for the SL8500 library allows users to modify their hardware configuration dynamically without terminating the HSC. The following operations can be performed:

- tape drives: add, remove, replace, and change unit addresses
- expansion panels: add, remove, and audit after expansion
- SL8500s: add, configure, modify the configuration.

### Where to Find NCO Information

Procedures to accomplish dynamic reconfiguration tasks are discussed in Appendix B, “HSC Support for Near Continuous Operation (NCO)”.

The MODify CONFIG command initiates dynamic hardware reconfiguration. Refer to the MODify Command in “Commands, Control Statements, and Utilities” in the *HSC Operator’s Guide*.

## Swapping Library Transports - New Device Types

The UNITDEF command is no longer used to define library drives. When a tape transport device type changes, the HSC automatically recognizes the new device type from the LMU and immediately changes its internal structures to reflect the new device type.

## Common Recovery Functions

Common recovery functions consist of information gathering from the control data sets and journals, and processing to recover from a database or hardware failure.

The most vital recovery function is control data set recovery which is described in this section.

### Control Data Set Recovery

Control data sets contain valuable information required for the HSC software and the library to function. The control data sets contain:

- inventory information on all volumes in a library
- the library configuration, including how many ACSs, LSMs, tape transports, etc.
- information about library hardware resource ownership across multiple processors
- information for controlling the communication link between HSC subsystems running on multiple processors.

The HSC subsystem has the capability of operating with several control data sets and journals simultaneously:

- **Primary control data set** — This data set is required for every installation
- **Secondary control data set** — This data set is optional, but highly recommended
- **Standby control data set** — This data set is strictly optional, but also recommended



**Note:** The SLIRCVRY LIBGEN macro TCHNIQE parameter determines how many CDS copies will be initialized by the SLICREAT program and whether or not journals will be initialized by SLICREAT. Refer to “SLIRCVRY Macro” in the *HSC/MSP Configuration Guide* for more information.

The number of CDS copies used by the HSC is dependent on the number of CDS copies defined in the CDSDEF PARMLIB control statement. It is not determined by the TCHNIQE parameter.

The HSC uses all of the CDS copies defined in the CDSDEF control statement (whether this includes more or less CDS copies than are specified by the TCHNIQE parameter). However, if journaling is specified by the TCHNIQE parameter, journals must be defined for successful HSC initialization.

- **Journals** — Two journals per host are kept to record library transactions. Each journal contains a record of changed data. The changed data consists only of bytes of data that have been changed. The record is made at the time the transaction occurs. The journals can be applied to a backup control data set, for recovery purposes, to make the control data set current.



**Note:** Journals are optional and are no longer a recommended recovery method. Secondary and standby data sets provide a faster and more reliable method for ensuring CDS integrity.



Control data sets can be accessed by different hosts and are kept synchronized. In event of a failure, the BACKup and RESTore utilities can be used to perform extensive error checking and synchronization of the data. A backup control data set and journals are used to reconstruct the control data sets.

The integrity of the control data sets is extremely important. In multiple processor environments, data set integrity is much more difficult to maintain. Because of this, the HSC subsystem is designed to keep the control data sets intact and configured to recover from failures. Features such as shadowing for the control data set, journaling, backup and restore were previously in place in prior releases to maintain data set integrity.

## **Control Data Set Recovery Techniques**

There are several techniques to accomplish control data set recovery. These techniques are:

- dynamic recovery of CDS errors (when possible)
  - switch
  - internal CDS directory rebuild
  - standby CDS copy.
- diagnostic information on CDS errors, error detection, and correction of the CDS through the BACKup and RESTore utilities
- the ability of the HSC to continue running on one copy of the CDS
- user control of enabling and disabling control data sets with operator commands
- automatic communication with other hosts in a complex when control is switched from one CDS to another.

## **User Control of Control Data Sets**

The HSC offers flexibility for definition and control of control data sets. User control of these data sets includes:

- allocation of data sets at initialization
- ability to dynamically enable or disable the library control data sets
- reassigning control data set names in the Database Heartbeat record.

## **Allocation of Control Data Sets**

Control data sets are defined at HSC initialization by PARMLIB control statements rather than defined by JCL. These definitions are invoked at HSC initialization and remain set until HSC termination. The definitions cannot be altered without HSC shutdown and restart.

See “PARMLIB Control Statements” on page 77 for additional information.

## Dynamic Enable/Disable of Control Data Sets

Operator commands are supplied to give you control over which data sets the HSC is utilizing. This functionality is particularly useful in a multiple-processor environment.

Before attempting to enable or disable any data set, you can use the Display CDS command to display the current status of the control data sets.

The commands to enable or disable a control data set can be issued without halting HSC execution or disrupting any running HSC.

Refer to the “CDS Enable/Disable Command” in the *HSC/MSP Operator’s Guide* for detailed information about operator commands for enabling or disabling control data sets.

## Reassigning Control Data Set Names in Database Heartbeat Record

The names of the control data sets are recorded by the HSC in the Database Heartbeat (DHB) record to identify the correct primary, secondary and standby control data sets. When HSC is initialized, it assigns its control data set copies as primary, secondary and standby based on the Database Heartbeat record, not on the assignment in the CDSDEF PARMLIB statement.

Assigning of specific control data sets as primary, secondary and standby happens automatically and is not normally of concern.

Either of the following procedures can be used to change the assignment of control data sets as primary, secondary and standby in the Database Heartbeat record.

- Procedure using CDS Disable and CDS Enable commands:
  1. Use CDS Disable and CDS Enable commands to rotate the control data sets into the desired sequence.
  2. Use the Display CDS command to view the current status and assignment of the control data sets.

For example, to switch the assigned order of a primary control data set (with DSN=SLS.DBASE1) and a secondary control data set (with DSN=SLS.DBASE2):

1. Issue the command:

```
DISPLAY CDS
```

to view the current control data set status and assignments.

2. Make the current secondary control data set the new primary control data set by issuing the command:

```
CDS DISABLE PRIMARY
```

3. Make SLS.DBASE2 the new secondary control data set by issuing the command:

```
CDS ENABLE DSN=SLS.DBASE2
```

4. Issue the command:

```
DISPLAY CDS
```

to view the current control data set status and assignments.

- HSC BACKup and HSC RESTore procedure:
  1. Stop the host software on all hosts.
  2. Back up the control data set with the HSC BACKup utility.
  3. Restore the control data set with the HSC RESTore utility. This will clear the control data set information in the Database Heartbeat record.
  4. Start an HSC system, specifying the desired primary, secondary, and standby control data sets in the CDSDEF PARMLIB statement. During HSC initialization, the control data sets assigned as primary, secondary, and standby will be recorded in the Database Heartbeat record.

## Renaming Control Data Sets

The control data set names are recorded in the Database Heartbeat (DHB) record. During HSC initialization, the data set names in the DHB are compared with the DSNs specified in the CDSDEF PARMLIB control statement.

If a DSN specified in the CDSDEF statement does not match any of the control data set names recorded in the DHB, that DSN is disabled. If all the specified DSNs are disabled, the HSC will not initialize. The specific assignment of enabled DSNs to the primary, secondary, and standby control data set(s) is made based on the control data set assignments recorded in the Database Heartbeat record.

If the control data set(s) needs to be renamed, use the HSC BACKup and RESTore utilities as described in the rename procedure below. Do **not** use MSP, TSS PFD, or third-party utilities to rename the control data set(s) without running the BACKup and RESTore utilities.

### Procedure to Rename Control Data Sets

Use the following procedure to rename the control data set(s):



**Note:** Use this procedure to move or copy the control data sets to new data set names, if the new control data sets are to be used as the control data sets. In these cases, the new control data sets can be allocated when they are restored.

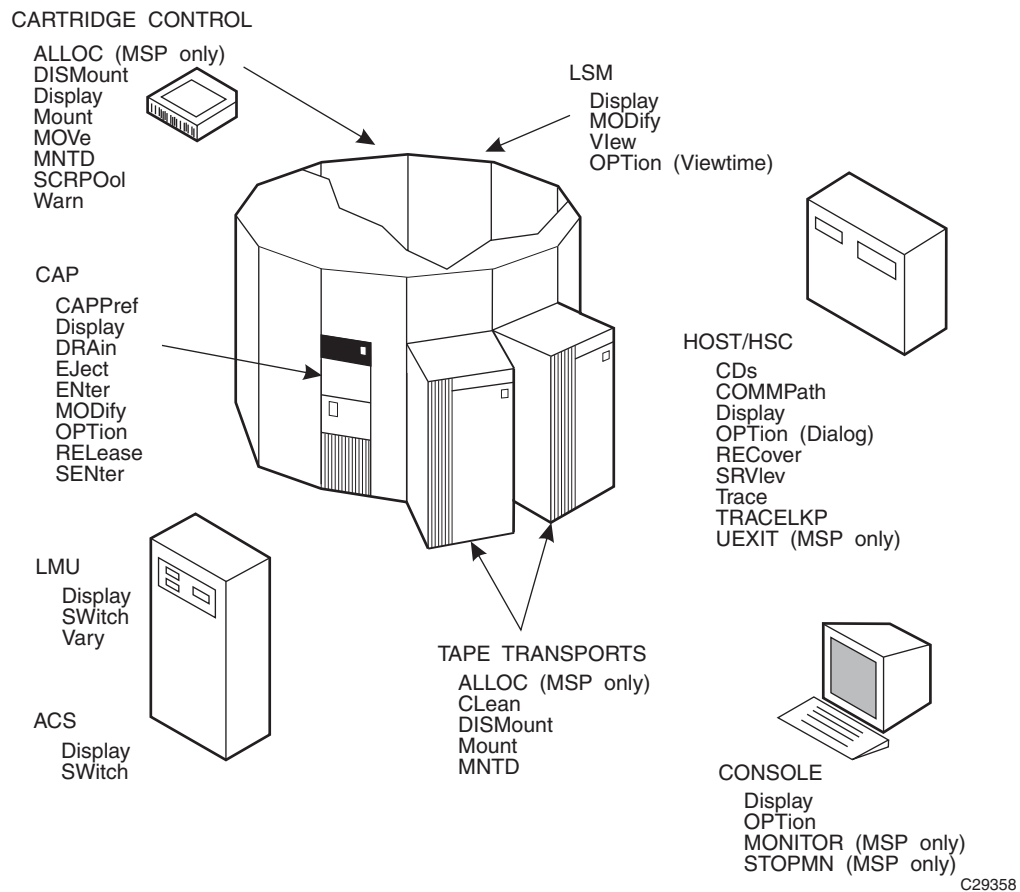
1. Stop the HSC on all hosts.
2. Back up the control data set using the HSC BACKup utility. Refer to “BACKup Utility” on page 174 for details on the BACKup utility.
3. Rename the control data sets using standard MSP or TSS PFD utilities. If you want to move the control data sets, this can be done at this time.
4. Restore the backup of the control data sets to the renamed control data sets using the HSC RESTore utility. Refer to “RESTore Utility” on page 251 for details on the RESTore utility. The control data set names in the Database Heartbeat record are blanked out.
5. Start the HSC, specifying the desired primary, secondary, and standby control data sets in the CDSDEF PARMLIB control statements.

During HSC initialization, the new control data set names are recorded in the Database Heartbeat record.

## Command Functions

Command functions consist of real-time control of automated cartridge handling, dynamic selection of HSC processing options, and various query operations.

Figure 5 illustrates the specific areas within a library where HSC commands enable you to control processing.



**Figure 5. HSC Command Functions Overview**

Refer to “Commands, Control Statements, and Utilities” in the *HSC/MSP Operator’s Guide* for a complete description of HSC operator commands, syntax, and examples for usage.

If you are interested only in reference information on command syntax, refer to Appendix C, “Macros, Control Statements, Utilities, and Commands Syntax Reference” on page 483.

## Enabling/Disabling/Reloading User Exits

User exits can be enabled, disabled, or reloaded without interrupting library operations or recycling the HSC.



**Note:** The above statement is true for all user exits except User Exit 03.

- User Exit 03 is enabled at HSC initialization, and the UEXIT operator command cannot be used to disable or reload the exit.
- User Exits 01, 02, 04, 08, 09, 10, 11, 12, and 13 are now loaded and executed in the SMC address space. See the *SMC Configuration and Administration Guide* for further information.

You can specify a unique exit load module name to the HSC by using the UEXIT operator command. This command permits you to enable, disable, or reload any user exit that you have customized for the HSC.

Refer to the “User Exit (UEXIT) Command and Control Statement” in the *HSC/MSP Operator’s Guide* for detailed information about the UEXIT command.

### Advantages of Using the UEXIT Command

If any of your user exits do not perform as expected, you can easily disable the exit, make any required changes, then reload and enable it again. This all can be done without interfering with the operation of the HSC and your library system.

## Controlling LSM Operating Mode

The operating mode for any LSM is controlled by using the MODify command to place the LSM online or offline. An LSM operating mode is a relationship between an LSM and all attached hosts. The two LSM operating modes are:

- automatic — the LSM is online to all hosts.
- manual — the LSM is offline to all hosts.



**Caution:** StorageTek strongly recommends that you do not place SL8500 libraries in manual mode. To use manual mode, all LSMs in the SL8500 must be offline, and that means all CAPs and drives are unavailable for automated operations.

Additionally, SL8500s have been designed for high cartridge density, so there is limited room for manually mounting and dismounting cartridges.

Refer to the “Precautions” topic in the *SL8500 Modular Library System User’s Guide* for safety requirements and physical restrictions if you decide that you must enter the library.

When an LSM is online, the LSM is in the automatic mode, meaning that the robot is fully operational. When an LSM is offline, the LSM is in manual mode.

## Controlling CAP Operating Mode

The operating mode for CAPs is controlled by the CAPPref and MODify commands. The four CAP operating modes are:

- automatic — the user can enter cartridges into an LSM without using HSC commands or utilities.
- manual — the user must issue HSC commands and utilities to use the CAP.
- online — the CAP is online to all hosts.
- offline — the CAP is offline to all hosts.

Refer to the *HSC/MSP Operator's Guide*, “Operating an Automated Cartridge System,” for a description of CAP modes and “Managing Library Resources,” for procedures describing how to operate an LSM in manual or automatic mode.

## Viewing the Interior Components of an LSM

Should you have a need to determine the state of a tape transport or any other component inside of an LSM, you can use the View command to “see” inside of an LSM for visual inspection of a tape transport, pass-thru port, storage cell, CAP, or playground cell.

Using the View command offers benefits; you do **not** need to:

- vary tape transports offline
- modify the LSM offline
- physically open the LSM access door to inspect the inside of the LSM
- disable the LSM for minutes at a time.

**Note:** This feature is standard on the model 4410 (Cimarron), 9310 (PowderHorn), and 9740 LSMs. A 9360 (WolfCreek) LSM requires an optional vision system. **The SL8500 library does not provide viewing capability.**

## Using the View command to Inspect an LSM Component

When you issue the View command, you direct the vision system to focus on an item inside of the LSM for a specified length of time. Upon entering the command, the following events occur:

- A View request is sent to the controlling LMU.
- A WTOR is displayed on the console when the camera is in position; the message indicates which camera/robot hand is focused on the specified object.

**Note:** If you respond to the message before the expiration of the requested time interval, the View request is cancelled.

Refer to the OPTion command and the Viewtime parameter for controlling the view interval. See “OPTION Command and Control Statement” in the *HSC/MSP Operator's Guide* for a description of the operator commands.

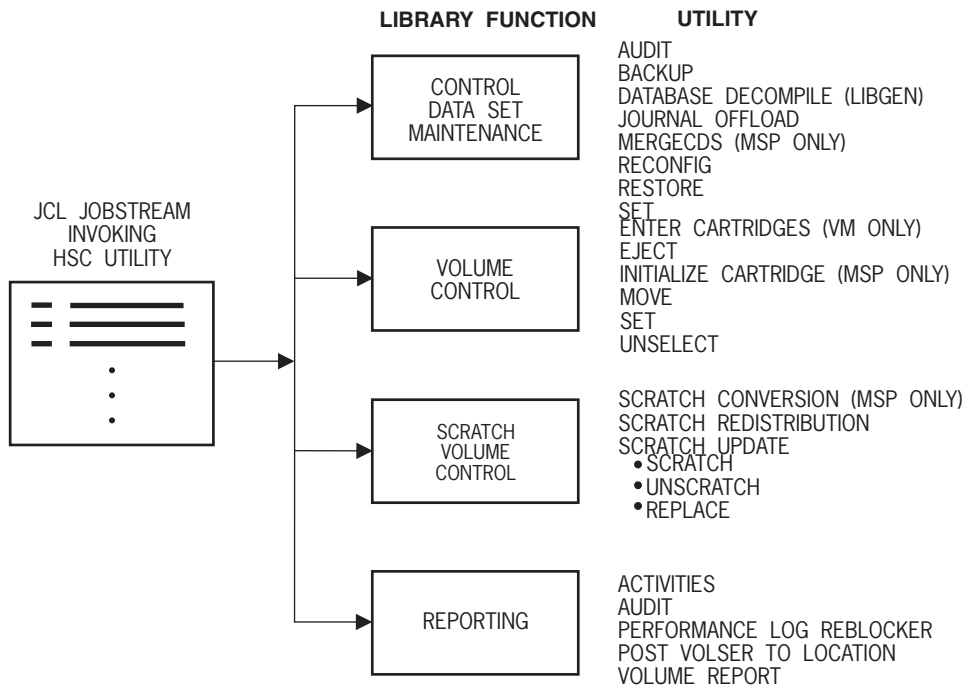
- The message on the console is DOMed.

- Optionally, a subtype 8 SMF record is written. The record includes the length of time that the camera was held in a static position for this particular VView command. Refer to Appendix D, “Record Formats” for more information on SMF records.

## Utility Functions

Utility functions provide control and recovery of library resources. In addition, reporting of library and volume activity can be invoked using various HSC utilities.

Figure 6 on page 60 illustrates the control concept provided by the various HSC utilities.



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**Figure 6. Utility Functions Overview**

Refer to Chapter 4, “Utility Functions” on page 139 for detailed descriptive information about all HSC utilities, including description, syntax and parameters, JCL requirements and examples, and samples of output.



## LMU Server Functions

LMU server functions control each of the Automated Cartridge Systems within a library. Many of the LMU server functions are completely transparent to users. This section contains information about LMU server tasks of which you should be aware.

### Dual LMU Functionality

With dual LMU functionality, a switch happens when the LMU designated as the master fails, or is forcibly switched by issuance of an operator command. The operator is also notified when the LMU designated as the standby fails.



**Note: Automatic LMU switching occurs only when the standby LMU detects problems with the master LMU's core logic and hardware components in an HSC environment.** Switching does not take place if the problem relates to the communications path between the HSC and the LMUs.

### If the Master LMU Fails

When the master LMU fails:

- the standby LMU detects the failing master and informs the HSC
- the HSC reports the failure by issuing a message
- the HSC reacts as necessary to recover and continue processing mounts and dismounts.

### If the Standby LMU Fails

The standby LMU constantly polls the master. The master LMU acknowledges this polling.

In the communications between the HSC and the master LMU, the master, as part of its acknowledgment, informs the HSC of the status of the standby. The standby LMU is either ready or not ready.

The master LMU thinks that the standby is ready if the standby has polled the master in the required time interval. If the standby LMU has not polled the master in the required time interval, the master informs the HSC that the standby is not ready.

The HSC issues a message which is highlighted and non-scrollable. This informs the operator of the status change (not ready) in the standby LMU.

### Operator Control of LMUs

A library operator can control which LMU is operating with the SWitch command. When the SWitch command is issued, all hosts connected to the ACS are affected.

If after entering a SWitch command, the new master LMU fails and the switchover does **not** occur in 20 seconds, the HSC attempts to resume working with the old master. (The HSC has been waiting for the standby LMU to take over as the master LMU, but the switch did not take place.)

If the SWitch command fails, the system issues an error message. The operator can force the completion of the command-generated switchover either by:

- manually re-IPLing the master LMU, or
- powering off the master LMU.

### LMU Switchover Messages

The *HSC/MSP Messages and Codes Manual* contains all the messages appropriate to the LMU switchover process.

### After an LMU Switch Occurs

After a switch of LMUs occurs and the LSMs have finished quick initialization procedures, all cartridge motion requests are redriven and completed. If a motion request cannot be completed, the cartridge in question is made errant.



**Note:** ENter and Eject operations may need to be restarted after a switchover.

### HSC/LMU Software Combinations

Table 6 describes the various possible combinations of HSC software with LMU microcode and installed hardware. The table indicates valid combinations.


**Table 6. HSC/LMU Validity Matrix**

HSC Version	LMU Version	Number of LMUs Powered Up	Valid Combination	Functionality Available
1.2 + ECap SPE	3.2	1	Yes	New HSC features are available. Dual LMU can be configured*, but switchover cannot occur.
		2	Yes	New HSC features are available. Dual LMU must be configured*. Switchover can be automated.
1.2 or later	3.6 or later	1	Yes	New HSC features are available. Dual LMU can be configured*, but switchover cannot occur.
		2	Yes	New HSC features are available. Dual LMU must be configured*. Switchover can be automated.
2.0 or later	9315/30 1.0 or later.	1	Yes	New HSC features are available. Dual LMU can be configured*, but switchover cannot occur.
		2	Yes	New HSC features are available. Dual LMU must be configured*. Switchover can be automated.

\* Configuration of dual LMU is done by a StorageTek Customer Services Engineer (CSE).

## Adding New Stations to an ACS

The following is an example of JCL for the SET utility that can be used as a pattern for adding new stations to an ACS without requiring a reconfiguration.


 **Note:** Update LIBGEN control statements to make changes permanent. You do not have to execute the Reconfig utility to implement these changes. Refer to “Reconfiguration Utility” on page 244 for more information about reconfiguration.

### JCL to Add New Stations to an ACS


```
//HSCUPDAT JOB (acctno),'LMU STATIONS',MSGCLASS=1,CLASS=A,  
//          MSGLEVEL=(1,1)  
//STEP00 EXEC PGM=SLUADMIN  
//* The following DD is the HSC STEP library  
//STEPLIB DD DSN=SLS.PROD.LINKLIB,DISP=SHR  
//SLSPRINT DD SYSOUT=*  
//* The following DD statement identifies the HSC primary CDS  
//SLSCNTL DD DISP=SHR,DSN=SLS.DBASE1  
//* The following DD statement identifies the HSC secondary CDS  
//SLSCNTL2 DD DISP=SHR,DSN=SLS.DBASE2  
//SLSIN DD *  
    SET SLISTATN(0CD,0CE,0D0,0D1) FORACS(0) FORHOST(MSP1)  
    SET SLISTATN(0CD,0CE,0D0,0D1) FORACS(0)  
//
```

### Notes for the Example

1. The first SET control statement defines the listed stations for only one host.

 **Note:** All stations must be specified (not just the new ones).

2. The second SET control statement defines the listed stations for all hosts.

 **Note:** All stations must be specified (not just the new ones).

3. The following are installation dependent:

- STEPLIB data set
- SLSCNTL data set
- SLSCNTL2 data set
- station identifiers
- ACS numbers
- host IDs.

4. The standby CDS is not required for this JCL.

The HSC does not need to be recycled to recognize the new addresses. Varying the ACS offline and back online automatically uses the new station configuration.

## **Reconstructing a LIBGEN**

The Database Decompile (LIBGEN) utility can be used to reconstruct a LIBGEN, reflecting the true configuration of your HSC subsystem if for some reason your LIBGEN has been lost.

Refer to “Database Decompile (LIBGEN) Utility” on page 187 for details on how to use the Database Decompile utility.

## Dynamic LMU Connection

LMU network connections can be defined dynamically to TCP/IP addresses using the LMUPATH and LMUPDEF control statements.



**Note:** For information on implementing TCP/IP connections, refer to the LMUPATH and LMUPDEF control statements in Chapter 3, “HSC Control Statements and HSC Start Procedure” and to display information about the LMUPDEF data set, refer to Display LMUPDEF in the *HSC/MSP Operator’s Guide*.

In addition to the control statements, the following informational and procedural topics are discussed in this section:

- recovery maintenance requirements
- HSC port number assignments
- TISP parameter requirements
- transitioning between 3270 and TCP/IP
- recovering TCP/IP communications.

### Recovery Maintenance Requirements

PTFs LF40008 and LF40050 must be applied for HSC 4.0 to allow the recovery processes described in “Recovering TCP/IP Communications” on page 69 to function correctly:

For HSC release levels later than HSC 4.0, these enhancements are included in the base FMID.

## HSC Port Number Assignments

The 9330 TCP/IP LMU listens on ports 50001 through 50016. The port assignment used by the HSC is determined by adding the host index number within the CDS to 50000, i.e.,

$$\text{host index number} + 50000$$

Users can find out the host index number of the system(s) running the HSC by entering:

```
Display CDS
```

Part of the output from this command displays hostids using this CDS. The first hostid in the list represents host index number 1, the second host index number 2, and so forth.

For example, if a user enters Display CDS and the following output appears

```
HOSTID---LEVEL-FLAG---DESCRIPTION---
MSPA      4.0.0 (F0)  ACTIVE PRIMARY SECONDARY STANDBY
MSPB      4.0.0 (F0)  ACTIVE PRIMARY SECONDARY STANDBY
MSPC      4.0.0 (F0)  ACTIVE PRIMARY SECONDARY STANDBY
MSPD      4.0.0 (F0)  ACTIVE PRIMARY SECONDARY STANDBY
```

then, MSPA is host index number 1, which when added to 50000 means that the HSC on MSPA uses port number 50001, the HSC on MSPB uses 50002, the HSC on MSPC uses 50003, and the HSC on MSPD uses 50004.

## TISP Parameter Requirements

Fujitsu's TCP/IP Support Package (TISP) requires that any application using TCP/IP services must be defined to TISP before that application can use TCP/IP services. Therefore, the TISP APPL statement for the HSC, and the HOST definition statements for the LMU(s), must be added to **one** of the following:

- 'SYS1.PARMLIB(KGTISP00)'

or

- the TAPPL nodeset for the APPL statement and HSTSRC nodeset for the HOST definition statements for VTAM-G/TISP before the HSC can be started using the TCP/IP LMU connection.

Please refer to the Fujitsu documentation appropriate to your TISP release for details on the TISP definition statement coding requirements.



**Note:** TISP must be restarted to enable the new definition statements.

### Defining the HSC Application Program

In the Application Program Definition Statements section of 'SYS1.PARMLIB(KGTISP00)' add the following statement:

```
STKBAPPL APPL
```

### Defining the LMU name(s) and IP address(es)

In the Network Definition Statements section of 'SYS1.PARMLIB(KGTISP00)' add HOST statements to define the LMU hostnames and IP addresses. If you are using a dual LMU, you must specify two LMU hostnames and addresses. Use the following format:

```
lmu_hostname HOST IP=nnn.nnn.nnn.nnn,FSIZE=1500
```

### Example

The following example defines two LMU host names.

```
LMUPRIM HOST IP=129.80.158.162,FSIZE=1500  
LMUSTBY HOST IP=129.80.158.166,FSIZE=1500
```



**Note:** The Host Names or IP addresses used in the LMUPATH statement **must** match the names and IP addresses defined in 'SYS1.PARMLIB(KGTISP00)'.

## Transitioning Between 3270 and TCP/IP

A number of methods are available to move between 3270 station connections and TCP/IP LMU network attachment. **StorageTek recommends cycling the HSC as the preferred process to transition between 3270 and TCP/IP.** However, the following procedures offer alternative ways to accomplish the transition.



**Note:** The host ACS client must be upgraded to NCS 4.0 or higher and must be running Fujitsu TCP/IP.

### 3270 to TCP/IP

1. After the hardware modification to the LMU has been made to support network communications, vary the stations offline.

```
Vary STation 028 OFFline
```



#### Notes:

1. Users can also vary the ACS offline.

```
Vary ACS 00 OFFline
```

2. Station addresses specified in the LIBGEN SLISTATN macro do not have to be removed for the HSC to communicate to the LMU using TCP/IP.
2. Load the LMUPDEF statements containing the LMUPATH parameters that specify the hostname or IP address for each ACS.

```
LMUPDEF DSN('xxx.xxx.xxx(xxx)')
```

StorageTek recommends that the LMUPDEF statement be specified in the initialization parameters, however, this statement can be issued from the console as well.

3. Use the Vary ACS command to bring each ACS online. Message SLS0054I indicates that the ACS is online. After all ACSs to be network-attached are online, the HSC is ready for processing.

### TCP/IP to 3270

1. Vary the ACS offline.

```
Vary ACS 00 OFFline
```

2. Load an LMUPDEF control statement that includes either an empty data set (no statements) or a data set that only contains an OPTion TITLE statement.
3. Either vary the ACS online, or vary the 3270 station addresses online.



## Recovering TCP/IP Communications

**StorageTek suggests either performing a normal HSC shutdown or changing the HSC state to the base service level prior to recycling TCP/IP or taking TCP/IP down for any extended period of time.**



**Note:** Please refer to “Recovery Maintenance Requirements” on page 65 to see PTFs that must be applied before recovery processes discussed in this section can be implemented.

Unlike 3270 station protocol, TCP/IP station protocol requires the socket interface to be reopened (restarted) by the HSC before communication to the LMU can be reestablished. If the LMU station connection is lost, the HSC begins network recovery to the station. During recovery, the HSC continues trying to reestablish the connection between its socket and the remote station socket every 10 seconds for 30 minutes. Once the network problem is resolved, the next time the HSC attempts network connectivity, it reestablishes communication to the LMU.



**Note:** When 30 minutes is exceeded, no further reconnection attempts are made, and operator intervention is required.

In a dual LMU environment, users can switch to the standby station if other host processing is not greatly impacted. If connectivity is lost to both LMU stations, network recovery is simultaneous.

When the HSC detects TCP/IP interface errors or timeout conditions, message SLS6012E is issued.

```
SLS6012E ACS AA recovery of network connection to station C...C is now active
```

When the HSC successfully recovers network connectivity, message SLS6013I is issued and all outstanding LMU requests are redriven.

```
SLS6013I ACS AA recovery of network connection to station C...C successful
```

If the HSC network recovery times out, message SLS6014E is issued, the station is considered in error, no further reconnection attempts are made, and operator intervention is required.

```
SLS6014E ACS AA unable to reestablish connection to station C...C
```



**Caution:** During network recovery or timeout situations, only use the Display Acs command to view ACS and station status. The Display Cap and Display LSM commands involve LMU requests and will not execute.

## Operator Intervention - Single LMU Configuration

If the HSC network recovery times out, the ACS is automatically changed to an offline state and all outstanding LMU requests are purged. After troubleshooting the network connection, vary the ACS online.

```
Vary ACS acs-id ONline
```



**Note:** During network recovery, the ACS can be forced offline, however, all outstanding LMU requests are purged. StorageTek recommends that users allow the HSC network recovery process to remain active and not to force the ACS offline.

## Operator Intervention - Dual LMU Configuration

### Communication Lost to Master LMU

If network recovery times out on the master LMU, and the HSC is still connected to the standby LMU, the ACS is still considered in an online state. Issue the SWITCH command to make the current standby LMU the new master LMU.

```
Switch Acs acs_id
```

The HSC redrives requests to the new master LMU.

### Communication Lost to Standby LMU

If network recovery times out on the standby LMU, resolve the network problem and IPL the standby LMU. After the IPL is complete, the master LMU notifies the HSC that the standby LMU is now ready and network connectivity is reestablished with the standby.

### Communication Lost to Both LMUs

If network recovery times out on both LMUs, the ACS is automatically changed to an offline state and all outstanding LMU requests are purged. After the network problems are resolved, vary the ACS online.



**Note:** When network recovery is active on the master and standby LMUs, the ACS can be forced offline, however, all outstanding LMU requests are purged. StorageTek recommends that users allow the HSC network recovery process to remain active and not to force the ACS offline.

## Communication Functions

HSC communication functions ensure that passing of pertinent information between HSC components and hosts is accomplished successfully.

### Host-to-Host Communications Services

The HSC permits you to select the hierarchy of methods used for host-to-host communications. The communications services are designed to provide you with fail-safe communications between HSC hosts in a data center complex.

#### Information Passed Between Hosts

The following kind of information is passed between hosts:

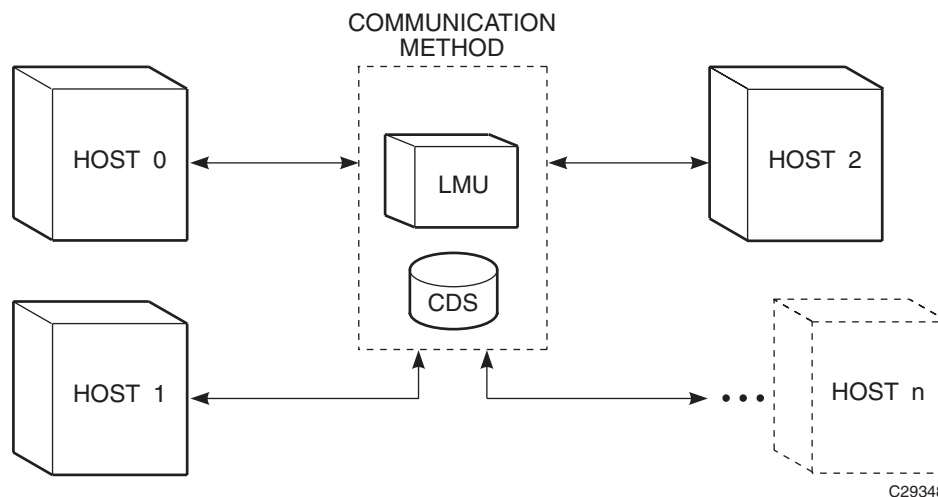
- control data set switch information
- CAP status information.

#### Types of Communications Services

Communications services that are available fall into the following categories:

- communication through the LMU
- communication through the CDS — This method of host-to-host communications is a lower performance method than LMU.

Figure 7 on page 71 illustrates the available communication methods and relative hierarchy of the methods.



**Figure 7. HSC Communication Methods**

## How Communications Services are Set or Changed

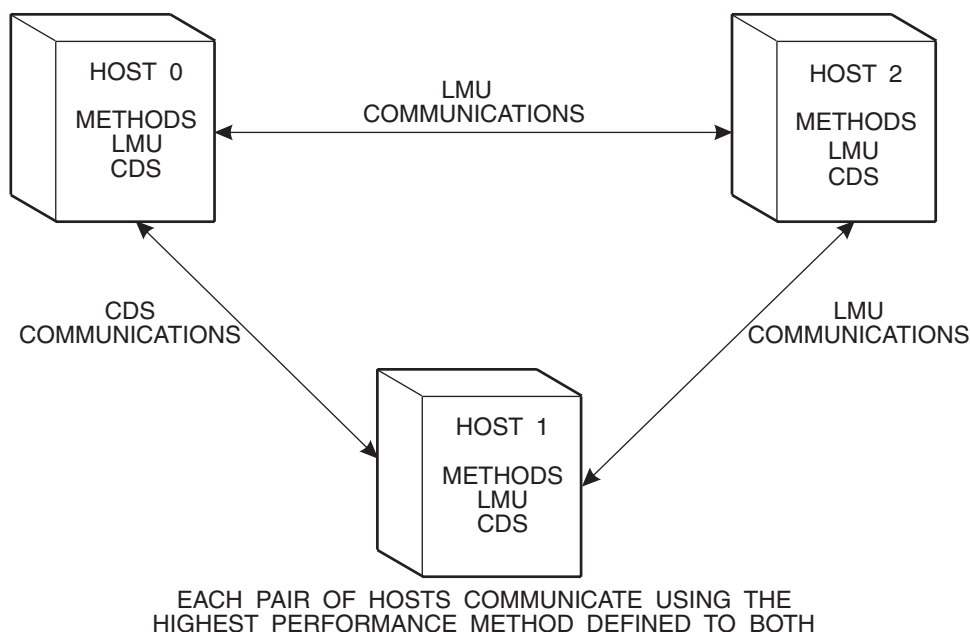
Communications services are set or changed by the Communications Path (COMMPath) command and control statement. This command specifies host, communication method, and LMU paths for the associated host. The communication path definitions can be modified at any time during library operation without terminating the HSC.

The COMMPath command and control statement sets up a table of definitions for the host that is executing the command. Each host's table must contain a list of path definitions for itself and a separate list for each defined host. Therefore, on each host, the command must be issued once to define the paths for itself, once to define the paths for a second host, once to define the paths for a third host, and so on, until all hosts are defined.

For example, the library is operating in an environment with three hosts: Host 0, Host 1, and Host 2. The COMMPath command must be issued three times on each host. The table of definitions for Host0 must contain a list of paths for Host 0, a list for Host 1, and a list for Host 2. The same is true for Host 1 and Host 2.

For one host to communicate with another, they must have matching entries in their respective lists of defined paths. The highest-performance method that is common to two hosts is selected as the current method of communications between the two. A host can use one method of communications with a second host, and a different method of communications with a third host.

Figure 8 on page 73 illustrates how different communication methods can be used between multiple hosts.



C26184

**Figure 8. HSC Communication Methods Between Multiple Hosts**

COMMPath can be specified by an operator as an operator command, or by a systems programmer as a PARMLIB control statement. Before COMMPath is issued, all methods of communications are set to CDS. Refer to “Communications Path (COMMPath) Command and Control Statement” in the *HSC/MSP Operator’s Guide* for information on the usage of the command.

It is recommended that host-to-host communications be defined in PARMLIB at startup. The COMMPath operator command is best used to switch communications paths, or to delete paths.

### Displaying Current Status of Communication Services

The current status of the communications method is displayed by issuing the Display operator command. Issuing the Display command, specifying the COMMPath parameter, and optional HOSTid parameter results in a summary display at the console.

When issuing the command, individual host IDs or all hosts can be specified. If you exclude the HOSTid parameter in the command, a summary of current parameter settings for all hosts is displayed in a message. If the HOSTid is specified as “\*” the current settings are displayed for the host from which the command is entered. If the ALL parameter is issued, the current settings for all defined hosts are displayed.

The message provides a summary list for the current HSC host-to-host communications parameters.

Tracing the host-to-host communications method is done with the operator Trace command. Upon issuance of the command at the system console, an appropriate message is displayed indicating a list of ACS subsystem components with tracing status.

## Switching Communications Paths

The performance ranking of the communications methods takes on meaning when it becomes necessary to switch from one method to another because of a failure. A switch can be initiated automatically by the HSC or dynamically by the operator using the COMMPath command. The HSC issues a message to the console when a communications path switch occurs, regardless of how it is initiated.

The HSC can initiate

- a lateral switch from one defined LMU path to another, or
- a downward switch from a higher performance method to any lower performance method (LMU to CDS).

The COMMPath command can initiate a switch to a higher, lower, or equivalent method.



**Note:** After an automatic downward switch has occurred, an upward switch can only be accomplished using the COMMPath command.

## Software Requirements

LMU 3.0 (or higher) or 9315/9330 1.0 (or higher)  $\mu$ -software is required for a multiple-level communications service.

## **Programmatic Interface**

The programmatic interface component provides you with the interface definitions to use for customizing the HSC. Using the detailed definitions provided, you can interface third-party software or create custom programming to run with the HSC.

In MSP, tape management systems are interfaced to the HSC using user exits rather than through the programmatic interface.

Refer to Appendix G, “Programmatic Interface (PGMI)” for detailed information about programmatic interfaces.

## **Batch Application Program Interface (API)**

The Batch API allows you to retrieve 2.0- and 2.1-level CDS information in batch mode. The CDS specified as input to the request does not have to be active nor does it have to be referenced by the HSC address space (the request executes in the user address space). In addition, the HSC does not have to be active to submit the request. Refer to Appendix H, “Batch Application Program Interface (API)” for more information.





## Chapter 3. HSC Control Statements and HSC Start Procedure

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### Overview

This chapter discusses two kinds of control statements, PARMLIB (below) and definition data set (refer to “Definition Data Set Control Statements” on page 99), and the HSC Start procedure (refer to “HSC Start Procedure” on page 128). For more information about HSC installation and initialization, refer to the *HSC/MSP Installation Guide* and the *HSC/MSP Configuration Guide*.

### PARMLIB Control Statements

Parameter library (PARMLIB) control statements provide you a way, at HSC initialization, to statically specify various operation parameters. Identifying your system needs and then specifying various control statements permits you to tailor the HSC to the needs of your data center.

Some PARMLIB options can be altered after HSC initiation with the HSC running. These options can be changed using an appropriate operator command. With these options it is not necessary to stop the HSC and restart it to initialize the new or changed options that you want to specify. Those PARMLIB control statements that can be altered with the HSC running are identified as PARMLIB commands or control statements in this chapter.

Any operator command can be specified as a PARMLIB control statement.



**Note:** Refer to Appendix C, “Macros, Control Statements, Utilities, and Commands Syntax Reference” on page 483 for the rules and conventions that apply to command and control statement syntax.

### Defining PARMLIB Control Statements

PARMLIB control statements are defined in a sequential data set or a single partitioned data set (PDS) member that is opened when the HSC is initialized.

There are two methods for defining PARMLIB control statements:

- defining PARMLIB members in user-defined data sets
- defining PARMLIB members in SYS1.PARMLIB.

The PARMLIB control statements are invoked by specifying MEMBER(xx) or M(xx) on the input parameter in the startup procedure. The suffix “xx” is concatenated with

SLSSYS to form a name. The name is used either as the ddname in the startup procedure or as a member in SYS1.PARMLIB.

If the ddname is not specified in the startup procedure, then the SYS1.PARMLIB data set is dynamically allocated and a search for the member name is made in that data set.

If the data set named in the SLSSYSxx DD is a partitioned data set (PDS), you **MUST** specify the member name containing the control statements. If the SLSSYSxx DD is a sequential data set, only the data set name (DSN) needs to be specified.

With either method, the PARMLIB data set (or SYS1.PARMLIB member) is opened and read to obtain the parameters for running the HSC software.



**Note:** Although SYS1.PARMLIB can be used in a multiple-system environment, it is recommended that a user-defined data set, other than SYS1.PARMLIB, be used.

## Processing PARMLIB Control Statements

PARMLIB control statements are processed at HSC initialization.

The following are examples of JCL for HSC execution. The examples contain DD statements defining data sets and members that contain PARMLIB control statement definitions.

### Example JCL Defining Sequential PARMLIB Data Sets

```
//SLS0      PROC
//IEFPROC   EXEC PGM=SLSBINIT,
//          TIME=1440,
//          REGION=2000K,
//          DPRTY=(7,5),
//          PARM='E(E086) F(23) M(00)'
//*
//STEPLIB   DD DISP=SHR,DSN=SLS.SLSLINK
//*
//SLSSYS00  DD DISP=SHR,DSN=parmlib0-data set
//SLSSYS01  DD DISP=SHR,DSN=parmlib1-data set
//SLSSYS02  DD DISP=SHR,DSN=parmlib2-data set
```

### Example JCL Defining Partitioned PARMLIB Data Sets

```
//SLS0      PROC
//IEFPROC   EXEC PGM=SLSBINIT,
//          TIME=1440,
//          REGION=2000K,
//          DPRTY=(7,5),
//          PARM='E(E086) F(23) M(00)'
//*
//STEPLIB   DD DISP=SHR,DSN=SLS.SLSLINK
//*
//SLSSYS00  DD DISP=SHR,DSN=parmlib0-data set(member)
//SLSSYS01  DD DISP=SHR,DSN=parmlib1-data set(member)
//SLSSYS02  DD DISP=SHR,DSN=parmlib2-data set(member)
```



**Note:** In the JCL examples, “M(xx)” is the MEMBER parameter described in “Defining PARMLIB Control Statements” on page 77.

Multiple PARMLIB data sets can be allocated. At HSC startup, members can be specified at your discretion.

Examples of SLSSYSxx command streams and PARMLIB control statements are contained in members SLSSYS00, SLSSYS12, and SLSSYS20 of the HSC SAMPLIB.

## Options Offered by PARMLIB Control Statements

The PARMLIB control statements offer various HSC operating options. At HSC installation you identify the control statements to the HSC for those processes that you want to tailor to your installation. The options are placed in the PARMLIB data set. Options that you can control by using PARMLIB control statements are summarized below. Refer to “Control Statement Syntax Conventions” on page 493 for information on specifying control statements.



**Note:** PARMLIB control statements that apply only to system programmer tasks are described in this guide. These include:

- Control Data Set definition
- EXECPARM Control definition
- Journal Data Set definition
- License Key definition
- Reconfiguration definition
- Scratch Subpool definition.

The other command and control statements appear in the *HSC/MSP Operator's Guide*.

### Device Allocation

Device allocation specifications are specified by the ALLOC operator command and the SMC ALLOCDEF command, and tailor the HSC to influence operating system processing of device allocation. Refer to “Allocation (ALLOC) Command and Control Statement” in the *HSC Operator's Guide* and the *SMC Configuration and Administration Guide* for more information.

### CAP Preference Definition

This control statement and operator command defines an ordered list of CAPs that is used by the library when cartridges are being entered or ejected. Refer to “CAP Preference (CAPPref) Command and Control Statement” in the *HSC/MSP Operator's Guide* for detailed information.



**Note:** The CAPPref AUTO and MANual settings should not be placed in PARMLIB. If these settings are used and the CAP is already in the selected mode, the command is rejected without changing the preference value.

### Control Data Set Definition

With this control statement and operator command, you specify the control data set definitions and the number of control data sets that you want running. CDS definition information is specified in the CDSDEF control statement. Refer to “CDS Definition (CDSDEF) Control Statement” on page 83 for control statement syntax, parameter information, and example statements.

### Communications Path Definition

This control statement and operator command provides you a way to set the communications path utilized in a multi-host environment. A hierarchy for communications can be established. If a communications failure occurs, the hierarchy defined ensures continued operation of HSC software and the

communications path. Refer to “Communications Path (COMMPath) Command and Control Statement” in the *HSC/MSP Operator’s Guide* for more information.

### **EXECPARM Control Definition**

The EXECPARM control statement provides an alternative method for specifying GTF event and format IDs normally specified in the subsystem startup procedure. This control statement also provides you with the option of displaying the command prefix preceding WTO or WTOR messages. Refer to “EXECParm Control Statement” on page 86 for control statement syntax, parameter information, and example statements.

### **Journal Data Set Definition**

In this control statement you specify the journal data set definitions. Journal information is specified in the JRNDEF control statement. Refer to “Journal Definition (JRNDEF) Control Statement” on page 88 for control statement syntax, parameter information, and example statements.

### **License Key Information**

This control statement is used to input license key information for the HSC. It is placed in a data set or Partitioned Data Set member identified by an LKEYDEF control statement in the HSC PARMLIB control statements, and must be present for the HSC to initialize.

### **Mount/Dismount Processing Control**

With the MNTD control statement and operator command, you can tailor the HSC’s response to mount or dismount processing that occurs. For example, some of the functions that you can control include:

- automatic or manual dismount and/or scratch
- console message display
- maximum count for use of cleaning cartridges
- device where scratch volumes mounted in a WolfCreek LSM are to be dismounted or archived
- maximum number of pass-thrus allowed for a cartridge to be archived.

Refer to “MNTD (Mount/Dismount Options) Command and Control Statement” in the *HSC/MSP Operator’s Guide* for control statement syntax, parameter information, and example statements.

### Option Control

The general purpose OPTion control statement and operator command provides you methods to control the following:

- viewing time when using the VView command
- issuance of a message if an attempt is made to enter duplicate volumes into a library
- display of uppercase and lowercase characters output at the system console
- maximum number of cartridges that can be ejected for one eject operation
- volume processing associated with a specific CAP when the CAP is drained or becomes unavailable before an eject operation completes.

Refer to “OPTION Command and Control Statement” in the *HSC/MSP Operator’s Guide* for control statement syntax, parameter information, and example statements.

### Reconfiguration CDS Definition

The RECDEF control statement is used during reconfiguration to specify the new primary and secondary CDS definitions. Refer to “Reconfiguration CDS Definition (RECDEF) Control Statement” on page 94 for control statement syntax, parameter information, and example statements.

### Scratch Subpool Definition

With this control statement, you can specify new scratch pools. Using this control statement is recommended over using User Exit 03 (SLSUX03). Refer to “Scratch Subpool Control Statement” on page 96 for control statement syntax, parameter information, and example statements.

### User Exit Execution Control

This control statement and operator command allows you to enable or disable specified user exits. Refer to “User Exit (UEXIT) Command and Control Statement” in the *HSC/MSP Operator’s Guide* for control statement syntax, parameter information, and example statements.

## Control Statement Continuation Conventions

Control statements may be interspersed with comments designated by an asterisk (\*) in column one.

For definition data sets (VOLATTRs, UNITATTRs and TAPEREQs) comments **must** be in the new format (/ \* ... \* /). Asterisk (\*) comments are not allowed. A / \* ... \* / comment in the first line is **not** required for definition data sets.

Refer to “Control Statement Syntax Conventions” on page 493 for more information.

## Virtual Storage Manager (VSM) Support

VSM support has been added for certain HSC PARMLIB control statements. See the VSM software documentation for more information.

## CDS Definition (CDSDEF) Control Statement

The CDSDEF control statement is required and provides CDS name and location information to the HSC. This information is used by the HSC during initialization.

The static information includes both specified and implied parameters of the CDSDEF statement. For example, if you code your CDSDEF control statements and do not include volume serial (VOLSER) information, the HSC determines the VOLSER from the MSP catalog at HSC startup time. You cannot change a CDS VOLSER without stopping the HSC. Therefore, if you

- disable a CDS
- uncatalog a CDS
- recatalog a CDS on a new VOLSER
- enable a CDS

the HSC reallocates the original uncataloged CDS. The HSC stores the CDS VOLSER and this information remains in effect for the life of the HSC execution, even if you did not explicitly specify the volume parameter.

The HSC also stores CDS unit address information, but this information can change if the CDS is moved to a new unit address as part of a TDMF, FDRPAS, or P/DAS swap operation.

The primary, secondary, and standby control data sets are dynamically allocated. The CDSDEF PARMLIB control statement defines which copies of the control data set are used while the HSC is running.

Information used to build the SVC99 parameter lists is acquired from the parameter data set.

If journaling is active, JRNDEF statements must be used (refer to “Journal Definition (JRNDEF) Control Statement” on page 88 for more information).

Control information provided to the HSC by CDSDEF includes:

- the name(s) for HSC control data set(s)
- the DASD volume where the specified CDS resides
- the unitname for the SVC99 parameter list for CDS allocation
- switch information controlling the enabling of a standby CDS.



**Note:** The number of CDS copies used by the HSC is dependent on the number of CDS copies defined in the CDSDEF PARMLIB control statement. Control and journal data sets **cannot** be defined in JCL; the CDSDEF statement **must** be in the PARMLIB definitions. It is not determined by the LIBGEN SLIRCVRY macro TCHNIQE parameter.

The HSC uses all of the CDS copies defined in the CDSDEF control statement (whether this includes more or less CDS copies than are specified by the TCHNIQE

## CDS Definition (CDSDEF)

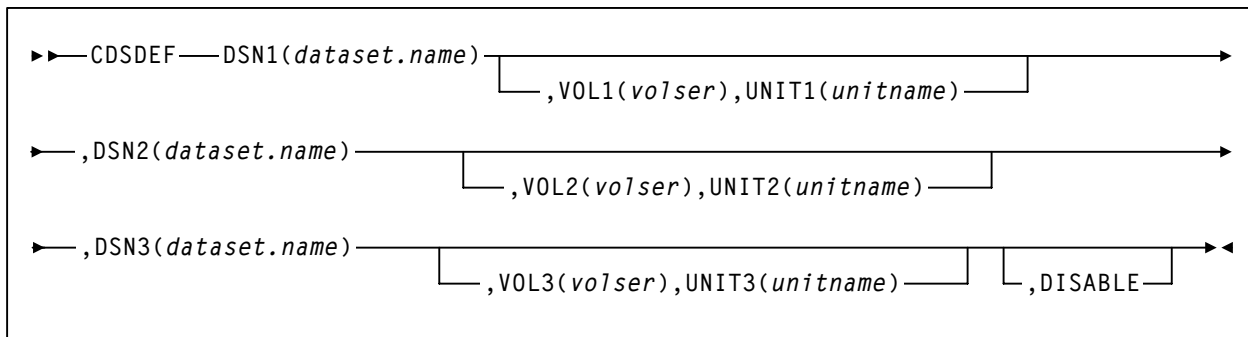
parameter). However, if journaling is specified by the TCHNIQE parameter, journals must be defined for successful HSC initialization.

The HSC RECONFIG utility uses CDS copies defined by JCL DD statements. JCL must be used to define the old and new CDS copies when VIO is used to minimize the time required to run RECONFIG. For more information about the RECONFIG utility, see “Reconfiguration Utility” on page 244.



**Caution:** Parameters specified for the CDS definition cannot be changed without a complete restart of the HSC on all hosts.

### Syntax



### Control Statement Name

#### CDSDEF

initiates the control statement.

### Parameters

#### DSNx

*dataset.name* is the name of an HSC control data set. At least one DSN parameter must be specified, as many as three can be specified. If two data sets are specified, then the volume inventory information on both copies is kept current, and these two data sets are referred to as the primary and the secondary CDS.

If all three are specified, then two copies are kept current and the third data set is a standby CDS which is enabled as the default condition. This standby CDS can be disabled with the **DISABLE** parameter. In the case where a standby copy of the CDS is being used, you do not need to specify which two of the three CDSs are the primary and secondary copies. The HSC determines, based on last use, which two are the correct copies to use during the initialization of the Control Data Set Services.

#### VOLx

optionally, *volser* is the volume serial number of the DASD volume where the specified CDS resides. If the data set is not cataloged, this must be specified.

If omitted, volume and unit information is determined from the MSP catalog, and the **UNITx** parameter is ignored.



**UNITx**

optionally, *unitname* is used to specify the unit parameter in the SVC99 dynamic allocation parameter list. If omitted, SYSALLDA is used.

*unitname* can be an IBM-defined generic (e.g., 3390), a system-built esoteric (e.g., SYSALLDA), a user-defined esoteric, or a specific device number. It is recommended that a general value of SYSALLDA be specified (or defaulted) to allow maximum flexibility and to reduce the need for CDSDEF updates to keep them consistent with the active CDS.

**DISABLE**

optionally, disables the standby CDS. If this parameter is not specified, the default is to enable the standby CDS at HSC initialization.

If **DISABLE** is specified, initialization verifies the standby CDS by allocating, opening, and reading the data set. The standby CDS is then closed and deallocated. This process allows manual control over the use of the standby CDS during a control data set switch situation.

If the standby CDS is enabled, the HSC automatically uses it for switching. If it is disabled, it is not used. There is no enable parameter for CDSDEF, as the enable condition is the default.

**Example**

The following is an example of using the CDSDEF control statement.

**CDSDEF Control Statement**

```
CDSDEF DSN1(SLS.DBASE),VOL1(HSC101),UNIT1(501),+
        DSN2(SLS.DBSEC),VOL2(HSC102),UNIT2(502),+
        DSN3(SLS.DSTBY),VOL3(HSC103),UNIT3(503),+
        DISABLE
```



**Note:** Control statements can only be continued if PARMLIB begins with a /\*...\*/ comment statement (see “Control Statement Syntax Conventions” on page 493).

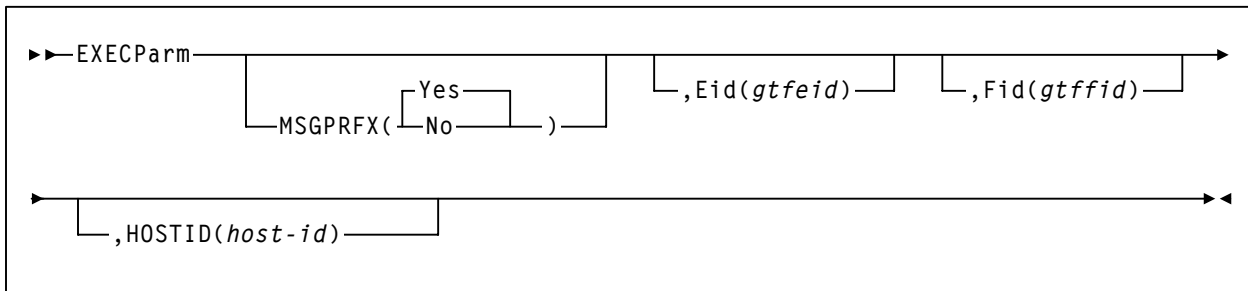
# EXECParm

## EXECParm Control Statement

The EXECParm control statement is an alternative method for specifying the GTF event ID (*Eid(gtfeid)*) and GTF format ID (*Fid(gtffid)*). The EXECParm control statement also provides a parameter that enables you to control display of the system command prefix when messages are written to the operator at the system console. This parameter controls the command prefix on WTO and WTOR messages.

Refer to “Creating an HSC START Procedure” on page 128 for a description of the start procedure and how it relates to EXECParm.

### Syntax



### Control Statement Name

#### EXECParm

initiates the control statement

### Parameters

#### MSGPRFX

optionally, specifies control of whether the command prefix is to precede WTO or WTOR messages to the operator.

#### Yes

indicates that the command prefix is to display preceding WTO or WTOR messages to the operator.

#### No

indicates that the command prefix is not to display preceding WTO or WTOR messages to the operator.

#### Eid

optionally, *gtfeid* specifies a GTF event ID.

PARAM='Eid(*user-specified-event-id*)' parameter is valid for use in the HSC initialization procedure as an alternative method of specifying the GTF event ID.

**Fid**

optionally, *gtffid* specifies a GTF format ID.

PARM='Fid(*user-specified-format-id*)' parameter is valid for use in the HSC initialization procedure as an alternative method of specifying the GTF format ID.

**HOSTID**

optionally, *host-id* specifies the system ID associated with the request to process the EXECParm control statement.



**Note:** If the *hostid* specified does not match the host executing the command, the command is ignored and no message is issued.

**Example**

The following example illustrates the use of the EXECParm control statement.

**EXECParm Control Statement — Command Prefix Off**

```
EXECPC MSGPRFX(NO) E(Ø86) F(23) HOSTID(MSP1)
```

## Journal Definition (JRNDEF)

### Journal Definition (JRNDEF) Control Statement

The JRNDEF control statement provides static information to the HSC. This information is used by the HSC at initialization and remains for the life of the HSC execution. Control information provided to the HSC by JRNDEF includes:

- the name for HSC journal data sets

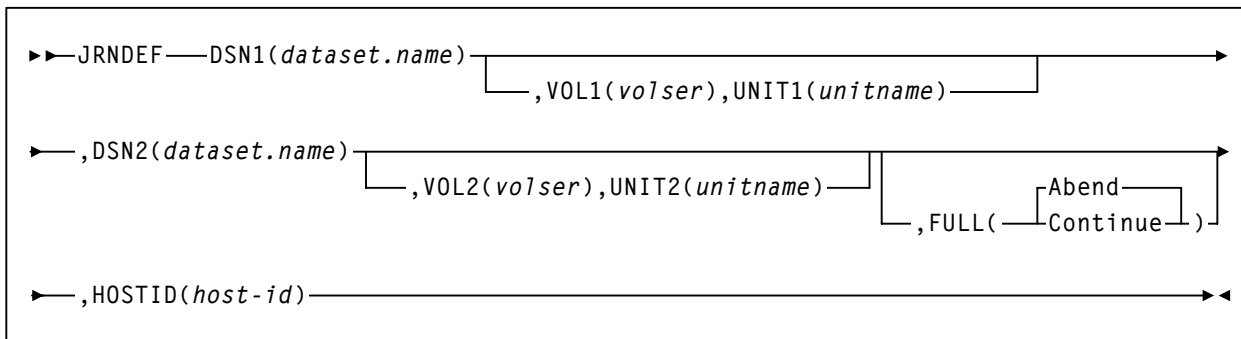


**Note:** If your recovery technique involves using journals, both journal data sets are required. HSC will not initialize if only one journal data set is provided.

- the DASD volume where the specified journal resides
- the unitname for the dynamic allocation parameter list for journal allocation
- journal full options.

In a multi-host complex, a separate JRNDEF statement is required for each host. Refer to “CDS Definition (CDSDEF) Control Statement” on page 83 for information about defining CDS files.

#### Syntax



#### Control Statement Name

##### JRNDEF

initiates the control statement.

#### Parameters

##### DSN<sub>x</sub>

dataset.name is the name of an HSC journal data set. If journaling is active, each HSC host that comes active must find a JRNDEF statement in PARMLIB with a HOSTID that matches the system where it is running. Each JRNDEF statement **must specify two distinct journal DSNs**.

Journal data sets cannot be shared between hosts.

### **VOL<sub>x</sub>**

optionally, *volser* is the volume serial number of the DASD volume where the specified journal resides. The volume must be specified if the journal data set is not cataloged.

### **UNIT<sub>x</sub>**

optionally, *unitname* is used to specify the unit parameter in the SVC99 dynamic allocation parameter list.

### **FULL**

optionally, this parameter provides the following options:

#### **Abend**

the HSC main address space internally abends if both journals fill to capacity before a CDS backup is executed. **This parameter is the default.**

#### **Continue**

library operations in the complex continue to occur **without the benefit of journaling on any host.**



**Note:** Once journaling is discontinued, the data contained in **all** journals and off-loaded copies cannot be used for recovery purposes. However, by running the BACKUP utility, all journals are reset and journaling automatically becomes active again.

### **HOSTID**

*host-id* is the system ID associated with the journals specified with this control statement. *host-id* must match the HOSTIDs defined by the SLILIBRY macro in the LIBGEN for the subsystem.

### **Example**

The following is an example of using the JRNDEF control statement.

#### **JRNDEF Control Statement**

```
JRNDEF DSN1(SLS.JRNØ1),VOL1(HSC1Ø1),UNIT1(51Ø),+
        DSN2(SLS.JRNØ2),VOL2(HSC1Ø2),UNIT2(511),+
        FULL(CONTINUE),+
        HOSTID(MSP1)
```



**Note:** Control statements can only be continued if PARMLIB begins with a /\*...\*/ comment statement (see “Control Statement Syntax Conventions” on page 493).

## License Key Definition (LKEYDEF)

### LKEYDEF Command and Control Statement

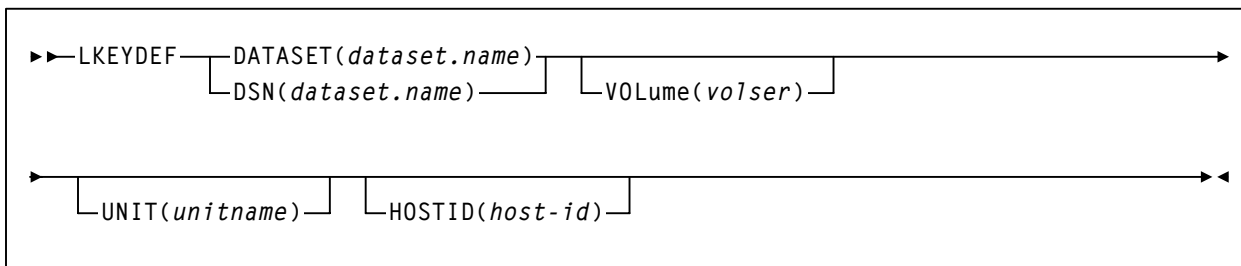
The LKEYDEF command/control statement retrieves LKEYINFO control statements containing HSC license key information, and loads them into an address space where they are available for retrieval by the HSC license key validation service.



**Warning:** The LKEYDEF control statement **must** be present in the HSC START procedure prior to initialization. The SLSSYSxx DD statement specifies the data set that contains PARMLIB start-up parameters. Refer to “Creating an HSC START Procedure” on page 128 for detailed information.

The LKEYDEF operator command can be issued from the console without terminating the HSC.

### Syntax



### Command Name

#### LKEYDEF

initiates the LKEYDEF command or control statement.

### Parameter Descriptions

#### DATASET or DSN

Specifies the name of the data set containing the LKEYINFO control statement(s).

#### *dataset-name*

Indicates the name of the data set.

The definition data set can be a fixed length 80-byte sequential data set, or a fixed length 80-byte member of a PDS. If the definition data set is a member of a PDS, you must enclose the PDS and member name within single quotes.

### **VOLume**

Optionally, specifies the volume on which the data set resides. This parameter is required if the data set is not cataloged.

#### *volser*

Indicates the volume serial number.

### **UNIT**

Optionally, specifies the unit where the definition data set resides.

#### *unitname*

Indicates the unit name. If the definition data set is not cataloged or this parameter is omitted, a unit name of SYSDA is the default.

### **HOSTID**

Optionally, limits the execution of this command or control statement to the specified hosts.

#### *host-id*

Specifies the name of one or more hosts from which to execute this command or control statement.

### **Example**

In the following example, the LKEYDEF control statement specifies that HSC license key information is retrieved from the data set MY.LKEYINFO.FILE during initialization.

```
LKEYDEF DSN(MY.LKEYINFO.FILE)
```



**Note:** Control statements can only be continued if PARMLIB begins with a /\*...\*/ comment statement (see “Control Statement Syntax Conventions” on page 493).

## License Key Information (LKEYINFO)

### License Key Information (LKEYINFO) Control Statement

The LKEYINFO control statement is used to input license key information for the HSC. It is placed in a data set or Partitioned Data Set member identified by an LKEYDEF control statement in the HSC PARMLIB control statements, and must be present for the HSC to initialize.



**Note:** Refer to the *HSC/MSP Configuration Guide* for more information about configuring your HSC license keys.

#### Syntax

```
►►LKEYINFO—PRoDuct(product_identifier)—CUSTomer('customer_name')————→  
◄—SITEno(nnnnnnn)—EXPRdate(yyyyddd)—KEY(license_key_string)————→◄
```

#### Parameter Descriptions



**Note:** All parameters must be entered exactly as received from StorageTek.

##### PRoDuct

Specifies the product and release to which the license key applies.

##### *product-identifier*

Indicates the product identifier. For the HSC 6.2 release, the product identifier is **VER0620**.

##### CUSTomer

Specifies the customer name as received from StorageTek.

##### *customer-name*

Indicates the customer name.

##### SITEno

Specifies the site number as received from StorageTek.

##### *nnnnnnn*

Indicates the site number.

##### EXPRdate

Specifies the expiration date of the license key as received from StorageTek.

##### *yyyyddd*

Indicates the expiration date.



## License Key Information (LKEYINFO)

### KEY

Specifies the license key string as received from StorageTek.

### *license-key-string*

Indicates the license key string.

### Examples

In the following example, the LKEYINFO control statement is used to input HSC license key information as received from StorageTek.

```
LKEYINFO PROD(VER0620) -  
          CUST('CUSTOMER NAME') -  
          SITE(111222) -  
          EXPRD(2002365) -  
          KEY(5IX4IX4ITE*T8M3W) -
```

## Reconfiguration CDS Definition (RECDEF)

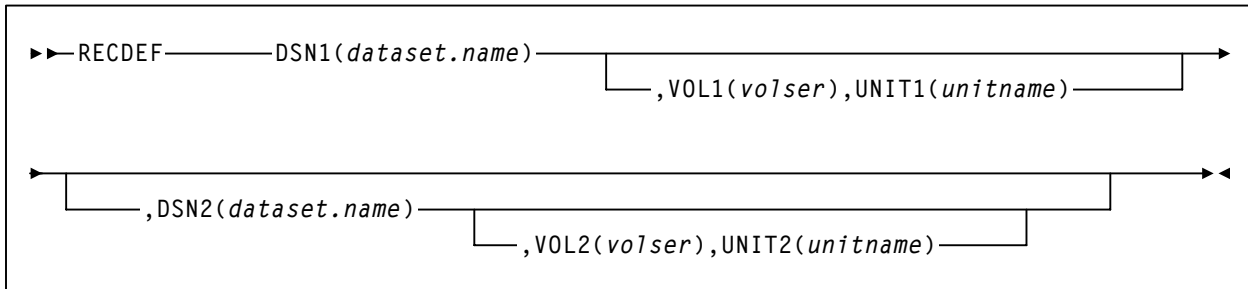
### Reconfiguration CDS Definition (RECDEF) Control Statement

The RECDEF control statement, in combination with the CDSDEF control statement (refer to “CDS Definition (CDSDEF) Control Statement” on page 83), defines which CDS copies are to be used when running the Reconfiguration utility. CDSDEF specifies the old input copies of the CDS; RECDEF the new copies.



**Note:** RECDEF parameters replace the DBPRMNEW and DBSHDNEW DD statements used in previous releases. A new standby CDS created by the SLICREAT program (refer to “Initializing the Control Data Sets” in the *HSC/MSP Configuration Guide*) is not affected by reconfiguration. It becomes valid once it is enabled by the HSC.

#### Syntax



#### Control Statement Name

##### RECDEF

initiates the control statement.

#### Parameters

##### DSNx

*dataset.name* is the name of a newly created HSC CDS. At least one DSN parameter must be specified; as many as two can be specified. The first DSN becomes the primary CDS. If specified, the next DSN is created as an identical copy of the primary CDS.

RECDEF DSNs are input for the first HSC initialization as CDSDEF control statements. DSNs can be entered in any order whether or not this is the first initialization. Order is not important, since all copies are identical after the reconfiguration and controlling information is kept in each CDS for subsequent runs.

##### VOLx

optionally, *volser* is the volume serial number of the DASD volume where the specified CDS resides.

##### UNITx

optionally, *unitname* is used to specify the unit parameter in the SVC99 dynamic allocation parameter list.

### Example

The following is an example of using the RECDEF control statement.

#### RECDEF Control Statement

```
RECDEF DSN1(SLS.DBASE),VOL1(HSC101),UNIT1(501),+  
       DSN2(SLS.DBSEC),VOL2(HSC102),UNIT2(502)
```



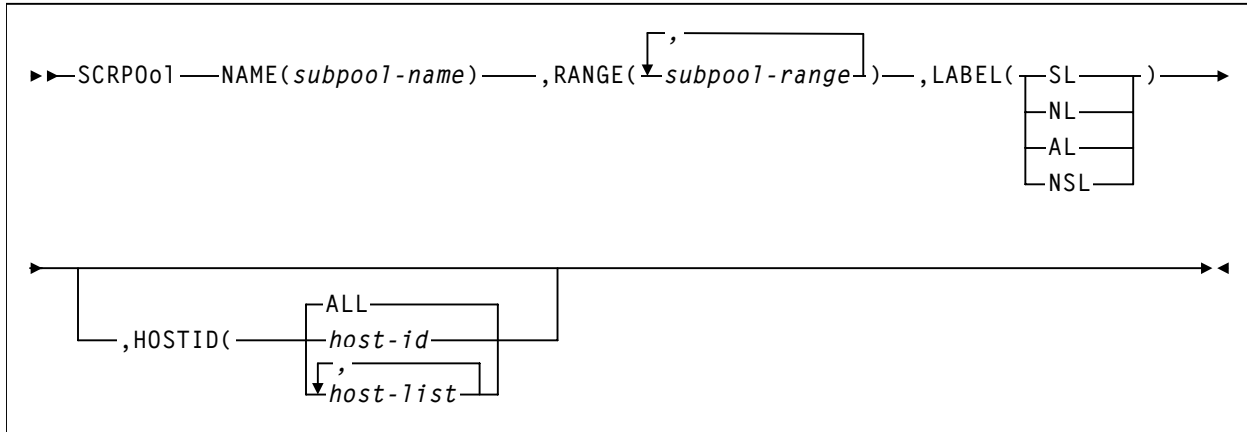
**Note:** Control statements can only be continued if PARMLIB begins with a /\*...\*/ comment statement (see “Control Statement Syntax Conventions” on page 493).

## Scratch Subpool

### Scratch Subpool Control Statement

The scratch subpool control statement provides you with control of the scratch volume activity in a library. Refer to “Scratch Subpool Management” on page 45 for more information relating to this control statement.

#### Syntax



#### Control Statement Name

##### SCRPOol

control statement identifier.

#### Parameters

Subpool information is defined in PARMLIB as individual control statements using the following parameters.

##### NAME

specifies the name of the subpool. A maximum of 13 characters is allowed; blank spaces are not permitted.



##### Notes:

1. If scratch subpools are defined using User Exit 03 (see the *NCS User Exit Guide*), the scratch subpool name may be omitted. If the subpool name is not provided by User Exit 03, the subpool index (subpool 0) is used as the name.

The subpool index is converted to three EBCDIC decimal digits and placed in the left most three positions of the subpool name. Subpool 0 contains all scratch tapes in the ACS including scratch tapes in named subpools.

2. A SCRPOOL statement containing a duplicate subpool name is ignored unless it immediately follows the first statement that specifies the same subpool name. In this case, the second statement is considered to be a continuation of the first. The following example shows a valid combination:

```
SCRPOOL NAME=POOL1, RANGE=(P10000-P10199), LABEL=SL
SCRPOOL NAME=POOL1, RANGE=(P90000-P20199), LABEL=SL
SCRPOOL NAME=POOL2, RANGE=(P20000-P20199), LABEL=SL
```

In the next example, the second POOL1 statement is not valid and causes an error message to be generated.

```
SCRPOOL NAME=POOL1, RANGE=(P10000-P10199), LABEL=SL
SCRPOOL NAME=POOL2, RANGE=(P20000-P20199), LABEL=SL
SCRPOOL NAME=POOL1, RANGE=(P90000-P90199), LABEL=SL
```

## RANGE

*subpool-range* specifies the volume serial numbers which the subpool represents. Range start and end values are separated by a single dash (-). Multiple ranges may be specified separating each range by commas.



### Notes:

1. The range of volume serial numbers must be unique for each subpool; that is, a volume serial number cannot be used in more than one subpool range.
2. Make sure when you are coding multiple ranges of tapes that you do not specify the **RANGE** parameter on different SCRPOOL control statements. If more than one SCRPOOL statement has been specified, the HSC reads only the **last** RANGE setting it encounters and loads only that range. All other ranges are ignored.

StorageTek recommends that you specify multiple ranges, separated by commas, on one SCRPOOL control statement, if possible.

## LABEL

*type* specifies the label type associated with the applicable subpool. Types include:

### SL

standard label

### NL

no label

### AL

ANSI label

### NSL

nonstandard label

## Scratch Subpool

### HOSTID

optionally, defines the hosts that are valid for this subpool. Multiple *host-lists* may be specified, separating each *host-list* value with a comma. Default HOSTID is ALL.

If you need to define the same subpool name on some but not all hosts, you may duplicate the SCRPOOL statement changing the HOSTID parameter as necessary (see examples). Optionally, you may use separate PARMLIB data sets for each host, but this is not recommended.

### Example

The following is an example of using the Scratch Subpool control statement.

### Scratch Subpool Control Statements

```
SCRPOOL NAME(SITE1), RANGE(100000-200000, 300000-400000), LABEL(SL)
SCRPO  NAME(SITE2), RANGE(500000-540072), LABEL(NL), HOSTID(MSP1)
SCRPO  NAME(SITE2), RANGE(500000-540072), LABEL(NL), HOSTID(MSP6)
SCRPO  NAME(SITE3), RANGE(540081-610094), LABEL(NSL)
SCRPO  NAME(SITE4), RANGE(AP1000-AP1999), LABEL(SL), HOSTID(MSP1, MSP6)
```

### Other Methods of Controlling Scratch Subpools

There are other ways to control scratch volumes and scratch subpools in the library. The following are additional methods that may be used:

- Display SCRatch command
- Display command with THReshld parameter
- ENTer command specified with SCRatch parameter
- SCREdist utility with SUBpool and BALtol parameters
- Eject command with SCRTCH SUBpool parameters
- Mount command with SCRTCH SUBpool parameters
- Warn command with SCRatch SUBpool and THREShold parameters
- Job Processing User Exit 01
- JES Scratch Allocation Exit 02
- Scratch Subpool User Exit 03.

Refer to the “Commands, Control Statements, and Utilities” in the *HSC/MSP Operator’s Guide* for more information.

## Definition Data Set Control Statements

Definition data sets contain the control statements used to define tape data set storage policies to the HSC. A definition data set must be sequential (it may be a partitioned data set [PDS] member) with any valid record format (RECFM). The syntax rules for the HSC PARMLIB data set designated by SLSSYSxx apply to the statements contained in a definition data set, except that comment statements with an asterisk in column one are not allowed. Refer to “Control Statement Syntax Conventions” on page 493 for information about PARMLIB syntax rules.

Each of the following commands cause the HSC to open a definition data set and load its specified attributes:

- LMUPDEF
- SCRPFDEF
- VOLDEF (for VOLATTRs).



**Note: The UNITDEF command is no longer supported by the HSC. The HSC now recognizes library and virtual drive characteristics from the LMU and CDS definitions. TREQDEF has been removed from the HSC and is now processed by the SMC.**

The user can specify LMUPDEF, SCRPFDEF, and VOLDEF control statements either in the HSC PARMLIB data set to load the definition data sets at startup, or issue them as operator commands to dynamically load the data sets without stopping the HSC. The LMUPATH, SCRPOOL, and VOLATTR statements contained in a definition data set are in effect only on the host that opens the data set. They are not broadcast or propagated to other hosts, and are not maintained across HSC stops and starts. The definition data sets must be opened each time the HSC is restarted.

LMU path (LMUPATH), scratch subpool (SCRPOOL), and volume attribute (VOLATTR), statements may be placed in the same definition data set or in different data sets, depending on your site requirements. Each data set may also contain an OPTION TITLE statement with an identifying string.

If the HSC encounters any other statements when it opens a definition data set, error messages are issued, the statements are ignored, **the definition data set is not loaded, and definition data set processing terminates**. The user must correct the problem statements and reload the data set.

## Options Offered by Definition Data Set Control Statements

The following definition data set control statements are included in this chapter:

### **OPTion TITLE**

This control statement allows you to specify a string that identifies a definition data set. Refer to “OPTion TITLE Control Statement” on page 109 for control statement syntax, parameter information, and example statements.

### **LMU Path**

The LMUPATH control statement defines network LMU attachments. Refer to “LMUPATH Control Statement” on page 103 for control statement syntax, parameter information, and example statements.

### **LMU Parameter Definition**

The LMUPDEF command and control statement identifies the definition data set where network LMU network attachment statements reside (see LMUPATH). LMUPDEF can be issued either in PARMLIB or as an operator command. Refer to “LMUPDEF Command and Control Statement” on page 106 for control statement syntax, parameter information, and example statements.

### **Scratch Subpool Parameter Statement Definition**

The SCRPFDEF command and control statement identifies the definition data set where scratch subpool parameter statements reside (see Scratch Subpool Control Statement). SCRPFDEF can be issued either in PARMLIB or as an operator command. Refer to “Scratch Subpool Definition (SCRPFDEF) Command and Control Statement” on page 111 for control statement syntax, parameter information, and example statements.

### **Tape Request**

The TAPEREQ control statement specifies tape request attributes. **TAPEREQ is no longer processed by the HSC.** Refer to the *SMC Configuration and Administration Guide* for control statement syntax, parameter information, and example statements.

### **Tape Request Definition**

The TREQDEF command and control statement identifies the definition data set where the tape request attributes reside (see TAPEREQ). **TREQDEF is no longer processed by the HSC.** Refer to the *SMC Configuration and Administration Guide* for control statement syntax, parameter information, and example statements.

### **Unit Attribute**

The UNITATTR control statement specifies unit attributes. **UNITATTR is no longer processed by the HSC.** Refer to the *SMC Configuration and Administration Guide* for control statement syntax, parameter information, and example statements.

### **Volume Attribute**

The VOLATTR control statement specifies tape volume attributes. Refer to “Volume Attribute (VOLATTR) Control Statement” on page 115 for control statement syntax, parameter information, and example statements.



### **Volume Attribute Definition**

The VOLDEF command and control statement identifies the definition data set where the tape volume attributes can be found (see VOLATTR). VOLDEF can be issued either in PARMLIB or as an operator command. Refer to “Volume Attribute Definition (VOLDEF) Command and Control Statement” on page 125 for control statement syntax, parameter information, and example statements.

### **Virtual Storage Manager (VSM) Support**

VSM support has been added for certain definition data set control statements. See the VSM software documentation for more information.

### **Defining LMU Network Connections**

LMUPATH statements allow users to define LMU network TCP/IP attachments. Network addresses can be specified by host name or LMU IP address.

### **Defining Volume Attributes (VOLATTR)**

VOLATTR statements describe the media type and recording technique attributes of cartridge tape volumes. Volumes are described by:

- volume serial number (VOLSER)
- media type
- recording technique.

**To allow the HSC to operate correctly, the user must define VOLATTR statements for all ECART, ZCART, helical, 9840/T9840B/T9840C (STK1R), T9940A/T9940B (STK2), and T10000 media. Volumes not defined by VOLATTRs are presumed to be standard capacity cartridges for scratch counts.**

Collections of cartridges with common attributes can be identified in a single VOLATTR statement by specifying ranges and lists of VOLSERs, or using wild card characters.

**Scratch counts are based entirely on VOLATTR information. Accurately defined VOLATTR control statements are critical for correct processing of nonspecific volume requests.**

**For specific mounts, the actual media type, as determined by the LMU, overrides what is specified in the VOLATTR.**

The VOLDEF command causes the HSC to open the definition data set containing the VOLATTR statements. See “Volume Attribute Definition (VOLDEF) Command and Control Statement” on page 125 and “Volume Attribute (VOLATTR) Control Statement” on page 115 for descriptions of syntax and parameters.

### **Identifying the Definition Data Sets (OPTION TITLE)**

The OPTion TITLE control statement places an identifying string in a definition data set to describe the contents of the data set. See “OPTion TITLE Control Statement” on page 109 for descriptions of syntax and parameters.

## Control Statement Continuation Conventions

Control statements may be interspersed with comments designated by an asterisk (\*) in column one.

For definition data sets (VOLATTRs, UNITATTRs and TAPEREQs) comments **must** be in the new format (/...\*/). Asterisk (\*) comments are not allowed. A /...\*/ comment in the first line is **not** required for definition data sets.

Refer to “Control Statement Syntax Conventions” on page 493 for more information.

## LMUPATH Control Statement

The LMUPATH control statement allows users to define network LMU attachments. LMUPATH information is obtained from the definition data set specified by the LMUPDEF command. The LMUPATH statement must be placed in the definition data set; it cannot be issued as an operator command.

Users can find additional important TCP/IP-related information by referring to “Dynamic LMU Connection” on page 65. To display the LMUPDEF data set, refer to Display LMUPDEF in the *HSC Operator’s Guide*.

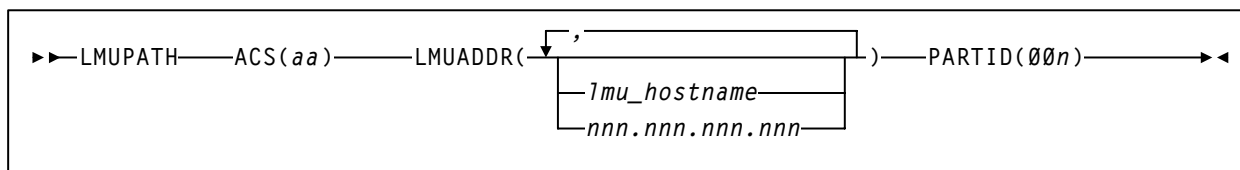


**Note:** If you are using the SL8500 partitioning feature, the PARTID parameter connects to a specific partition defined by the SL8500 library for the HSC host group.

## LMUPATH Usage

LMUPATH statements define the TCP/IP addresses used to communicate between an HSC on a host and the LMU or library controller for a specific ACS. Up to two addresses can be specified for each ACS, however, a second address indicates a dual LMU or dual TCP/IP environment.

## Syntax



## Control Statement Name

### LMUPATH

initiates the LMUPATH control statement.

## Parameters

### ACS

specifies the ACS name.

### aa

specifies the hexadecimal ACSid value (00 through FF) to identify the LMU(s) used to communicate with an HSC.

# LMUPATH

## LMUADDR

identifies an LMU by IP address or host name for each ACS. To designate a single LMU environment, specify one IP address or host name. To specify a dual LMU environment or a dual IP connection to an SL8500, enter an additional IP address and/or host name.



**Note:** The HSC automatically detects the type of connection, dual LMU for a 9330 or dual IP for an SL8500 library.

A maximum of two addresses can be specified.

Users can intermix host name and IP addresses in one LMUPATH control statement. Each parameter entered must represent a different IP address.

### *lmu\_hostname*

defines a host name for the TCP/IP connection. The host name can be up to 24 characters long. The first character must be alphabetic.



**Note:** This option is not supported in VM.

### *nnn.nnn.nnn.nnn*

defines an IP address for the LMU.

## PARTID

defines a partition ID for each ACS.

### *00n*

specifies a partition ID from 001 to 999.



### **Notes:**

- All three characters must be entered for the partition ID.
- For this release, only IDs 001 through 004 are supported.

## Examples

The following examples show multiple LMUADDR parameters consisting of an IP address and a hostname or dual IP connection. The second parameter indicates a dual LMU environment or a dual IP connection to an SL8500.

```
LMUPATH ACS(00) LMUADDR(123.456.789.012, LMU01)
```

```
LMUPATH ACS(00) LMUADDR(123.456.789.012, 123.678.789.013)
```

```
LMUPATH ACS(00) LMUADDR(123.456.789.012, 123.456.789.013) PARTID(001)
```



The host name parameter shown in this example (LMU01) is not supported in VM.

## LMUPDEF Command and Control Statement

The LMUPDEF command and control statement is used to specify the definition data set that contains network LMU attachment (LMUPATH) statements. The data set must be a sequential or a partitioned data set (PDS) with any valid record format (RECFM). Also, the data set must contain one or more LMUPATH statements.

The LMUPDEF statement can be specified in PARMLIB, or it can be issued as an operator command to dynamically load or reload LMUPATH parameters. (Refer to “PARMLIB Control Statements” in the *HSC/MSP Configuration Guide* for an explanation of PARMLIB.)

If a definition file is changed by a LMUPDEF operator command, and if the change is to be permanent, you must update PARMLIB before restarting the HSC. If the definition file is to be modified for a given shift or application, remember that the new definition remains in effect until another definition is loaded or the HSC is recycled. The definition file then reverts to the PARMLIB specification. Thus, LMUPDEF can be used to temporarily change a definition file.

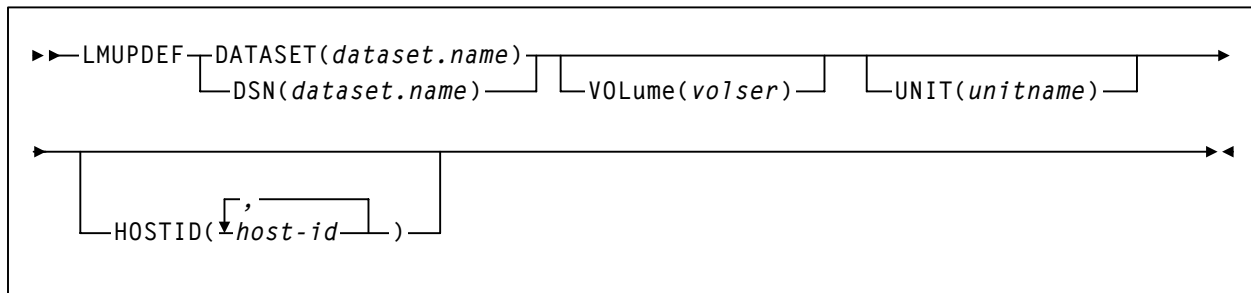
Definition commands issued on one host are in effect only on that host. If different hosts use the same definition data set, the LMUPATH parameter statements are shared by those hosts.



### Notes:

1. Users can find additional important TCP/IP-related information by referring to “Dynamic LMU Connection” on page 65. To display the LMUPDEF data set, refer to Display LMUPDEF in the *HSC/MSP Operator's Guide*.
2. When the LMUPDEF command is issued, if the definition data set contains errors, an HSC message provides the parameter in error, a description of the problem, and the line number where the error occurred. If the definition data set contains errors, none of the attributes specified in the LMUPATH control statement(s) will be loaded (put into effect). Message SLS1627I is displayed if errors are encountered. If 50 errors are encountered, the remainder of the data set is not checked. Correct the problem and reissue the command.
3. The LMUPDEF command and control statement executes at both base and full service levels of the HSC.
4. If you issue multiple LMUPDEF commands or statements, the last one processed is currently active. You can determine which LMUPDEF statement is active by entering the Display LMUPDEF command.
5. In order for the new IP addresses to take effect, users must first establish IP addresses with the LMUPDEF command. Next, vary the ACS(s) offline and then online, using the Vary ACS operator command.

## Syntax



## Control Statement Name

### LMUPDEF

Initiates the LMUPDEF command and control statement.

## Parameters

### DATASET or DSN

specifies the name of the data set containing the LMUPATH statements to be processed and, optionally, an OPTion TITLE statement.



**Note:** The definition data set may contain VOLATTR, UNITATTR, TAPEREQ, LMUPATH, and OPTion TITLE statements.

- Only OPTion TITLE and LMUPATH statements are processed.
- If any other statement is encountered, an error message is issued and the statement is ignored.

### *dataset.name*

specifies the name of the data set containing the LMUPATH address parameters. If the data set name includes a member name, *dataset.name* must be enclosed in quotes. For example,

```
DATASET('YOUR.DSN(MEMBER)')
```

### VOLume

specifies the serial number of the DASD volume on which the data set resides. This parameter is optional. Specify the VOLume parameter if the data set is not cataloged, or if a data set on a volume other than the volume indicated by the catalog is to be used.



**Note:** The volume specified must be a DASD volume.

### *volser*

specifies the volume serial number for the definition data set.

# LMUPDEF

## UNIT

specifies the unit where the definition data set is located.

### *unitname*

specifies the unit name. If the definition data set is not cataloged and this parameter is omitted, a unit name of SYSALLDA is the default.

## HOSTID

(This parameter is valid only for use in PARMLIB, so that multiple systems can share a PARMLIB member containing TAPEREQ, VOLATTR, UNITATTR, or LMUPATH statements for different releases of HSC. If entered from the console, message SLS0018I is issued.)

Optionally, limits the execution of this control statement to the specified hosts. If one of the specified hostids matches the host executing this control statement, the control statement is executed for that host. Otherwise, it is ignored. If this parameter is omitted, the control statement is executed on all hosts.

### *host-id*

specifies the name of one or more hosts from which to execute this control statement. Multiple hosts must be separated by commas.

## Examples

The following examples illustrate the use of the LMUPDEF statement.

### Load the LMUPATH Parameters From YOUR.DSN(MEMBER)

```
LMUPDEF DSN('YOUR.DSN(MEMBER)')
```

### Load the LMUPATH Parameters From DASD Volume DISK03

```
LMUPDEF DSN(YOUR.DSN2) VOLUME(DISK03)
```



**Note:** Control statements can only be continued if PARMLIB begins with a /\*...\*/ comment statement (see “Control Statement Syntax Conventions” on page 493).



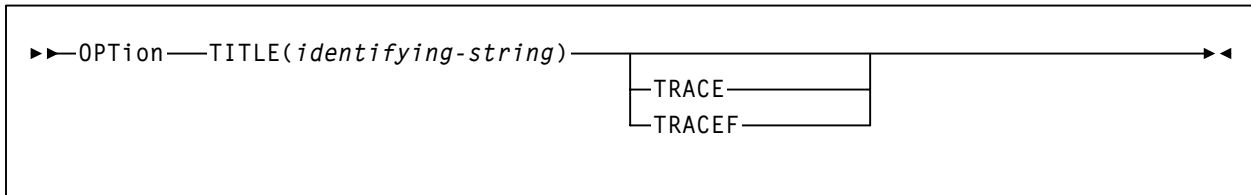
## OPTion TITLE Control Statement

The OPTion TITLE statement is used to specify an identifying string for a definition data set. The identifying string can be any information that helps the user describe the contents of the definition data set.

The OPTion TITLE statement must be placed in the definition data set; it cannot be issued as an operator command. If more than one OPTion statement is specified in the definition data set, only the identifying string of the last OPTion statement encountered is retained.

The identifying string can be displayed with HSC Display commands. Refer to “DISPLAY Command” in the *HSC/MSP Operator’s Guide* for descriptions of command syntax and parameters.

### Syntax



### Control Statement Name

#### OPTion

initiates the OPTion control statement.

### Parameters

#### TITLE

specifies an identifying string for the definition data set. If this statement is omitted, the definition data set has no identifying string associated with it.

#### *identifying-string*

specifies the identifying string. The maximum length of the identifying string is fifty characters. If the identifying string includes one or more spaces, or any characters other than alphabetic, numeric, or national (i.e., \$, @, #), it must be enclosed in quotes.

#### TRACE or TRACEF

used to control internal tracing of HSC table lookups. During problem resolution, Software Support may request that you specify one of these parameters.

## OPTion TITLE

### Example

The following example illustrates the use of the OPTion TITLE control statement.

#### **Specify an Identifying String For a Definition Data Set**

```
OPTION TITLE('SAMPLE IDENTIFYING STRING')
```

### Scratch Subpool Definition (SCRPDEF) Command and Control Statement

The SCRPDEF command and control statement is used to specify the definition data set that contains scratch subpool (SCRPOol) parameter statements. (Refer to “Scratch Subpool Control Statement” on page 96 for details on syntax and parameters.) The data set must be a sequential or a partitioned data set (PDS) with any valid record format (RECFM). Also, the definition data set must contain one or more SCRPOol statements.

The SCRPDEF statement may be specified in the HSC PARMLIB, or it may be issued as an operator command to dynamically load or reload scratch subpool parameters. (Refer to “PARMLIB Control Statements” on page 77 for an explanation of PARMLIB.)



**Warning:** If you reissue SCRPDEF, it resets subpool threshold values to 0. In this case, you must reenter the subpool thresholds on the Warn command SUBpool parameter. Only subpool thresholds are affected; ACS and LSM thresholds are not reset.

If a definition file is changed by a SCRPDEF operator command, and if the change is to be permanent, you must update PARMLIB before restarting the HSC. If the definition file is to be modified for a given shift or application, remember that the new definition remains in effect until another definition is loaded or the HSC is recycled. The definition file then reverts to the PARMLIB specification. Thus, SCRPDEF can be used to temporarily change a definition file.



**Caution:** If SCRPOol parameter statements are specified in PARMLIB or are loaded from User Exit 03, SCRPDEF is disabled and dynamic scratch pool reload is not allowed.

Definition commands issued on one host are in effect only on that host. If different hosts use the same definition data set, then the tape request parameter statements are shared by those hosts.

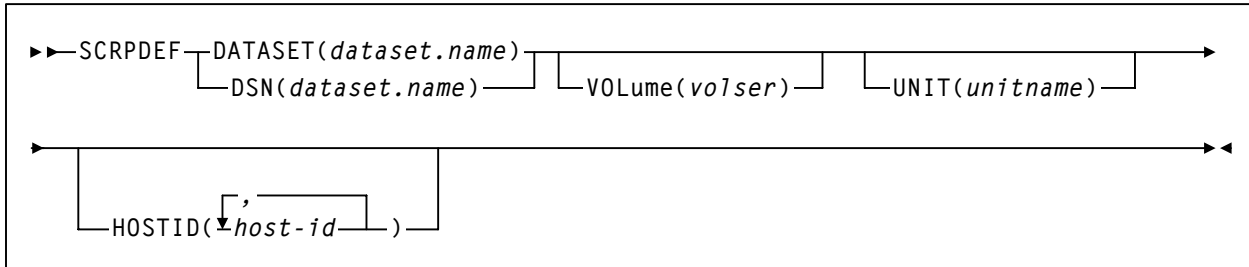


#### Notes:

1. When the SCRPDEF command is issued, if the definition data set contains errors, an HSC message provides the parameter in error, a description of the problem, and the line number where the error occurred. If the definition data set contains errors, none of the attributes specified in the SCRPOol control statement(s) will be loaded (put into effect), which may cause data sets to be created on the wrong type of media and incorrect devices to be allocated. Message SLS1627I is displayed if errors are encountered. If 50 errors are encountered, the remainder of the data set is not checked. Correct the problem and reissue the command.
2. The SCRPDEF command and control statement executes at both base and full service levels of the HSC.
3. If you issue multiple SCRPDEF statements, the last one processed is currently active. You can determine which SCRPDEF statement is active by entering the Display SCRPDEF command.
4. For additional information about syntax, refer to “Control Statement Syntax Conventions” on page 493.

# Scratch Subpool Definition (SCRPDEF)

## Syntax



## Control Statement Name

### SCRDEF

initiates the SCRDEF command and control statement.

## Parameters

### DATASET or DSN

specifies the name of the data set containing the SCRPOOL statements to be processed and, optionally, an OPTION TITLE statement. (Refer to “Scratch Subpool Control Statement” on page 96 and “OPTION TITLE Control Statement” on page 109 for details on syntax and parameters).



**Note:** The definition data set may contain SCRPOOL, TAPEREQ, UNITATTR, VOLATTR, and OPTION TITLE statements. Only OPTION TITLE and SCRPOOL statements are processed. If any other statement is encountered, an error message is issued and the statement is ignored.

### *dataset.name*

specifies the name of the data set containing scratch subpool parameters. If the data set name includes a member name, *dataset.name* must be enclosed in quotes. For example,

```
DATASET('YOUR.DSN(MEMBER)')
```

### VOLUME

specifies the serial number of the DASD volume on which the data set resides. This parameter is optional. Specify the VOLUME parameter if the data set is not cataloged, or if a data set on a volume other than the volume indicated by the catalog is to be used.



**Note:** The volume specified must be a DASD volume.

### *volser*

specifies the volume serial number for the definition data set.

### UNIT

specifies the unit where the definition data set is located.

#### *unitname*

specifies the unit name. If the definition data set is not cataloged and this parameter is omitted, a unit name of SYSALLDA is the default.

### HOSTID

(This parameter is valid only for use in PARMLIB, so that multiple systems can share a PARMLIB member containing SCRPOOL, TAPEREQ, VOLATTR, or UNITATTR statements for different releases of HSC. If entered from the console, message SLS0018I is issued.)

Optionally, the HOSTID parameter limits the execution of this control statement to the specified hosts. If one of the specified hostids matches the host executing this control statement, the control statement is executed for that host. Otherwise, it is ignored. If this parameter is omitted, the control statement is executed on all hosts.

#### *host-id*

specifies the name of one or more hosts from which to execute this control statement. Multiple hosts must be separated by commas.

### Examples

The following examples illustrate the use of the SCRPDEF statement.

#### Load the SCRPOOL Parameters From YOUR.DSN(MEMBER)

```
SCRPDEF DSN('YOUR.DSN(MEMBER)')
```

#### Load the SCRPOOL Parameters From DASD Volume DISK01

```
SCRPDEF DSN('YOUR.DSN(MEMBER)') VOLUME(DISK01)
```



**Note:** Control statements can only be continued if PARMLIB begins with a /\*...\*/ comment statement (see “Control Statement Syntax Conventions” on page 493).

## Tape Request (TAPEREQ) Control Statement

The TAPEREQ control statement is used to specify tape request attributes.



**Note:** TAPEREQ is controlled by the SMC. Refer to the *SMC Configuration and Administration Guide* for detailed information.

## Tape Request Definition (TREQDEF) Command and Control Statement

The TREQDEF command and control statement is used to specify the definition data set that contains tape request (TAPEREQ) parameter statements.



**Note:** TREQDEF is processed by the SMC. Refer to the *SMC Configuration and Administration Guide* for more information.

## Unit Attribute (UNITATTR) Control Statement

The UNITATTR statement specifies unit attributes and allows the user to define the model number of transports.



**UNITATTR** is controlled by the SMC. Refer to the *SMC Configuration and Administration Guide* for detailed information.

## Unit Attribute Definition (UNITDEF) Command and Control Statement

The UNITDEF command and control statement allows the user to specify the data set that contains the unit attribute (UNITATTR) statements.



**UNITDEF** is processed by the SMC. Refer to the *SMC Configuration and Administration Guide* for more information.

## Volume Attribute (VOLATTR) Control Statement

The VOLATTR control statement is used to specify tape volume attributes. VOLATTR statements are read from the definition data set specified by the VOLDEF command. (Refer to “Volume Attribute Definition (VOLDEF) Command and Control Statement” on page 125 for details on syntax and parameters.) The VOLATTR statement must be placed in the definition data set; it cannot be issued as an operator command.



### Notes:

1. You must enter a VOLATTR statement for each media type so that the HSC can correctly determine scratch counts and preferencing for scratch allocation. **It is important that all VOLATTR control statements be accurate if you rely on precise scratch counts.**
2. A VOLATTR must exist for ECARTs that do not have a media label so that the HSC can distinguish ECARTs from standard cartridges.

## VOLATTR Usage

When the HSC needs to determine the attributes for a volume, it searches the VOLATTR statements in the order that they appear in the definition data set. The first statement that matches the requested volume is used to determine the attributes that are specified on that VOLATTR statement. The search continues for any attributes that are not specified on the first matching VOLATTR statement. These attributes are supplied by the next matching VOLATTR that specifies the attribute(s).

For example, if MEDIA is provided but RECtech is not, RECtech takes a default value based upon the MEDIA parameter. The same situation occurs if a RECtech value is present but MEDIA is not. Thus, StorageTek recommends that users:

- order the VOLATTR statements from most specific to most general
- specify only MEDIA on all VOLATTR statements and let RECtech default, or specify both MEDIA and RECtech on all VOLATTR statements.

The HSC always selects a RECtech compatible with the volume’s media type; it is not necessary to specify RECtech on VOLATTR statements unless a specific RECtech is desired.

If RECtech is specified for any default VOLATTRs, however, it should be specified for all VOLATTRs to avoid obtaining MEDIA from one VOLATTR and RECtech from another.



**Note:** Run the Volume Report utility using the NONMEDEQ option to verify that your VOLATTRs are in agreement with the CDS volume attribute record (VAR). The VAR reflects volume information from the LMU and can be compared to the VOLATTRs.

StorageTek recommends that the volume attribute statements in effect be the same on all processors; if not, results are unpredictable. This is especially true when running the HSC as a remote server to an SMC client.

## Volume Attribute (VOLATTR)

If you enter any VOLATTR statement that globally defaults to all volumes (e.g., VOLATTR SER(\*) REC(18)), you **must** precede this statement with VOLATTRs specifying the cleaning cartridges for each type of transport defined in the ACS. Cleaning cartridges should be defined as follows:

- for longitudinal drives should be defined as MEDia(S)
- for helical drives, MEDia(DD3D)
- for 9840, T9840B, and T9840C drives, MEDia(STK1U)
- for T9940A and T9940B drives, MEDia(STK2W)
- for T10000, MEDia(T10000CT)

If global defaults are used to specify RECtech for large ranges of volumes, specify both MEDia and RECtech on all preceding VOLATTR statements. Otherwise, for a given VOLSER, the MEDia may be obtained from an earlier statement.

In the following example, the media type obtained from an earlier statement results in a default RECtech of STK1R. Then, the global statement that follows specifies a global RECtech of 36track, which is incompatible with the earlier statement.

```
VOLATTR SERIAL(EAG000-EAG999) MEDIA(STK1R)
VOLATTR SERIAL(*) RECTECH(36TRACK)
```

### Disabling a VOLATTR Definition

Use the following procedure to disable a VOLATTR definition.

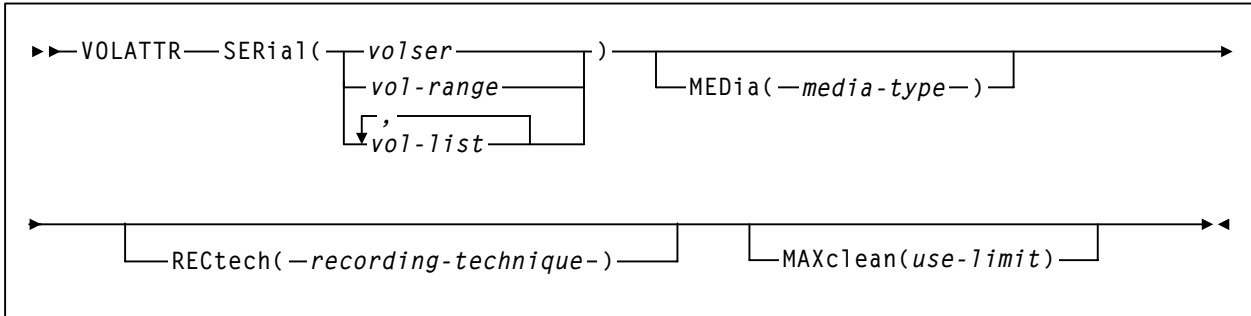
1. Edit the definition data set containing the current VOLATTR statements.
2. Delete the parameters of the VOLATTR statement you want to disable, or delete or comment out the VOLATTR statement.
3. Issue the VOLDEF command to reload the definition data set.

With the modified definition data set in effect, the HSC searches the remaining VOLATTR statements to determine the media type and recording technique for a volume.

To disable all VOLATTR definitions, load a definition data set that contains only the statement VOLATTR SERIAL(\*). Refer to Table 7 on page 118 and Table 8 on page 121 to see a list of VOLATTR media and recording technique default values.



**Syntax**



**Control Statement Name**

**VOLATTR**

initiates the VOLATTR control statement. This statement applies to all cartridges including all types of cleaning cartridges.



**Note:** Standard cleaning cartridges that do not match the cleaning prefix established in the LIBGEN may be treated as scratch cartridges.

**Parameters**

**SERIAL**

specifies one or more volume serial numbers (VOLSERS) to which this definition applies.

**volser or vol-range or vol-list**

identifies a single VOLSER, a VOLSER range, or a list of VOLSERS and/or VOLSER ranges in any combination. This parameter may include the following wildcard characters:

- % or ? any single non-blank character
- \* any character string (length 0 to 6).

The wildcard characters shown above may not be used in a range.



**Notes:**

1. On a single VOLATTR statement, all volumes specified in a list or range must be the same media type (e.g., a Standard cartridge cannot be included in a range of VOLSERS that also contains an ECART or DD3A cartridge).
2. If a given VOLSER is not included in any VOLATTR statement, the MEDia value defaults to Standard; thus, RECTech defaults to LONGitud.

## Volume Attribute (VOLATTR)

### MEDIA

optionally, specifies the type of media (cartridge) for the VOLSER designated in the SERIAL parameter.



**Notes:** The SL8500 library supports only the T9840A, T9840B, T9840C, T9940B, and T10000 media types and recording techniques.

Only specific media types can be entered. Generic media types, that is, LONGItud and HELical cannot be specified. Refer to the syntax for this control statement to see the parameters available to you.

If this parameter is not specified by any matching VOLATTR statement, a default is chosen based on the value of the RECtech parameter. Table 7 shows default values used if MEDIA is omitted.

If both media type and recording technique are omitted, all media types and recording techniques are assumed to be eligible. StorageTek recommends that MEDIA always be specified on all VOLATTR statements.

**Table 7. VOLATTR MEDIA Default Values**

RECtech Entered:	MEDIA Default:
18track	Standard
36track, 36Atrack, 36Btrack	Standard
36Ctrack	ZCART
LONGItud	Standard
DD3, HELical	DD3A
STK1R, STK1R34, STK1R35, STK1RA, STK1RA34, STK1R35, STK1RB, STK1RB34, STK1RB35, STK1RAB, STK1RAB4, STK1RAB5, STK1RC, STK1RC34, STK1RC35	STK1R
STK2P, STK2P34, STK2P35, STK2PA, STK2PA34, STK2PA35, STK2PB, STK2PB34, STK2PB35	STK2P
T1A, T1AN, T1A34, T1A35, T1AE, T1AE34, T1AE35	T10000T1

*media-type*

identifies the media type. Valid media types are:

**LONGItud**

indicates any Standard or ECART cartridge.

**Standard**

indicates a standard length, 3480 cartridge. It can be read on any longitudinal drives (4480, 4490, 9490, or 9490EE). Data can be written in 36-track mode on a 4490, 9490, or 9490EE transport but cannot be read on an 18-track (4480) drive. Synonyms for this type of cartridge include:

- CST
- MEDIA1
- STD
- 1
- 3480

**ECART**

indicates a 3490E, extended capacity cartridge. It can be used only on a 36-track drive (4490, 9490, or 9490EE). Synonyms include:

- E
- ECCST
- ETAPE
- Long
- MEDIA2
- 3490E

**ZCART**

indicates a 3490E, extended capacity cartridge that provides greater storage capacity than an ECART. It can be used only on a 9490EE drive.

ZCART can be abbreviated as Z.

**DD3A, DD3B, DD3C, DD3D**

indicates a helical cartridge. The media indicator in the external label is encoded with the cartridge type (A, B, C, or D). DD3A, DD3B, DD3C, or DD3D can be abbreviated to A, B, C, or D, respectively.

Types of helical cartridges, along with their associated media capacities, are:

- A – 10GB
- B – 25GB
- C – 50GB
- D – cleaning cartridge.

Data capacity differences between DD3A, DD3B, and DD3C cartridges are related to the length of the tape in the cartridge, not to the recording density of the data.

## Volume Attribute (VOLATTR)



**Note:** Cleaning cartridges that do not match the cleaning prefix established in the LIBGEN cannot be selected as valid cleaners.

### **STK1R, STK1U**

indicates a T9840 cartridge. The media indicator in the external label is encoded with the cartridge type (R or U). STK1R or STK1U can be abbreviated to R or U, respectively.

Types of T9840 cartridges are:

- STK1R — 20GB (T9840A and T9840B) or 40GB (T9840C) data cartridge
- STK1U — cleaning cartridge.

### **STK2**

indicates any T9940 cartridge.

### **STK2P, STK2W**

indicates a T9940 cartridge. The media indicator in the external label is encoded with the cartridge type (P or W). STK2P or STK2W can be abbreviated to P or W, respectively.

Types of T9940 cartridges are:

- STK2P — 60GB (T9940A) or 200GB (T9940B)
- STK2W — cleaning cartridge.

### **T1000T1 or T1**

indicates a full-capacity 500GB T10000 cartridge. **T1000T1** can be abbreviated as **T1**.

### **T1000TS or TS**

indicates a smaller-capacity 120GB T10000 cartridge. **T1000TS** can be abbreviated as **TS**.

### **T1000CT or CT**

indicates a T10000 cleaning cartridge. **T1000CT** can be abbreviated as **CT**.

### **RECtech**

optionally, specifies the method used to record data tracks on the tape surface for the VOLSER designated in the SERIAL parameter.



**Note: The SL8500 library supports only the T9840A, T9840B, T9840C, T9940B, and T10000 media types and recording techniques.**

If this parameter is not specified on any matching VOLATTR statement, a default is chosen based on the value of the MEDia parameter. Table 8 shows default values used if RECtech is omitted.

**Table 8. VOLATTR RECtech Default Values**

<b>MEDia Entered:</b>	<b>RECtech Default:</b>
Standard	LONGItud
ECART	36track
ZCART	36Ctrack
DD3A, DD3B, DD3C, DD3D	DD3
STK1, STK1R, STK1U	STK1R
STK2, STK2P, STK2W	STK2P
T10000T1, T10000TS, T10000CT	T1A

***recording-technique***

identifies the recording technique. Valid recording techniques are:

**LONGItud**

indicates any device that uses longitudinal recording.

**18track**

indicates a 4480 transport.

**36track**

indicates a 4490, 9490, or 9490EE transport (any device that records in 36-track mode).

**36Atrack**

indicates a 4490 (Silverton) transport.

**36Btrack**

indicates a 9490 (Timberline) transport.

**36Ctrack**

indicates a 9490EE transport.

**HELical**

indicates a device using helical recording.

**DD3**

indicates a device using helical recording.

## Volume Attribute (VOLATTR)

### **STK1R**

indicates any 9840 transport.

### **STK1R34**

indicates any 3490E-image 9840 transport.

### **STK1R35**

indicates any 3590-image 9840 transport.

### **STK1RA**

indicates a 3490E or 3590-image T9840A transport.

### **STK1RA34**

indicates a 3490E-image T9840A transport.

### **STK1RA35**

indicates a 3590-image T9840A transport.

### **STK1RB**

indicates a 3490E or 3590-image T9840B transport.

### **STK1RB34**

indicates a 3490E-image T9840B transport.

### **STK1RB35**

indicates a 3590-image T9840B transport.

### **STK1RAB**

indicates a 3490E or 3590-image T9840A or T9840B transport.

### **STK1RAB4**

indicates a 3490E-image T9840A or T9840B transport.

### **STK1RAB5**

indicates a 3590E-image T9840A or T9840B transport.

### **STK1RC**

indicates a 3490E or 3590-image T9840C transport.

### **STK1RC34**

indicates a 3490-image T9840C transport.

### **STK1RC35**

indicates a 3590-image T9840C transport.

### **STK2P**

indicates any 9940 transport.

### **STK2P34**

indicates any 3490E-image 9940 transport.

**STK2P35**

indicates any 3590-image 9940 transport.

**STK2PA**

indicates a T9940A transport.

**STK2PA34**

indicates a 3490E-image T9940A transport.

**STK2PA35**

indicates a 3590-image T9940A transport.

**STK2PB**

indicates a T9940B transport.

**STK2PB34**

indicates a 3490E-image T9940B transport.

**STK2PB35**

indicates a 3590-image T9940B transport.

**T1A**

indicates any T10000 transport.

**T1AN**

indicates a non-encryption enabled 3490E- or 3590-image T10000 transport.

**T1A34**

indicates a non-encryption enabled 3490E-image T10000 transport.

**T1A35**

indicates a non-encryption enabled 3590-image T10000 transport.

**T1AE**

indicates an encryption-enabled 3490E- or 3590-image T10000 transport.

**T1AE34**

indicates an encryption-enabled 3490E-image T10000 transport.

**T1AE35**

indicates an encryption-enabled 3590-image T10000 transport.

## Volume Attribute (VOLATTR)

### MAXclean

optionally, specifies a maximum cleaning cartridge usage for the VOLSER or range of VOLSERS (1 to 32767) associated with the SERIAL parameter. Do not specify values that exceed the manufacturer's recommendation for usage. MAXclean applies to all types of cleaning cartridges.

If this parameter is specified, the VOLSER(s) indicated in the SERIAL parameter must begin with the cleaning cartridge prefix established in the LIBGEN.

### *use-limit*

indicates the maximum number of times a cleaning cartridge should be used. Refer to "Tape Transport Cleaning" on page 38 for additional details.



### Notes:

1. If MAXclean is not specified in the VOLATTR statement, the value or default of the MAXclean parameter in the MNTD operator command is used for all cleaning cartridge counts.
2. If MAXclean is specified, the MEDIA setting must be Standard, DD3D, or STK1U.

### Example

The following example illustrates how to use VOLATTR statements to specify volume attributes for particular VOLSERS.

### Set Volume Attributes

```
VOLATTR SERIAL(L*,AA9*) MEDIA(ECART) RECTECH(36)
VOLATTR SER(S*,PRD000-PRD499,BY*) MED(S) REC(36)
VOLATTR SER(CLN200-CLN299) MED(DD3D) REC(HEL) MAXCLEAN(50)
VOLATTR SER(CLN300-CLN599) MED(S) REC(LONGI)
VOLATTR SER(*) MED(S) REC(18)
```



### Notes:

1. Ask your StorageTek CSE about recommended MAXCLEAN values for specific types of cleaning cartridges.
2. In the example above, the last VOLATTR statement specifies a user-defined default for all volumes that do not match any of the previous statements.
3. Note that recording technique is specified on all VOLATTR statements in the preceding examples, since the last statement specifies a RECtech(18), which is not the default (LONGI). If RECtech were omitted from the previous MED(S) VOLATTR statements, the REC(18) from the last VOLATTR statement would be used.



### Volume Attribute Definition (VOLDEF) Command and Control Statement

The VOLDEF command and control statement is used to specify the definition data set that contains volume attribute (VOLATTR) statements. (Refer to “Volume Attribute (VOLATTR) Control Statement” on page 115 for details on syntax and parameters.) The data set must be a sequential or a partitioned data set (PDS) with any valid record format (RECFM). Also, the data set must contain one or more VOLATTR statements.

The VOLDEF statement can be specified in PARMLIB, or it can be issued as an operator command to dynamically load or reload volume attribute parameters. (Refer to “PARMLIB Control Statements” in the *HSC/MSP Configuration Guide* for an explanation of PARMLIB.)

If a definition file is changed by a VOLDEF operator command, and if the change is to be permanent, you must update PARMLIB before restarting the HSC. If the definition file is to be modified for a given shift or application, remember that the new definition remains in effect until another definition is loaded or the HSC is recycled. The definition file then reverts to the PARMLIB specification. Thus, VOLDEF can be used to temporarily change a definition file.

Definition commands issued on one host are in effect only on that host. If different hosts use the same definition data set, the volume attribute parameter statements are shared by those hosts.

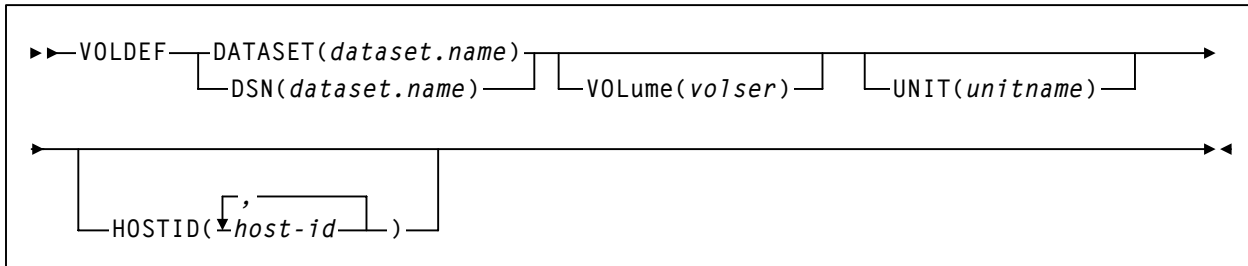


#### Notes:

1. StorageTek recommends that volume attributes be the same on all processors. This can be assured by defining the same volume attribute definition data set to all hosts.
2. When the VOLDEF command is issued, if the definition data set contains errors, an HSC message provides the parameter in error, a description of the problem, and the line number where the error occurred. If the definition data set contains errors, none of the attributes specified in the VOLATTR control statement(s) will be loaded (put into effect), which may cause the wrong scratch media to be mounted on a transport or the wrong transport to be allocated for a volume. Message SLS1627I is displayed if errors are encountered. If 50 errors are encountered, the remainder of the data set is not checked. Correct the problem and reissue the command.
3. The VOLDEF command and control statement executes at both base and full service levels of the HSC.
4. If you issue multiple VOLDEF statements, the last one processed is currently active. You can determine which VOLDEF statement is active by entering the Display VOLDEF command.
5. For additional information about syntax, refer to “Control Statement Syntax Conventions” on page 493.

## Volume Attribute Definition (VOLDEF)

### Syntax



### Control Statement Name

#### **VOLDEF**

initiates the VOLDEF command and control statement.

### Parameters

#### **DATASET or DSN**

specifies the name of the data set containing the VOLATTR statements to be processed and, optionally, an OPTion TITLE statement. (Refer to “Volume Attribute (VOLATTR) Control Statement” on page 115 and “OPTion TITLE Control Statement” on page 109 for details on syntax and parameters).



**Note:** The definition data set may contain SCRPOOL, VOLATTR, UNITATTR, TAPEREQ, and OPTion TITLE statements.

- Only OPTion TITLE and VOLATTR statements are processed.
- If any other statement is encountered, an error message is issued and the statement is ignored.

#### ***dataset.name***

is the name of the data set containing volume attribute parameters. If the data set name includes a member name, *dataset.name* must be enclosed in quotes. For example,

```
DATASET('YOUR.DSN(MEMBER)')
```

#### **VOLume**

specifies the serial number of the DASD volume on which the data set resides. This parameter is optional. Specify the VOLume parameter if the data set is not cataloged, or if a data set on a volume other than the volume indicated by the catalog is to be used.



**Note:** The volume specified must be a DASD volume.

#### ***volser***

specifies the volume serial number for the definition data set.

### UNIT

specifies the unit where the definition data set is located.

#### *unitname*

specifies the unit name. If the definition data set is not cataloged and this parameter is omitted, a unit name of SYSALLDA is the default.

### HOSTID

(This parameter is valid only for use in PARMLIB, so that multiple systems can share a PARMLIB member containing SCRPOOL, TAPEREQ, VOLATTR, or UNITATTR statements for different releases of HSC. If entered from the console, message SLS0018I is issued.)

Optionally, limits the execution of this control statement to the specified hosts. If one of the specified hostids matches the host executing this control statement, the control statement is executed for that host. Otherwise, it is ignored. If this parameter is omitted, the control statement is executed on all hosts.

#### *host-id*

specifies the name of one or more hosts from which to execute this control statement. Multiple hosts must be separated by commas.

### Examples

The following examples illustrate the use of the VOLDEF statement.

#### Load the VOLATTR Parameters From YOUR.DSN(MEMBER)

```
VOLDEF DSN('YOUR.DSN(MEMBER)')
```

#### Load the VOLATTR Parameters From DASD Volume DISK02

```
VOLDEF DSN(YOUR.DSN2) VOLUME(DISK02)
```



**Note:** Control statements can only be continued if PARMLIB begins with a /\*...\*/ comment statement (see “Control Statement Syntax Conventions” on page 493).

## HSC Start Procedure

Starting HSC execution requires two basic tasks:

- creating an HSC START Procedure
- executing the HSC START Procedure.

### Creating an HSC START Procedure

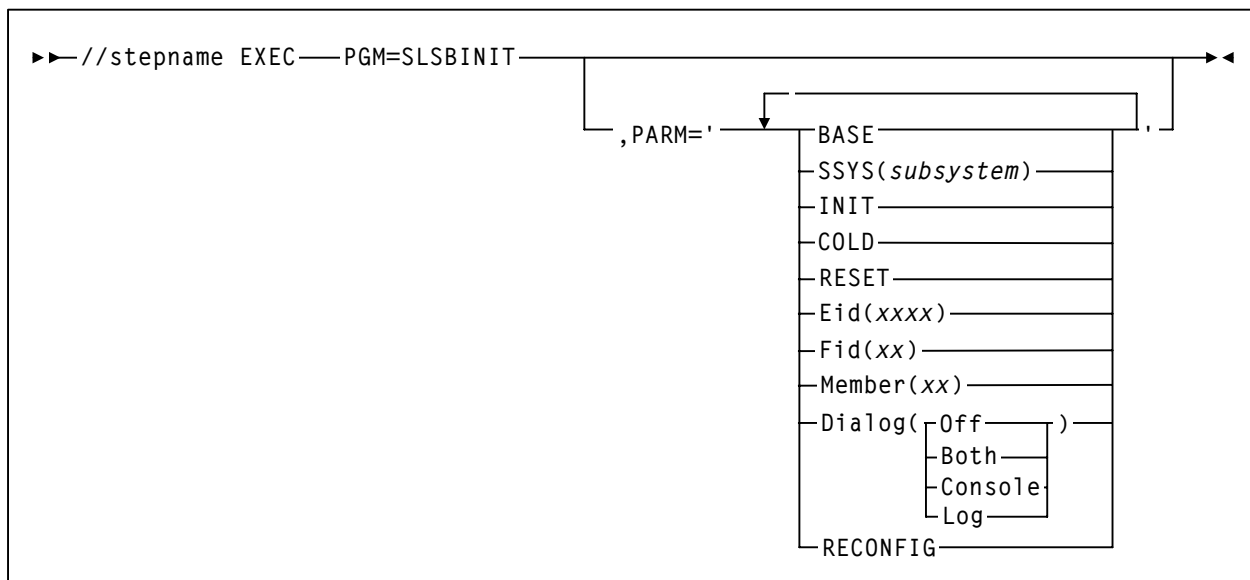
A procedure must be created in the cataloged procedure library of the host system. The START command invokes the cataloged procedure. The procedure loads the nucleus of the HSC into main storage, instructs the operating system to allocate data sets, and invokes the library host software initialization routine.



**Note:** Refer to “EXEC Parm Control Statement” on page 86 for an alternative method of specifying GTF Eid and Fid parameters.

This section describes how to create the procedure. A typical syntax for the EXEC statement and full descriptions of each of the parameters follows.

### EXEC Statement Syntax



### EXEC Statement Parameters

#### PARM=

defines the list of parameters passed to the HSC initialization routine.



**Note:** If you enter more than one of the following parameters, you must separate them with a blank space (e.g., `BASE SSYS(subsystem) RESET`).

#### BASE

specifies that the HSC initialize and execute at the base service level.

## SSYS

specifies that HSC initialization search for the *subsystem* name specified. If the name is not found or is not a valid name, the subsystem terminates. *subsystem* must be a 1- to 4-character name or problems can occur when initializing the HSC.

This parameter permits you to symbolically specify the subsystem and retain the same startup procedure whether starting the HSC before or after JES.

## COLD

specifies that any permanent in-memory data structures previously allocated by HSC are reallocated and reinitialized.

On the first startup of the HSC after an IPL, this option is meaningless. If the HSC has been brought up previously for this IPL, use of this option results in the loss of a system linkage index for Program Call (PC) instructions. There are a limited number of system linkage indexes. Once exhausted, they can only be restored by IPLing. If COLD is not specified, the linkage index used previously by the HSC is reused.

This parameter should be used only when absolutely necessary. (The installation instructions for some HSC maintenance may direct you to perform a COLD start.)



**Note:** You do **not** need to include the COLD parameter when you are initializing an HSC that is at a different release level than the HSC that was previously running on a host. When an initializing HSC detects a release level difference, it performs an automatic internal cold start. For an automatic cold start, PC system linkage indexes are reused by the HSC.

Contact StorageTek Software Support before using this parameter (see the guide *Requesting Help from Software Support for more information*).

## RESET

specifies that all subsystem status flags in the MSP Subsystem Communications Vector Table (SSCVT) for the HSC are unconditionally reset. Use of this option may correct a situation in which the HSC was terminated abnormally without resetting the status flags; for example, if the HSC was terminated with the MSP FORCE command.

These messages are possible symptoms of this situation:

```
... ACS subsystem CCCC is ACTIVE
```

or

```
... ACS subsystem CCCC is TERMINATING
```

or

```
... ACS subsystem CCCC is INITIALIZING
```

at HSC startup, when a display of active jobs indicates that the subsystem is not, in fact, active.

This parameter should only be used in extreme situations and may not correct all error conditions. Contact StorageTek Software Support before using this parameter.

### Eid

xxxx is 1 to 4 hex characters specifying the GTF event ID used for the duration of this subsystem. “E” is the abbreviation for this parameter. The default Eid value is **E086**.

### Fid

xx is 1 to 2 hex characters specifying the GTF format ID used for the duration of this subsystem. “F” is the abbreviation for this parameter. The default Fid value is **17**.



**Note:** Refer to “EXECParm Control Statement” on page 86 for an alternative method of specifying GTF Eid and Fid parameters.

### Member

For MSP, xx is the suffix of the SLSSYSxx member in SYS1.PARMLIB, or an SLSSYSxx DD statement in the startup procedure used as the automatic commands (PARMLIB control statements) data set. “M” is the abbreviation for this parameter.

### Dialog

specifies that messages can be displayed on the operator console and/or written to the system log. This option can be used to further restrict where messages are displayed based on the ROUTCDE. These messages indicate that the HSC is waiting for an active task to complete before the HSC terminates.

For more information on Dialog, see “OPTION Command and Control Statement” in the *HSC Operator’s Guide*.

If Dialog is specified, one of the options **must** be selected. There is no default. The options for Dialog include:

#### Off

specifies that you do not want active task termination messages displayed on the operator console or written to the system log.

#### Both

specifies that messages are displayed on the operator console and written to the system log.

#### Console

specifies that messages are displayed on the operator console only.

#### Log

specifies that messages are written to the system log only.

### RECONFIG

specifies this execution of the HSC will only run the Reconfiguration utility.

## Example

The following listing is an example PROC for the START command. This sample is also included in the HSC SAMPLIB as member JCLPROC.

### Example PROC for START Command

```
//SLS0 PROC PROG=SLSBINIT,PRM=' '  
//*  
//IEFPROC EXEC PGM=&PROG,TIME=1440,  
// PARM='&PRM E(086) F(23) M(00) SSYS(SLS0)',REGION=4M  
//*  
//STEPLIB DD DSN=SLS.SLSLINK,DISP=SHR  
//*  
//SLSUEXIT DD DSN=load.module.library,DISP=SHR  
//SLSSYS00 DD DSN=SLS.PARMS,DISP=SHR
```

In the example PROC shown above, SLS0 is used as both the name of the started task procedure (line 1) and as the subsystem name defined in the SSYS parameter “SSYS(SLS0)” in line 4. Your site is not required to use these values. You can replace

either or both of these values with more meaningful or useful names pertaining to your site specific needs. However, you must keep in mind the following:

1. HSC subsystem names must be cataloged in your SUBSYSxx member.
2. The subsystem name must be 4 characters in length.
3. If the started task procedure name and the subsystem name are identical, the SSYS parameter is not necessary in the started task procedure. If the started task procedure name is not identical to the subsystem name, then the SSYS parameter must be used to point the started task procedure to the required HSC subsystem.

For more information on using the SSYS parameter, refer to “SSYS” on page 129 and “Starting the HSC using the SSYS Parameter” on page 137.



#### Notes:

1. Control data sets are defined using the CDSDEF control statement. The CDSDEF statement **must** be present in your PARMLIB definitions. Control and journal data sets may no longer be defined in JCL. Refer to “CDS Definition (CDSDEF) Control Statement” on page 83 for more information.
2. The number of CDS copies used by the HSC is dependent on the number of CDS copies defined in the CDSDEF PARMLIB control statement. It is not determined by the TCHNIQE parameter of the LIBGEN SLIRCVRY macro. The HSC uses all of the CDS copies defined in the CDSDEF control statement (whether this includes more or less CDS copies than are specified by the TCHNIQE parameter).
3. Journals are defined using the JRNDEF control statement. The JRNDEF statement must be present in your PARMLIB definitions if you want to use journaling. Journal data sets may no longer be defined in JCL. Refer to “Journal Definition (JRNDEF) Control Statement” on page 88 for more information.
4. If journaling is specified by the TCHNIQE parameter of the LIBGEN SLILIBRY macro, journals must be defined in your PARMLIB definitions for successful HSC initialization.
5. A control statement is terminated if the statement is not continued. Control statements must have a /\*...\*/ comment as the **first** control statement in the PARMLIB member. A PARMLIB member that does not begin with a /\*...\*/ style comment is assumed to be in the old format. Comments in old format members must begin with an asterisk in column 1.
6. TIME=1440 or TIME=NOLIMIT should be coded to ensure that the HSC does not time out and terminate.



## Descriptions of DD Statements

The following are descriptions of the JCL DD statements used in the example PROC for the START command.

### **SLSSYSxx**

statement that defines the data set containing the HSC PARMLIB. In the example procedure above, xx is replaced by the suffix ‘‘00’’. The SLSSYS00 DD statement matches the M(00) declaration and points to the PARMLIB member ‘‘00’’ that contains your start-up parameters.

### **SLSUEXIT**

statement that defines the data set containing HSC user exits.

## Starting HSC Execution

The HSC cataloged procedure is invoked by issuing the MSP START command. Refer to “Issuing the START Command” on page 136 for information about the MSP START command, syntax, and parameter descriptions.

When phases of HSC initialization are completed, messages are displayed on the system console indicating completion of the initialization phases. Messages inform you when HSC base service level and when HSC full service level initialization is completed.



### Notes:

1. **An SMC subsystem is required to influence tape allocations and intercept MSP messages. Refer to the “Starting SMC” chapter in the *SMC Configuration and Administration Guide* for more information.**
2. **The HSC requires a valid license key for initialization. Refer to the *HSC/MSP Configuration Guide* for more information.**
3. When it is initialized, the HSC determines whether this HSC release differs from the release level of the previous HSC subsystem. If there is a difference, an internal cold start is invoked.

Before starting the internal cold start processing, however, the Program Call system linkage indexes are saved, and the HSC’s main in-memory data structure is freed. This reduces the resources lost due to the cold start.

If your SMF options for the HSC did not specify the SUBTYPE parameter, the HSC issues a message that SMF record subtypes 1 through 6 are being recorded.

If you did not specify GTF Eid and Fid parameters on the PARM operand in the HSC start procedure, the HSC issues a message indicating that default Eid and Fid values are being used.

The HSC may be started prior to hardware arrival to ensure that it has been installed properly. The HSC subsystem comes up with the LMU stations offline. HSC operator commands may be entered, but any functions requiring interaction with the ACS hardware result in error messages.

## Modifying LSMs ONLINE

When the CDS is initialized, the status of all LSMs defined in the LIBGEN is OFFLINE. You must issue the HSC MODify ONline command to bring all of your LSMs online.

For subsequent executions of HSC, the last recorded status of the LSMs is obtained from the control data set.

### Specifying CAP Preferences

When the CDS is initialized, all CAP preferences are zero (never selected). You must issue the CAPPREF command and control statement to establish a preference value for a CAP. The HSC selects CAPs based on the preference value. Refer to “CAP Preference (CAPPref) Command and Control Statement” in the *HSC/MSP Operator's Guide* for more information.

### Configuration Mismatches

During HSC initialization, the HSC remains active if LSM or panel type configuration mismatches occur between the CDS and LMU. Specifically, these mismatches include:

- different numbers of LSMs
- different or unknown types of LSMs
- different or unknown panel types in an LSM.

In these cases, the affected ACS(s) is forced offline. The HSC continues to support the unaffected ACS(s).

While the unaffected ACS(s) remains online, the mismatched configuration can be corrected. If the hardware configuration is incorrect, the affected ACS(s) can then be brought online. Otherwise, the configuration can be changed through the LIBGEN/SLICREAT/MERGEcds or Reconfiguration process at your convenience.

## Multiple Hosts Startup Considerations

In a multiple-host configuration, start one host at a time. **Do not bring up multiple hosts simultaneously.**

### Issuing the START Command

The HSC software is initialized by issuing the MSP START command. Parameters associated with PARM= on the EXEC statement of the HSC cataloged procedure (see “Creating an HSC START Procedure” on page 128) can also be supplied via PARM= on the START command. The PARM= specification on the START command overrides the PARM= specification in the HSC cataloged procedure. Examples in this section relevant to single PARM= parameters may need to be accompanied by other parameters present in the HSC cataloged procedure.

Alternately, a JCL substitution symbol may be specified in the HSC cataloged procedure, and additional parameters passed via the START command using the substitution symbol.

The HSC can be initialized to a full or base service level by issuing the MSP START command. The HSC can also be initialized under the MSP Master subsystem (MSTR) through the START command.

Table 9 shows examples of the START command options introduced in this section. For further information about these options, refer to the paragraphs following the table.

**Table 9. HSC Initialization**

HSC Start Command	Proc Name Same as SUBSYSxx Entry	SLSBPRESI in SUBSYSxx or Previous HSC Start With PARM='INIT'
<b>HSC Started Under MSTR and PROC in SYS1.PROCLIB</b>		
S SLS0	Yes	No
S SLS0,SUB=MSTR	Yes	Ignored
S SLS0,PRM='SSYS(SLS0)',SUB=MSTR	No	Ignored
<b>HSC Started Under JES and PROC in a PROCLIB</b>		
S SLS0	Yes	Yes
S SLS0,PARM='INIT' S SLS0	Yes	No
S SLS0,PARM='SSYS(SLS0)'	No	Yes
S SLS0,PARM='INIT,SSYS(SLS0)' S SLS0,PARM='SSYS(SLS0)'	No	No

## Initializing the HSC Under the Master Subsystem

If you want to initialize the HSC under the Master subsystem (MSTR), the following circumstances must be considered:

- If SLSBPRESI is not part of the subsystem definition in SUBSYSxx or a prior execution of the subsystem using the INIT parameter was done, then the MSP subparameter SUB=MSTR must be appended to the START command.

For example:

### SLSBPRESI Defined in SUBSYSxx or Prior execution Using INIT

```
S SLS0, SUB=MSTR
```

This command starts the HSC under Master subsystem control.

- If SLSBPRESI is not part of the subsystem definition in SUBSYSxx and the subsystem name is the same as the start procedure name, then no preinitialization or SUB=MSTR is necessary. For example:

### Subsystem Name is Same as Start Procedure Name

```
S SLS0
```



**Note:** When running the HSC under the Master subsystem, JES services are not used. It is also possible to receive duplicate messages in the system log.

If you want to initialize the HSC under JES later, the INIT parameter may be used to do the preinitialization when necessary.

## Starting the HSC using the SSYS Parameter

The HSC can be started against a particular subsystem by specifying the SSYS PARM. Refer to “Creating an HSC START Procedure” on page 128 for a description of the parameter.



**Note:** When using PARM, be sure to specify **all** applicable parameters.

### Starting HSC Against a Subsystem Named SLS0

```
S SLS0, PARM='SSYS(SLS0)'
```

## Starting the HSC at the Full Service Level

Normally, HSC software is initialized to the full service level when it is started. The syntax for the START command to initialize the HSC to the full service level is:

### Starting to Full Service Level

```
S SLSØ
```

## Starting the HSC at the Base Service Level

HSC software can be started only to the base service level by coding the BASE parameter in the PARM field of the MSP START command. The syntax for the START command to initialize the HSC to the base service level is:

### Starting to Base Service Level

```
S SLSØ,PRM='BASE'
```



**Note:** PRM adds the parameter BASE to the startup PARMs.

The BASE parameter should be used with other parameters in the START command since these parameters override whatever is specified in the HSC START Procedure. A sample START command with parameters is:

```
S SLSØ,PARM='BASE E(Ø86) F(23) M(ØØ) SSYS(SLSØ)'
```

In this case, PARM overrides **all** parameters in the PARM field.

Refer to “Creating an HSC START Procedure” on page 128 for a description of these and other related parameters.

After initializing to this point, the SRVlev command can be used to bring the subsystem up to full function.

# Chapter 4. Utility Functions

---

## Overview of Library Utilities

The HSC contains utility functions that provide you with ways to manage library resources. Primary utility functions include:

- library CDS maintenance
- control of library cartridges
- control of scratch volumes
- preparation of reports covering library activity.

**Table 10. Utilities Overview**

Function	Utility
Library Control Data Set Maintenance	AUDIt BACKUp Database Decompile (LIBGEN) Directory Rebuild (DIRBLD) Journal Offload (OFFLoad) MERGEcds REStore SET
Cartridge Control	Initialize Cartridge (INITialize) Eject Cartridge (EJECT) MOVE UNSElect
Scratch Volume Control	Scratch Conversion (SLUCONDB) Scratch Redistribution (SCREdist) Scratch Update (SCRATch, UNSCRatch, and REPLaceall)
Reporting	Activities Report (ACTivities) Performance Log Reblocker (SLUPERF) Volume Report (VOLRpt)

## Selecting a Utility

There are many utilities described within this chapter. If you know what function you want to perform, find that function in Table 11. The applicable utility for each specific function is contained in the table.

**Table 11. HSC Utilities and Functions**

Function	Utility to Use
Add a volume (or list of volumes) to the existing scratch list contained in the CDS	SCRATch
Backup the library CDS	BACKUp

**Table 11. HSC Utilities and Functions**

<b>Function</b>	<b>Utility to Use</b>
Balance the number of scratch volumes across the library	Scratch Redistribution (SCREdist)
Clear (delete) the scratch list in the CDS and optionally replace it with a new list	Replace (REPLaceall)
Delete a volume (or volumes) from the scratch list contained in the CDS	UNSCratch or Replace (REPLaceall)
Eject one or more cartridges from an ACS in batch mode	EJECT
Force unselection of a volume selected by the HSC	UNSElect
Generate scratch transactions from tape management systems	Scratch Conversion (SLUCONDB)
Inventory cartridges in the library	AUDIt
Label cartridges through the CAP	Initialize Cartridge (INITialize)
Merge volume information from one CDS into another	MERGEcds
Move or relocate a volume (or volumes) within an ACS	MOVE
Off-load one or both of the journals	Journal Offload (OFFLoad)
Prepare the SCP-generated performance log (SMF data) for use by the Activities Report utility	Performance Log Reblocker (SLUPERF)
Print a listing of volumes and locations residing in an LSM	Volume Report (VOLRpt)
Print an activities report listing library activity statistics	Activities Report (ACTivities)
Rebuild the database directory if the CDS becomes corrupted	Directory Rebuild (DIRBLD)
Recreate the library LIBGEN from the existing CDS	Database Decompile (LIBGEN)
Restore or recreate the library CDS	RESTore



**Table 11. HSC Utilities and Functions**

Function	Utility to Use
Set or change library configuration information, including: <ul style="list-style-type: none"><li>- ACS esoteric</li><li>- cleaning prefix</li><li>- delete disposition</li><li>- device numbers for drives</li><li>- eject password</li><li>- host identification</li><li>- HSC command prefix</li><li>- HSC level</li><li>- library station device numbers</li><li>- MAJNAME (QNAME)</li><li>- nonlibrary esoteric</li><li>- scratch label type</li><li>- SMF record type</li><li>- recovery technique</li></ul>	SET



**Note:** If you are running a mixed multi-host complex of HSC 6.0, 6.1, or 6.2 systems, refer to Appendix D, “Migration and Coexistence Processes” in the *HSC/MSP Configuration Guide* for the proper utility release level.

## Typical Use of Utilities

A typical use of utility functions might be, for example, invoking both the Scratch Update utility and an Activities Report. In the following example

- volumes A1B1C1 through A1B1C4 have been designated as scratch volumes
- an activities report is to be produced starting on 1/23/93 at 12:00:00. Data in the report will contain uppercase and lowercase characters.



**Note:** PARM=MIXED in the JCL specifies mixed characters.

The JCL for invoking these utilities is:

### JCL for Scratch Update and Activities Report

```
//JOB1      job (account),programmer
//STEP1     EXEC PGM=SLUADMIN,PARM=MIXED
//SLSCNTL   DD DSN=control.dataset.name,DISP=SHR
//SLSSMF    DD DSN=smf.history,UNIT=TAPE,DISP=OLD
//SLSPRINT  DD SYSOUT=A
//SLSIN     DD *
            SCRATCH VOLSER(A1B1C1,A1B1C2,A1B1C3,A1B1C4)
            ACTI BEGIN(01/23/93,12:00:00)
/*
//
```

Refer to “Activities Report Utility” on page 151 and “messages detailing actions or attempts to provide an even distribution of scratch volumes across LSMs in an ACS (see Figure 20). Scratch Update Utilities” on page 281 for detailed descriptions of these utilities.

It is only necessary to supply those statements required by the particular utility function(s) being invoked. Utility functions can also share data sets represented by the same statement.

## Control Statement Syntax Conventions

The control statement for each utility program consists of a command (indicating the utility function) followed by parameters, as applicable, in 80-character card-image records. For more information about this syntax, see Appendix C, “Macros, Control Statements, Utilities, and Commands Syntax Reference” on page 483.

## Utility Syntax Conventions

Utility syntax is illustrated using syntax flow diagrams. For a complete description of this syntax convention, refer to Appendix C, “Macros, Control Statements, Utilities, and Commands Syntax Reference”.

## Utility Administrator (SLUADMIN)

The SLUADMIN program operates as a batch job and controls initialization processing for most utility functions. The utility administrator (SLUADMIN) can accept multiple control statements which are handled as serial requests for multiple utilities. If all requirements needed to execute the utility function are met, control is passed to the appropriate program which handles the actual processing.

Utility functions represented by additional control statements are not started until the prior utility function stops and control is returned to the SLUADMIN program.



**Caution:** The maximum length of a control statement is 32,767 characters. Exceeding this limit causes message SLS024II to be displayed, which indicates an invalid utility control statement.

### How to Invoke SLUADMIN

The following is a generic example of JCL that can be modified to execute SLUADMIN. Where “utility and CSV definition statements” appears in this sample JCL, enter the utilities or CSV statements you want to execute.

For example:

```
SET HOSTID(HSC2) FORHOST(HSCB)
OFFLoad
SCREdist ACS(01)
```

### JCL to Invoke SLUADMIN

```
//JOBname    job (account),programmer
//S1         EXEC PGM=SLUADMIN,PARM=MIXED
//SLSPRINT  DD SYSOUT=A
//SLSIN     DD *
            utility and CSV definition statements
            .
            .
            .
//*****
//* The following datasets are optional *
//*****
            optional csv text
//SLSCSV    DD DSN=yourcsv.output.dataset,DISP=SHR
//SLXML     DD DSN=yourxml.output.dataset,DISP=SHR
/*
//
```

## SLUADMIN Output

In addition to plain text, SLUADMIN supports output types added through Unified User Interface (UUI) requests. See the *NCS/VTCS XML Guide* for a list of commands and utilities supported by the UUI.

The output type is controlled by DD statements defined in the SLUADMIN JCL and includes:

- plain text — output written to an SLSPRINT data set. Plain text output is always produced and is unchanged from previous releases.
- structured XML — output written to the SLSXML data set. This output type is optional and is generated only if its corresponding DD statement is specified.

Structured XML is a well-formed XML datastream containing XML header tags, data tags, and data element content. Refer to the *NCS/VTCS XML Guide* for XML tag names and structure for all UUI requests.

- comma separated values (CSV) — output written to the SLSCSV data set. This output type is optional and is generated only if its corresponding DD statement is specified.

CSV output is customizable. A template of XML data tag names can be input by the user to specify which data values will be output. The output data is a single CSV header line followed by CSV detail lines.

A CSV header line is a list of the XML data tag names requested; each name is separated by a comma. Each CSV detail line is a specified fixed number of data values, separated by a comma. This kind of output is readily adaptable as input into spreadsheets or customizable report writers.



**Note:** The Volume Report utility **VOLDATA** parameter produces a volume flat file. This option is still supported, but may be discontinued in future releases.

### Requesting XML Output

If the SLSXML DD statement is present, it indicates that structured XML output should be provided for all SLUADMIN commands that support the UUI interface. Refer to the *NCS/VTCS XML Guide* for detailed information.

### Requesting CSV Output

If the SLSCSV DD statement is present, comma separated value (CSV) output is provided for all SLUADMIN commands that support the UUI interface. See the *NCS/VTCS XML Guide* for more information.

## How to Invoke Utility Programs

For convenience, most utility programs are packaged to appear as a single, user-invoked program. An exception is Scratch Conversion.

All other utility functions are invoked as a normal batch job using the SLUADMIN program and user-specified control statements needed to invoke the required utility function.

Utility functions represented by additional control statements are not started until the prior utility function stops and control is returned to the SLUADMIN program.

## Authorization to Use Utility Functions

For SLUADMIN to run as an APF-authorized program, it must reside in an authorized library.

A copy of SLUADMIN can be placed in a non-APF authorized library whose access is restricted to those personnel authorized to print reports. Only the Activities Report and Volume Report utilities can execute from a non-APF authorized library.

Volume Report can be executed from an unauthorized library if all required DD statements (including SLSCNTL, SLSVA, and SLSSCRPL) are provided. To dynamically allocate data sets based on an active HSC subsystem, the library for the SLUADMIN job must be authorized.

Another copy of SLUADMIN can be placed in an APF-authorized library whose access is restricted to personnel authorized to run all the utilities.

It may be desirable to further restrict access to individual utility functions. Table 12 lists utility commands and the applicable load modules that are invoked to process the utility. By restricting access to any of the load modules with an appropriate security package, it is possible to restrict access to the specified utility function.

Security for commands executing under the UUI is managed by User Exit 15. See the *NCS/VTCS XML Guide* for the list of commands executed under the UUI.

**Table 12. Load Modules for Utilities**

Utility	Load Module
ACTIVITIES (Activities Report)	SLUACTV
AUDIT	SLUAUDT
BACKUP	SLUBKUP
DIRBLD (Directory Rebuild)	SLUDRDIR
INITIALIZE (Initialize Cartridge)	SLUINCT
LIBGEN (Database Decompile)	SLUDBMAP
MERGEcds	SLUMERGE

**Table 12. Load Modules for Utilities**

<b>Utility</b>	<b>Load Module</b>
MOVE	SLUMOVE
OFFLOAD (Journal Offload)	SLUOFFLD
Performance Log Reblocker *	SLUPERF
Reconfiguration *	SLURECON
RESTORE	SLURSTR *
SCRATCH CONVERSION	SLUCONDB
SCREDIST (Scratch Redistribution)	SLUSCRD
SET	SLUSET
UNSELECT	SLUNSEL
VOLRPT (Volume Report)	SLUVOLR

\* Not invoked by command.

## SLUADMIN Program Return Codes

The SLUADMIN program sets a return code for the execution of the job step as defined in Table 13.

**Table 13. SLUADMIN Return Codes**

Return Code	Description
0	All utility functions requested via control statements completed normally.
4	At least one utility function encountered an abnormal situation, but it did not cause termination of that utility function or any subsequent utility functions.
8	At least one utility function encountered an error condition that prevented continuation of that utility function, but any subsequent utility functions represented by control statements were attempted.
12	An error condition was detected that either prevented the start of any utility functions, or terminated the active utility function and prevented processing of subsequent utility functions. <b>Note:</b> If the return code occurred because of a problem with the HSC CDS or journal files, the problem must be resolved before the HSC can be initialized safely.

The return code for each utility function is listed in a message. For return codes other than 0, additional messages are listed providing more information and description of the error condition. Refer to the *HSC/MSP Messages and Codes Manual* for any messages encountered.

Examples of utility program outputs, including messages indicating the return codes, are provided throughout this chapter.

## Reports Created By Utilities

Several utilities produce reports when executed. The reports are in addition to the utility function. Utilities that produce reports include:

- Activities Report
- AUDit
- BACKup
- MOVE
- Volume Report.

A description of each utility and resulting report is contained in this chapter.

### Report Headings

Utilities provide reports at the end of execution. Report headings include the following information:

- date/time of the report
- page number(s)
- host software version number
- name of the utility function executed.

### Parameters Controlling Report Headings

There are two optional parameters that change the format of output reports.

Parameter	Description
<b>NOHDR</b>	<p>Suppresses printing of report headings (error messages still can be written to the report file). This can be useful when running the Volume Report utility with the VOLDATA parameter specified, which produces a raw volume (flat) data file.</p> <p>This parameter can be used only with the Activities Report, MOVE, and Volume Report utilities.</p> <p>NOHDR and LINECNT are mutually exclusive.</p> <p>If NOHDR is not specified, the default is to print headings containing the following information:</p> <ul style="list-style-type: none"><li>- date/time of the report</li><li>- page number(s)</li><li>- host software version number</li><li>- name of the utility function executed.</li></ul>
<b>MIXED</b>	<p>Prints all report headings and messages in mixed case. The default is uppercase.</p>
<b>LINECNT=<i>nn</i></b>	<p>Specifies the number of lines per page for the SLUADMIN report. Allowable values are 10 through 99; the default is 60 lines per page. LINECNT and NOHDR are mutually exclusive.</p>



- XMLDate(*date*)** Defines the format of date fields in XML and CSV output. Allowable *date* formats are:
- *yyyymondd*
  - *yyyy-mm-dd*
  - *yyyy-mon-dd*
- The default format is *yyyymondd*, and an example of this is 2005Oct14.
- XMLCase(*case*)** Defines the case of alphabetic data fields in XML and CSV output. Allowable *case* formats are:
- M (mixed uppercase and lowercase)
  - U (all uppercase)
- The default is M.
- DATE=2YR** Specifies that all dates displayed in report detail lines are in the “*mm/dd/yy*” format. A *yy* value of 71 or greater indicates a 20th century (19*xx*) date. A *yy* value of 70 or less indicates a 21st century (20*xx*) date. To avoid confusion, you are encouraged to use the DATE=4YR parameter setting described below.
- DATE=4YR** Specifies that all dates displayed in report detail lines are in the “*yyyymmdd*” format. This is the default.

**Note:** The DATE parameter does not control report header date formats, which are displayed as *yyyy-mm-dd*. See Figure 9 on page 160 for an example of this format.

## Example

Several JCL examples using the options for report headings follow:

### Example of JCL Using Report Heading Options

```
//STEP1 EXEC PGM=SLUADMIN,PARM='NOHDR,MIXED'  
//STEP1 EXEC PGM=SLUADMIN,PARM='LINECNT=55'  
//STEP1 EXEC PGM=SLUADMIN,PARM='MIXED'  
//STEP1 EXEC PGM=SLUADMIN,PARM='DATE=4YR'
```

## Stand-alone Utilities

Most of the utility functions require the Host Software Component (HSC) to be up and functional. Some utilities run stand-alone, in the sense that they perform no dialogues with other HSC components, but they do require the MSP Operating System to be available. These stand-alone utilities are:

- Activities Report
- BACKup
- Database Decompile
- Directory Rebuild
- Journal Offload
- RESTore, which requires the HSC to be quiesced
- Scratch Conversion, unless LIBONLY is specified as an option (see “Scratch Conversion (SLUCONDB) Utility” on page 260) If LIBONLY is not specified, the SLUADMIN SCRATCH UPDATE utility that performs the actual scratch operation requires the HSC to be at BASE service level or higher.
- SET
- Volume Report.

## Activities Report Utility

The Activities Report utility provides you with information to analyze library resource loading by volume groups (for example, scratch compared to nonscratch, mounted, dismounted, entered, and ejected). This report provides the information necessary for analyzing and possibly redistributing library resources. You specify the time period to be reported against.

The utility also requires the SMF data for the time period requested (see the SET utility, SMF parameter in “SET SMF Record Type” on page 304). It is assumed that you elect to have cartridge movement SMF records recorded in the time period specified. It is also assumed that the SMF records are in sequence by:

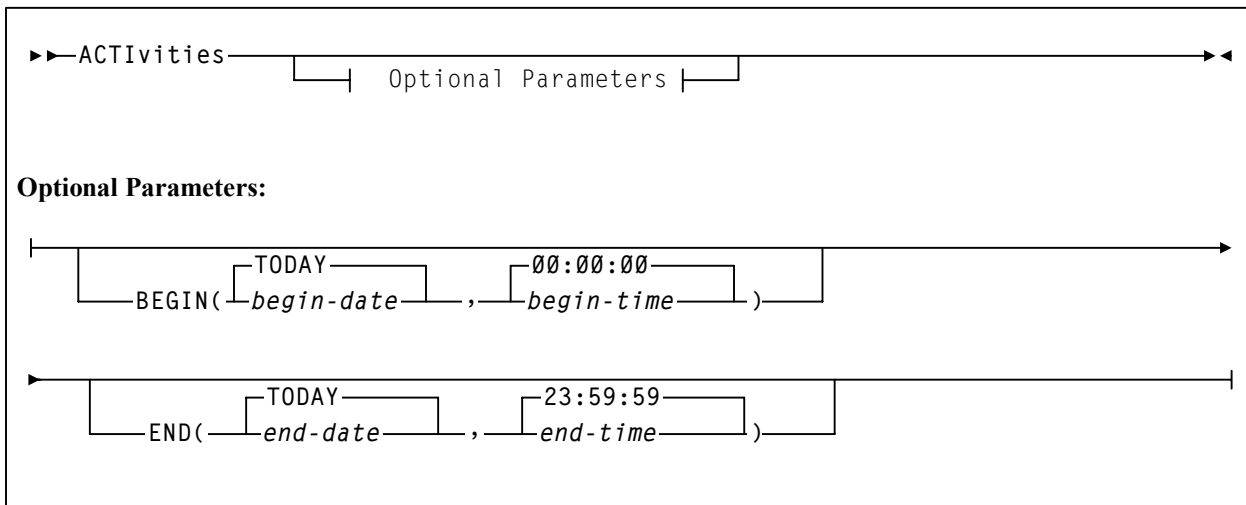
- SMF ID
- date
- time, from earliest to latest.

Duplicate or out of sequence records cause the utility to terminate and to display a message indicating that the SMF records are not sorted. Refer to “JCL Requirements” on page 153 to see sort statements you can specify to avoid this situation.



**Note: The Activities Report utility is not supported for the SL8500 library.**

### Syntax



### Utility Name

#### ACTivities

specifies that an activities report is to be produced.

# Activities Report Utility

## Parameters

### BEGIN

optionally specifies the beginning of the period for the activities analysis.

#### *begin-date*

*begin-date* specifies the starting date of the analysis, expressed in *mm/dd/yy* or *yyyymmdd* format.



**Note:** When using the *mm/dd/yy* format, specify a *yy* value of 71 or greater to indicate a 20th century (19xx) date. Specify a *yy* value of 70 or less to indicate a 21st century (20xx) date. To avoid confusion, you are encouraged to use the *yyyymmdd* date format.

### TODAY

is default date.

#### *begin-time*

*begin-time* is the beginning time-of-day (24-hour value), expressed in *hh:mm:ss* format.

The allowable range for the *begin-time* and *end-time* parameters is 00:00:00 to 24:00:00.

### 00:00:00

The default value is **00:00:00**.

Examples:

In each of the following examples, activity reporting begins on October 27, 1997 at midnight.

```
BEGIN(10/27/97,00:00:00)
BEGIN(19971027,00:00:00)
BEGIN(TODAY,00:00:00)
BEGIN(,00:00:00)
```

### END

optionally specifies the end of the period for the activities analysis.

#### *end-date*

*end-date* specifies the ending date of the analysis, expressed in *mm/dd/yy* or *yyyymmdd* format. If *begin-date* is specified, *end-date* must be in the same format.



**Note:** When using the *mm/dd/yy* format, specify a *yy* value of 71 or greater to indicate a 20th century (19xx) date. Specify a *yy* value of 70 or less to indicate a 21st century (20xx) date. To avoid confusion, you are encouraged to use the *yyyymmdd* date format.

### TODAY

is the default date.

## *end-time*

*end-time* is the ending time-of-day (24-hour value), expressed in *hh:mm:ss* format.

The allowable range for the begin-time and end-time parameters is 00:00:00 to 24:00:00.

## **23:59:59**

The default value is **23:59:59**.

Examples:

```
END(10/27/93,18:00:00)
END(19960501,11:30:00)
END(TODAY,23:29:00)
END(,23:59:59)
```

## JCL Requirements

The following definitions apply to the Activities Report utility JCL:

### **SLSCNTL**

the primary control data set. This is required so that the SMF record type code may be retrieved.

### **SLSPRINT**

output messages and report from the utility.

### **SLSSMF**

SMF data which the utility reports against. This may be a number of data sets concatenated from oldest to newest. This is an off-loaded copy of the active SMF data sets, created by the SMF dump utility IFASMFDP.

### **SLSIN**

input to the utility in the form of a control statement card image.

The user must specify several additional control cards in the SYSIN portion of the SYNCSORT JCL to ensure SMF records are sorted.

## Additional Sort Control Cards

```
//SYSIN DD *
INCLUDE COND=(6,1,BI,EQ,X'xx')
SORT FIELDS=(15,4,CH,A,11,4,PD,A,7,4,BI,A)
SUM FIELDS=NONE
```

**Note:** In the “INCLUDE COND” statement, the SMF type setting, shown as “X’xx” above, is supplied by the user. The default setting is “FF” (SMF type 255).

# Activities Report Utility

## JCL Example

The following example shows JCL for producing an Activities report beginning on December 2, 1993 at noon. Since the END parameter is not specified, all activity up to the last record in the SLSSMF data set is reported. (This assumes that all SMF data is after the start time.)

### JCL to Produce an Activities Report

```
//JOBACTV    job (account),programmer
//S1        EXEC PGM=SLUADMIN,PARM=MIXED
//SLSCNTL   DD DSN=control.data set.name,DISP=SHR
//SLSPRINT  DD SYSOUT=A
//SLSSMF    DD DSN=SMF.HISTORY,DISP=OLD
//SLSIN     DD *
            ACTIVITIES BEGIN(12/02/93,12:00:00)
/*
//
```

## Output Description

There are two types of output contained in the Activities report:

- statistics on cartridge movements (the first section of the report; called the Move section of the report)
- statistics on overall ACS activity (the second section of the report, called the ACS section of the report).

### Cartridge Movement Statistics - Move Section of the Report

In the first section of the report, the Move section, the HSC provides two summary lines:

- The first summary line lists from 1 to 16 SMF system IDs found in the SMF records input to the utility.
- The second summary line lists the SMF record type being reported, the total number of SMF records, and the date (*mm/dd/yy* or *yyyymmdd*) and time (*hh:mm:ss*) of the earliest and latest SMF record found matching the duration criteria.

The HSC SMF record type can be changed. When changed, the data extracted from SMF represents the most recent SMF record type, and records with prior SMF record types are ignored.

The duration criteria are specified in the Activities Report utility syntax as input via the SLSIN parameters.

For the Move section of the Activities Report, every move type is reported under the following headings:

### **Total**

is the count of all operations for the move category listed found in the SMF input matching the duration criteria. This is calculated as the sum of the number of operations found in the SMF records for the move category.

The value is reported as a count of moves and can range from 0 to 99,999,999,999 moves.

The major move categories are:

- all mounts (includes cleaning mounts)
- all dismounts (includes cleaning dismounts)
- all enters
- all ejects.

Subcategories for mount/dismounts are:

- scratch - same LSM
- scratch - diff LSM
- nonscratch - same LSM
- nonscratch - diff LSM.

Subcategories for enter/ejects are:

- ejects-same LSM
- ejects-diff LSM
- enters-same
- enters-diff LSM.

All “-same LSM” subcategories report moves which have the source and destination of the move in the same LSM. All “-diff LSM” subcategories report moves which have the source and destination of the move in different LSMs.

### **% of all**

is the percent of move operations represented by the category or subcategory found in SMF input matching the duration criteria.

This percentage is calculated as the number of operations in the category or subcategory divided by the number of operations in the major category.

The value is reported as a percent and can range from 0 to 100 percent.

# Activities Report Utility

## **Ave. time**

is the mean elapsed time from the issuance of the move request by the HSC until the HSC receives an acknowledgment that the cartridge has been moved.

It is calculated as the sum of the elapsed time for operations in the category divided by the number of operations in the category. The elapsed time is an HSC determined response time for a move request.

The value is reported as seconds and can range from 0.0 to 9,999.9 seconds. A value of “N/A” indicates no SMF records were found for the move category or no library hardware existed which matched the requested duration criteria.

For dismounts, this includes time for the transport to rewind and unload the cartridge. For mounts, this includes time the transport takes to load and spin the tape to load point. For mounts and dismounts, this **excludes** HSC queueing incurred when the HSC delays sending a mount request to the LMU until a previous tape has been rewound, unloaded, and put away.

Temporary enters are counted in the enter category. Ejects of temporarily entered volumes are counted in the eject category. For temporary enter/ejects, transport load and unload times are included in the elapsed time.

For enters and ejects, this only includes time it takes to move a cartridge from the CAP to a cell or from a cell to the CAP. It does NOT include time it takes for an operator to service the CAP or for the LSM to scan the CAP. It also **excludes** HSC queueing done to manage the CAP activity.

## **Ave. pass-thrus**

is the mean number of pass-thrus for a move category.

This is calculated as the sum of the number of pass-thrus divided by the number of operations in the category.

The value is reported as the mean number of pass-thrus and can range from 0.0 to 99.9 pass-thrus.

This is only reported for the major and the “-diff LSM” move subcategories. A value of “N/A” is reported for the “-same LSM” subcategories.

## **Earliest**

is the date (*mm/dd/yy* or *yyyymmdd*) and time (*hh:mm:ss*) of the earliest SMF record found matching the category being reported for the duration requested.

## **Latest**

is the date (*mm/dd/yy* or *yyyymmdd*) and time (*hh:mm:ss*) of the last SMF record found matching the category being reported for the duration requested.



## Usage Notes

1. Only cartridge moves involving a CAP or a transport are reported. Cell to cell moves such as those used by the Scratch Redistribution utility are not reported.
2. Only moves which complete successfully are reported in the statistics. Moves which incur HSC or LMU errors are not reported.
3. Other products exist which report mount pending time, but fail to consider dismount as a separate activity. To compare the Activities Report values to other products' "mount pending" time, it may be necessary to add HSC reported mount and dismount times.
4. Other LSM operations besides cartridge moves consume ACS resources (e.g., CAP and audit scans probably take the next highest amount of LSM activity depending on frequency). Scans are not reported specifically, except as they impact cartridge movement time and increase LSM ARM USE (see "Overall ACS Statistics - ACS Section of the Report" on page 158).
5. The LSM may move more than one cartridge at a time and often interleaves moves when busy. The HSC reported response time is an elapsed time which does not consider overlapped operations. When attempting to determine how the LSM is capable of mounting 10 cartridges in 125 wall clock seconds when the HSC reports average mount time of 25 seconds, LSM interleave must be considered.
6. Dismount scratch categories depend on the settings established in the SMC MOUNTDef command. Refer to the *SMC Configuration and Administration Guide* for more information.
7. Dismount scratch categories depend on the LIBGEN SLILIBRY macro DELDISP parameter. A scratch dismount occurs whenever the HSC detects a "delete" dismount and the library is LIBGENed with SLILIBRY macro parameter DELDISP=SCRATCH. If this defaults to or specifies DELDISP=NOSCRATCH, then there are no scratch dismounts.
8. As the HSC attempts to float dismounts to a nearby LSM, there should be less pass-thru activity on dismounts than on mounts. However, to float cartridges, free cells must be available. Ejects also may incur more pass-thru activity than enters because the HSC attempts to place entered cartridges into the same LSM as the entry CAP. Ejected cartridges may take numerous pass-thru operations to move from their home cell to the preferred CAP.
9. The Activities Report summarizes information contained in SMF input. Two types of SMF records are written every HSC SMF interval:
  - LSM operating statistics record, (subtype 1), and
  - LMU statistics buffer data block records (subtype 4).

The Move section of the Activities Report only processes the LSM operating statistics records. LSM operating statistic records contain information describing moves which complete during an HSC SMF interval. When attempting to understand ACS performance it may be worthwhile to decrease the HSC SMF interval so the HSC SMF records describe finer intervals of time (see the post-installation tasks information in the *HSC/MSP Installation Guide*).

## Activities Report Utility

For the ACS section of the Activities Report, output is based on an LMU interval. In a single host environment, the LMU interval is equivalent to the customer-defined HSC SMF interval.

In a multi-host environment, the LMU interval for each host is equivalent to the customer-defined HSC SMF interval for the host on which the HSC is running. In this case, data from all hosts must be combined to get an accurate picture of HSC activity. Combining data is necessary because the LMU's reports of robotic motions and temporary error counts are not separated by the requesting host. Robotic motions and temporary error counts attributed to all hosts are combined and sent to the host that is currently requesting ACS statistics.

In addition, in a multi-host environment, cartridge motions initiated for one host may be accounted for in another host's SMF data, depending on the relative length and timing of the SMF reporting intervals on the various hosts. This is true for data that appears in PM2 and CA-9 Reliability Plus (R+) reports, as well as in this report. The SMF subtype 7 records generated for each motion request are reported only by the host that initiated the request.



**Note:** For this report and for the CA-9 (R+) report, it is better to combine data from multiple hosts prior to generating the report so that the data from all sources will be reported and the totals and averages listed will be as accurate as possible.

### Overall ACS Statistics - ACS Section of the Report

For the ACS section of the Activities report, ACS statistics are reported under the following report headings:

#### ACS ID

is the ACS number of the ACS being reported, the number of SMF records, and the earliest and latest SMF record date (*mm/dd/yy* or *yyyymmdd*) and time (*hh:mm:ss*) found matching the Activities Report verbs duration specification.

#### LSM

the LSM numbers are listed across the page.

#### ARM USE

is the mean percent LMU calculated LSM arm busy found in the SMF input matching the duration criteria.

The LMU calculates this value as the amount of time since start of an LMU interval the LSM arm has been in motion divided by the total time in the LMU interval. This value is then summed for all SMF records and divided by the number of SMF records found matching the duration criteria.

The value is reported as a percent and may range from 0 to 100 percent. A value of "N/A" indicates the LSM is not configured. A value of "X percent" indicates that the LSM is configured, but no SMF records matched the duration criteria.

LSM arm motion is used for CAP and audit scans as well as general cartridge movement. This does not include pass-thru port rotation time, but does include time

to place the cartridge into the pass-thru port or to remove a cartridge from the pass-thru port.

### P-THRU

is the LMU calculated number of master pass-thru operations found in the SMF records matching the duration criteria.

This is recorded by the LMU every LMU interval and is summed by the Activities Report.

The value is reported as a count of pass-thrus and can range from 0 to 99,999 pass-thrus. A value of “N/A” indicates the LSM is not configured. A value of “X” indicates that the LSM is configured, but no SMF records matched the duration criteria.

Each pass-thru port has both a master and a slave LSM. A pass-thru operation involves placing a cartridge into one side of a pass-thru port, rotating the pass-thru port, and removing the cartridge from the other side of the pass-thru port. Each pass-thru operation is counted one time and is only counted by the master side LSM for the pass-thru port.

### Usage Notes

1. Merging multi-host HSC SMF records impacts the LSM ARM USE statistic as described above. However, not merging multi-host HSC SMF records affects the number of pass-thrus reported, as this is only the number of pass-thru operations occurring during the hosts LMU interval.
2. LSM ARM USE should never be reported higher than 100 percent. If the LSM is overlapping operations the arm is still only busy for 1 second even though it may be moving two cartridges during that 1 second time period.
3. The raw SMF record contains counts of pass-thru operations for each master pass-thru port of an LSM. The ACS section totals this information for its pass-thru count.
4. The ACS section of the Activities Report only processes the LMU statistics buffer data block SMF record (subtype 4). LMU statistics buffer records contain information calculated and returned by the LMU every HSC SMF interval. When attempting to understand ACS performance it may be worthwhile to decrease the HSC SMF interval so the HSC SMF records describe finer intervals of time (refer to the post-installation tasks information in the *HSC/MSP Installation Guide*).
5. Depending on the 9740 microcode level, 9740 LSMs may display zeroes for LSM arm use percentage and pass-thru statistics. Additionally, the SLSSLB SMF record (refer to “SLSSLB” on page 545) will contain zeroes in the LMU ATHS Statistics Buffer entries, and the SLSSLG6 LOGREC record (refer to “SLSSLG6” on page 580) will not write robotics motion and soft fail counts for 9740s.

Figure 9 on page 160 is an example of a typical Activities report.

# Activities Report Utility

```

SLUADMIN (n.n.n)                StorageTek Automated Cartridge System Utility                PAGE 0001
TIME hh:mm:ss                    Control Card Image Listing                    DATE yyyy-mm-dd

ACTIVITIES BEGIN(20040301)

SLUADMIN (n.n.n)                StorageTek Automated Cartridge System Utility                PAGE 0002
TIME hh:mm:ss                    Activities Begin 2004-03-01                    DATE yyyy-mm-dd

SYSTEM IDS: HSC1 HSC2 HSC3 HSC4 HSC5 HSC6 HSC7 HSC8
SMF RECORD TYPE: 245 TOTAL RECORDS: 1,580 EARLIEST 20040301 11:54:12 LATEST: 20040401 05:12:25

TOTAL % OF ALL AVE.TIME AVE. PASS-THRU EARLIEST LATEST
ALL MOUNTS: 346 100% 22.4 SEC. 0.0 20040301 11:54:12 20040401 05:12:25
SCRATCH -SAME LSM 10 0% 19.7 SEC. N/A 20040301 11:54:12 20040401 05:12:25
-DIFF LSM 0 0% N/A 0.0 20040301 11:54:12 20040401 05:12:25
NONSCRATCH-SAME LSM 336 97% 22.5 SEC. N/A 20040301 11:54:12 20040401 05:12:25
-DIFF LSM 0 0% N/A 0.0 20040301 11:54:12 20040401 05:12:25
TOTAL % OF ALL AVE.TIME AVE. PASS-THRU EARLIEST LATEST
ALL DISMOUNTS: 345 100% 19.9 SEC. 0.0 20040301 11:54:12 20040401 05:12:25
SCRATCH -SAME LSM 0 0% N/A N/A 20040301 11:54:12 20040401 05:12:25
-DIFF LSM 0 0% N/A 0.0 20040301 11:54:12 20040401 05:12:25
NONSCRATCH-SAME LSM 345 100% 19.9 SEC. N/A 20040301 11:54:12 20040401 05:12:25
-DIFF LSM 0 0% N/A 0.0 20040301 11:54:12 20040401 05:12:25
TOTAL % OF ALL AVE.TIME AVE. PASS-THRU EARLIEST LATEST
ALL ENTERS: 338 100% 12.2 SEC. 0.0 20040301 11:54:12 20040401 05:12:25
-SAME LSM 338 100% 12.2 SEC. N/A 20040301 11:54:12 20040401 05:12:25
-DIFF LSM 0 0% N/A 0.0 20040301 11:54:12 20040401 05:12:25
TOTAL % OF ALL AVE.TIME AVE. PASS-THRU EARLIEST LATEST
ALL EJECTS: 338 100% 13.2 SEC. 0.0 20040301 11:54:12 20040401 05:12:25
-SAME LSM 326 96% 12.5 SEC. N/A 20040301 11:54:12 20040401 05:12:25
-DIFF LSM 12 4% 32.7 SEC. 1.0 20040301 11:54:12 20040401 05:12:25

ACS ID: 00 USAGE RECORDS: 690 EARLIEST: 20040301 11:54:12 LATEST: 20040401 05:12:25
LSM: 0 1 2 3 4 5 6 7 8 9 A B C D E F
ARM USE: 0% N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A
P-THRU: 31 N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A
ACS ID: 01 USAGE RECORDS: 195 EARLIEST: 20040301 11:54:12 LATEST: 20040401 05:12:25
LSM: 0 1 2 3 4 5 6 7 8 9 A B C D E F
ARM USE: 8% N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A
P-THRU: 0 N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A
SLS0155I CONDITION CODE FOR UTILITY FUNCTION IS 0

```

Figure 9. Activities Report Utility Sample Output

## AUDIt Utility

The Audit utility provides the user the ability to perform a physical inventory of library volumes and to optionally update the library control data set to reflect all observed changes in cell storage for the specified component(s). Identification of the library components to be audited may include:

- the entire library
- an ACS
- LSMs (or a single LSM) within a specified ACS
- certain panels within a specified LSM
- certain rows within a specified panel
- certain columns (cells) within a specified row
- empty cells only
- diagnostic cells
- in-transit cartridges.

The AUDIt utility does not audit the enhanced CAP panel (panel 11 on the 4410 and 9310 LSMs) because the panel contains no storage cells. Audit processing preserves, whenever possible, the volume history/usage information and scratch status.

9360 (WolfCreek) LSMs perform an internal audit when the LSM access door is closed. This takes only a few minutes. To move volume data into the CDS, the user must run an HSC external audit.

Audits are lengthy because the LSM hardware physically scans the library elements identified in the audit. The Audit utility validates the contents of cell storage locations on a cell-by-cell basis across each specified LSM panel, then proceeds on a panel-by-panel basis regardless of whether an entire LSM or an ACS is being audited.

Usually you invoke this utility after detecting a possible loss of library integrity. Such events can include LSM access door opening or a volume not found at the data set location. To minimize processing time, each LSM engaged in the audit process is managed by an independent task attached in the HSC address space.

- If a loss of control data set integrity is suspected in an operating Automated Cartridge System, specification of optional parameters restricts audit processing to only those library elements where an integrity loss is suspected. Because selective or restrictive audits take less time, you are encouraged to run these types of audits if the library elements which experienced the loss of integrity are known.
- On the other hand, a total library audit is an acceptable method to use to initialize the control data sets when the LSMs in a library have been opened and manually loaded. In order to initialize the control data set for a total library audit, you must have a control data set with a valid configuration. This can be obtained from any previous backup of the control data set or from a new execution of data set initialization (SLICREAT is used to create the control data set during installation).

Depending on the size of the library elements and installation conventions, you may choose to code **TIME=1440** on the utility job card. Setting this parameter allows you to override the default execution time limit. TIME=1440 specifies that no time checking is

done at all, which allows a job to execute indefinitely (1440 is the number of minutes in 24 hours).

You can specify whether or not the library control data set is updated as a result of audit, or if only the discrepancy listing is produced by the parameters chosen.

- If the APPLy(YES) is specified, the library control data set is updated to reflect all observed contents in cell storage. A discrepancy listing is also produced. Duplicate VOLSERS and cartridges with unreadable or illegal external labels are ejected from the LSM. Cartridges that are not recorded in the CDS that have external media labels that are unreadable are also ejected.



**Note:** The discrepancy list identifies differences between the CDS and the physical inventory. APPLy(YES) is the default setting.

- If APPLy(NO) is specified, duplicate VOLSERS and cartridges with unreadable/illegal external labels are not ejected, the library control data set is not updated, and a discrepancy listing is produced.

## Media Type Mismatch Conditions

The Audit utility can address a mismatch condition if the LMU reports a different media type than the CDS contains. In this case, an unreadable external media label exists, and the vision system cannot determine the media type.



**Note:** CDS media information is updated when the volume external label is read by the robotic vision system and is transmitted back to the HSC through the LMU.

It is recommended that users provide an external media label for all cartridges.

Depending on the parameters input by the user, the following actions occur:

1. If APPLy(YES) is specified (or defaulted to):
  - If the LMU and a VOLATTR are mismatched, the VOLATTR is incorrect, and the HSC issues a warning message.
  - If the media values for the LMU and the VAR do not agree, the HSC issues a warning message, and the CDS is updated to reflect the value reported by the LMU.
  - If the media value is unreadable by the LMU (for a cartridge recorded in the CDS), the HSC issues a warning message, and the CDS is updated to indicate that the media value of this volume is unreadable.
  - If the media value is unreadable by the LMU (for a cartridge not recorded in the CDS), the HSC issues a warning message, and the volume is ejected.
2. If APPLy(NO) is specified:
  - If the LMU and a VOLATTR are mismatched, the VOLATTR is incorrect, and the HSC issues a warning message.

- If the media values for the LMU and the VAR do not agree, the HSC issues a warning message.
- If the media value is unreadable by the LMU (recorded in the CDS), the HSC issues a warning message.
- If the media value is unreadable by the LMU (not recorded in the CDS), the HSC issues a warning message.

In both of these cases (APPLY(NO) or APPLY(YES)), the audit continues.

## Actions Permitted During an Audit

During execution, AUDIt permits any of the following actions to occur within any LSM in which an audit is being conducted:

- mounts
- dismounts to the same or another LSM (if the home location exists prior to the start of the audit)
- ejects
- pass-thru events.

No new cartridge cell allocations can occur during audit processing within those LSMs being audited, so cartridge enters and pass-thrus with MNTD Float(ON) are not allowed in ACSs or LSMs involved in the audit. In addition, cartridge initialization and scratch redistribution is not allowed in an ACS being audited.

## How the AUDIt Utility Functions

Each LSM element to be audited is scanned, cell by cell, and compared with the volume and cell information for the corresponding entries in the library control data set. If the APPLY(YES) parameter is specified, the control data set is corrected to reflect the current contents of the inspected cell. If duplicate volumes are found in either a previously audited cell in the LSM currently being audited or another LSM, the last volume scanned is physically ejected.

Volumes which are to be ejected are moved to the CAP identified in the invoking control statement or to the highest-priority, available CAP. The CAP is not allocated until the Audit utility requires it.

If, during the Audit operation, a CAP is required and the scope of the Audit is a row or column level Audit, the CAP remains allocated until the Audit completes. If the scope of the Audit is for multiple panels or larger (such as an LSM or ACS level Audit), the operator is given the opportunity to release the CAP or have it remain allocated for the duration of the Audit.



**Note:** The opportunity to release the CAP is presented only after each full panel audit completes. An audit consisting of only one panel is not presented with the choice to reserve or release the CAP. The same logic applies to the last panel of a multiple-panel audit.

## AUDIt Utility

After the Audit ejects volumes from the current panel, a write-to-operator with reply (WTOR) is issued allowing the operator to keep or release the CAP. If the operator responds with a “K”, the CAP remains allocated for the duration of the Audit. If the operator responds “R”, the CAP is released so that it may be allocated to another operation. If another volume is to be ejected, the Audit again acquires the CAP and the keep/release dialog is repeated. If the operator does not reply to the message within a 5-minute time period (unattended operations, nighttime Audits), the default is “K”. The CAP remains allocated, and the Audit continues.

Scratch status of some volumes may be lost after an audit; therefore, it is recommended that the installation run the Volume Report utility, and possibly the Scratch Update utility, after an audit. You are also encouraged to back up the library control data sets after completing an audit.

On a frozen panel, if cartridges are encountered that have not been recorded in the CDS and APPLy(YES) is specified, these cartridges will then be recorded in the CDS. The panel free cell counts are updated. LSM free cell counts are not updated, since the LSM free cell count does not include free cells on frozen panels.

### Concurrent Audits

Concurrent Audit utilities (from the same or different MSP systems) are allowed and can usually improve the performance of the selective/restrictive audits in different LSMs. Concurrent audits are not recommended when duplicate volumes are suspected.

In some cases, running concurrent audits may compromise the accuracy of the audits. For example, two concurrent audits running on different MSP systems may not detect duplicate volumes if both utilities audit separate library elements containing duplicate volumes.

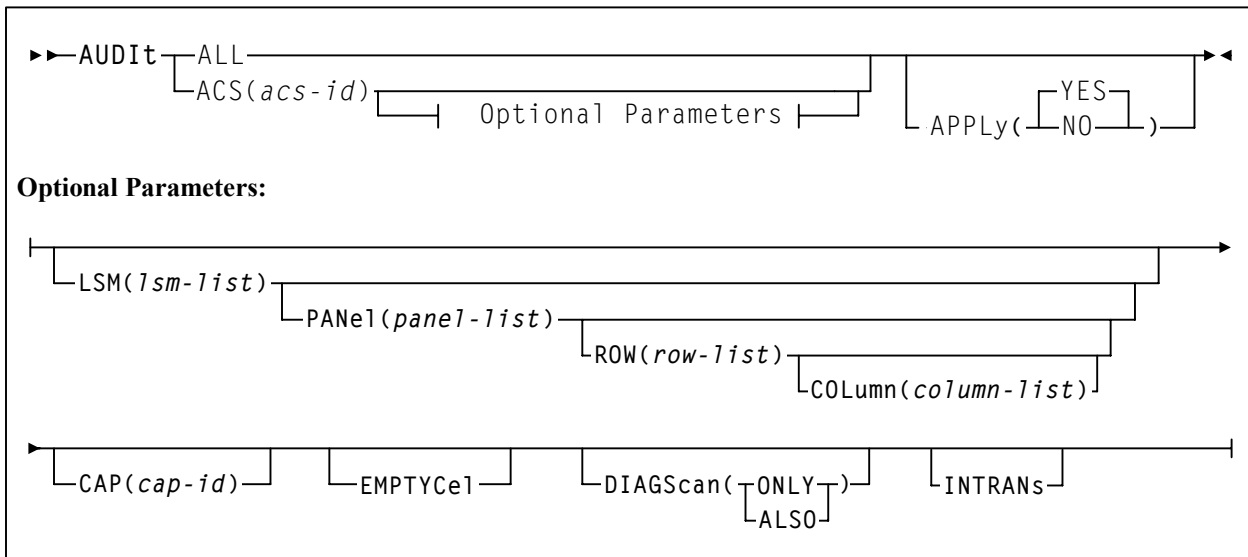


**Note:** Concurrent APPLy(YES) and APPLy(NO) audits or audits of overlapping elements are disallowed. In addition, audits are prohibited from running concurrently with the Initialize Cartridge or Scratch Redistribution utilities within the same ACS. An HSC message is generated and the utility must be resubmitted or its parameters changed so no conflict exists.

If concurrent audits are running on multiple LSMs, and an audit is canceled and restarted, a conflicting audit message is generated. If the restarted audit were to be run, inappropriate duplicate VOLSERS may be detected and these volumes may be ejected from the LSM. All audits must be completed before any can be restarted.



## Syntax



## Utility Name

### AUDIt

specifies that an audit operation is to be performed.

## Parameters

### ALL

specifies that the total library is to be audited.

### APPLY

#### (YES)

specifies that the Audit operation ejects cartridges with duplicate VOLSERS, unreadable or illegal external media labels, and/or new cartridges unreadable external labels, and performs corrective actions to the control data set to reflect the physical contents of storage cells. **YES is the default.**

#### (NO)

specifies that a discrepancy listing is produced, and the control data set is not updated.

### ACS

specifies that only a particular ACS in the library is to be audited.

#### (acs-id)

The one or two digit hexadecimal ACS identifier.



**Note:** If the ACS parameter is specified with no LSM parameters, the audit is performed on all LSMs in the ACS at the same time (multitasking). This is the same as running the AUDIT utility with the ALL parameter. To audit only certain LSMs

within an ACS, you must code the LSM parameter with the LSM or list of LSMs.

## LSM

optionally specifies that only certain LSMs within the specified ACS are to be audited.

### *(lsm-list)*

An *lsm-list* can be a single LSMid or a list of LSMids. An LSMid is a single hexadecimal digit. An LSM range is not allowed. If a list is specified, the elements must be separated by blanks or commas, and the entire list enclosed in parentheses.

## PANel

optionally specifies that only certain panels within an LSM are to be audited.

### *(panel-list)*

*panel-list* may be a single panel or a list of panels. Panel ranges are not allowed. If a list is specified, the elements must be separated by blanks or commas, and the entire list enclosed in parentheses.

Refer to the appropriate ACS hardware document for information about LSM outer and inner wall panel layouts.



**Note:** If this parameter is specified, the LSM parameter may contain only one LSM number.

**A *panel-list* element is a one or two digit decimal number.**

- For 4410 and 9310 LSMs, valid panel entries are 0 through 11 (outer LSM wall panels) and 12 through 19 (inner wall panels).
- For 9360 (WolfCreek) LSMs, valid panel entries are 0 through 4.
- For 9740 (TimberWolf) LSMs, valid panel entries are 0 through 3.
- For SL8500 (StreamLine) libraries, valid panel entries are:
  - base library — 2-10
  - with one expansion panel — 2-18 (expansion panel is 8-15)
  - with two expansion panels — 2-26 (expansion panels are 8-23)
  - with three expansion panels — 2-34 (expansion panels are 8-31).



**Note:** Panels 0 (CAP panel) and 1 (drive panel) are allowable entries for an SL8500 audit, however, in this case the HSC displays a condition code 0 because it does not find any storage cells on these panels.

**ROW**

optionally specifies that only certain rows within the specified LSM panel are to be audited.

**(row-list)**

*row-list* may be a single row or a list of rows. Ranges are not allowed. If a list is specified, the elements must be separated by blanks or commas, and the entire list enclosed in parentheses.

If this parameter is specified, the LSM and PANEL parameters may contain only one element.

**A *row-list* element is a one or two digit decimal number.**

- For 4410 and 9310 LSMs, valid row entries are 0 through 14 (0 indicates the top row and 14 indicates the bottom row).
- For 9360 (WolfCreek) LSMs, rows 0 through 41 can be specified with the exception of panel 1, which contains only four usable cells (rows 35 through 38).
- For 9740 LSMs, valid row entries are 0 through 41 on panels 0, 2, and 3; and 36 through 41 on panel 1.
- For SL8500 libraries, valid row entries are:
  - 0-26 on a standard panel
  - 0-12 on a short panel (panels 2-4, 6-7)
  - 6-12 on a PTP panel (panel 5)

**Notes:**

1. On 9740s, column 3 on panel 2 allows row entries only on rows 28 through 41.
2. On 9740s, the cells on panel 3 are optional.

**COLumn**

optionally specifies that only certain columns (cells) within an LSM panel row are to be audited.

**(column-list)**

*column-list* may be a single column, or a list of columns. Ranges are not allowed. If a list is specified, the elements must be separated by blanks or commas, and the entire list enclosed in parentheses.

If this parameter is specified, the LSM, PANEL, and ROW parameters may contain only one element.

**A *column-list* element is a one or two digit decimal number.**

- For 4410 and 9310 LSMs, valid column entries are 0 through 23, left to right, for outside wall panel columns. Inner wall panels are numbered 0 through 19, right to left.
- For 9360 (WolfCreek) LSMs, columns 0 through 5 can be specified.
- For 9740 LSMs, valid column entries are 0 through 3 for panels 0, 2, and 3 (if the optional cells are present); 0 through 2 for panel 1.
- For SL8500 libraries, valid column entries are 0 through 1 for each panel type.

## CAP

CAP optionally specifies a particular Cartridge Access Port to be used for any required cartridge ejections during the Audit operation.

### *(cap-id)*

The Cartridge Access Port identifier. The format for *cap-id* is *AA:LL:CC* where *AA* is the ACS number (hexadecimal 00-FF), *LL* is the LSM number (hexadecimal 00-17), and *CC* is the CAP number.

Allowable values for *CC* are:

#### 00

- For 4410 and 9310 LSMs, standard 21-cell CAP or the right-hand 40-cell enhanced CAP
- For 9360 LSMs, the 20-cell WolfCreek CAP
- For 9740 LSMs, fixed rack 14-cell or 10-cell removable magazine CAP
- For SL8500 libraries, the CAP consists of 3, 13-cell removable magazines.



**Note:** 000 is also an allowable entry for this CAP type.

#### 01

- For 4410 and 9310 LSMs, left-hand 40-cell enhanced CAP
- For 9360 LSMs, the 30-cell WolfCreek optional CAP
- For SL8500 libraries, this is an optional CAP consisting of 3, 13-cell removable magazines.

#### 02

priority CAP (PCAP) for a 4410 or 9310 LSM enhanced CAP or for a 9360 LSM CAP.

#### 03

standard fixed rack 14-cell CAP or the 10-cell removable magazine. The LMU recognizes the configuration when the ACS or LSM is varied online.



**Note:** If a CAP is not specified, a CAP in the identified ACS is selected based on the CAPPref operator command (refer to the “CAP Preference (CAPPref)

Command and Control Statement” in the *HSC Operator’s Guide*).

Multi-ACS audits cannot specify the CAP parameter. A CAP is chosen for each ACS based upon CAP preference values.

## EMPTYCel

optionally specifies that only empty cells are to be audited. **This parameter can be used in combination with all other AUDIt parameters except DIAGScan(ONLY).**

The main benefit provided by auditing only empty cells is reducing the time required to run an audit.



**Note:** StorageTek does not recommend running an empty cell audit on an SL8500 library because the time to run the audit will not be substantially reduced.

Typically, users will want to specify this parameter when:

- they have entered an LSM and placed new cartridges in empty cells, or
- they need to correct cartridge location information for library volumes that have been manually moved to empty cells.

In either case, if APPLy(YES) is specified, the CDS is updated to reflect that these cells are no longer empty.



**Caution:** In some cases, running an empty cell only audit may compromise the accuracy of the audit.

## DIAGScan

optionally specifies that diagnostic cells are to be scanned. The HSC scans these cells one at a time and displays the contents of each cell in the AUDIt utility report.



### Notes:

1. **DIAGScan is mutually exclusive with the ROW and COLUMN parameters.** It can be used in combination with all other AUDIt parameters.
2. Cartridge movement between diagnostic cells and regular storage or CAP cells is not supported by the LMU, so diagnostic cell contents can only be reported.

## ONLY

specifies that only diagnostic cells should be scanned. **This parameter cannot be specified in combination with the EMPTYCel parameter.**

## ALSO

specifies that diagnostic cells should also be scanned along with the normal AUDIt utility operations.

# AUDIt Utility

## INTRANs

optionally specifies that in-transit cartridges in an LSM are to be processed. All in-transit cartridges, except those identified in the note below, are read and ejected as part of an AUDIt utility operation.



### Notes:

1. **INTRANs is mutually exclusive with the APPLY(NO) parameter.** It can be used in combination with all other AUDIt parameters.
2. Only the first two cells (columns 0 and 1) in a 9310 playground are accessible to an in-transit audit. Cartridges in other cell positions in a 9310 playground (columns 2 through 5) cannot be ejected by an in-transit operation.
3. 9740 diagnostic cells cannot be scanned by an audit.

## JCL Requirement

The following definitions apply to Audit utility JCL:

### SLSPRINT

output messages from the utility program.

### SLSIN

input to the utility in the form of control cards.

## JCL Examples

The following example shows JCL for auditing an entire library (all ACSs).

### JCL for Audit of Entire Library (all ACSs)

```
//JOBAUDT      job (account),programmer,TIME=1439
//S1           EXEC PGM=SLUADMIN,PARM=MIXED
//SLSPRINT     DD SYSOUT=A
//SLSIN        DD *
  AUDIT ALL
/*
//
```

The following example shows JCL for a selective audit of a single ACS and two LSMs. The CAPid where the cartridges are to be ejected is also specified.

**JCL for Selective Audit (1 ACS, 2 LSMs, with CAPid)**

```
//JOBAUDT    job (account),programmer
//S1         EXEC PGM=SLUADMIN,PARM=MIXED
//SLSPRINT   DD SYSOUT=A
//SLSIN      DD *
    AUDIT ACS(01) LSM(01,02) CAP(00)
/*
//
```

The following example shows JCL for a selective audit specifying a panel-list and producing a discrepancy list if duplicate VOLSERS or unreadable/illegal cartridge labels are encountered.

**JCL for Selective Audit (with panel-list and discrepancy list)**

```
//JOBAUDT    job (account),programmer
//S1         EXEC PGM=SLUADMIN,PARM=MIXED
//SLSPRINT   DD SYSOUT=A
//SLSIN      DD *
    AUDIT ACS(01) LSM(04) PANEL(6,12) APPLY(NO)
/*
//
```

**JCL for Selective Audit of Empty Cells**

```
//JOBAUDT    job (account),programmer
//S1         EXEC PGM=SLUADMIN,PARM=MIXED
//SLSPRINT   DD SYSOUT=A
//SLSIN      DD *
    AUDIT ACS(00) LSM(01) EMPTYCELL
/*
//
```

**JCL for Selective Audit of Diagnostic Cells Only**

```
//JOBAUDT    job (account),programmer
//S1         EXEC PGM=SLUADMIN,PARM=MIXED
//SLSPRINT   DD SYSOUT=A
//SLSIN      DD *
    AUDIT ACS(00) LSM(02) DIAGSCAN(ONLY)
/*
//
```

# AUDIt Utility

## JCL for Selective Audit that Includes Diagnostic Cells

```
/JOB AUDT      job (account),programmer
//S1           EXEC PGM=SLUADMIN,PARM=MIXED
//SLSPRINT    DD SYSOUT=A
//SLSIN       DD *
              AUDIT ACS(00) LSM(02) PANEL(6,7,8) DIAGSCAN(ALSO)
/*
//
```

## Output Description

Output resulting from the execution of the Audit utility includes:

- a listing of input commands with appropriate messages when syntax errors occur
- messages associated with error conditions resulting from an unsuccessful attempt to execute audit processing
- messages indicating anomalies observed and/or actions occurring during processing (see Figure 10 on page 173)
- updated and validated library control data set with respect to the library elements that have been audited (if APPLY(YES) is specified).



```

SLUADMIN (n.n.n)                StorageTek Automated Cartridge System Utility                PAGE 0001
TIME hh:mm:ss                    Control Card Image Listing                DATE yyyy-mm-dd

AUDIT ACS(00) LSM(11)

SLUADMIN (n.n.n)                StorageTek Automated Cartridge System Utility                PAGE 0002
TIME hh:mm:ss                    Audit Utility                DATE yyyy-mm-dd

-SLS0231I Audit phase 1 (Registration) completed
-
SLS2200I Warning: Volume MVC005 Media-type compare failed between VOLATTR and cartridge label
-SLS0232I Audit phase 2 (Volumes Check) completed
-
SLS0199I Volume CLN504 in cell 00:11:00:02:00 is in control data set at cell 00:11:00:00:00
SLS0199I Volume CLN505 in cell 00:11:00:02:05 is in control data set at cell 00:11:00:00:05
SLS0238I Audit scan for LSMid 00:11, panel 0 has completed
SLS0238I Audit scan for LSMid 00:11, panel 1 has completed
SLS0238I Audit scan for LSMid 00:11, panel 2 has completed
SLS0238I Audit scan for LSMid 00:11, panel 3 has completed
SLS0238I Audit scan for LSMid 00:11, panel 4 has completed
SLS0238I Audit scan for LSMid 00:11, panel 5 has completed
SLS0238I Audit scan for LSMid 00:11, panel 6 has completed
SLS0238I Audit scan for LSMid 00:11, panel 7 has completed
SLS0238I Audit scan for LSMid 00:11, panel 8 has completed
SLS0238I Audit scan for LSMid 00:11, panel 9 has completed
SLS0238I Audit scan for LSMid 00:11, panel 10 has completed
SLS0238I Audit scan for LSMid 00:11, panel 11 has completed
SLS0238I Audit scan for LSMid 00:11, panel 12 has completed
SLS0200I Volume Y20114 in cell 00:11:13:02:05 is not in control database
SLS0238I Audit scan for LSMid 00:11, panel 13 has completed
SLS0238I Audit scan for LSMid 00:11, panel 14 has completed
SLS0238I Audit scan for LSMid 00:11, panel 15 has completed
SLS0238I Audit scan for LSMid 00:11, panel 16 has completed
SLS0200I Volume Y20133 in cell 00:11:17:02:07 is not in control database
SLS0238I Audit scan for LSMid 00:11, panel 17 has completed
SLS0238I Audit scan for LSMid 00:11, panel 18 has completed
SLS0238I Audit scan for LSMid 00:11, panel 19 has completed
SLS0239I Audit scan for panels in LSMid 00:11 has terminated
-SLS0233I Audit phase 3 (Cell Scan) completed

SLS0213I Volume Y00133 not located by Audit
SLS0213I Volume Y00114 not located by Audit
-SLS0234I Audit phase 4 (Finish) completed
SLS0155I Condition code for utility function is 4

```

**Figure 10. AUDIt Utility Sample Output**

# BACKup Utility

## BACKup Utility

The BACKup utility allows you to back up the library control data set. The control data set is the single most important resource required in the operation of the HSC. Various controls and services are available to keep the control data set intact and to enable you to recover the data set from a total failure. Features such as shadowing, journaling, backup, and restore, are all intended to provide for the integrity of the control data set. A library can have the following control data sets:

- **Primary control data set.** Every installation must have this data set. It contains the inventory of all cartridges in the library, the library configuration, information about library hardware and resource ownership across multiple processors, and serves as a vehicle of communication between the HSCs running on multiple processors.
- **Secondary control data set.** This optional data set is a duplicate copy of the primary control data set.
- **Standby control data set.** This data set is optional. It is a formatted control data set with only one valid record, the Database Heartbeat (DHB). It is highly recommended that a standby control data set be created and initialized in your installation. This database is used primarily for control data set recovery.

### Prerequisites

The BACKup utility can be executed with or without functioning library host software.

**Note:** Backup to tape is not supported.

### Reasons for Running the BACKup Utility

The following items justify running the BACKup utility:

- regularly scheduled backups can be run to prevent inadvertent loss of information
- the primary and/or secondary copy of the control data set for your library has been deleted or corrupted
- in a multiprocessor environment, due to a CDS switch on one processor, the primary and secondary CDS might run independently and become unsynchronized. In such a situation, you must determine which of two nonidentical control data sets is the correct copy; the BACKup utility assists you in recovery.
- to choose the CDS with the most current updates if a database mismatch is detected.

Refer to “CDS Synchronization Between Local/Remote-linked Libraries” on page 176 for the procedure to recover control data sets in remote-linked libraries.

## How the BACKup Utility Functions

The BACKup utility performs extensive error checking on CDS records, as well as comparison checking between primary and secondary copies of the CDS.



### Notes:

1. In order to run a back up correctly, all data sets currently defined to the HSC should be specified. This ensures that proper CDS selection and reservation occurs.
2. The backup data set is formatted as RECFM=F, BLKSIZE=4096. The logical record length may be LRECL=0. In this case, LRECL=0 indicates to default to the block size, so you should not construe this as a problem.

If both copies of the data set are available and an I/O error occurs during the analysis phase of backup, the utility attempts to continue backup on the other copy unless the CDS keyword specifies the CDS that contains the error. If the CDS keyword specifies the control data set containing the error, the utility terminates.

Depending upon the option that you select with the keyword OPTion,

- a straight copy is made
- a detailed block analysis is performed
- a restart of the utility is performed.

Copy data sets are made for use as analysis data sets to limit the hardware reserve placed on the control data set to an absolute minimum. Depending upon options selected, analysis of data blocks can be performed and block information modified before the data is written to the backup data set (SLSBKUP).

A return code of eight (RC=8) can be expected if shadowing (a secondary CDS) is enabled and the secondary DD statement is not provided. A backup of the primary control data set will not be taken.

If for any reason, a return code of eight (RC=8) occurs, the utility may be able to be restarted (refer to “How to Restart Backup” on page 186).

The RESTore utility works in conjunction with BACKup by formatting the discrepancy blocks into control card statements and outputting them to the SLSAUDIT data set. When the HSC is reactivated after a backup and restore, the discrepancy control statements are input to the SLUADMIN program and AUDIt, UNSCratch, and UNSElect are performed to resolve discrepancies.

Refer to “RESTore Utility” on page 251 for detailed information on the RESTore utility.

# BACKup Utility

## Backup Procedure

Backup of the control data set may be performed using conventions for specifying the secondary control data set and with copy data sets to enable block analysis, if desired. The following procedure describes steps for performing backups (see the examples in “JCL Examples” on page 170 for each step).

1. If OPTion(Analyze) is specified, allocate the SLSCOPY1 and SLSCOPY2 data sets. This step is not necessary if you specify OPTion(Copy). These data sets must be the size of the current control data set.
2. Allocate the SLSBKUP data set. It should be slightly larger than the control data sets. The size depends upon the number of discrepancies found. However, a recommended size is five percent larger than the current control data set.
3. Run the BACKup utility.

If backup options requiring copy data sets are specified, the control data set is placed in a reserve state only long enough for the data to be copied to the SLSCOPYn data sets. The resident-host cannot access either control data set except for backup processing.

The library control data set is backed-up to the user-specified DASD data set. If journaling is enabled, all specified journals are reset when the backup is completed.



**Note:** Up to 99 journals can be specified per run.

Finally, the control data set is returned to a state where it can support normal library processing. If Analyze is specified, the SLSCOPYn data sets are processed using unreserved READs; otherwise, the utility ends.

4. If SLSCOPYn data sets are used and a return code of less than RC=8 (i.e., backup successful) is achieved, these data sets may be deleted or reused when the backup is restarted due to a failure.

## CDS Synchronization Between Local/Remote-linked Libraries

Special precautions should be taken for running BACKup and RESTore when local/remote-linked libraries run control data sets independent of each other. In this situation, the primary and secondary control data sets are being updated by the HSC on their respective sides of the link. If remote communication is lost, the two control data sets become unsynchronized.

Precautions also should be followed when the link connecting the local and remote libraries is disrupted.

Special considerations while the link is down include:

- Keep enters and ejects of cartridges to a minimum. This practice reduces the number of AUDIT statements produced.
- Enter MNTD Float(OFF). This generates more pass-thrus, but less AUDIT statements.

- Enter MNTD SCRDISM(CURRENT) to avoid cartridge movement.
- Avoid running the SET utility.
- Avoid running the Scratch Update and Scratch Redistribution functions during this time.
- Take all HSCs down prior to the link being restored.

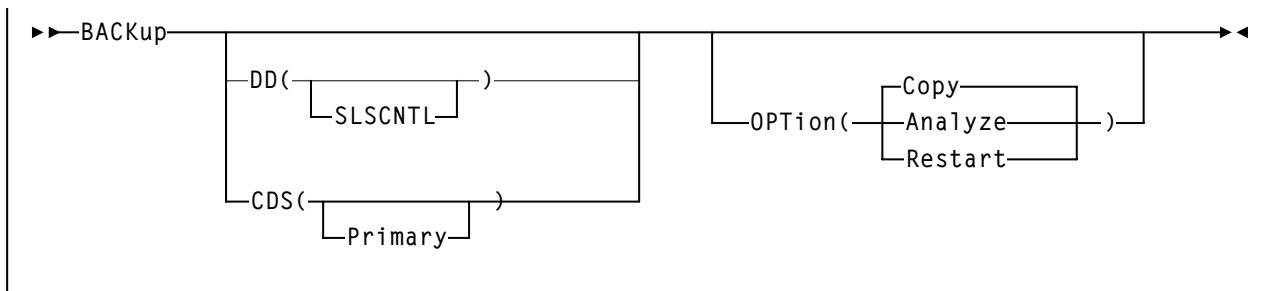
Special considerations after the link is restored include:

- Avoid restoring CDS copies from backups taken while the link is down. If a restore of the CDS(s) is necessary only on one side of the link, make sure that only the CDS(s) on that side is restored.

Do this by including **only** DD statements for the data sets on the side of the link to be restored. Do **not** restore **all** CDS copies from a backup taken while the link is down.

- After the link is restored, **all** HSCs should remain down for backup/restore.
- Run BACKup. OPTion(Analyze) must be used.
- If you know which CDS has had the most processing occur after the link was disrupted, use the CDS keyword to select that CDS for backup.
- Once backup is completed, restore the control data sets. Do not apply journals.
- Reinitialize the HSCs.
- When the ACSs are available, start the SLUADMIN program using the SLSAUDIT data set from the restore as input.

## Syntax



## Utility Name

### BACKup

specifies that a backup operation is to be performed.

# BACKup Utility

## Parameters

### **DD**

optionally, specifies a backup is to be run on a selected CDS. If **DD** is not specified, the BACKup utility backs up the CDS containing the most updates.

For regularly scheduled backups of HSC CDSs, do not specify the **DD** keyword unless each CDS copy has been backed up individually in the same time frame. The reason for not specifying the **DD** keyword is that a CDS switch(es) may have taken place.

### **(SLSCNTL)**

specifies that the CDS defined by the SLSCNTL DD statement is to be copied to the SLSBKUP data set.

### **CDS**

optionally, specifies that a backup is to be run on a control data set. If CDS is not specified, the BACKup utility backs up the CDS containing the most updates.

For regularly scheduled backups of HSC control data sets, do **not** specify the CDS keyword when each CDS copy is not being backed up individually in the same time frame. The reason for not specifying the CDS keyword is that a CDS switch(es) may have taken place.

### **(Primary)**

specifies that the primary control data set is to be copied to the SLSBKUP data set.

### **(Secondary)**

specifies that the secondary control data set is to be copied to the SLSBKUP data set.

### **(STandby)**

specifies that the standby control data set is to be copied to the SLSBKUP data set.

### **Notes:**

1. The CDS parameter specifies the CDS currently in that position. For example, if the primary CDS is disabled and the secondary CDS is running as the primary, specify Primary (**not** Secondary) to back up the secondary CDS.
2. Using the CDS parameter is especially useful for libraries operating through a remote link, such as channel extenders. Should the link drop and the primary CDS and the secondary CDS complete processing separately, you may bypass the programmatic algorithm that normally determines the control data set to be backed up. If you know which data set (primary or secondary) had the most cartridge processing, then you can select that data set to be processed by the utility.

### **OPTion**

optionally, allows you to select one of three backup options.

## (Copy)

if this parameter is specified, NO block analysis is performed. The backup is taken from one of the control data sets. This function is a straight copy to the SLSBKUP data set. It emulates the last backup; therefore, the DD SLSCOPYx statements are not required in the JCL for this option.

**OPTion(Copy) is the default and should be used or defaulted to for regularly scheduled backups of the HSC control data set.**

OPTion(Copy) determines which copy of the CDS is the most current and copies that CDS copy to the SLSBKUP data set. This dynamic determination of the current primary CDS is disabled if the CDS keyword is specified.

## (Analyze)

this option allows detailed analysis of individual blocks to occur. A reserve is held against the control data set until the SLSCOPY data sets are made and the journals are reset. An analysis is made and discrepancies are output to a summary report and to the SLSBKUP data set. Refer to Figure 11 on page 184 to see a sample discrepancy report. An errant and in-transit destination report, followed by a block processing report, also is produced in this case. Figure 11 on page 184 shows these reports.



**Note:** The VOLSERS and cell locations that are discrepant are sorted into an incremental stack to reduce the amount of robotic movement.

Up to 10,000 discrepancies can be recorded for the Scratch and Select discrepancy types; 96,000 discrepancies or one ACS can be recorded for the Audit discrepancy type. Once these limits have been reached, discrepancy saving is discontinued. Discrepancies saved prior to reaching the limits are retained and output.

If you specify this option, normally SLSCNTL represents the current primary data set; SLSCNTL2 specifies the current secondary data set. However, if you are recovering from a link down or multi-host switch situation, SLSCNTL should remain the current primary CDS on one side of the link while SLSCNTL2 should be specified as the current primary CDS on the other side of the link. If you are sure which two CDSs should be compared, do **not** specify SLSSTBY.

Upon restore, the discrepancy blocks are used to generate UNSCratch, UNSElect, and AUDIt statements to the SLSAUDIT data set.



### Notes:

1. Specify a region size of 2000K (REGION=2000K) on the EXEC statement.
2. It is better to use OPTion(Copy) for regularly scheduled backups of the HSC CDS. OPTion(Analyze) is designed to backup the CDSs when there may be discrepancies between copies of the CDS.

# BACKup Utility

## **(Restart)**

specifies to bypass the initial copy of the control data sets to the SLSCOPY data sets. This option is used when a system outage or job failure has occurred after the control data sets have been copied to the SLSCOPY data sets. Analysis of the previous backup run-time report indicates the successful copies.

If you have journals, the report should be inspected to determine if the journals were **successfully** reset. If they have not been reset, a backup should be taken again to obtain the most current control data sets prior to doing the journal resets.

If the journals have been reset, OPTion(Restart) should be used to obtain the information from the SLSCOPY data sets.

## **JCL Requirements**

The following definitions apply to the BACKup utility JCL:

### **SLSPRINT**

the message output data set.

### **SLSCNTL**

the primary control data set. This statement must be provided.

### **SLSCNTL2**

the secondary control data set. If a secondary CDS exists, it should be specified so that if a switch occurs and the secondary data set is now active, the CDSs can be reordered to maintain database integrity.



**Note:** The logical record length of the backup data set may be LRECL=0. This is not an indication of a problem. In this case, the LRECL for the backup data set defaults to BLKSIZE=4096.

### **SLSBKUP**

the created backup data set.

### **SLSSTBY**

the standby data set. If a standby exists, it should be specified so that if a switch occurs and the standby data set is now active, the CDSs can be reordered to maintain database integrity.

### **SLSCOPY1**

the data set to which the primary control data set (specified by the DD SLSCNTL statement) is copied. This statement is not required when you specify OPTion(Copy).

### **SLSCOPY2**

the data set to which the secondary control data set (specified by the DD SLSCNTL2 statement) is copied. This statement is not required when you specify OPTion(Copy).



## SLSJRNnn

if journaling is enabled, these statements define the library journal data sets (two per host, up to 16 hosts). All journals must be specified. Up to 99 journals can be specified. **Allowable values for nn are decimal 01 to 99, but numbers cannot be skipped.**

## SLSIN

input to the utility in the form of control statement card images.

## JCL Examples

Various examples showing JCL for running the BACKup utility are presented. Select an appropriate example matching the control statement conventions that you have used for specifying data sets.

### JCL for Running Backup

The first example shows JCL for backup with the primary, secondary, and standby control data sets, copy data sets (SLSCOPY1 and SLSCOPY2), and journals. The JCL to perform a backup contains the following statements:

#### Run Backup Utility

```
//JOB BKUP      job (account),programmer
//S2           EXEC PGM=SLUADMIN,PARM=MIXED,REGION=2000K
//SLSCNTL     DD DSN=primary.dataset.name,DISP=SHR
//SLSCNTL2    DD DSN=secondary.dataset.name,DISP=SHR
//SLSSTBY     DD DSN=standby.dataset.name,DISP=SHR
//SLSBKUP     DD DSN=backup.dataset.name,DISP=(NEW,CATLG),
//            UNIT=dasd-name,SPACE=
//SLSJRN01    DD DSN=journal1.dataset.name,DISP=SHR
//SLSJRN02    DD DSN=journal2.dataset.name,DISP=SHR
//SLSCOPY1    DD DSN=copy1.dataset.name,DISP=(NEW,CATLG),UNIT=,SPACE=
//SLSCOPY2    DD DSN=copy2.dataset.name,DISP=(NEW,CATLG),UNIT=,SPACE=
//SLSPRINT    DD SYSOUT=*
//SLSIN       DD *
Backup OPTion(Analyze) CDS(Primary)
/*
//
```

### JCL for Running a Copy Backup

The following examples show JCL for running a straight copy backup of the control data set.

This example specifies BACKup utilizing OPTion(Copy) with shadowing (a secondary CDS) and journaling enabled. The SLSCNTL statement identifies the primary control data set. Backup is processed with journals. If the DD SLSCNTL2 statement is not provided, a return code of four (RC=4) is generated, and a backup of the primary is taken.

# BACKup Utility

## JCL for Backup of Primary or Secondary CDS with Journals

```
//JOB BKUP    job (account),programmer
//S1         EXEC PGM=SLUADMIN,PARM=MIXED
//SLSBKUP    DD DSN=backup.dataset.name,DISP=(NEW,KEEP),
//           UNIT=unit-number,SPACE=
//SLSCNTL    DD DSN=primary.dataset.name,DISP=SHR
//SLSCNTL2   DD DSN=standby.dataset.name,DISP=SHR
//SLSJRN01   DD DSN=journal1.dataset.name,DISP=SHR
//SLSJRN02   DD DSN=journal2.dataset.name,DISP=SHR
//SLSPRINT   DD SYSOUT=A
//SLSIN      DD *
            BACKUP OPTION(COPY)
/*
//
```

This example specifies BACKup with the SLSCNTL statement to identify the primary control data set. Backup is processed without a secondary control data set and journals.

## JCL for Backup of the Primary CDS without Secondary and Journals

```
//JOB BKUP    job (account),programmer
//S1         EXEC PGM=SLUADMIN,PARM=MIXED
//SLSBKUP    DD DSN=backup.dataset.name,DISP=(NEW,KEEP),
//           UNIT=unit-number,SPACE=
//SLSCNTL    DD DSN=primary.dataset.name,DISP=SHR
//SLSPRINT   DD SYSOUT=A
//SLSIN      DD *
            BACKUP
/*
//
```

## Output Description

Output resulting from the execution of the BACKup utility includes:

- the following data sets:
  - backup of the library control data set
  - copies of the primary and secondary control data sets
  - reset of the control data set journals.
- a listing of input commands with appropriate messages when syntax errors occur
- messages associated with backup processing

**Note:** These messages may include error conditions.

- an “Errant and In-transit Location Report” (refer to Figure 11 on page 184)



**Note:** This report is normal. In-transit and possibly errant VOLSERS are normal when the HSC is active.

- a “Block Processing Report,” which may include reports of mismatches between the primary and secondary CDS (refer to Figure 11 on page 184)
- a “Block Record Element Discrepancy Report” (refer to Figure 11 on page 184)



**Note:** Unselect cards may be generated during a good backup of a primary and secondary CDS that match.

- a condition code from backup processing:

0	no errors and no SLUADMIN control cards generated
4	warning MESSAGES --- Backup successful
8	a system failure occurred. Restart or rerun backup.

# BACKup Utility

```
SLUADMIN (n.n.n)          STORAGETEK AUTOMATED CARTRIDGE SYSTEM UTILITY          PAGE 0001
TIME hh:mm:ss              CONTROL CARD IMAGE LISTING          DATE yyyy-mm-dd

BACKUP OPTION(ANALYZE)

SLUADMIN (n.n.n)          STORAGETEK AUTOMATED CARTRIDGE SYSTEM UTILITY          PAGE 0002
TIME hh:mm:ss              BACKUP UTILITY          DATE yyyy-mm-dd

SLS1315I  SPRC.@793665.V6L.DBASEPRM WAS SELECTED AS THE PRIMARY CONTROL DATA SET
SLS1212I  JCL HAS BEEN VERIFIED FOR THE BACKUP UTILITY
SLS1216I  SLS_CNTL WAS SELECTED AS THE CONTROL DATA SET TO OUTPUT
SLS1215I  SLS_CNTL WAS SUCCESSFULLY COPIED TO SLS_COPY1

SLUADMIN (n.n.n)          STORAGETEK AUTOMATED CARTRIDGE SYSTEM UTILITY          PAGE 0003
TIME hh:mm:ss              BACKUP UTILITY          DATE yyyy-mm-dd
                          BLOCK PROCESSING REPORT

SLS1210I  PROCESSING HAS STARTED FOR THE DHB BLOCK
SLS1211I  PROCESSING COMPLETE FOR THE DHB BLOCK

SLS1210I  PROCESSING HAS STARTED FOR THE DPV BLOCK
SLS1211I  PROCESSING COMPLETE FOR THE DPV BLOCK

SLS1210I  PROCESSING HAS STARTED FOR THE DDIR BLOCK
SLS1211I  PROCESSING COMPLETE FOR THE DDIR BLOCK

SLS1210I  PROCESSING HAS STARTED FOR THE DALM BLOCK
SLS1211I  PROCESSING COMPLETE FOR THE DALM BLOCK

SLS1210I  PROCESSING HAS STARTED FOR THE LSM BLOCK
SLS1211I  PROCESSING COMPLETE FOR THE LSM BLOCK

SLS1210I  PROCESSING HAS STARTED FOR THE CAP BLOCK
SLS1211I  PROCESSING COMPLETE FOR THE CAP BLOCK

SLS1210I  PROCESSING HAS STARTED FOR THE VSLB BLOCK
SLS1211I  PROCESSING COMPLETE FOR THE VSLB BLOCK

SLS1210I  PROCESSING HAS STARTED FOR THE DPTR BLOCK
SLS1211I  PROCESSING COMPLETE FOR THE DPTR BLOCK

SLS1210I  PROCESSING HAS STARTED FOR THE VSLB BLOCK
SLS1211I  PROCESSING COMPLETE FOR THE VSLB BLOCK

SLS1210I  PROCESSING HAS STARTED FOR THE DCX BLOCK
SLS1211I  PROCESSING COMPLETE FOR THE DCX BLOCK

SLS1210I  PROCESSING HAS STARTED FOR THE DPTR BLOCK
SLS1211I  PROCESSING COMPLETE FOR THE DPTR BLOCK

SLS1210I  PROCESSING HAS STARTED FOR THE DCX BLOCK
SLS1211I  PROCESSING COMPLETE FOR THE DCX BLOCK

SLS1210I  PROCESSING HAS STARTED FOR THE VCAM BLOCK
SLS1211I  PROCESSING COMPLETE FOR THE VCAM BLOCK
      .
      .
SLS1210I  PROCESSING HAS STARTED FOR THE ACS BLOCK
SLS1211I  PROCESSING COMPLETE FOR THE ACS BLOCK

SLS1210I  PROCESSING HAS STARTED FOR THE DRV BLOCK
SLS1211I  PROCESSING COMPLETE FOR THE DRV BLOCK

SLS1210I  PROCESSING HAS STARTED FOR THE GBL BLOCK
SLS1211I  PROCESSING COMPLETE FOR THE GBL BLOCK
```

**Figure 11. BACKup Utility Sample Output**  
(1 of 2)

```

SLUADMIN (n.n.n)                STORAGETEK AUTOMATED CARTRIDGE SYSTEM UTILITY                PAGE 0004
TIME hh:mm:ss                   BACKUP UTILITY                                DATE yyyy-mm-dd

SLS1210I PROCESSING HAS STARTED FOR THE DITA BLOCK
SLS1211I PROCESSING COMPLETE FOR THE DITA BLOCK

SLS1210I PROCESSING HAS STARTED FOR THE DITR BLOCK
SLS1211I PROCESSING COMPLETE FOR THE DITR BLOCK

SLS1210I PROCESSING HAS STARTED FOR THE DPTR BLOCK
SLS1211I PROCESSING COMPLETE FOR THE DPTR BLOCK
.
.
SLS1210I PROCESSING HAS STARTED FOR THE DES BLOCK
SLS1211I PROCESSING COMPLETE FOR THE DES BLOCK

SLS1210I PROCESSING HAS STARTED FOR THE DPTR BLOCK
SLS1211I PROCESSING COMPLETE FOR THE DPTR BLOCK

SLS1210I PROCESSING HAS STARTED FOR THE DES BLOCK
SLS1211I PROCESSING COMPLETE FOR THE DES BLOCK

SLS1210I PROCESSING HAS STARTED FOR THE FREE BLOCK
SLS1211I PROCESSING COMPLETE FOR THE FREE BLOCK

SLS1215I SLSCOPY1 WAS SUCCESSFULLY COPIED TO SLSBKUP

SLUADMIN (n.n.n)                STORAGETEK AUTOMATED CARTRIDGE SYSTEM UTILITY                PAGE 0005
TIME hh:mm:ss                   BACKUP UTILITY                                DATE yyyy-mm-dd
                                ERRANT AND INTRANSIT LOCATION REPORT

      |-- VOLSER --|      |-- SOURCE  LOCATION    --|      |-- DESTINATION LOCATION    --|
      A0040C         CELL    00:01:08:00:00         DRIVEID   00:00:09:00
      Y00130         CELL    00:11:14:00:00         DRIVEID   00:11:10:01

SLUADMIN (n.n.n)                STORAGETEK AUTOMATED CARTRIDGE SYSTEM UTILITY                PAGE 0006
TIME hh:mm:ss                   BACKUP UTILITY                                DATE yyyy-mm-dd
                                BLOCK RECORD ELEMENT DISCREPANCY REPORT

|--ACTION--| |--DATATYPE-| |-----DETAILED ELEMENT DISCREPANCY INFORMATION-----|
UNSELECT    VOLSER      (A0040C,Y00130)
UNSCRATCH   VOLSER      NO VOLSER DISCREPANCIES FOUND.
AUDIT       CELL        (00:01:08:00:00,00:11:14:00:00)

SLS1213I DISCREPANCY BLOCKS HAVE BEEN GENERATED
SLS0155I CONDITION CODE FOR UTILITY FUNCTION IS 4

```

**Figure 11. BACKup Utility Sample Output (2 of 2)**

# BACKup Utility

## How to Restart Backup

After executing the BACKup utility, if a system failure or any other circumstance occurs that causes a return code of eight (RC=8), the BACKup utility can be restarted as long as criteria described in “Parameters” on page 178 for OPTion(Restart) is true.

## Related Utilities

The RESTore utility complements the BACKup utility. If a restore is required, it should be performed immediately after a CDS failure. Refer to “RESTore Utility” on page 251 for detailed information about the Restore utility.

## Database Decompile (LIBGEN) Utility

The Database Decompile utility provides a way to generate LIBGEN macro statements from an existing library control data set.



**Note: If you run Database Decompile using HSC 6.2 load libraries, you must run the LIBGEN using HSC 6.2 load libraries.**

### Prerequisites

The utility runs under the control of the SLUADMIN program and does not require the HSC to be running.

### Reasons for Running the Database Decompile Utility

The following are possible reasons for running the Database Decompile utility to restore the LIBGEN for a library:

- The LIBGEN for your library has been deleted, lost, or corrupted; you want to re-create the file to match your library configuration.
- The SET utility is used to change the library configuration stored in the CDS; consequently, the original LIBGEN no longer matches the CDS.

### How the Database Decompile Utility Functions

The utility performs the following processing to create the LIBGEN from the existing control data set:

- opens the existing control data set and an output data set to hold the recreated LIBGEN data set
- reads the control data set into buffers and determines validity of the existing control data set
- locates host IDs generated for the library
- extracts values from the control data set corresponding with LIBGEN macro parameters and re-creates the output of each LIBGEN macro. The re-creation follows the same required order as in LIBGEN generation (see “LIBGEN Macros” in the *HSC/MSP Configuration Guide* for information about library generation). During the re-creation processing, various reads, calculations, and copies are performed.
- If errors are encountered, appropriate messages are displayed (see the *HSC/MSP Messages and Codes Manual* for explanations of error messages)
- Upon completion, the output LIBGEN deck is ready for configuration changes and reassembly for the SLICREAT program (see “Executing the SLICREAT Program” in the *HSC/MSP Configuration Guide* for information on data set initialization using the SLICREAT program).

# Database Decompile (LIBGEN) Utility

## Syntax

```
▶—LIBGEN—▶
```

## Utility Name

### LIBGEN

specifies that database processing is to be performed and invokes the SLUDBMAP module. SLUDBMAP creates a complete HSC LIBGEN from an existing control data set.

## Parameters

None.

## JCL Requirements

The following definitions apply to the LIBGEN utility JCL:

### SLSPRINT

output messages from the utility program.

### SLSCNTL

the primary control data set. **This statement is required.**



**Note:** SLSCNTL should be the copy of the CDS currently selected as the primary CDS. Two ways to determine the identity of the primary CDS are:

- issue the Display CDS command, and look at PRIVOL
- run the BACKup OPTion(Analyze) utility and note the “*ddname* was selected as the control dataset to output” line in the output report (*ddname* is the name of the current primary CDS).

### SLSLIBGN

the output data set to accommodate the LIBGEN created by the utility. The data set has these characteristics: LRECL=80, fixed-blocked format (multiple of 80). The data set can be assigned to print or to output to a DASD. **This statement is required.** It may be assigned to DUMMY if only the SLSPRINT output is desired.

### SLSIN

input to the utility in the form of control cards.

## JCL Example

The following example shows JCL for creating a LIBGEN from the existing control data set.



# Database Decompile (LIBGEN) Utility

## JCL for Database Decompile

```
//JOB      job (account),programmer
//S1       EXEC PGM=SLUADMIN
//SLSCNTL DD DSN=control.dataset.name,DISP=SHR
//SLSLIBGN DD DSN=control.dataset.decompile,DISP=(NEW,CATLG,KEEP),
//          SPACE=(TRK,(1,1)),DCB=(RECFM=F,BLKSIZE=8000),UNIT=SYSDA
//*
//SLSPRINT DD SYSOUT=*
//SLSIN    DD *
           LIBGEN
/*
```

## Output Description

Outputs resulting from the execution of the Database Decompile utility include:

- a valid LIBGEN file matching the existing control data set. The output file has the following characteristics:
  - All station and drive addresses are 4-character addresses.
  - In cases where multiple parameters point to the same label statement, the utility duplicates the statement with a unique label and points each parameter to a different, although identical statement.
  - Labels generated in the output LIBGEN are listed in Table 14.
  - If an Eject password exists, it is **NOT** displayed. Instead, the following line is displayed: EJCTPAS=????????
- messages associated with error conditions resulting from an unsuccessful execution of the utility.

**Table 14. Label Descriptions for Devices in Output LIBGEN**

Device	Label	Description
ACS	ACSaa	aa is the sequential hexadecimal ACSid value (00 through FF), beginning with zero.
LSM	LSMaall	aa is the ACSid, and ll is the sequential hexadecimal LSMid value (00 through 17), beginning with zero.
STATION	STaah	aa is the ACSid, and h is the sequential hexadecimal host index value (0 through F), beginning with zero.
PANEL	Paallpp	aa is the ACSid, ll is the LSMid, and pp is the sequential decimal panel number (0 through 10).

## Database Decompile (LIBGEN) Utility

**Table 14. Label Descriptions for Devices in Output LIBGEN**

Device	Label	Description
DRIVE	<i>Daallpph</i>	<i>aa</i> is the ACSid, <i>ll</i> is the LSMid, <i>pp</i> is the decimal panel number, and <i>h</i> is the hexadecimal host index value, beginning with zero.

Refer to Figure 12 on page 191 for an example of output from the utility.

# Database Decompile (LIBGEN) Utility

```

*****
* THIS IS A SAMPLE LIBGEN THAT CONTAINS A MIX OF POWDERHORN AND *
* SL8500 LSMS.THE SL8500 PORTION OF THE LIBGEN SPECIFIES TWO *
* LIBRARIES WITH PTP CONNECTIONS. *
*****
*
LIBGEN SLIRCVRY TCHNIQE=STANDBY
*
      SLILIBRY SMF=007, X
      ACSLIST=ACSLIST, X
      HOSTID=(VM6,ECC2,ECC32,EC20,ECC36,ECCS,EC38, X
      ECCB,ECC18,ECCL,ECC41,EC21,ECC43, X
      ECCY,ECC42), X
     >NNLBDRV=(TNLCART,TNLCART,TNLCART,TNLCART,TNLCART, X
      TNLCART,TNLCART,TNLCART,TNLCART,TNLCART, X
      TNLCART,TNLCART,TNLCART,TNLCART), X
      DELDISP=SCRTCH, X
      MAJNAME=STKALSON, X
      CLNPRFX=CLN, X
      COMPRFX=<, X
      DRVHOST=, X
      SCRLABL=SL X
*
ACSLIST SLIALIST ACS00,ACS01,ACS02
*
ACS00 SLIACS ACSDRV=(HVZZZZ0,HVZZZZ0,HVZZZZ0,HVZZZZ0,HVZZZZ0, X
      HVZZZZ0,HVZZZZ0,HVZZZZ0,HVZZZZ0,HVZZZZ0, X
      HVZZZZ0,HVZZZZ0,HVZZZZ0,HVZZZZ0), X
      STATION=(ST000,ST001,ST002,ST003,ST004,ST005, X
      ST006,ST007,ST008,ST009,ST00A,ST00B,ST00C, X
      ST00D,ST00E,ST00F), X
      LSM=(LSM0000,LSM0001) X
*
ST000 SLISTATN ADDRESS=(0025,0026,0020,0021)
ST001 SLISTATN ADDRESS=(0025,0026,0020,0021)
ST002 SLISTATN ADDRESS=(0025,0026,0020,0021)
ST003 SLISTATN ADDRESS=(0026,002B)
ST004 SLISTATN ADDRESS=(0025,0026,0020,0021)
ST005 SLISTATN ADDRESS=(0025,0026,0020,0021)
ST006 SLISTATN ADDRESS=(0025,0026,0020,0021)
ST007 SLISTATN ADDRESS=(0025,0026,0020,0021)
ST008 SLISTATN ADDRESS=(0025,0026,0020,0021)
ST009 SLISTATN ADDRESS=(0020,0022)
ST00A SLISTATN ADDRESS=(0025,0026,0020,0021)
ST00B SLISTATN ADDRESS=(0025,0026,0020,0021)
ST00C SLISTATN ADDRESS=(0026,002B)
ST00D SLISTATN ADDRESS=(0025,0026,0020,0021)
ST00E SLISTATN ADDRESS=(0020,0023)
ST00F SLISTATN ADDRESS=(0025,0026,0020,0021)
*
LSM0000 SLILSM PASTHRU=(B,M), X
      ADJACNT=(LSM0001), X
      DRIVE=(1,2,3,10), X
      DRVELST=(P000001,P000002,P000003,P000010), X
      TYPE=9310, X
      D00R=STD X
*
P000001 SLIDLIST HOSTDRV=(D0000010,D0000011,D0000012,D0000013, X
      D0000014,D0000015,D0000016,D0000017,D0000018, X
      D0000019,D000001A,D000001B,D000001C,D000001D, X
      D000001E,D000001F) X
*
D0000010 SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF, X
      ,,,) X
D0000011 SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF, X
      ,,,) X
D0000012 SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF, X
      ,,,) X
D0000013 SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF, X
      ,,,) X
D0000014 SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF, X
      ,,,) X
D0000015 SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF, X
      ,,,) X
D0000016 SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF, X
      ,,,) X
D0000017 SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF, X
      ,,,) X
D0000018 SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF, X
      ,,,) X

```

Figure 12. Database Decompile Utility Sample Output

(1 of 11)

# Database Decompile (LIBGEN) Utility

```
D0000019 SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF, X
,,, )
D000001A SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF, X
,,, )
D000001B SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF, X
,,, )
D000001C SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF, X
,,, )
D000001D SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF, X
,,, )
D000001E SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF, X
,,, )
D000001F SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF, X
,,, )
*
P000002 SLIDLIST HOSTDRV=(D0000020,D0000021,D0000022,D0000023, X
D0000024,D0000025,D0000026,D0000027,D0000028, X
D0000029,D000002A,D000002B,D000002C,D000002D, X
D000002E,D000002F)
*
D0000020 SLIDRIVS ADDRESS=(0B34,0B35,0B36,0B37)
D0000021 SLIDRIVS ADDRESS=(0B34,0B35,0B36,0B37)
D0000022 SLIDRIVS ADDRESS=(0B34,0B35,0B36,0B37)
D0000023 SLIDRIVS ADDRESS=(0B34,0B35,0B36,0B37)
D0000024 SLIDRIVS ADDRESS=(0B34,0B35,0B36,0B37)
D0000025 SLIDRIVS ADDRESS=(0B34,0B35,0B36,0B37)
D0000026 SLIDRIVS ADDRESS=(0B34,0B35,0B36,0B37)
D0000027 SLIDRIVS ADDRESS=(0B34,0B35,0B36,0B37)
D0000028 SLIDRIVS ADDRESS=(0B34,0B35,0B36,0B37)
D0000029 SLIDRIVS ADDRESS=(0B34,0B35,0B36,0B37)
D000002A SLIDRIVS ADDRESS=(0B34,0B35,0B36,0B37)
D000002B SLIDRIVS ADDRESS=(0B34,0B35,0B36,0B37)
D000002C SLIDRIVS ADDRESS=(0B34,0B35,0B36,0B37)
D000002D SLIDRIVS ADDRESS=(0B34,0B35,0B36,0B37)
D000002E SLIDRIVS ADDRESS=(0B34,0B35,0B36,0B37)
D000002F SLIDRIVS ADDRESS=(0B34,0B35,0B36,0B37)
*
P000003 SLIDLIST HOSTDRV=(D0000030,D0000031,D0000032,D0000033, X
D0000034,D0000035,D0000036,D0000037,D0000038, X
D0000039,D000003A,D000003B,D000003C,D000003D, X
D000003E,D000003F)
*
D0000030 SLIDRIVS ADDRESS=(, , , , , , , , )
D0000031 SLIDRIVS ADDRESS=(, , , , , , , , )
D0000032 SLIDRIVS ADDRESS=(, , , , , , , , )
D0000033 SLIDRIVS ADDRESS=(, , , , , , , , )
D0000034 SLIDRIVS ADDRESS=(, , , , , , , , )
D0000035 SLIDRIVS ADDRESS=(, , , , , , , , )
D0000036 SLIDRIVS ADDRESS=(, , , , , , , , )
D0000037 SLIDRIVS ADDRESS=(, , , , , , , , )
D0000038 SLIDRIVS ADDRESS=(, , , , , , , , )
D0000039 SLIDRIVS ADDRESS=(, , , , , , , , )
D000003A SLIDRIVS ADDRESS=(, , , , , , , , )
D000003B SLIDRIVS ADDRESS=(, , , , , , , , )
D000003C SLIDRIVS ADDRESS=(, , , , , , , , )
D000003D SLIDRIVS ADDRESS=(, , , , , , , , )
D000003E SLIDRIVS ADDRESS=(, , , , , , , , )
D000003F SLIDRIVS ADDRESS=(, , , , , , , , )
*
P000010 SLIDLIST HOSTDRV=(D0000100,D0000101,D0000102,D0000103, X
D0000104,D0000105,D0000106,D0000107,D0000108, X
D0000109,D000010A,D000010B,D000010C,D000010D, X
D000010E,D000010F)
*
D0000100 SLIDRIVS ADDRESS=(11C0,11C1,11C2,11C3)
D0000101 SLIDRIVS ADDRESS=(11C0,11C1,11C2,11C3)
D0000102 SLIDRIVS ADDRESS=(11C0,11C1,11C2,11C3)
D0000103 SLIDRIVS ADDRESS=(11C0,11C1,11C2,11C3)
D0000104 SLIDRIVS ADDRESS=(11C0,11C1,11C2,11C3)
D0000105 SLIDRIVS ADDRESS=(11C0,11C1,11C2,11C3)
D0000106 SLIDRIVS ADDRESS=(11C0,11C1,11C2,11C3)
D0000107 SLIDRIVS ADDRESS=(11C0,11C1,11C2,11C3)
D0000108 SLIDRIVS ADDRESS=(11C0,11C1,11C2,11C3)
D0000109 SLIDRIVS ADDRESS=(11C0,11C1,11C2,11C3)
D000010A SLIDRIVS ADDRESS=(11C0,11C1,11C2,11C3)
D000010B SLIDRIVS ADDRESS=(11C0,11C1,11C2,11C3)
D000010C SLIDRIVS ADDRESS=(11C0,11C1,11C2,11C3)
D000010D SLIDRIVS ADDRESS=(11C0,11C1,11C2,11C3)
D000010E SLIDRIVS ADDRESS=(11C0,11C1,11C2,11C3)
D000010F SLIDRIVS ADDRESS=(11C0,11C1,11C2,11C3)
*
```

Figure 12. Database Decompile Utility Sample Output (2 of 11)

# Database Decompile (LIBGEN) Utility

```

LSM0001  SLILSM PASTHRU=((2,S)),                X
          ADJACNT=(LSM0000),                    X
          DRIVE=(6,7,8,10),                      X
          DRVELST=(P000106,P000107,P000108,P000110), X
          WINDOW=(9),                            X
          TYPE=9310,                              X
          DOOR=ECAP,                              X
*
P000106  SLIDLIST HOSTDRV=(D0001060,D0001061,D0001062,D0001063, X
          D0001064,D0001065,D0001066,D0001067,D0001068, X
          D0001069,D000106A,D000106B,D000106C,D000106D, X
          D000106E,D000106F)
*
D0001060 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001061 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001062 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001063 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001064 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001065 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001066 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001067 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001068 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001069 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D000106A SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D000106B SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D000106C SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D000106D SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D000106E SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D000106F SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
*
P000107  SLIDLIST HOSTDRV=(D0001070,D0001071,D0001072,D0001073, X
          D0001074,D0001075,D0001076,D0001077,D0001078, X
          D0001079,D000107A,D000107B,D000107C,D000107D, X
          D000107E,D000107F)
*
D0001070 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001071 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001072 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001073 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001074 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001075 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001076 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001077 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001078 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001079 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D000107A SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D000107B SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D000107C SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D000107D SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D000107E SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D000107F SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
*
P000108  SLIDLIST HOSTDRV=(D0001080,D0001081,D0001082,D0001083, X
          D0001084,D0001085,D0001086,D0001087,D0001088, X
          D0001089,D000108A,D000108B,D000108C,D000108D, X
          D000108E,D000108F)
*
D0001080 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001081 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001082 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001083 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001084 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001085 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001086 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001087 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001088 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D0001089 SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D000108A SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D000108B SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D000108C SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D000108D SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D000108E SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
D000108F SLIDRIVS ADDRESS=(,,,,,,,,,,,,,)
*

```

Figure 12. Database Decompile Utility Sample Output (3 of 11)

# Database Decompile (LIBGEN) Utility

```

P000110 SLIDLIST HOSTDRV=(D0001100,D0001101,D0001102,D0001103, X
D0001104,D0001105,D0001106,D0001107,D0001108, X
D0001109,D000110A,D000110B,D000110C,D000110D, X
D000110E,D000110F)
*
D0001100 SLIDRIVS ADDRESS=(11C9,11CA,11CB,11CC,11CD,11CE, X
,,,,,,,,,,,,)
D0001101 SLIDRIVS ADDRESS=(11C9,11CA,11CB,11CC,11CD,11CE, X
,,,,,,,,,,,,)
D0001102 SLIDRIVS ADDRESS=(11C9,11CA,11CB,11CC,11CD,11CE, X
,,,,,,,,,,,,)
D0001103 SLIDRIVS ADDRESS=(11C9,11CA,11CB,11CC,11CD,11CE, X
,,,,,,,,,,,,)
D0001104 SLIDRIVS ADDRESS=(11C9,11CA,11CB,11CC,11CD,11CE, X
,,,,,,,,,,,,)
D0001105 SLIDRIVS ADDRESS=(11C9,11CA,11CB,11CC,11CD,11CE, X
,,,,,,,,,,,,)
D0001106 SLIDRIVS ADDRESS=(11C9,11CA,11CB,11CC,11CD,11CE, X
,,,,,,,,,,,,)
D0001107 SLIDRIVS ADDRESS=(11C9,11CA,11CB,11CC,11CD,11CE, X
,,,,,,,,,,,,)
D0001108 SLIDRIVS ADDRESS=(11C9,11CA,11CB,11CC,11CD,11CE, X
,,,,,,,,,,,,)
D0001109 SLIDRIVS ADDRESS=(11C9,11CA,11CB,11CC,11CD,11CE, X
,,,,,,,,,,,,)
D000110A SLIDRIVS ADDRESS=(11C9,11CA,11CB,11CC,11CD,11CE, X
,,,,,,,,,,,,)
D000110B SLIDRIVS ADDRESS=(11C9,11CA,11CB,11CC,11CD,11CE, X
,,,,,,,,,,,,)
D000110C SLIDRIVS ADDRESS=(11C9,11CA,11CB,11CC,11CD,11CE, X
,,,,,,,,,,,,)
D000110D SLIDRIVS ADDRESS=(11C9,11CA,11CB,11CC,11CD,11CE, X
,,,,,,,,,,,,)
D000110E SLIDRIVS ADDRESS=(11C9,11CA,11CB,11CC,11CD,11CE, X
,,,,,,,,,,,,)
D000110F SLIDRIVS ADDRESS=(11C9,11CA,11CB,11CC,11CD,11CE, X
,,,,,,,,,,,,)
*
ACS01 SLIACS ACSDRV=(HJACS1,HJACS1,HJACS1,HJACS1,HJACS1, X
HJACS1,HJACS1,HJACS1,HJACS1,HJACS1,HJACS1, X
HJACS1,HJACS1,HJACS1,HJACS1,HJACS1), X
STATION=(ST010,ST011,ST012,ST013,ST014,ST015, X
ST016,ST017,ST018,ST019,ST01A,ST01B,ST01C, X
ST01D,ST01E,ST01F), X
LSM=(LSM0100,LSM0101)
*
ST010 SLISTATN ADDRESS=(0145)
ST011 SLISTATN ADDRESS=(0045,0046)
ST012 SLISTATN ADDRESS=(002D,002E)
ST013 SLISTATN ADDRESS=(0045,0046)
ST014 SLISTATN ADDRESS=(002D,002E)
ST015 SLISTATN ADDRESS=(002D,002E)
ST016 SLISTATN ADDRESS=(0045,0046)
ST017 SLISTATN ADDRESS=(0045,0046)
ST018 SLISTATN ADDRESS=(0045,0046)
ST019 SLISTATN ADDRESS=(0025)
ST01A SLISTATN ADDRESS=(0045,0046)
ST01B SLISTATN ADDRESS=(0045,0046)
ST01C SLISTATN ADDRESS=(0045,0046)
ST01D SLISTATN ADDRESS=(0045,0046)
ST01E SLISTATN ADDRESS=(0045,0046)
ST01F SLISTATN ADDRESS=(0045,0046)
*
LSM0100 SLILSM PASTHRU=((2,M)), X
ADJACNT=(LSM0101), X
DRIVE=(7,8,9,10), X
DRVELST=(P010007,P010008,P010009,P010010), X
TYPE=9310, X
DOOR=ECAP
*
P010007 SLIDLIST HOSTDRV=(D0100070,D0100071,D0100072,D0100073, X
D0100074,D0100075,D0100076,D0100077,D0100078, X
D0100079,D010007A,D010007B,D010007C,D010007D, X
D010007E,D010007F)
*
D0100070 SLIDRIVS ADDRESS=(11D8,11D9,11DA,11DB)
D0100071 SLIDRIVS ADDRESS=(11D8,11D9,11DA,11DB)
D0100072 SLIDRIVS ADDRESS=(11D8,11D9,11DA,11DB)
D0100073 SLIDRIVS ADDRESS=(11D8,11D9,11DA,11DB)

```

Figure 12. Database Decompile Utility Sample Output (4 of 11)

# Database Decompile (LIBGEN) Utility

```
D0100074 SLIDRIVS ADDRESS=(1108,1109,11DA,11DB)
D0100075 SLIDRIVS ADDRESS=(1108,1109,11DA,11DB)
D0100076 SLIDRIVS ADDRESS=(1108,1109,11DA,11DB)
D0100077 SLIDRIVS ADDRESS=(1108,1109,11DA,11DB)
D0100078 SLIDRIVS ADDRESS=(1108,1109,11DA,11DB)
D0100079 SLIDRIVS ADDRESS=(1108,1109,11DA,11DB)
D010007A SLIDRIVS ADDRESS=(1108,1109,11DA,11DB)
D010007B SLIDRIVS ADDRESS=(1108,1109,11DA,11DB)
D010007C SLIDRIVS ADDRESS=(1108,1109,11DA,11DB)
D010007D SLIDRIVS ADDRESS=(1108,1109,11DA,11DB)
D010007E SLIDRIVS ADDRESS=(1108,1109,11DA,11DB)
D010007F SLIDRIVS ADDRESS=(1108,1109,11DA,11DB)
*
P010008 SLIDLIST HOSTDRV=(D0100080,D0100081,D0100082,D0100083,      X
                          D0100084,D0100085,D0100086,D0100087,D0100088,      X
                          D0100089,D010008A,D010008B,D010008C,D010008D,      X
                          D010008E,D010008F)
*
D0100080 SLIDRIVS ADDRESS=(,,,)
D0100081 SLIDRIVS ADDRESS=(,,,)
D0100082 SLIDRIVS ADDRESS=(,,,)
D0100083 SLIDRIVS ADDRESS=(,,,)
D0100084 SLIDRIVS ADDRESS=(,,,)
D0100085 SLIDRIVS ADDRESS=(,,,)
D0100086 SLIDRIVS ADDRESS=(,,,)
D0100087 SLIDRIVS ADDRESS=(,,,)
D0100088 SLIDRIVS ADDRESS=(,,,)
D0100089 SLIDRIVS ADDRESS=(,,,)
D010008A SLIDRIVS ADDRESS=(,,,)
D010008B SLIDRIVS ADDRESS=(,,,)
D010008C SLIDRIVS ADDRESS=(,,,)
D010008D SLIDRIVS ADDRESS=(,,,)
D010008E SLIDRIVS ADDRESS=(,,,)
D010008F SLIDRIVS ADDRESS=(,,,)
*
P010009 SLIDLIST HOSTDRV=(D0100090,D0100091,D0100092,D0100093,      X
                          D0100094,D0100095,D0100096,D0100097,D0100098,      X
                          D0100099,D010009A,D010009B,D010009C,D010009D,      X
                          D010009E,D010009F)
*
D0100090 SLIDRIVS ADDRESS=(,,,)
D0100091 SLIDRIVS ADDRESS=(,,,)
D0100092 SLIDRIVS ADDRESS=(,,,)
D0100093 SLIDRIVS ADDRESS=(,,,)
D0100094 SLIDRIVS ADDRESS=(,,,)
D0100095 SLIDRIVS ADDRESS=(,,,)
D0100096 SLIDRIVS ADDRESS=(,,,)
D0100097 SLIDRIVS ADDRESS=(,,,)
D0100098 SLIDRIVS ADDRESS=(,,,)
D0100099 SLIDRIVS ADDRESS=(,,,)
D010009A SLIDRIVS ADDRESS=(,,,)
D010009B SLIDRIVS ADDRESS=(,,,)
D010009C SLIDRIVS ADDRESS=(,,,)
D010009D SLIDRIVS ADDRESS=(,,,)
D010009E SLIDRIVS ADDRESS=(,,,)
D010009F SLIDRIVS ADDRESS=(,,,)
*
P010010 SLIDLIST HOSTDRV=(D0100100,D0100101,D0100102,D0100103,      X
                          D0100104,D0100105,D0100106,D0100107,D0100108,      X
                          D0100109,D010010A,D010010B,D010010C,D010010D,      X
                          D010010E,D010010F)
*
D0100100 SLIDRIVS ADDRESS=(11DC,11DD,11D6,11D7,11DE,11DF,      X
                          ,,,)
D0100101 SLIDRIVS ADDRESS=(11DC,11DD,11D6,11D7,11DE,11DF,      X
                          ,,,)
D0100102 SLIDRIVS ADDRESS=(11DC,11DD,11D6,11D7,11DE,11DF,      X
                          ,,,)
D0100103 SLIDRIVS ADDRESS=(11DC,11DD,11D6,11D7,11DE,11DF,      X
                          ,,,)
D0100104 SLIDRIVS ADDRESS=(11DC,11DD,11D6,11D7,11DE,11DF,      X
                          ,,,)
D0100105 SLIDRIVS ADDRESS=(11DC,11DD,11D6,11D7,11DE,11DF,      X
                          ,,,)
D0100106 SLIDRIVS ADDRESS=(11DC,11DD,11D6,11D7,11DE,11DF,      X
                          ,,,)
D0100107 SLIDRIVS ADDRESS=(11DC,11DD,11D6,11D7,11DE,11DF,      X
                          ,,,)
D0100108 SLIDRIVS ADDRESS=(11DC,11DD,11D6,11D7,11DE,11DF,      X
                          ,,,)
```

**Figure 12. Database Decompile Utility Sample Output**  
(5 of 11)

# Database Decompile (LIBGEN) Utility

```

D0100109 SLIDRIVS ADDRESS=(11DC,11DD,11D6,11D7,11DE,11DF,
,,,) X
D010010A SLIDRIVS ADDRESS=(11DC,11DD,11D6,11D7,11DE,11DF,
,,,) X
D010010B SLIDRIVS ADDRESS=(11DC,11DD,11D6,11D7,11DE,11DF,
,,,) X
D010010C SLIDRIVS ADDRESS=(11DC,11DD,11D6,11D7,11DE,11DF,
,,,) X
D010010D SLIDRIVS ADDRESS=(11DC,11DD,11D6,11D7,11DE,11DF,
,,,) X
D010010E SLIDRIVS ADDRESS=(11DC,11DD,11D6,11D7,11DE,11DF,
,,,) X
D010010F SLIDRIVS ADDRESS=(11DC,11DD,11D6,11D7,11DE,11DF,
,,,) X
*
LSM0101 SLILSM PASTHRU=(8,S), X
ADJACNT=(LSM0100), X
DRIVE=(4,6,10), X
DRVELST=(P010104,P010106,P010110), X
TYPE=9310, X
DOOR=ECAP
*
P010104 SLIDLIST HOSTDRV=(D0101040,D0101041,D0101042,D0101043,
D0101044,D0101045,D0101046,D0101047,D0101048,
D0101049,D010104A,D010104B,D010104C,D010104D,
D010104E,D010104F) X
*
D0101040 SLIDRIVS ADDRESS=(,,,)
D0101041 SLIDRIVS ADDRESS=(,,,)
D0101042 SLIDRIVS ADDRESS=(,,,)
D0101043 SLIDRIVS ADDRESS=(,,,)
D0101044 SLIDRIVS ADDRESS=(,,,)
D0101045 SLIDRIVS ADDRESS=(,,,)
D0101046 SLIDRIVS ADDRESS=(,,,)
D0101047 SLIDRIVS ADDRESS=(,,,)
D0101048 SLIDRIVS ADDRESS=(,,,)
D0101049 SLIDRIVS ADDRESS=(,,,)
D010104A SLIDRIVS ADDRESS=(,,,)
D010104B SLIDRIVS ADDRESS=(,,,)
D010104C SLIDRIVS ADDRESS=(,,,)
D010104D SLIDRIVS ADDRESS=(,,,)
D010104E SLIDRIVS ADDRESS=(,,,)
D010104F SLIDRIVS ADDRESS=(,,,)
*
P010106 SLIDLIST HOSTDRV=(D0101060,D0101061,D0101062,D0101063,
D0101064,D0101065,D0101066,D0101067,D0101068,
D0101069,D010106A,D010106B,D010106C,D010106D,
D010106E,D010106F) X
*
D0101060 SLIDRIVS ADDRESS=(11D4,11D5,11D2,11D3)
D0101061 SLIDRIVS ADDRESS=(11D4,11D5,11D2,11D3)
D0101062 SLIDRIVS ADDRESS=(11D4,11D5,11D2,11D3)
D0101063 SLIDRIVS ADDRESS=(11D4,11D5,11D2,11D3)
D0101064 SLIDRIVS ADDRESS=(11D4,11D5,11D2,11D3)
D0101065 SLIDRIVS ADDRESS=(11D4,11D5,11D2,11D3)
D0101066 SLIDRIVS ADDRESS=(11D4,11D5,11D2,11D3)
D0101067 SLIDRIVS ADDRESS=(11D4,11D5,11D2,11D3)
D0101068 SLIDRIVS ADDRESS=(11D4,11D5,11D2,11D3)
D0101069 SLIDRIVS ADDRESS=(11D4,11D5,11D2,11D3)
D010106A SLIDRIVS ADDRESS=(11D4,11D5,11D2,11D3)
D010106B SLIDRIVS ADDRESS=(11D4,11D5,11D2,11D3)
D010106C SLIDRIVS ADDRESS=(11D4,11D5,11D2,11D3)
D010106D SLIDRIVS ADDRESS=(11D4,11D5,11D2,11D3)
D010106E SLIDRIVS ADDRESS=(11D4,11D5,11D2,11D3)
D010106F SLIDRIVS ADDRESS=(11D4,11D5,11D2,11D3)
*
P010110 SLIDLIST HOSTDRV=(D0101100,D0101101,D0101102,D0101103,
D0101104,D0101105,D0101106,D0101107,D0101108,
D0101109,D010110A,D010110B,D010110C,D010110D,
D010110E,D010110F) X
*
D0101100 SLIDRIVS ADDRESS=(,11D0,,11D1)
D0101101 SLIDRIVS ADDRESS=(,11D0,,11D1)
D0101102 SLIDRIVS ADDRESS=(,11D0,,11D1)
D0101103 SLIDRIVS ADDRESS=(,11D0,,11D1)
D0101104 SLIDRIVS ADDRESS=(,11D0,,11D1)
D0101105 SLIDRIVS ADDRESS=(,11D0,,11D1)
D0101106 SLIDRIVS ADDRESS=(,11D0,,11D1)
D0101107 SLIDRIVS ADDRESS=(,11D0,,11D1)
D0101108 SLIDRIVS ADDRESS=(,11D0,,11D1)
D0101109 SLIDRIVS ADDRESS=(,11D0,,11D1)

```

**Figure 12. Database Decompile Utility Sample Output (6 of 11)**



# Database Decompile (LIBGEN) Utility

```

D010110A SLIDRIVS ADDRESS=(,11D0,,11D1)
D010110B SLIDRIVS ADDRESS=(,11D0,,11D1)
D010110C SLIDRIVS ADDRESS=(,11D0,,11D1)
D010110D SLIDRIVS ADDRESS=(,11D0,,11D1)
D010110E SLIDRIVS ADDRESS=(,11D0,,11D1)
D010110F SLIDRIVS ADDRESS=(,11D0,,11D1)
*
ACS02  SLIACS  ACSDRV=(SL8500,SL8500,SL8500,SL8500,SL8500,
                        SL8500,SL8500,SL8500,SL8500,SL8500,SL8500,
                        SL8500,SL8500,SL8500,SL8500,SL8500),
                        STATION=(ST020,ST021,,ST023,ST024,ST025,ST026,
                        ST027,ST028,ST029,ST02A,ST02B,ST02C,ST02D,
                        ST02E,ST02F),
                        LSM=(LSM0200,LSM0201,LSM0202,LSM0203,LSM0204,
                        LSM0205,LSM0206,LSM0207)
*
ST020  SLISTATN ADDRESS=(00CC,00CD)
ST021  SLISTATN ADDRESS=(00CC,00CD)
ST023  SLISTATN ADDRESS=(00CC,00CD)
ST024  SLISTATN ADDRESS=(00CC,00CD)
ST025  SLISTATN ADDRESS=(00CC,00CD)
ST026  SLISTATN ADDRESS=(00CC,00CD)
ST027  SLISTATN ADDRESS=(00CC,00CD)
ST028  SLISTATN ADDRESS=(00CC,00CD)
ST029  SLISTATN ADDRESS=(00CC,00CD)
ST02A  SLISTATN ADDRESS=(00CC,00CD)
ST02B  SLISTATN ADDRESS=(00CC,00CD)
ST02C  SLISTATN ADDRESS=(00CC,00CD)
ST02D  SLISTATN ADDRESS=(00CC,00CD)
ST02E  SLISTATN ADDRESS=(00CC,00CD)
ST02F  SLISTATN ADDRESS=(00CC,00CD)
*
LSM0200 SLILSM  PASTHRU=(0,M),(0,M),(0,M),(0,M)),
                        ADJACNT=(LSM0203,LSM0202,LSM0201,LSM0204),
                        DRIVE=(1),
                        DRVELST=(P020001),
                        TYPE=8500,
                        DOOR=8500-1
*
P020001 SLIDLIST HOSTDRV=(D0200010,D0200011,D0200012,D0200013,
                           D0200014,D0200015,D0200016,D0200017,D0200018,
                           D0200019,D020001A,D020001B,D020001C,D020001D,
                           D020001E,D020001F)
*
D0200010 SLIDRIVS ADDRESS=(,,9500,,9501,,,9502,,9503,,
                           9512,9513)
D0200011 SLIDRIVS ADDRESS=(,,9500,,9501,,,9502,,9503,,
                           9512,9513)
D0200012 SLIDRIVS ADDRESS=(,,9500,,9501,,,9502,,9503,,
                           9512,9513)
D0200013 SLIDRIVS ADDRESS=(,,9500,,9501,,,9502,,9503,,
                           9512,9513)
D0200014 SLIDRIVS ADDRESS=(,,9500,,9501,,,9502,,9503,,
                           9512,9513)
D0200015 SLIDRIVS ADDRESS=(,,9500,,9501,,,9502,,9503,,
                           9512,9513)
D0200016 SLIDRIVS ADDRESS=(,,9500,,9501,,,9502,,9503,,
                           9512,9513)
D0200017 SLIDRIVS ADDRESS=(,,9500,,9501,,,9502,,9503,,
                           9512,9513)
D0200018 SLIDRIVS ADDRESS=(,,9500,,9501,,,9502,,9503,,
                           9512,9513)
D0200019 SLIDRIVS ADDRESS=(,,9500,,9501,,,9502,,9503,,
                           9512,9513)
D020001A SLIDRIVS ADDRESS=(,,9500,,9501,,,9502,,9503,,
                           9512,9513)
D020001B SLIDRIVS ADDRESS=(,,9500,,9501,,,9502,,9503,,
                           9512,9513)
D020001C SLIDRIVS ADDRESS=(,,9500,,9501,,,9502,,9503,,
                           9512,9513)
D020001D SLIDRIVS ADDRESS=(,,9500,,9501,,,9502,,9503,,
                           9512,9513)
D020001E SLIDRIVS ADDRESS=(,,9500,,9501,,,9502,,9503,,
                           9512,9513)
D020001F SLIDRIVS ADDRESS=(,,9500,,9501,,,9502,,9503,,
                           9512,9513)
*

```

**Figure 12. Database Decompile Utility Sample Output  
(7 of 11)**

# Database Decompile (LIBGEN) Utility

```

LSM0201  SLILSM  PASTHRU=((0,M),(0,S),(0,M),(0,M)),          X
              ADJACNT=(LSM0203,LSM0200,LSM0202,LSM0205),    X
              DRIVE=(1),                                     X
              DRVELST=(P020101),                           X
              TYPE=8500,                                    X
              DOOR=8500-2
*
P020101  SLIDLIST  HOSTDRV=(D0201010,D0201011,D0201012,D0201013, X
              D0201014,D0201015,D0201016,D0201017,D0201018, X
              D0201019,D020101A,D020101B,D020101C,D020101D, X
              D020101E,D020101F)
*
D0201010  SLIDRIVS  ADDRESS=(9504,,,9505,,,950C,,,950D,,, X
              ,)
D0201011  SLIDRIVS  ADDRESS=(9504,,,9505,,,950C,,,950D,,, X
              ,)
D0201012  SLIDRIVS  ADDRESS=(9504,,,9505,,,950C,,,950D,,, X
              ,)
D0201013  SLIDRIVS  ADDRESS=(9504,,,9505,,,950C,,,950D,,, X
              ,)
D0201014  SLIDRIVS  ADDRESS=(9504,,,9505,,,950C,,,950D,,, X
              ,)
D0201015  SLIDRIVS  ADDRESS=(9504,,,9505,,,950C,,,950D,,, X
              ,)
D0201016  SLIDRIVS  ADDRESS=(9504,,,9505,,,950C,,,950D,,, X
              ,)
D0201017  SLIDRIVS  ADDRESS=(9504,,,9505,,,950C,,,950D,,, X
              ,)
D0201018  SLIDRIVS  ADDRESS=(9504,,,9505,,,950C,,,950D,,, X
              ,)
D0201019  SLIDRIVS  ADDRESS=(9504,,,9505,,,950C,,,950D,,, X
              ,)
D020101A  SLIDRIVS  ADDRESS=(9504,,,9505,,,950C,,,950D,,, X
              ,)
D020101B  SLIDRIVS  ADDRESS=(9504,,,9505,,,950C,,,950D,,, X
              ,)
D020101C  SLIDRIVS  ADDRESS=(9504,,,9505,,,950C,,,950D,,, X
              ,)
D020101D  SLIDRIVS  ADDRESS=(9504,,,9505,,,950C,,,950D,,, X
              ,)
D020101E  SLIDRIVS  ADDRESS=(9504,,,9505,,,950C,,,950D,,, X
              ,)
D020101F  SLIDRIVS  ADDRESS=(9504,,,9505,,,950C,,,950D,,, X
              ,)
*
LSM0202  SLILSM  PASTHRU=((0,M),(0,S),(0,S),(0,S)),          X
              ADJACNT=(LSM0203,LSM0200,LSM0201,LSM0206),    X
              DRIVE=(1),                                     X
              DRVELST=(P020201),                           X
              TYPE=8500,                                    X
              DOOR=8500-2
*
P020201  SLIDLIST  HOSTDRV=(D0202010,D0202011,D0202012,D0202013, X
              D0202014,D0202015,D0202016,D0202017,D0202018, X
              D0202019,D020201A,D020201B,D020201C,D020201D, X
              D020201E,D020201F)
*
D0202010  SLIDRIVS  ADDRESS=(9510,,,950B,,,9506,,,9507,, X
              ,9511)
D0202011  SLIDRIVS  ADDRESS=(9510,,,950B,,,9506,,,9507,, X
              ,9511)
D0202012  SLIDRIVS  ADDRESS=(9510,,,950B,,,9506,,,9507,, X
              ,9511)
D0202013  SLIDRIVS  ADDRESS=(9510,,,950B,,,9506,,,9507,, X
              ,9511)
D0202014  SLIDRIVS  ADDRESS=(9510,,,950B,,,9506,,,9507,, X
              ,9511)
D0202015  SLIDRIVS  ADDRESS=(9510,,,950B,,,9506,,,9507,, X
              ,9511)
D0202016  SLIDRIVS  ADDRESS=(9510,,,950B,,,9506,,,9507,, X
              ,9511)
D0202017  SLIDRIVS  ADDRESS=(9510,,,950B,,,9506,,,9507,, X
              ,9511)
D0202018  SLIDRIVS  ADDRESS=(9510,,,950B,,,9506,,,9507,, X
              ,9511)
D0202019  SLIDRIVS  ADDRESS=(9510,,,950B,,,9506,,,9507,, X
              ,9511)
D020201A  SLIDRIVS  ADDRESS=(9510,,,950B,,,9506,,,9507,, X
              ,9511)

```

**Figure 12. Database Decompile Utility Sample Output (8 of 11)**

# Database Decompile (LIBGEN) Utility

D020201B	SLIDRIVS ADDRESS=(9510,,950B,,9506,,9507,,9511)	X
D020201C	SLIDRIVS ADDRESS=(9510,,950B,,9506,,9507,,9511)	X
D020201D	SLIDRIVS ADDRESS=(9510,,950B,,9506,,9507,,9511)	X
D020201E	SLIDRIVS ADDRESS=(9510,,950B,,9506,,9507,,9511)	X
D020201F	SLIDRIVS ADDRESS=(9510,,950B,,9506,,9507,,9511)	X
*		
LSM0203	SLILSM PASTHRU=((0,S),(0,S),(0,S),(0,S)), ADJACNT=(LSM0202,LSM0201,LSM0200,LSM0207), DRIVE=(1), DRVELST=(P020301), TYPE=8500, DOOR=8500-2	X X X X X
*		
P020301	SLIDLIST HOSTDRV=(D0203010,D0203011,D0203012,D0203013, D0203014,D0203015,D0203016,D0203017,D0203018, D0203019,D020301A,D020301B,D020301C,D020301D, D020301E,D020301F)	X X X
*		
D0203010	SLIDRIVS ADDRESS=(9508,9509,,,,950E,,,,950F)	
D0203011	SLIDRIVS ADDRESS=(9508,9509,,,,950E,,,,950F)	
D0203012	SLIDRIVS ADDRESS=(9508,9509,,,,950E,,,,950F)	
D0203013	SLIDRIVS ADDRESS=(9508,9509,,,,950E,,,,950F)	
D0203014	SLIDRIVS ADDRESS=(9508,9509,,,,950E,,,,950F)	
D0203015	SLIDRIVS ADDRESS=(9508,9509,,,,950E,,,,950F)	
D0203016	SLIDRIVS ADDRESS=(9508,9509,,,,950E,,,,950F)	
D0203017	SLIDRIVS ADDRESS=(9508,9509,,,,950E,,,,950F)	
D0203018	SLIDRIVS ADDRESS=(9508,9509,,,,950E,,,,950F)	
D0203019	SLIDRIVS ADDRESS=(9508,9509,,,,950E,,,,950F)	
D020301A	SLIDRIVS ADDRESS=(9508,9509,,,,950E,,,,950F)	
D020301B	SLIDRIVS ADDRESS=(9508,9509,,,,950E,,,,950F)	
D020301C	SLIDRIVS ADDRESS=(9508,9509,,,,950E,,,,950F)	
D020301D	SLIDRIVS ADDRESS=(9508,9509,,,,950E,,,,950F)	
D020301E	SLIDRIVS ADDRESS=(9508,9509,,,,950E,,,,950F)	
D020301F	SLIDRIVS ADDRESS=(9508,9509,,,,950E,,,,950F)	
*		
LSM0204	SLILSM PASTHRU=((1,S),(0,M),(0,M),(0,M)), ADJACNT=(LSM0200,LSM0205,LSM0206,LSM0207), DRIVE=(1), DRVELST=(P020401), TYPE=8500, DOOR=8500-1	X X X X X
*		
P020401	SLIDLIST HOSTDRV=(D0204010,D0204011,D0204012,D0204013, D0204014,D0204015,D0204016,D0204017,D0204018, D0204019,D020401A,D020401B,D020401C,D020401D, D020401E,D020401F)	X X X
*		
D0204010	SLIDRIVS ADDRESS=(,,9400,,9401,940A,,940B,,940E, 940F,,)	X
D0204011	SLIDRIVS ADDRESS=(,,9400,,9401,940A,,940B,,940E, 940F,,)	X
D0204012	SLIDRIVS ADDRESS=(,,9400,,9401,940A,,940B,,940E, 940F,,)	X
D0204013	SLIDRIVS ADDRESS=(,,9400,,9401,940A,,940B,,940E, 940F,,)	X
D0204014	SLIDRIVS ADDRESS=(,,9400,,9401,940A,,940B,,940E, 940F,,)	X
D0204015	SLIDRIVS ADDRESS=(,,9400,,9401,940A,,940B,,940E, 940F,,)	X
D0204016	SLIDRIVS ADDRESS=(,,9400,,9401,940A,,940B,,940E, 940F,,)	X
D0204017	SLIDRIVS ADDRESS=(,,9400,,9401,940A,,940B,,940E, 940F,,)	X
D0204018	SLIDRIVS ADDRESS=(,,9400,,9401,940A,,940B,,940E, 940F,,)	X
D0204019	SLIDRIVS ADDRESS=(,,9400,,9401,940A,,940B,,940E, 940F,,)	X
D020401A	SLIDRIVS ADDRESS=(,,9400,,9401,940A,,940B,,940E, 940F,,)	X
D020401B	SLIDRIVS ADDRESS=(,,9400,,9401,940A,,940B,,940E, 940F,,)	X
D020401C	SLIDRIVS ADDRESS=(,,9400,,9401,940A,,940B,,940E, 940F,,)	X
D020401D	SLIDRIVS ADDRESS=(,,9400,,9401,940A,,940B,,940E, 940F,,)	X
D020401E	SLIDRIVS ADDRESS=(,,9400,,9401,940A,,940B,,940E, 940F,,)	X
D020401F	SLIDRIVS ADDRESS=(,,9400,,9401,940A,,940B,,940E, 940F,,)	X

**Figure 12. Database Decompile Utility Sample Output (9 of 11)**

# Database Decompile (LIBGEN) Utility

```

*
LSM0205  SLILSM PASTHRU=((1,S),(0,S),(0,M),(0,M)),          X
          ADJACNT=(LSM0201,LSM0204,LSM0206,LSM0207),        X
          DRIVE=(1),                                         X
          DRVELST=(P020501),                                X
          TYPE=8500,                                         X
          DOOR=8500-2
*
P020501  SLIDLIST HOSTDRV=(D0205010,D0205011,D0205012,D0205013, X
          D0205014,D0205015,D0205016,D0205017,D0205018,    X
          D0205019,D020501A,D020501B,D020501C,D020501D,    X
          D020501E,D020501F)
*
D0205010 SLIDRIVS ADDRESS=(,,9408,,,9409,,940C,940D,9402,    X
          ,,9403)
D0205011 SLIDRIVS ADDRESS=(,,9408,,,9409,,940C,940D,9402,    X
          ,,9403)
D0205012 SLIDRIVS ADDRESS=(,,9408,,,9409,,940C,940D,9402,    X
          ,,9403)
D0205013 SLIDRIVS ADDRESS=(,,9408,,,9409,,940C,940D,9402,    X
          ,,9403)
D0205014 SLIDRIVS ADDRESS=(,,9408,,,9409,,940C,940D,9402,    X
          ,,9403)
D0205015 SLIDRIVS ADDRESS=(,,9408,,,9409,,940C,940D,9402,    X
          ,,9403)
D0205016 SLIDRIVS ADDRESS=(,,9408,,,9409,,940C,940D,9402,    X
          ,,9403)
D0205017 SLIDRIVS ADDRESS=(,,9408,,,9409,,940C,940D,9402,    X
          ,,9403)
D0205018 SLIDRIVS ADDRESS=(,,9408,,,9409,,940C,940D,9402,    X
          ,,9403)
D0205019 SLIDRIVS ADDRESS=(,,9408,,,9409,,940C,940D,9402,    X
          ,,9403)
D020501A SLIDRIVS ADDRESS=(,,9408,,,9409,,940C,940D,9402,    X
          ,,9403)
D020501B SLIDRIVS ADDRESS=(,,9408,,,9409,,940C,940D,9402,    X
          ,,9403)
D020501C SLIDRIVS ADDRESS=(,,9408,,,9409,,940C,940D,9402,    X
          ,,9403)
D020501D SLIDRIVS ADDRESS=(,,9408,,,9409,,940C,940D,9402,    X
          ,,9403)
D020501E SLIDRIVS ADDRESS=(,,9408,,,9409,,940C,940D,9402,    X
          ,,9403)
D020501F SLIDRIVS ADDRESS=(,,9408,,,9409,,940C,940D,9402,    X
          ,,9403)
*
LSM0206  SLILSM PASTHRU=((1,S),(0,S),(0,S),(0,M)),          X
          ADJACNT=(LSM0202,LSM0204,LSM0205,LSM0207),        X
          DRIVE=(1),                                         X
          DRVELST=(P020601),                                X
          TYPE=8500,                                         X
          DOOR=8500-2
*
P020601  SLIDLIST HOSTDRV=(D0206010,D0206011,D0206012,D0206013, X
          D0206014,D0206015,D0206016,D0206017,D0206018,    X
          D0206019,D020601A,D020601B,D020601C,D020601D,    X
          D020601E,D020601F)
*
D0206010 SLIDRIVS ADDRESS=(,,,,,,,,,9406,,,9407)
D0206011 SLIDRIVS ADDRESS=(,,,,,,,,,9406,,,9407)
D0206012 SLIDRIVS ADDRESS=(,,,,,,,,,9406,,,9407)
D0206013 SLIDRIVS ADDRESS=(,,,,,,,,,9406,,,9407)
D0206014 SLIDRIVS ADDRESS=(,,,,,,,,,9406,,,9407)
D0206015 SLIDRIVS ADDRESS=(,,,,,,,,,9406,,,9407)
D0206016 SLIDRIVS ADDRESS=(,,,,,,,,,9406,,,9407)
D0206017 SLIDRIVS ADDRESS=(,,,,,,,,,9406,,,9407)
D0206018 SLIDRIVS ADDRESS=(,,,,,,,,,9406,,,9407)
D0206019 SLIDRIVS ADDRESS=(,,,,,,,,,9406,,,9407)
D020601A SLIDRIVS ADDRESS=(,,,,,,,,,9406,,,9407)
D020601B SLIDRIVS ADDRESS=(,,,,,,,,,9406,,,9407)
D020601C SLIDRIVS ADDRESS=(,,,,,,,,,9406,,,9407)
D020601D SLIDRIVS ADDRESS=(,,,,,,,,,9406,,,9407)
D020601E SLIDRIVS ADDRESS=(,,,,,,,,,9406,,,9407)
D020601F SLIDRIVS ADDRESS=(,,,,,,,,,9406,,,9407)
*

```

**Figure 12. Database Decompile Utility Sample Output (10 of 11)**

# Database Decompile (LIBGEN) Utility

```
LSM0207  SLILSM PASTHRU=((1,S),(0,S),(0,S),(0,S)),          X
          ADJACNT=(LSM0203,LSM0204,LSM0205,LSM0206),        X
          DRIVE=(1),                                         X
          DRVELST=(P020701),                                 X
          TYPE=8500,                                         X
          DOOR=8500-2
*
P020701  SLIDLIST HOSTDRV=(D0207010,D0207011,D0207012,D0207013, X
          D0207014,D0207015,D0207016,D0207017,D0207018,    X
          D0207019,D020701A,D020701B,D020701C,D020701D,    X
          D020701E,D020701F)
*
D0207010 SLIDRIVS ADDRESS=(,,9404,,,9405,9410,,,9411,,     X
          ,)
D0207011 SLIDRIVS ADDRESS=(,,9404,,,9405,9410,,,9411,,     X
          ,)
D0207012 SLIDRIVS ADDRESS=(,,9404,,,9405,9410,,,9411,,     X
          ,)
D0207013 SLIDRIVS ADDRESS=(,,9404,,,9405,9410,,,9411,,     X
          ,)
D0207014 SLIDRIVS ADDRESS=(,,9404,,,9405,9410,,,9411,,     X
          ,)
D0207015 SLIDRIVS ADDRESS=(,,9404,,,9405,9410,,,9411,,     X
          ,)
D0207016 SLIDRIVS ADDRESS=(,,9404,,,9405,9410,,,9411,,     X
          ,)
D0207017 SLIDRIVS ADDRESS=(,,9404,,,9405,9410,,,9411,,     X
          ,)
D0207018 SLIDRIVS ADDRESS=(,,9404,,,9405,9410,,,9411,,     X
          ,)
D0207019 SLIDRIVS ADDRESS=(,,9404,,,9405,9410,,,9411,,     X
          ,)
D020701A SLIDRIVS ADDRESS=(,,9404,,,9405,9410,,,9411,,     X
          ,)
D020701B SLIDRIVS ADDRESS=(,,9404,,,9405,9410,,,9411,,     X
          ,)
D020701C SLIDRIVS ADDRESS=(,,9404,,,9405,9410,,,9411,,     X
          ,)
D020701D SLIDRIVS ADDRESS=(,,9404,,,9405,9410,,,9411,,     X
          ,)
D020701E SLIDRIVS ADDRESS=(,,9404,,,9405,9410,,,9411,,     X
          ,)
D020701F SLIDRIVS ADDRESS=(,,9404,,,9405,9410,,,9411,,     X
          ,)
*
*
          SLIENDGN ,
```

**Figure 12. Database Decompile Utility Sample Output (11 of 11)**

# Directory Rebuild Utility

## Directory Rebuild Utility

The Directory Rebuild utility provides a means to rebuild the database directory for all defined CDS copies.

### Prerequisites

The stand-alone Directory Rebuild utility:

- runs under the control of the SLUADMIN utilities program
- may be run while the CDS-related HSCs are STOPped
- must be run using all CDS copies as input.

### Reasons for Running the Directory Rebuild Utility

The major purpose of the Directory Rebuild utility is to repair a corrupted CDS database directory when the HSC is not active. Normally, the HSC corrects errors automatically.

### How the Directory Rebuild Utility Functions

The utility performs the following processing to rebuild the database directory:

- opens the control data sets specified by the SLSCNTL, SLSCNTL2, and SLSSTBY DD statements
- locates invalid pointers, directory entries, and recovery data
- rewrites corrected blocks to all CDS copies.

### Syntax

▶—DIRBLD—▶▶

### Utility Name

#### **DIRBLD**

specifies that directory rebuild processing is to be performed and invokes the SLUDRDIR module.

### Parameters

None.

### JCL Requirements

The following definitions apply to the DIRBLD utility JCL:

#### **SLSPRINT**

output messages from the utility program.

## **SLSCNTL, SLSCNTL2, SLSSTBY**

SLSCNTL is the primary CDS, SLSCNTL2 is the secondary CDS, and SLSSTBY is the standby CDS from which the directory is rebuilt. **This statement is required for each CDS that has been defined.**

## **SLSIN**

input to the utility in the form of control cards.

## **JCL Example**

The following example shows JCL for Directory Rebuild execution.

### **JCL for Directory Rebuild**

```
//JOB      job (account),programmer
//S1      EXEC PGM=SLUADMIN
//SLSCNTL DD DSN=control.dataset.name,DISP=(OLD,KEEP)
//*
//SLSPRINT DD SYSOUT=*
//SLSIN   DD *
          DIRBLD
/*
```

## **Output Description**

Output resulting from the execution of the Directory Rebuild utility includes:

- a listing of input commands with appropriate messages when syntax errors occur
- messages associated with error conditions resulting from an unsuccessful attempt to execute DIRBLD processing
- an updated CDS with corrected pointer and directory information
- a condition code indicating successful or unsuccessful CDS update.

## Eject Cartridge Utility

### Eject Cartridge Utility

The EJECT Cartridge utility permits you to remove one or more cartridges from an ACS in a batch mode. For the automated ejection of cartridges, the EJECT Cartridge utility takes advantage of the Cartridge Access Port (CAP) in an LSM.

The control statement allows you to designate a single CAP, a specific CAP, or a list of specific CAPs. Specifying one or more CAPs limits cartridge ejection to those CAPs.



**Caution:** The maximum length of a control statement is 32,767 characters. Exceeding this limit causes message SLS024II to be displayed, which indicates an invalid utility control statement.

Ejections in a multiple ACS configuration may specify CAPs in each ACS if volumes reside in each ACS. If a CAP list is not provided, the utility selects the highest priority CAP available for each ACS (refer to the the “CAP Preference (CAPPref) Command and Control Statement” in the *HSC/MSP Operator’s Guide*).

You may elect to submit multiple EJECT Cartridge utility requests, each of which may specify a particular CAP. If you elect to specify a CAP in a multi-ACS configuration, then the list of volumes must reside within the CAP ACS.

Multiple CAPs within one ACS can be allocated to the EJECT utility. Specifying multiple CAPs in a single EJECT Cartridge utility typically improves performance by reducing pass-thrus.

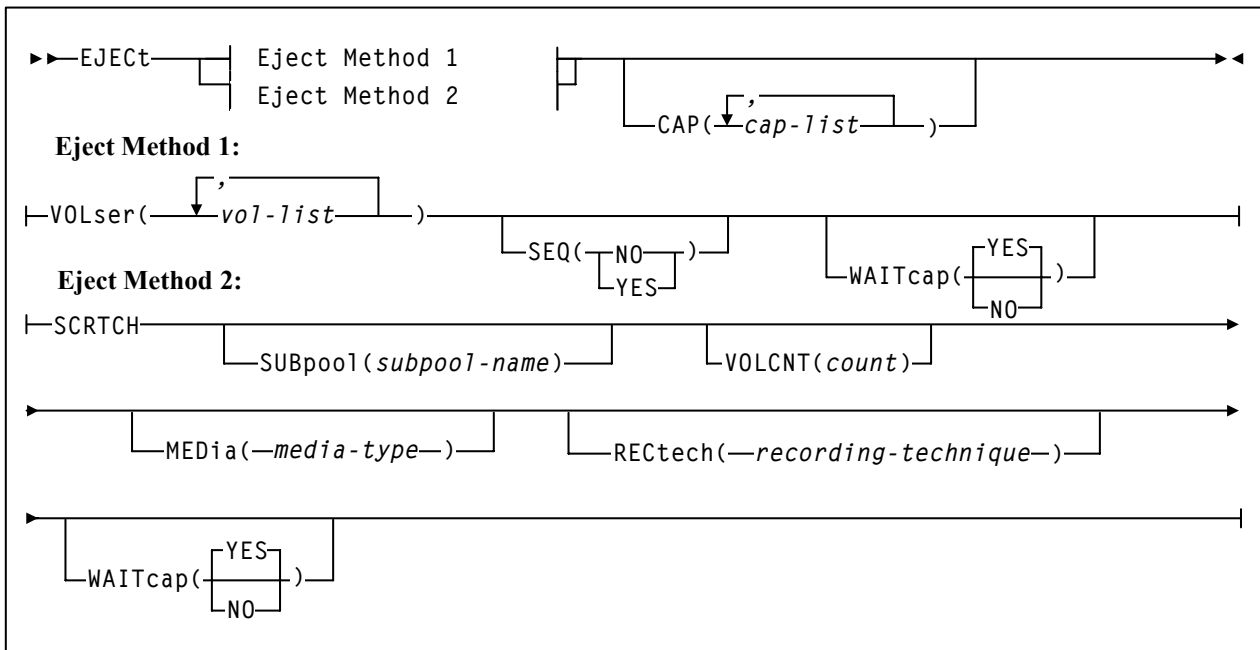
If two CAPs are specified in the same LSM, cartridges in that LSM are ejected in sequential order. This is helpful for vaulting.

### Output Options - SLUADMIN

In addition to plain text, SLUADMIN supports output types added through Unified User Interface (UUI) requests. Refer to “SLUADMIN Output” on page 144 or the *NCS/VTCS XML Guide* for more information.



## Syntax



# Eject Cartridge Utility

## Utility Name

### **EJECT**

specifies that ejection processing is to be performed.

## Parameters

### **VOLser**

specifies that a VOLSER(s) is to be ejected.

#### **(vol-list)**

*vol-list* specifies the list of volumes to be ejected. A *vol-list* can be a single VOLSER, a range of VOLSERS or a list of VOLSERS and/or VOLSER ranges in any combination.

If a list is specified, the elements must be delimited by commas or blanks, and the entire list enclosed in parentheses. A range of VOLSERS consists of a starting VOLSER and an ending VOLSER separated by a dash.

### **SEQ**

optionally, specifies whether or not CAP eject processing fills the CAP cells in the same order specified by the **VOLser** parameter.



#### **Notes:**

1. If **SEQ** is not specified, but two CAPs are requested in the same LSM, and the LSM is not an SL8500, cartridges in the ACS are ejected in sequential order.
2. For best performance, **SEQ(NO)** is recommended.

### **NO**

specifies to eject the requested volumes in the order of home cell location. Eject processing fills the CAP or magazine (for the SL8500) according to the distance of the home cell to the CAP or magazine; that is, volumes closest to the CAP or magazine are ejected first.

### **YES**

specifies to eject cartridges to the CAP in the order the volumes are listed in the associated **VOLser** parameter. The first cartridge requested appears in the topmost CAP cell, the second cartridge requested appears in the next CAP cell, and so on until the CAP is full or all cartridges have been moved to the CAP.

### **WAITcap**

optionally, specifies whether or not a list of ejecting volumes waits for an available CAP if one is not available.

### **YES**

specifies that the eject process waits indefinitely for a CAP to become available. **YES** is the default.

### **NO**

specifies that the eject process does not wait for a CAP if it is not available.

## SCRTCH

indicates that scratch volumes are to be ejected.



**Note:** If no CAPs are specified, only scratch tapes in ACS 00 are ejected.

## SUBpool

optionally, specifies the subpool from which scratch volumes are to be ejected. If MEDia or RECtech are specified, cartridges are ejected for that media type or recording technique within the same subpool.

*(subpool-name)*

*subpool-name* indicates the name for the subpool.

## VOLCNT

optionally, specifies that a designated number of scratch volumes are to be ejected.

*(count)*

count indicates the number of scratch volumes to be ejected.

## MEDia

optionally, specifies that scratch cartridges of the desired media are to be ejected.



### Notes:

1. If MEDia is not specified, the next scratch cartridge is selected without regard to media type if RECtech does not exist. If both MEDia and RECtech are supplied, they must be compatible.
2. **The SL8500 library supports only the T9840A, T9840B, T9840C, T9940B, and T10000 media types and recording techniques.**

### *media-type*

identifies the media type. Valid media types are:

#### **Standard**

indicates a standard length, 3480 cartridge. It can be read on any longitudinal drives (4480, 4490, 9490, or 9490EE). Data can be written in 36-track mode on a 4490, 9490, or 9490EE transport but cannot be read on an 18-track (4480) drive. Synonyms for this type of cartridge include:

- CST
- MEDIA1
- STD
- 1
- 3480

# Eject Cartridge Utility

## **ECART**

indicates a 3490E, extended capacity cartridge. It can be used only on a 36-track drive (4490, 9490, or 9490EE). Synonyms include:

- E
- ECCST
- ETAPE
- Long
- MEDIA2
- 3490E

## **ZCART**

indicates a 3490E, extended capacity cartridge that provides greater storage capacity than an ECART. It can be used only on a 9490EE drive.

ZCART can be abbreviated as Z.

## **DD3**

indicates any DD3A, DD3B, or DD3C (HELical) cartridge. HELical is a synonym for DD3.

## **DD3A, DD3B, DD3C**

indicates a helical cartridge. The media indicator in the external label is encoded with the cartridge type (A, B, or C). DD3A, DD3B, or DD3C can be abbreviated to A, B, or C, respectively.

Types of helical cartridges, along with their associated media capacities, are:

- A — 10GB
- B — 25GB
- C — 50GB.

Data capacity differences between DD3A, DD3B, and DD3C cartridges are related to the length of the tape in the cartridge, not to the recording density of the data.

## **STK1**

indicates any T9840 cartridge.

## **STK1R**

indicates a T9840 cartridge. The media indicator in the external label is encoded with the cartridge type (R). STK1R can be abbreviated to R.

T9840 cartridge media capacities are 20GB (T9840A and T9840B) or 40GB (T9840C).

## **STK2**

indicates any T9940 cartridge.

## **STK2P**

indicates a T9940 data cartridge. The media indicator in the external label is encoded with the cartridge type (P). STK2P can be abbreviated to P.

T9940 cartridge media capacities are 60GB (T9940A) or 200GB (T9940B).

## **T1000T1** or **T1**

indicates a full-capacity 500GB T10000 cartridge. **T1000T1** can be abbreviated as **T1**.

## **T1000TS** or **TS**

indicates a smaller-capacity 120GB T10000 cartridge. **T1000TS** can be abbreviated as **TS**.

## **RECtech**

optionally, specifies scratch cartridges of the desired recording technique are to be ejected. RECtech indicates the method used to record data tracks on the tape surface.



### **Notes:**

- If RECtech is not specified, the next scratch cartridge is selected depending on the media type (if supplied). If neither is supplied, the next scratch cartridge is selected without taking media type and recording technique into consideration. If both RECtech and MEDia are supplied, they must be compatible.
- **The SL8500 library supports only the T9840A, T9840B, T9840C, T9940B, and T10000 media types and recording techniques.**

### *recording-technique*

identifies the recording technique. Valid recording techniques are:

#### **18track**

indicates a 4480 transport.

#### **36track**

indicates a 4490, 9490, or 9490EE transport (any device that records in 36-track mode).

#### **36Atrack**

indicates a 4490 (Silverton) transport.

#### **36Btrack**

indicates a 9490 (Timberline) transport.

#### **36Ctrack**

indicates a 9490EE transport.

#### **HELical**

indicates a device using helical recording.

## Eject Cartridge Utility

### **DD3**

indicates a device using helical recording.

### **STK1R**

indicates any 9840 transport.

### **STK1R34**

indicates any 3490E-image 9840 transport.

### **STK1R35**

indicates any 3590-image 9840 transport.

### **STK1RA**

indicates a 3490E or 3590-image T9840A transport.

### **STK1RA34**

indicates a 3490E-image T9840A transport.

### **STK1RA35**

indicates a 3590-image T9840A transport.

### **STK1RB**

indicates a 3490E or 3590-image T9840B transport.

### **STK1RB34**

indicates a 3490E-image T9840B transport.

### **STK1RB35**

indicates a 3590-image T9840B transport.

### **STK1RAB**

indicates a 3490E or 3590-image T9840A or T9840B transport.

### **STK1RAB4**

indicates a 3490E-image T9840A or T9840B transport.

### **STK1RAB5**

indicates a 3590E-image T9840A or T9840B transport.

### **STK1RC**

indicates a 3490E or 3590-image T9840C transport.

### **STK1RC34**

indicates a 3490-image T9840C transport.

### **STK1RC35**

indicates a 3590-image T9840C transport.

### **STK2P**

indicates any 9940 transport.

**STK2P34**

indicates any 3490E-image 9940 transport.

**STK2P35**

indicates any 3590-image 9940 transport.

**STK2PA**

indicates a T9940A transport.

**STK2PA34**

indicates a 3490E-image T9940A transport.

**STK2PA35**

indicates a 3590-image T9940A transport.

**STK2PB**

indicates a T9940B transport.

**STK2PB34**

indicates a 3490E-image T9940B transport.

**STK2PB35**

indicates a 3590-image T9940B transport.

**T1A**

indicates any T10000 transport.

**T1AN**

indicates a non-encryption enabled 3490E- or 3590-image T10000 transport.

**T1A34**

indicates a non-encryption enabled 3490E-image T10000 transport.

**T1A35**

indicates a non-encryption enabled 3590-image T10000 transport.

**T1AE**

indicates an encryption-enabled 3490E- or 3590-image T10000 transport.

**T1AE34**

indicates an encryption-enabled 3490E-image T10000 transport.

**T1AE35**

indicates an encryption-enabled 3590-image T10000 transport.

# Eject Cartridge Utility

## CAP

optionally, specifies which Cartridge Access Port(s) is being used for the operation.

This utility ejects scratch volumes to the specified CAP(s) only. EJECT searches for scratch volumes only in the LSMs that contain the specified CAP(s).



**Note:** If a CAP has not been specified, EJECT determines the CAP to use based upon the CAPPref command setting (refer to “CAP Preference (CAPPref) Command and Control Statement” in the *HSC/MSP Operator’s Guide*).

If a CAP preference has not been specified, the HSC displays a message and waits until the user enters a CAPPref value. Pass-thrus can be made to CAPs specified by CAPPref.

### *(cap-list)*

*cap-list* identifies the Cartridge Access Port(s). The *cap-list* requires explicitly specified CAPids separated by commas. A CAPid range is not allowed.

If more than one CAPid is specified, the elements must be separated by blanks or commas, and the entire list must be enclosed in parentheses. If no CAP is specified, one is chosen in each ACS.

The format for *cap-id* is *AA:LL:CC* where *AA* is the ACS number (hexadecimal 00-FF), *LL* is the LSM number (hexadecimal 00-17), and *CC* is the CAP number.

Allowable values for *CC* are:

#### **00**

- For 4410 and 9310 LSMs, standard 21-cell CAP or the right-hand 40-cell enhanced CAP
- For 9360 LSMs, the 20-cell WolfCreek CAP
- For 9740 LSMs, fixed rack 14-cell or 10-cell removable magazine CAP
- For SL8500 libraries, the CAP consists of 3, 13-cell removable magazines.

#### **01**

- For 4410 and 9310 LSMs, left-hand 40-cell enhanced CAP
- For 9360 LSMs, the 30-cell WolfCreek optional CAP
- For SL8500 libraries, this is an optional CAP consisting of 3, 13-cell removable magazines.

#### **02**

priority CAP (PCAP) for a 4410 or 9310 LSM enhanced CAP or for a 9360 LSM CAP.



## JCL Requirements

The following definitions apply to EJECT Cartridge utility JCL:

### SLSPRINT

output messages from the utility program.

### SLSIN

input to the utility in the form of control statements.

## JCL Examples

The following example shows JCL for ejecting a single volume from the library.

### JCL for Ejecting a Single Volume

```
//JOBEJCT  job (account),programmer
//S1      EXEC PGM=SLUADMIN,PARM=MIXED
//SLSPRINT DD SYSOUT=A
//SLSIN   DD *
          EJECT VOL(A1B1C1)
/*
/
```

The following example shows JCL for ejecting cartridges from the library with the CAPid specified. Nine cartridge volumes are specified for ejection at CAPid 01:02:01.

### JCL to Eject Several Volumes (with a CAPid Specified)

```
//JOBEJCT  job (account),programmer
//S1      EXEC PGM=SLUADMIN,PARM=MIXED
//SLSPRINT DD SYSOUT=A
//SLSIN   DD *
          EJECT VOL(A1B1C1-A1B1C9) CAP(01:02:01)
/*
//
```

# Eject Cartridge Utility

The following example shows JCL for ejecting one standard scratch cartridge.

## JCL to Eject One STD Scratch Cartridge

```
//JOB EJECT job (account), programmer
//S1 EXEC PGM=SLUADMIN, PARM=MIXED
//SLS PRINT DD SYSOUT=A
//SLSIN DD *
EJECT SCRATCH MEDIA(STD)
/*
//
```

The following example shows JCL for ejecting five SD-3 (helical) scratch cartridges.

## JCL to Eject Five SD-3 Scratch Cartridges

```
//JOB EJECT job (account), programmer
//S1 EXEC PGM=SLUADMIN, PARM=MIXED
//SLS PRINT DD SYSOUT=A
//SLSIN DD *
EJECT SCRATCH RECTECH(DD3) VOLCNT(5)
/*
//
```

## Output Description

Output resulting from the execution of the EJECT Cartridge utility includes:

- a listing of input commands, with appropriate messages, when syntax errors occur
- messages associated with error conditions resulting from an unsuccessful attempt to execute ejection processing
- a message indicating successful ejection processing (see Figure 13 on page 214).

```
SLUADMIN (n.n.n) StorageTek Automated Cartridge System Utility PAGE 0001
TIME hh:mm:ss Control Card Image Listing DATE yyyy-mm-dd

EJECT VOL(A1B1C1)

SLUADMIN (n.n.n) StorageTek Automated Cartridge System Utility PAGE 0002
TIME hh:mm:ss Eject Cartridges Utility DATE yyyy-mm-dd

SLS0174I Volume A1B1C1 successfully ejected from library
SLS0155I Condition code for utility function is 0
```

**Figure 13. EJECT Cartridge Utility Sample Output**

## Initialize Cartridge (INITIALIZE) Utility

The Initialize Cartridge utility permits you to batch enter cartridges into the library through the CAP and to write magnetic labels for those cartridges.



**Warning:** This utility must be executed on an MSP system running the SMC and using a local HSC server.

This program reads the external Tri-Optic labels and records them in a data set defined through the CNTLDD parameter.



**Note:** CNTLDD is a control statement parameter that describes the DDname to be used for TMSTPNIT control statements.

The Initialize Cartridge utility does not initialize cartridges on its own; it invokes TMS, TLMS, or any other initialization utility, which performs the initialization. CNTLDD specifies, through the HSC to the TMS utility, the DD to be used for the input parameters the TMS utility requires.

Initialize Cartridge modifies the skeleton statement provided by the SLSINIT DD statement by substituting the VOLSER provided from the optical label of the cartridge entered in the library. It then passes the statement, unchanged in any other respect, as input to the program specified in the PROGram parameter of the utility.

When CAP processing completes, cartridges are placed in a home cell. Each new volume then is moved to the library transport defined by the SLSTAPE DD statement and the magnetic volume label is written. At the end of the labeling process, any of the following actions can occur:

- the volume(s) may be optionally ejected from the library
- the volume(s) may be optionally entered into the library control data set as a scratch volume
- the volume(s) may be entered as a non-scratch volume if the OPTion parameter is not specified
- the volumes that have a media mismatch are ejected.

This utility identifies the desired transport by one of the following:

- a specific unit address
- an esoteric limited to a single ACS and a single device type
- an esoteric limited to a single ACS and TAPEREQ statements, which restrict the transport to a specific device type.



**Note:** TAPEREQ statements must match the unit esoteric specified for the cartridge initialization job being run. For example, if the esoteric designates helical cartridges, the TAPEREQ(s) must request helical media as well.

## Initialize Cartridge (INITIALIZE) Utility

The HSC determines the recording technique and supported media from the selected drive. If the transport specified in the SLSTAPE DD statement does not match the media type of volumes entered into the CAP, the volumes are ejected and an error message is displayed.



**Note:** You must batch enter volumes through a manual mode CAP with a non-zero CAP preference.

By using TAPEREQ control statements, different cartridge initialization jobs can be defined to select different types of drives.

The following guidelines apply to running the Initialize Cartridge utility in a library with mixed device types:

- Do not mix recording techniques in a single job step. Run the utility to initialize cartridges in either 18-track, 36-track, helical, 9840, or 9940 recording format at one time. If 36-track recording format is desired, both standard and long media cartridges can be initialized in a single job.



**Note:** A ZCART cartridge can be initialized only on a 9490EE transport, but a 9490EE transport can initialize a 36-track, ECART, or ZCART cartridge.

If helical is requested, all helical types can be mixed.

- Specify the correct device for the volumes to be entered.

### Interface with a Tape Management System

It is the responsibility of the installation to inform the tape management system (i.e., TMS or TLMS) of the volume's scratch status.

### CAP Operating Instructions

Operating instructions for the CAP are provided in the *HSC/MSP Operator's Guide*.



**Note:** When there are no more cartridges to be entered, open the CAP once again to ensure that no cartridges are present in the CAP cells, and then close the CAP to complete processing.

### How the Initialize Cartridge Utility Functions

Part of the labeling process involves an installation-specified program to perform the labeling. The program must conform to, or actually invoke, IEHINITT. The label program must issue SVC 39 which normally requires the operator to reply M to message IEC701D. The HSC causes the volume to be mounted and generates the reply to the IEC701D message. If the user-supplied label program requires a special DDname identity, then a DD statement containing that DDname should be specified with a reference to the required SLSTAPE DD statement via UNIT=AFF=SLSTAPE.

## Initialize Cartridge (INITIALIZE) Utility



**Note:** The SLSTAPE DD statement defines the library transport where tape labeling is performed. In a multi-LSM environment, pass-thrus may be avoided by:

- supplying a specific address for the SLSTAPE device along with the CAP parameter (specifying the *cap-id* for the LSM where the SLSTAPE device is attached) on the control statement, or
- supplying the library esoteric on the SLSTAPE DD statement without a CAP parameter.

You must provide **all** necessary DD statements for the Initialize Cartridge utility and any program in its path (i.e., IEHINITT). You must also supply a prototype control statement, via the SLSINIT DD statement, in the format of card-images (a maximum of six) to initialize a single volume.

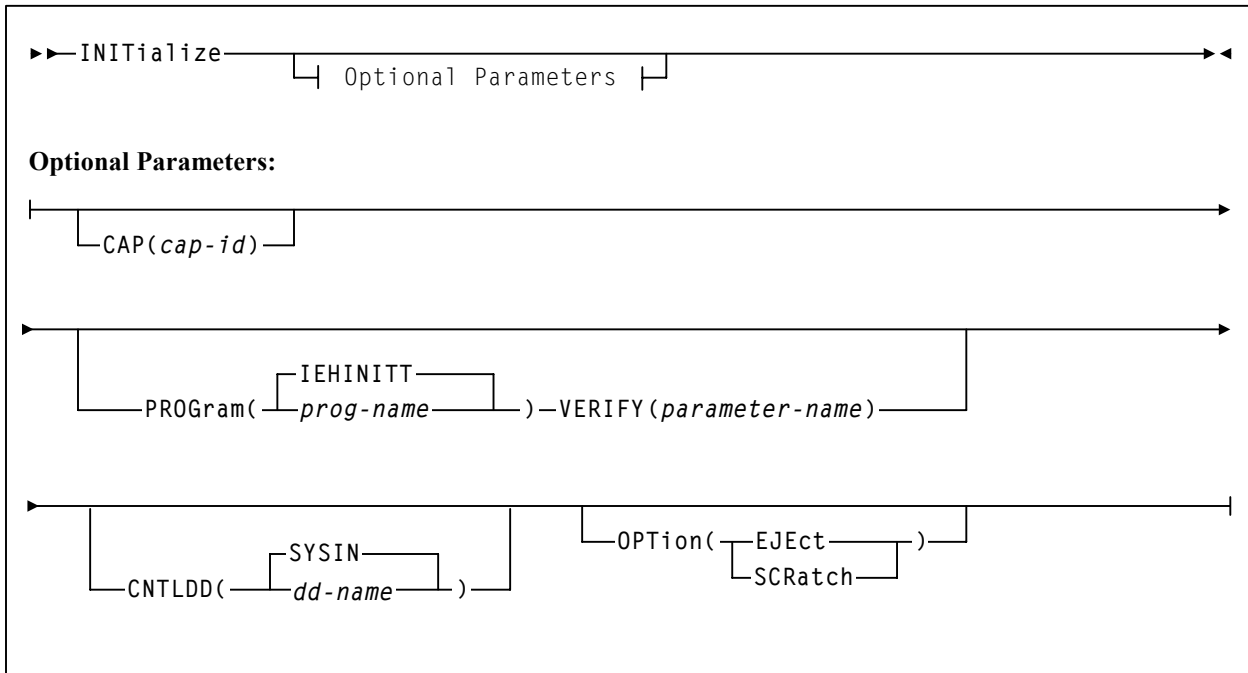
The control statement must contain a variable symbol indicator (a string of six asterisks) in place of the volume serial number. If the cartridges being entered have external labels with trailing blanks, it is suggested that the variable symbol indicators be the last characters on the prototype control statement to ensure the proper handling of other parameters present in this control statement. The utility substitutes the six characters from the external cartridge label for the asterisks and writes a control statement for each cartridge entered.



**Note:** The Initialize Cartridge utility may not run concurrently with an Audit utility within the same ACS. In addition, the Scratch Redistribution utility may not run concurrently, within the same ACS, when the Initialize Cartridge utility scratch option is specified. If either of these conditions are not followed, an HSC message is generated and the utility must be resubmitted.

# Initialize Cartridge (INITIALIZE) Utility

## Syntax



## Utility Name

### INITialize

specifies that cartridges are to be initialized.

## Parameters

### CAP

optionally specifies a particular CAP to be used for the operation.

If CAP is not specified, the utility chooses a CAP in the ACS implied by the device allocated to satisfy the SLSTAPE DD statement.

### (cap-id)

*cap-id* identifies the CAP. The format for *cap-id* is *AA:LL:CC* where *AA* is the ACS number, *LL* is the LSM number, and *CC* is the CAP number.

Allowable values for *CC* are:

### 00

- For 4410 and 9310 LSMs, standard 21-cell CAP or the right-hand 40-cell enhanced CAP
- For 9360 LSMs, the 20-cell WolfCreek CAP
- For 9740 LSMs, fixed rack 14-cell or 10-cell removable magazine CAP
- For SL8500 libraries, the CAP consists of 3, 13-cell removable magazines.

# Initialize Cartridge (INITIALIZE) Utility

## 01

- For 4410 and 9310 LSMs, left-hand 40-cell enhanced CAP
- For 9360 LSMs, the 30-cell WolfCreek optional CAP
- For SL8500 libraries, this is an optional CAP consisting of 3, 13-cell removable magazines.

## 02

priority CAP (PCAP) for a 4410 or 9310 LSM enhanced CAP or for a 9360 LSM CAP.

### PROGm

optionally specifies a program to be invoked to actually write the label (if not specified, IEHINITT is assumed).

#### *(prog-name)*

*prog-name* identifies the name of the program that is to perform the initialization.

#### **(IEHINITT)**

IEHINITT is the default value.

### VERIFY

optionally specifies a parameter to be passed to the tape initialization program identified by the PROGm parameter. **VERIFY is valid only when the PROGm parameter specifies TMSTPNIT.**

#### *(parameter-name)*

*parameter-name* is the parameter passed to the TMSTPNIT program. For example, if the parameter entered is

```
VERIFY(ROBOT)
```

TMSTPNIT suppresses the TMS CAL0TN01 message for NL (nonlabeled) tapes. Refer to the appropriate CA-1 documentation for valid parameter values.

### CNTLDD

optionally specifies the DD statement to which initialization control statements are written, and from which the label program reads its control statements.

**Note:** This is not your control data set.

#### *(dd-name)*

The name of the DD statement.

**Note:** The *dd-name* option may only be specified when using CA-1 (TMS) prior to version 5.1. The default value (SYSIN) MUST be used with CA-1 (TMS) version 5.1 or later.

#### **(SYSIN)**

SYSIN is the default value.

# Initialize Cartridge (INITIALIZE) Utility

## **OPTion**

specifies optional handling to be performed following the completion of label processing. If not specified, the default is retention of the new cartridges in the library with a non-scratch status.

## **(EJEct)**

specifies that the labeled volumes are to be ejected from the library after the labeling process is complete.

## **(SCRatch)**

specifies that the labeled volumes entering the library are to be added to the scratch list. If the volume is to be treated as scratch, the installation must inform the tape management system of the volume's scratch status.

## **JCL Requirements**

The following definitions apply to the Initialize Cartridge utility JCL:

### **SLSPRINT**

output messages from the utility.

### **SLSIN**

input to the utility in the form of control statement card images.

### **SLSINIT**

A substitution control card format for the invoked initialization program.

### **SLSTAPE**

The library transport on which the cartridge is mounted for labeling. To prevent a nonlibrary transport from being allocated, specify the esoteric for library transports, a specific library transport address, or have HSC JES Allocation User Exit (SLSUX02) installed.

### **CNTLDD or SYSIN**

Contains volume serial labeling information and is passed as input to the initialization program (IEHINITT or the program specified by the PROG keyword parameter).

If CNTLDD is specified in the utility control statement, then the DDname identifies the data set containing the labeling information.

### **SYSPRINT**

Output messages from IEHINITT.

## **JCL Examples**

The following example shows JCL for cartridge initialization with a unit esoteric specified and no *cap-id* specified.



## Initialize Cartridge (INITIALIZE) Utility

### JCL for Initializing a Cartridge with Unit Esoteric and No CAPid

```
//JOBINCT    job (account),programmer
//S1         EXEC PGM=SLUADMIN,PARM=MIXED
//SLSPRINT   DD SYSOUT=A
//SLSTAPE    DD UNIT=(LIB4480,,DEFER),DISP=NEW
//SYSPRINT   DD SYSOUT=A
//SLSINIT    DD *
SLSTAPE     INITT      OWNER='CUSTOMER',SER=*****
//SLSIN      DD *
            INITIALIZE
/*
//SYSIN      DD DSN=*&&TEMP,DISP=(,DELETE,DELETE),UNIT=SYSDA,
//           SPACE=(TRK,1)
//
```

The following example shows JCL for cartridge initialization of a CA-1(TMS) cartridge that is in delete status in the TMC, with the unit, the cap-id parameter, the PROGRAM parameter, and the CNTLDD parameter all specified.

# Initialize Cartridge (INITIALIZE) Utility

## JCL for Initializing a Cartridge with CA-1 (TMS) 4.9/5.0

```
//JOBINIT   job (account),programmer
//*
//TINIT     EXEC PGM=SLUADMIN,TIME=1440,PARM=MIXED
//LABELDD   DD UNIT=(580,1,DEFER),DISP=NEW
//*         TMSTPNIT INIT TAPE UNIT DD.
//*
//SLSTAPE   DD UNIT=AFF=LABELDD           INIT CARTRIDGES INIT TAPE
//*         UNIT DD
//SYSIN     DD UNIT=VIO,SPACE=(TRK,1)     IEHINITT CONTROL DATASET
//PRESYSIN  DD UNIT=VIO,SPACE=(TRK,1)     TMSTPNIT CONTROL DATASET
//TMC       DD DSN=XXXXX.TMC,DISP=SHR     TMS CATALOG
//TMSRPT    DD SYSOUT=*                   TMSTPNIT REPORT OUTPUT
//SLSRPT    DD SYSOUT=*                   UTILITY MESSAGES
//SYSRPT    DD UNIT=VIO,SPACE=(TRK,1)     IEHINITT MESSAGES
//SLSINIT   DD *                           PROTOTYPE CONTROL STATEMENT
INTAPE NUMBTAPE=1,SER=*****
//*
//SLSIN     DD *                           INIT CART CONTROL STATEMENT
           INITIALIZE CAP(000:00) PROGRAM(TMSTPNIT) CNTLDD(PRESYSIN)
           OPTION(SCRATCH)
//*  WHEN USING THE TMS TAPE INITIALIZATION PROGRAM TMSTPNIT, YOU
   *  MUST SPECIFY THE 'PROGRAM' PARAMETER AND THE 'CNTLDD' PARAMETER
   *  ON THE INIT CARTRIDGES CONTROL STATEMENT.
/*
```

## JCL for Initializing a Cartridge with CA-1 (TMS) 5.1/5.2

```
//JOBINIT   job (account),programmer
//*
//TINIT     EXEC PGM=SLUADMIN,PARM=MIXED
//LABELDD   DD UNIT=(uuu,,DEFER),DISP=NEW  TMSTPNIT TAPE UNIT DD
//SLSTAPE   DD UNIT=AFF=LABELDD           INIT CART TAPE UNIT DD
//SYSIN     DD UNIT=VIO,SPACE=(TRK,1)     TMSTPNIT CONTROL DATASET
//SLSRPT    DD SYSOUT=*                   HSC UTILITY MESSAGES
//SYSRPT    DD SYSOUT=*                   TMSUPNIT MESSAGES
//SLSINIT   DD *                           PROTOTYPE CONTROL STATEMENT
INTAPE NUMBTAPE=1,SER=*****
//SLSIN     DD *
           INITIALIZE PROGRAM(TMSTPNIT)
```

The following example shows JCL for cartridge initialization with the unit, the *cap-id* parameter, and the PROGram parameter (EDGINERS) specified.

# Initialize Cartridge (INITIALIZE) Utility

## JCL for Initializing a Cartridge with EDGINERS

```
//JOBINIT job (account),programmer
//*
//TINIT EXEC PGM=SLUADMIN,TIME=1440,PARM=MIXED
//TAPE DD UNIT=(580,1,DEFER),DISP=NEW
//* EDGINERS INIT TAPE UNIT DD.
//*
//SLSTAPE DD UNIT=AFF=TAPE INIT CARTRIDGES INIT TAPE
//* UNIT DD.
//SYSIN DD UNIT=VIO,SPACE=(TRK,1) EDGINERS CONTROL DATASET.
//SLSPRINT DD SYSOUT=* UTILITY MESSAGES.
//SLSPRINT DD SYSOUT=* EDGINERS MESSAGES.
//SLSINIT DD * PROTOTYPE CONTROL STATEMENT.
INIT LABEL(SL) VOL(*****)
//*
//SLSIN DD * INIT CARTRIDGES CONTROL
//* STATEMENT.
* WHEN USING THE DFSMSrmm TAPE INITIALIZATION PROGRAM EDGINERS, YOU
* MUST SPECIFY THE 'PROGRAM' PARAMETER ON THE INIT CARTRIDGES
* CONTROL STATEMENT.
INITIALIZE CAP(000) PROGRAM(EDGINERS) OPTION(SCRATCH)
/*
```

## Output Description

Output resulting from the execution of the Initialize Cartridge utility includes:

- a listing of input commands with appropriate messages when syntax errors occur (see Figure 14 on page 224)
- console messages informing the console operator when the labeling of the new volume(s) is complete
- messages associated with error conditions resulting from an unsuccessful attempt to execute initialization processing or actions occurring during processing
- updated library control data set containing new volumes with the proper scratch disposition.
- labeled cartridges
- listing from the installation-specified initialization utility (see Figure 14 on page 224).

# Initialize Cartridge (INITIALIZE) Utility

```
SYSTEM SUPPORT UTILITIES IEHINITT                                PAGE 0001

SLSTAPE INITT SER=SQUARE,OWNER='CUSTOMER'
VOL 1 SQUARE

SLUADMIN (n.n.n)          StorageTek Automated Cartridge System Utility          PAGE 0002
TIME hh:mm:ss            Control Card Image Listing                          DATE yyyy-mm-dd

INITIALIZE CAP(00:00:00)

SLUADMIN (n.n.n)          StorageTek Automated Cartridge System Utility          PAGE 0003
TIME hh:mm:ss            Initialize Cartridges Utility                          DATE yyyy-mm-dd

SLS0211I Volume SQUARE successfully entered into library
SLS0155I Condition code for utility function is 0
```

**Figure 14. Initialize Cartridge Utility Sample Output**

## Journal Offload Utility

The Journal Offload utility allows you to offload one or both of the journals on a given host without backing up the control data set. It is extremely important that you archive the offloaded journals, in the event that these journals are required for a restore operation.

The HSC can be operational while the Journal Offload utility is executing.

### Syntax

```
▶—OFFLoad—————▶◀
```

### Utility Name

#### **OFFLoad**

specifies that a journal offload is to be performed.

### Parameters

None.

### JCL Requirements

The following definitions apply to the Journal Offload utility program JCL:

#### **SLSPRINT**

the message output data set.

#### **SLSCNTL**

DD statement naming the primary library control data set.

#### **SLSCNTL2**

the secondary copy of the control data set.

#### **SLSSTBY**

the standby copy of the control data set.

#### **SLSJRN01**

the first of two journals on the given host.

#### **SLSJRN02**

the second of two journals on the given host. This statement is required only if both journals are to be offloaded. If specified, the SLSOFF02 statement is also required.

#### **SLSOFF01**

the created offload data set for the first journal (SLSJRN01).

#### **SLSOFF02**

the created offload data set for the second journal (SLSJRN02).

# Journal Offload Utility

## SLSIN

input to the utility in the form of control statement card images.



**Note:** The offloaded data sets created by SLSOFF01 and SLSOFF02 must be allocated on DASD. You can then copy the offloaded data sets to tape if you desire.

## JCL Example

The following example shows JCL for the offload of both journals.

### JCL for Offload of Journals

```
//JOB0FFL  job (account),programmer
//S2      EXEC PGM=SLUADMIN,PARM=MIXED
//SLSCNTL DD DSN=primary.dataset.name,DISP=SHR
//SLSCNTL2 DD DSN=secondary.dataset.name,DISP=SHR
//SLSSTBY DD DSN=standby.dataset.name,DISP=SHR
//SLSOFF01 DD DSN=offload.file1,DISP=(NEW,CATLG),UNIT=unit-number,
//        SPACE=(CYL,(primary.cyl.extent,secondary.cyl.extent),RLSE)
//SLSOFF02 DD DSN=offload.file2,DISP=(NEW,CATLG),UNIT=unit-number,
//        SPACE=(CYL,(primary.cyl.extent,secondary.cyl.extent),RLSE)
//SLSJRN01 DD DSN=journal1.dataset.name,DISP=SHR
//SLSJRN02 DD DSN=journal2.dataset.name,DISP=SHR
//SLSPRINT DD SYSOUT=*
//SLSIN   DD *
          OFFLOAD
/*
//
```



**Note:** The space specified in the SPACE parameter should equal the allocated space that your active journals take today. For example,

```
SPACE=(CYL,(4,1),RLSE)
```

indicates 4 primary extent cylinders and 1 secondary extent cylinders are to be allocated.

## Output Description

Output resulting from the execution of the Journal Offload utility (see Figure 15 on page 227) includes:

- the journal(s) is copied to the offload data set(s)
- the journal(s) is reset
- messages associated with error conditions resulting from an unsuccessful attempt to execute the Journal Offload utility
- a condition code indicating successful or unsuccessful completion of the utility.

# Journal Offload Utility

```
SLUADMIN (n.n.n)          StorageTek Automated Cartridge System Utility          PAGE 0001
TIME hh:mm:ss            Control Card Image Listing                DATE yyyy-mm-dd

OFFLOAD)

SLUADMIN (n.n.n)          StorageTek Automated Cartridge System Utility          PAGE 0002
TIME hh:mm:ss            Journal Offload Utility                DATE yyyy-mm-dd

SLS0282I Journal at DDname SLSJRN01 successfully offloaded to data set defined by SLSOFF01 DD statement
SLS0282I Journal at DDname SLSJRN02 successfully offloaded to data set defined by SLSOFF02 DD statement
SLS0191I Journal at DDname SLSJRN01 successfully reset
SLS0191I Journal at DDname SLSJRN02 successfully reset
SLS0155I Condition code for utility functions is 0
```

**Figure 15. Journal Offload Utility Sample Output**

# MERGEcds Utility

## MERGEcds Utility

The MERGEcds utility integrates volume information from one CDS into another. Users can designate specific ACSids or LSMids to merge volume information from and to.

This utility supports the following activities:

- adding or changing a configuration to reflect new ACSs or LSMs



### Notes:

1. **Before you execute this utility, run the Volume Report utility (refer to “Volume Report Utility” on page 312) and resolve all errant volumes.**
  2. StorageTek recommends that MERGEcds be used instead of the Reconfiguration utility. Support for RECONFIG will end in a future release.
  3. If MERGEcds is used as a replacement for RECONFIG, the HSC should remain at the base service level until the merge is complete.
- consolidating multiple libraries and CDSs into one library and CDS. No audit is necessary.
  - dividing one library and CDS into multiple libraries and CDSs. MERGEcds copies volume information from the old to the new CDS for each library.
  - merging multiple ACSs into one ACS
  - dividing one ACS into multiple ACSs
  - modifying an ACSid and/or LSMid and copying the affected volume information from the old to the new CDS. This provides the ability to renumber ACSs and LSMs.

The “from” CDS is identified by DD statements in the utility JCL that designate the primary, secondary, or standby CDS. The utility uses the primary CDS for volume information, so if more than one of these DD statements is present, the HSC determines which CDS is the primary from the Database Heartbeat (DHB) record. The “from” CDS is not modified.

**Note:** Refer to “Renaming Control Data Sets” on page 56 for information about how to rename a CDS in the DHB.

The “to” CDS is accessed by an active HSC subsystem that executes on the same host as the SLUADMIN program that runs this utility. The “to” CDS can be either:

- an existing CDS containing volume information
- the output of a SLICREAT program, which initializes CDS configuration information but does not supply volume information. In this case, stop tape processing until the merge is complete.

If specific ACSids or LSMids have been named, the affected ACSs must remain disconnected from all hosts until the merge is complete.



## How the MERGEcds Utility Functions

During a merge, volume information is copied from the “from” CDS to the “to” CDS. For each LSM included in the merge, volume information is copied for all panels as long as the panel type did not change.



### Notes:

1. LSM types must be the same, or no volumes in those LSMs are merged. 4410 and 9310 LSMs are considered to be the same LSM type.
2. An example of a “changed” panel type is if a drive panel replaces a cell panel. In this case, volume information on that panel is not copied.

When panels are frozen by the SET FREEZE utility, the resulting panel status in the “to” CDS is determined by these conditions:

- If the panel types match on the “from” and “to” CDS, the panel is frozen only if the panel on the “from” CDS is frozen.
- If the panel types do not match on the “from” and “to” CDS, the panel is frozen only if the panel on the “to” CDS is frozen.



**Note:** In-transit volumes in *selected* status in the “from” CDS are copied to the “to” CDS but are changed to *unselected* status after the merge is completed.

To avoid losing in-transit information, the “from” CDS should not be in use by an active HSC subsystem. If active HSCs have been running using the “from” CDS, they should either be stopped normally (not cancelled) or recovered (see “RECOVER Host Command” in the *HSC/MSP Operator’s Guide*).

Errant volumes, along with all errant volume information, are copied to the “to” CDS.

## Changing the HSC Library Configuration

The following procedure details the necessary steps to change your HSC configuration (add new ACSs or new LSMs, change LSM types, and so forth). **This procedure replaces the process described in “Running a Successful Reconfiguration” on page 246.**

1. Run the Database Decompile utility to create a new LIBGEN.



**Caution:** Do not rely on old LIBGENs for accuracy. If you do not perform this step, modifications made to the CDS (e.g., changes entered from the SET utility) will not be added to the LIBGEN. Thus, you may encounter a mismatch between your CDS and LIBGEN.

2. Identify any proposed changes to the host system’s Configuration Plan.
3. Assemble a LIBGEN that contains the required macro changes.
4. Create the data set initialization JCL and execute SLICREAT to format the new control data set(s) (refer to “Initializing the Control Data Sets” in the *HSC/MSP Configuration Guide*).

## MERGEcds Utility



**Note:** SLICREAT must create **all** control data sets (primary, secondary, and standby) referenced by the HSC.

5. Update the CDSDEF PARMLIB statement to specify the new HSC data set to be created.
6. Initialize the HSC on a test system (or a production system that can be brought down to be used for a test).
7. Execute the SLUADMIN program and include the following control statement to verify that the merged configurations are compatible:

```
MERGEcds ALL VALIDate
```

Run the validation test using an active CDS as the “from” CDS, and ignore any in-transit or errant volume warning messages.

8. If additional libraries (i.e., CDSs and ACSs) will be merged in the future, you can also validate that the configurations are compatible at this time.
9. At a predetermined time, terminate the HSC on all hosts (suspending tape activity).
10. To retain the original CDS names, do the following:
  - Back up the current active CDS.
  - Restore the CDS to the same data set.
  - Rename the CDS to reflect the desired name for your “from” CDS.
  - Rename the output of your SLICREAT job to the original CDS names.
11. Start the HSC on the target host at the base level using the new CDS created by the SLICREAT program.



**Note:** Make sure tape activity is still suspended. Since the new CDS does not contain any volumes, all tape mounts during the merge are sent outside the library.

12. If some ACS(s) defined on the “to” CDS will not be used immediately, add to the HSC PARMLIB member the following command to suppress the “ACS is disconnected” message.

```
OPTion DISCmsg SUPpress ACS(aa)
```

Refer to “OPTION Command and Control Statement” in the *HSC/MSP Operator’s Guide* for more information about this command.

13. Run SLUADMIN, specifying the following command:

```
MERGE ALL
```

Include the SLSFCNTL, SLSFCTL2, or SLSFSTBY DD statements, as appropriate, to indicate the “from” CDS.



**Note:** MERGEcds determines the primary CDS from these statements.

14. Back up the “to” CDS after the merge.

15. After the merge is complete, verify that the contents of the ACS(s) have been merged successfully into the new CDS. Check the output of the utility. Make hardware LMU microcode changes.
16. Restart tape processing on the host. The HSC does not need to be recycled.
17. Modify all LSMs online.
18. Start the HSC on the other hosts using the new CDS. Bring the HSC to the full service level.
19. Audit any panels that changed while reconfiguring the library.



**Caution:** When an LSM panel is replaced, the contents of the original panel are not retained in the CDS. The entire new panel must be audited to update the CDS.

20. The reconfiguration sets all CAP preference values to MANUAL. If necessary, reassign CAP preference values.

## Merging Additional Data Centers

Once the new CDS has been reconfigured, you are not required to recycle the HSC when you merge other data centers. The following procedure describes merging data centers into an active HSC.

1. Run a validation test on the host to be merged to using the CDS to be merged.

```
SLSIN: MERGE VALIDate
```

You must specify the “from” to “to” ACSs on the SLSMERGE DD statement. See “SLSMERGE DD Statement” on page 233 for information about its syntax.

```
SLSMERGE: MERGE FACS(aa) TACS(aa)
```

Run the validation test prior to the merge. If the “from” CDS is in use by active HSCs when the test is executing, ignore any in-transit or errant volume warning messages.

2. Review the output of the validation run and repeat the process until all errors are corrected.
3. Back up the CDS before running the merge.
4. Run the merge without the VALIDate parameter.

```
SLSIN: MERGE  
SLSMERGE: MERGE FACS(aa) TACS(aa)
```

5. Back up the updated “to” CDS.
6. If additional ACSs are to be merged, repeat the previous steps.

## MERGEcds Utility



**Note:** If LSMs in another data center are to be merged into an ACS, follow the same process used for ACSs. Specify the “from” and “to” LSM parameters, FLSM and TLSM, in the SLSMERGE DD statement.

- a. Run the validation test.

```
SLSIN: MERGE VALIDate  
SLSMERGE: MERGE FLSM(aa11) TLSM(aa11)
```

- b. Verify the validation test.

- c. Run the merge without the VALIDate parameter.

```
SLSIN: MERGE  
SLSMERGE: MERGE FLSM(aa11) TLSM(aa11)
```

Since an LSM may be merged into a CDS where it becomes part of another ACS, it is likely that the LSM will be changed so that one or more of its panels becomes a pass-thru panel.

In this case, volumes stored on the affected panel(s) are not merged, and a warning message is issued indicating that the panel type does not match and that no volumes from the panel have been merged.

7. After completing any necessary hardware moves, connect the new ACS by entering:

```
Vary dev-id ONline
```

The HSC can now access the new ACS.

8. Stop suppression of the “ACS is disconnected” message by entering:

```
OPTion DISCmsg(SHow) ACS(acs-id)
```

9. Modify the new LSMs online.

10. Reset the CAPPREF parameter.

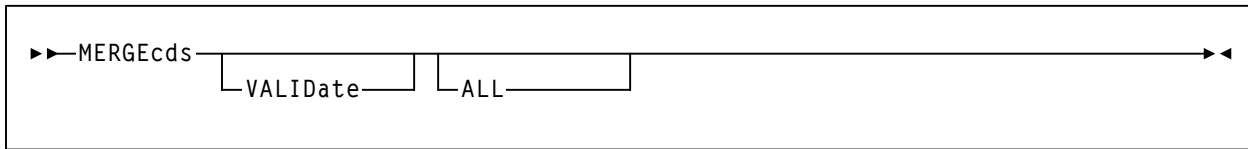
11. Remove the OPTion DISCmsg control statement from the HSC PARMLIB member.

12. If either of the following cases are reported

- duplicate volumes from the merge
- errant or in-transit volumes

audit the target cell locations to eject these volumes.

## Syntax



## Utility Name

### MERGEcds

specifies that a CDS merge is to be performed.

## Parameters

### VALIDate

optionally, verifies that the configurations to be merged are compatible and reports duplicate, in-transit, and errant volumes. **The merge is not performed with this parameter.**

### ALL

optionally, indicates that volume information associated with all ACSs and LSMs in the “from” CDS is to be merged into the corresponding ACSs and LSMs in the “to” CDS. The ACSids and LSMids must match.

If **ALL** is omitted, MERGEcds reads the parameters specified in the SLSMERGE DD statement.



**Note:** ALL and the SLSMERGE DD statement are mutually exclusive.

## SLSMERGE DD Statement

This statement designates specific ACSs or LSMs to merge volume information from and to.



### Notes:

1. If a “from” and “to” ACS is specified, all matching LSMs within the ACS are merged.
2. If a matching LSM contains panels types that do not match, no volumes in those panels are merged. 4410 and 9310 LSMs are considered to be matching LSMs.

When LSM types in a merging ACS do not match, no volumes in those LSMs are merged.

3. The “to” ACS must not contain volumes in the “to” CDS unless the volumes reside in an LSM that is not included in the merge.
4. The “to” LSM must not contain volumes in the “to” CDS.
5. Duplicate volumes in LSMs are not merged.

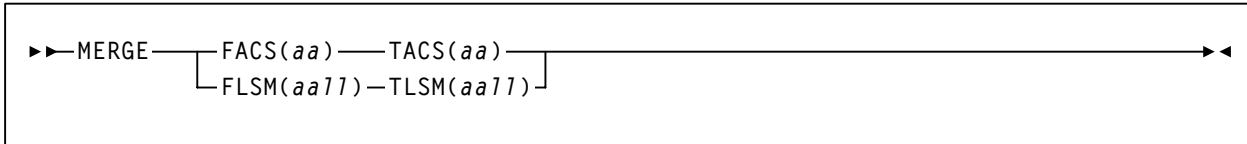
# MERGEcds Utility

- The SLSMERGE DD statement and the MERGEcds **ALL** parameter cannot be entered in the same job step.

Multiple sets of parameters can be specified (with no limit) for a single MERGEcds run. ACS and LSM formats can be mixed, as long as the same ACS or LSM is not named more than once in a run.

The syntax for SLSMERGE is:

## SLSMERGE Statement



where:

### FACS

specifies the “from” ACS.

*aa*

specifies the hexadecimal ACSid value (00 through FF) to merge volume information from.

### TACS

specifies the “to” ACS.

*aa*

specifies the ACSid to merge volume information to.

### FLSM

specifies the “from” LSM.

*aall*

specifies the hexadecimal LSMid value. An LSMid (*lsm-id*) is made up of the ACSid (hexadecimal 00-FF) and the LSM number (hexadecimal 00-17) separated by a colon (:).

### TLSM

specifies the “to” LSM.

*aall*

specifies the LSMid to merge volume information to.

**Note:** The “from” and “to” LSM must be the same LSM type (4410 and 9310 are considered to be the same type).

## JCL Requirements

The following definitions apply to the MERGEcds utility JCL:

### SLSPRINT

output messages from the utility program.

### SLSIN

input to the utility in the form of control cards.

### SLSFCNTL, SLSFCTL2, SLSFSTBY

the “from” control data set. MERGEcds selects the primary CDS if more than one of these DD statements is provided.

### SLSMERGE

the statement that contains specific ACSs and/or LSMs to be merged.

## JCL Examples

The following example shows JCL for verifying volume information in all ACSs and LSMs.

### JCL for Verifying All ACSs/LSMs

```
//JOBMERG   job (account),programmer
//S1        EXEC PGM=SLUADMIN,PARM=MIXED
//SLSPRINT  DD SYSOUT=A
//SLSFCNTL  DD DSN=from.primary.control.dataset,DISP=SHR
//SLSFCTL2  DD DSN=from.secondary.control.dataset,DISP=SHR
//SLSFSTBY  DD DSN=from.standby.control.dataset.,DISP=SHR
//SLSIN     DD *
            MERGECDS VALIDATE ALL
/*
//
```

The next example merges volume information from an ACS and a LSM.

# MERGEcdfs Utility

## JCL for Merging ACS/LSM Volume Information

```
//JOBMERG    job (account),programmer
//S1         EXEC PGM=SLUADMIN,PARM=MIXED
//SLSPRINT   DD SYSOUT=A
//SLSFCNTL   DD DSN=from.primary.control.dataset,DISP=SHR
//SLSFCTL2   DD DSN=from.secondary.control.dataset,DISP=SHR
//SLSFSTBY   DD DSN=from.standby.control.dataset.,DISP=SHR
//SLSIN      DD *
             MERGECDs
//SLSMERGE   DD *
             MERGE FACS(00) TACS(01)
             MERGE FLSM(02:00) TLSM(02:01)
/*
//
```

## Output Description

Output resulting from the execution of the MERGEcdfs utility includes:

- a merged library control data set
- messages associated with error conditions resulting from an unsuccessful attempt to execute MERGEcdfs processing (with or without the VALIDate option)
- messages warning about each in-transit or errant volume affected by the merge, LSMid mismatches, LSM type and panel mismatches, and duplicate volumes in LSMs.



## MOVE Utility

The MOVE utility permits you to request the HSC to move a single volume, a list of volumes, or a range of volumes to other locations within an ACS.

### MOVE Considerations

You should be aware of the following considerations before attempting to use the MOVE utility:

- Movement of volumes to all LSMs is done on a first-come first-served basis. As volumes are moved, should an LSM become fully populated before the move request is satisfied for that LSM, the move request continues with the movement of volumes designated for the next LSM specified in the request. An LSM is fully populated when all available cells contain tape cartridges. This process continues until the entire move request is completed or all destination LSMs are full.
- Moves are performed one at a time so that other LSM work can be done.
- The target LSM for the move request must be specified. Optionally, the specific panel within the target LSM may also be specified. Cartridges may be moved from one panel to another panel within the same LSM, but cartridges may **not** be moved from one location to another on the **same** panel. Also, cartridges cannot be moved to frozen panels in an LSM which is the target of a move.

The cartridges being moved may be specified in the following ways:

- move a single cartridge or a group of cartridges (specified by a VOLSER, a list of VOLSERS, or a range of VOLSERS)
- move the contents of a specified column, row, or entire panel (specified using the parameters FromLSM,Panel,Row,Column)
- An entire panel or panels can be emptied by specifying the **Panel** parameter without the **Row** or **Column** parameters. Any panels that are specified in the *panel-list* are excluded as destination panels if cartridges are being moved within the same LSM.

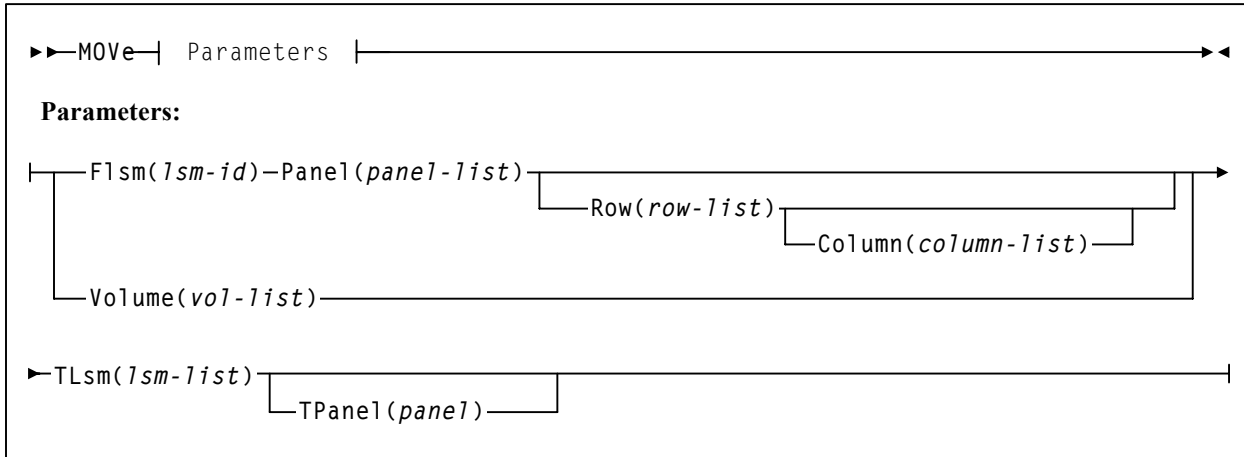


**Note:** Other cartridge activity occurring in the LSM can result in cartridges being placed in cells in a panel that is being emptied by the MOVE utility.

Refer to the appropriate ACS hardware document for information about LSM outer and inner wall panel layouts.

# MOVE Utility

## Syntax



## Utility Name

### MOVE

specifies a move request.

## Parameters

### Flsm

The “From” LSMid in the format *AA:LL* that the cartridges are to be moved from. If you specify the **Flsm** parameter, you may not specify the Volume parameter.

#### *(lsm-id)*

LSM identifier name. An LSMid (*lsm-id*) is made up of the ACSid (hexadecimal 00-FF) and the LSM number (hexadecimal 00-17) separated by a colon (:).

### Panel

panel number to be moved from. This parameter has a corequisite of the **Flsm** parameter and is required.

An entire panel can be emptied if the **Row** and **Column** parameters are not specified.

#### *(panel-list)*

A one or two digit panel number. Ranges are not valid. This parameter cannot contain a list if a list is specified for the **Row** or **Column** parameter.

Panels specified by *panel-list* are excluded as destination panels if cartridges are being moved within the same LSM.

### Row

list of rows to be moved from. This parameter has a corequisite of the **Panel** parameter.

**(row-list)**

A one or two digit row number or list of row numbers. The maximum list allowed is four rows. However, this parameter cannot contain a list if a list was specified for the **Column** parameter. Ranges are not valid.

**Column**

list of columns to be moved from. This parameter has a corequisite of the **Row** parameter and is optional. If this parameter is not specified, all columns will be moved for the rows specified.

**(column-list)**

A one or two digit column number or list of column numbers. This parameter cannot contain a list if a list was specified for the **Row** parameter. Ranges are not valid.



**Note:** Refer to the appropriate ACS hardware document for information about LSM panel, row, and column locations and layouts.

**Volume**

volumes to be moved.

**(vol-list)**

A list of volumes (a maximum of 100 can be specified) or a range of volumes. If you specify the **Volume** parameter, you may not specify the **Flsm** parameter.

**TLsm**

The target LSM(s). This is a required parameter. The LSMs are specified as *AA:LL*, where *AA* is the ACSid and *LL* is the LSMid. The ACSid:

- must be identical to the Flsm parameter “aa” (ACSid), or
- must be the same ACS in which the volume resides if the Volume parameter is specified.

**(lsm-list)**

A list of LSMs (a maximum of 24 can be specified). Ranges are invalid. An LSMid (*lsm-id*) is made up of the ACSid (hexadecimal 00-FF) and the LSM number (hexadecimal 00-17) separated by a colon (:).

**TPanel**

the panel in the **TLsm** to move the cartridge(s) to. This parameter is optional.

**(panel)**

The one or two digit panel number. This parameter cannot contain a list or range.

## MOVE Utility

### JCL Requirements

The following definitions apply to MOVE utility JCL:

#### SLSPRINT

output messages from the utility program.

#### SLSIN

input to the utility in the form of control cards.

### JCL Examples

The following example shows JCL for moving a single volume from a panel to another panel within the same LSM.

The example JCL moves a volume from LSM 00:01, Panel 08, Row 05, Column 02 to the same LSM (00:01) to Panel 09.

#### JCL for Moving a Single Volume within the Same LSM

```
//JOBMOVE   job (account),programmer
//S1        EXEC PGM=SLUADMIN,PARM=MIXED
//SLSPRINT  DD SYSOUT=A
//SLSIN     DD *
            MOVE FLSM(00:01) PANEL(08) ROW(05) COLUMN(02) TLSM(00:01) TPANEL(09)
/*
//
```

The example JCL moves volumes 000345, 000357, 000367, and 000360 to LSM 00:02, Panel 06.

#### Move Several Volumes From an LSM to Another LSM

```
//JOBMOVE   job (account),programmer
//S1        EXEC PGM=SLUADMIN,PARM=MIXED
//SLSPRINT  DD SYSOUT=A
//SLSIN     DD *
            MOVE VOLUME(000345 000357 000367 000360) TLSM(00:02) TPANEL(06)
/*
//
```

### Output Description

Typical outputs resulting from the execution of the MOVE utility include:

- a listing of input commands with appropriate messages when syntax errors occur
- messages associated with error conditions resulting from an unsuccessful attempt to execute unselect processing
- messages indicating actions occurring during processing (see Figure 16).

- an updated control data set indicating the volume is moved
- a condition code indicating successful or unsuccessful volume movement (see Figure 16).

```
SLUADMIN (n.n.n)          StorageTek Automated Cartridge System Utility          PAGE 0001
TIME hh:mm:ss            Control Card Image Listing                    DATE yyyy-mm-dd

MOVE FLSM(00:04) PANEL(00) TLSM(00:11)

SLUADMIN (n.n.n)          StorageTek Automated Cartridge System Utility          PAGE 0002
TIME hh:mm:ss            Move Volume Utility                          DATE yyyy-mm-dd

SLS1950I Volume X00609 moved from location 00:04:00:00:00 to location 00:11:00:00:14
SLS1950I Volume X00594 moved from location 00:04:00:00:01 to location 00:11:01:00:09
SLS1950I Volume X00578 moved from location 00:04:00:00:02 to location 00:11:02:00:09
SLS1950I Volume X00562 moved from location 00:04:00:00:03 to location 00:11:03:00:09
SLS1950I Volume X00546 moved from location 00:04:00:00:04 to location 00:11:04:00:09
SLS1950I Volume X00638 moved from location 00:04:00:00:05 to location 00:11:05:00:09
SLS1950I Volume X00659 moved from location 00:04:00:00:06 to location 00:11:06:00:09
SLS1950I Volume X00680 moved from location 00:04:00:00:07 to location 00:11:07:00:09
SLS1950I Volume X00431 moved from location 00:04:00:00:08 to location 00:11:08:00:09
SLS1950I Volume X00538 moved from location 00:04:00:00:09 to location 00:11:09:00:09
SLS1156I 10 volume(s) moved
SLS1155I 10 volume(s) moved to LSM 00:11
SLS0155I Condition code for utility function is 0
```

**Figure 16. MOVE Utility Sample Output**

# Performance Log Reblocker Utility

## Performance Log Reblocker

The Performance Log Reblocker utility is used by sites sharing an ACS between MSP and VM hosts. The utility is used to reformat the VM performance log data to a common format similar to that of the MSP/SMF data. This data is then used as input for the Activities Report utility. The Performance Log Reblocker utility is required to reconstruct the original-image SMF data; different versions are provided to execute in the CMS and MSP environments.

This utility prepares the generated performance log (SMF data) for use by the Activities Report utility.

SMF records passed to the SCP (see the glossary for a definition of SCP) are variable in length and can be up to 32K bytes long. The SCP breaks these records into sections that fit in a VM punch spool file, and passes reblocking information with each segment.

The MSP version takes SCP performance log output (with header/trailer data) and reblocks the physical records into the original length variable, blocked, spanned records that an MSP SMF function can handle.

For more information about the Performance Log Reblocker utility, refer to the *HSC System Programmer's Guide (VM Implementation)*. The PERFLOG trailer data optionally may be used to specify additional processing of the data after it is reblocked.

### JCL Example

The following example shows JCL for Performance Log Reblocker formatter and merge tasks.

## JCL for Performance Log Reblocker

```
//PERFLOG JOB (Accounting info),
// CLASS=x
//* ----- *
//* PERFLOG Formatter *
//* Takes PERFLOG records in 80 column card images and rebuilds them *
//* as SMF type records. *
//* ----- *
//STEP01 EXEC PGM=SLUPERF,REGION=512K
//STEPLIB DD DSN=your.hsc.loadlib,DISP=SHR
//SYSPRINT DD SYSOUT=*
//PRINTER DD SYSOUT=*
//SLSSMF DD DSN=PERFLOG.FORMATED,DISP=(NEW,CATLG,DELETE),
// DCB=(BLKSIZE=3120,LRECL=16384,RECFM=VBS),
// UNIT=SYSDA,SPACE=(CYL,(10,5))
//SYSIN DD *
+++++ PERFLOG DATA GOES HERE +++++
//* ----- *
//* PERFLOG Merge *
//* Takes the SMF type PERFLOG records and merges them with any other*
//* records desired. *
//* ----- *
//STEP02 EXEC PGM=merge,REGION=512K
//SYSPRINT DD SYSOUT=*
//PRINTER DD SYSOUT=*
//SYSUT1 DD DSN=PERFLOG.FORMATED,DISP=OLD
//SYSUT2 DD DSN=other.data,DISP=OLD
//SYSUT3 DD DSN=merged.data,DISP=(NEW,CATLG,DELETE),
// UNIT=SYSDA,SPACE=(CYL,(10,5))
//
```

## Output Description

Output resulting from the execution of the Performance Log Reblocker utility includes:

- a reblocked SMF data file
- a listing of record subtypes that have been reblocked.

A sample output listing of the Performance Log Reblocker utility follows.

```
SLUPERF: Begin Date= 1996155   Begin Time= 14:44:27   End Date= 1996155
          End Time= 14:45:42

SMF Subtype: 001 LSM Offload Statistics 8

SMF Subtype: 004 LMU Read Statistics 16
```

This example shows the number of records reblocked for a given SMF subtype. In this case, 8 subtype 001 records and 16 subtype 004 records have been reblocked.

Reconfiguration Utility

# Reconfiguration Utility

## Reconfiguration Utility

The Reconfiguration utility is used as part of a four stage process to create a new copy of the control data set when library hardware configurations change, such as the addition of drives or LSMs, but when information regarding the location of cartridges in the library must be retained from the original control data set.

The four stages include:

- performing a LIBGEN to create the new hardware configuration
- executing the SLICREAT procedure to format the new CDS that will hold the information transferred from the old CDS during the execution of the Reconfiguration utility
- executing the Reconfiguration utility to transfer current cartridge information from the old CDS to the new CDS taking into account the hardware configuration changes made
- possibly executing a partial audit that may be necessary to make final corrections to the CDS contents for panels that may have changed as a result of hardware configurations, such as the addition of drive panels.

The Reconfiguration utility, called via an MSP START command parameter, runs as a special invocation of the HSC. The Reconfiguration utility uses as input the CDSDEF control statement (points to the old CDS) as its information source and the RECDEF control statement (points to the newly formatted CDS) as the target where the updated information is stored.



### Notes:

- **Before you execute this utility, run the Volume Report utility (refer to “Volume Report Utility” on page 312) and resolve all errant volumes.**
- StorageTek recommends that the MERGEcds utility be used instead of this utility. Support for Reconfiguration will end in a future release.

## Reasons for Running the Reconfiguration Utility

The Reconfiguration utility minimizes the amount of time that the library is unavailable for your use due to library modifications. Some typical examples of library modifications are:

- an LSM panel is reconfigured (possibly by adding a drive panel to the LSM)
- an LSM is added to the existing configuration. Usually, this causes a change to the configuration of some of the existing LSMs since PTP panels replace panels that are currently full wall panels.
- an ACS is added to the library
- an LSM, or an entire ACS, is removed from the library.



Since the LIBGEN macros define the various physical aspects of a library, most changes or modifications affecting the physical configuration of the library require that corresponding LIBGEN macro(s) be updated. Any update to the LIBGEN (except changes made via the SET utility) requires that a new library control data set be created. To do this, run your LIBGEN through the SLICREAT program (refer to “Executing the SLICREAT Program” in the *HSC Configuration Guide*) and use that output file along with your old CDS as input to the Reconfiguration utility (refer to “Reconfiguration CDS Definition (RECDEF) Control Statement” on page 94).



**Note:** The SET utility allows many changes to be made without executing the Reconfiguration utility to accomplish a desired functional change. Refer to “SET Utility” on page 286 for a description of the SET utility.

## How the Reconfiguration Utility Functions

During a reconfiguration, volume information is copied from the old CDS to the new CDS. If the same LSMid exists on both the old and new CDS, volume information is copied for all panels as long as the panel type did not change.



### Notes:

- LSM types must be the same, or no volumes in those LSMs are copied. 4410 and 9310 LSMs are considered to be the same LSM type.
- An example of a “changed” panel type is if a drive panel replaces a cell panel. In this case, volume information on that panel is not copied.

When panels are frozen by the SET FREEZE utility, the resulting panel status in the new CDS is determined by these conditions:

- If the panel types match on the old and new CDS, the panel is frozen only if the panel on the old CDS is frozen.
- If the panel types **do not** match on the old and new CDS, the panel is frozen only if the panel on the new CDS is frozen.

The console operator can execute the Reconfiguration utility via a PROC (refer to “Reconfiguration PROC” on page 249) using the MSP START command to transfer data from the old control data sets to the new control data sets.



**Note:** Reconfiguration executes under the Base service level only.

Before executing the Reconfiguration utility, it is highly recommended that you run the Volume Report utility, which specifies the ACS and/or ACS and LSM options.

The volume report detects any errant and/or selected volume plus cell-allocated, but empty, conditions. If any of these conditions exist, it is recommended that each condition be cleared before running the Reconfiguration utility. If not cleared, the condition is copied to the newly created control data set.

An exception exists for selected volumes that are copied and marked unselected in the new control data set. If duplicate VOLSERS exist, run the AUDIt utility before running the Reconfiguration utility.

# Reconfiguration Utility

The net result of executing the Reconfiguration utility (process) is the creation of new control data sets that must be used for HSC execution from this point.



**Note:** ALL new control data sets (primary, secondary, and standby) must conform to the library hardware.



**Caution: Following a reconfiguration, all LSMs are in offline, manual mode and must be brought online. Commands that are dependent on the LSMs being online (including all commands used when automated mounts or dismounts are necessary) need to be issued after the LSMs are brought online.**

## I/O Considerations

The Reconfiguration utility supports creating data spaces to store CDS records subject to multiple I/O updates. Data space size is approximately 500K (.5M) for each LSM in the new configuration.

If the necessary data space cannot be acquired by the utility, CDS I/O will require significant additional time.



**Note:** Reconfiguration to real DASD with many scratch volumes has been known to take hours of wall clock time.

## Running a Successful Reconfiguration

While the Reconfiguration utility is in process, the library is unavailable to the user. The steps necessary to achieve a successful reconfiguration are as follows:

1. Run the Database Decompile utility to create a new LIBGEN.



**Caution: Do not rely on old LIBGENs for accuracy. If you do not perform this step, modifications made to the CDS (e.g., changes entered from the SET utility) will not be added to the LIBGEN. Thus, you may encounter a mismatch between your CDS and LIBGEN.**

2. Identify any proposed changes to the host system's Configuration Plan. Update your Hardware Configuration Definition (HCD) and LIBGEN to reflect these changes.

If you want to insert new ACSs into the middle of an existing library, or LSMs into an existing ACS, use the MERGEcds utility instead of Reconfiguration.



**Caution:**

- **If new ACSs are inserted into the middle of an existing library, all volume information will be lost for ACSs after the inserted ACS(s). In this case, audits may need to be run on the affected ACSs.**

When you add a new ACS(s), add it as the last ACS defined in LIBGEN; specifically, add it as the last assembler label specified on the SLIALIST macro and add all other affected macros. Refer to the "SLIALIST Macro" in the *HSC Configuration Guide* for a description of the macros.

- **If new LSMs are inserted in the middle of an existing ACS LSM string, all volume information will be lost for LSMs after the inserted LSM(s). In this case, audits may need to be run on the affected LSMs.**

When you add new LSMs to an ACS, add them as the last LSMs in that ACS; that is, add them as the last SLILSM macros specified on the highest-numbered LSM parameter (LSM, LSM2, LSM3, or LSM4) of the SLIACS macro and include all other affected macros. Refer to the “SLIACS Macro” in the *HSC Configuration Guide* for a description of the macros.

Assuming you specify additional LSM parameters (LSM2, LSM3, LSM4) in ascending order to enhance maintainability, note these syntax requirements:

- If the number of LSMs in an ACS does not exceed the 255-character limit on the LSM parameter, add the new LSMs as the last SLILSM macros on the LSM parameter.
- If the number of LSMs in an ACS exceeds the 255-character limit on the LSM parameter, add the new LSMs as the last SLILSM macros on the LSM2 parameter.
- If the number of LSMs in an ACS exceeds the 255-character limit on the LSM2 parameter, add the new LSMs as the last SLILSM macros on the LSM3 parameter.
- If the number of LSMs in an ACS exceeds the 255-character limit on the LSM3 parameter, add the new LSMs as the last SLILSM macros on the LSM4 parameter.



**Note:** If the number of LSMs in an ACS exceeds the 255-character limit on the LSM4 parameter, you have surpassed the architectural limit of 256 LSMs for each ACS. In this case, you must add the new LSMs to another ACS.

3. Assemble a LIBGEN that contains the required macro changes.
4. Optionally, run the SLIVERFY program to verify the HCD and LIBGEN.
5. Create the data set initialization JCL and execute SLICREAT to format the new control data set(s) (refer to “Initializing the Control Data Sets” in the *HSC Configuration Guide*).



**Note:** SLICREAT must create **all** control data sets (primary, secondary, and standby) referenced by the HSC.

6. Update the RECDEF PARMLIB statement to specify the new HSC data set to be created.

## Reconfiguration Utility

7. Make sure that the current primary CDS copy (as shown by the Display CDS command) is the primary copy of the old CDS input to RECONFIG.

If the CDS copies need to be rotated into a different sequence, use the procedure described under “Reassigning Control Data Set Names in Database Heartbeat Record” on page 54.

8. Update the CDSDEF PARMLIB control statement to include **only** the primary CDS.



**Warning:** You must specify **only** the primary CDS copy that was last active. If you do not, unpredictable and undesirable operational results, including operating system hangs, can occur.

9. Stop execution of the HSC on all hosts.
10. Use the MSP START Command to invoke the Reconfiguration PROC. Refer to “Reconfiguration PROC” on page 249.
11. When the RECONFIG is complete, if necessary, make hardware/LMU microcode changes.
12. Back up the new control data set.
  - a. Update the CDSDEF PARMLIB statement to specify the new HSC data set(s). Change the existing utility JCL to reflect the new CDS names.

**or**

- b. Rename the CDSs. To see how to retain the CDS names, refer to “Reassigning Control Data Set Names in Database Heartbeat Record” on page 54.



**Note:** The HSC startup after reconfiguration must point to the new primary, secondary, and standby CDS copies.

13. Remove the RECDEF PARMLIB statement.
14. Start the new production procedure (see “Reassigning Control Data Set Names in Database Heartbeat Record” on page 54 for more information).
15. Modify all LSMs online.
16. The reconfiguration sets all CAP preference values to MANUAL. If necessary, reassign CAP preference values.
17. Audit any panels that changed while reconfiguring the library.



**Caution:** When an LSM panel is replaced, the contents of the original panel are **not retained in the CDS**. The entire new panel must be audited to update the CDS.

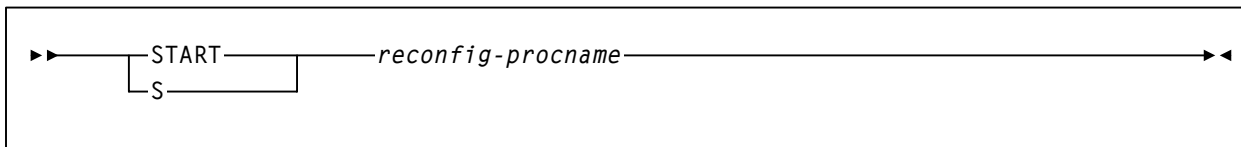
## Reconfiguration PROC

Create a reconfiguration procedure that includes the new control data sets produced by the reconfiguration data set initialization JCL. This PROC may be identical to the startup PROC with the following modifications:

- Add RECONFIG to the PARM information passed from the EXEC statement.
- Enter the new control data set name specified in the RECDEF PARMLIB statement (refer to “Reconfiguration CDS Definition (RECDEF) Control Statement” on page 94) in your SLSSYS DD statement.

Refer to “JCL Example” for an example of a Reconfiguration PROC.

## Syntax



**Note:** The Reconfiguration utility is invoked by using the MSP START command that includes the RECONFIG parameter in the PROC. This PROC executes program SLSBINIT.

## MSP Command Name

**START or S**  
initiates the MSP START command.

## Parameters

***reconfig-procname***  
is the name of the Reconfiguration PROC.

## JCL Requirements

Refer to “Reconfiguration CDS Definition (RECDEF) Control Statement” on page 94 for information required for the Reconfiguration utility.

# Reconfiguration Utility

## JCL Example

### Sample Reconfiguration PROC

```
//newprocname PROC
//IEFPROC EXEC PGM=SLSBINIT,
// TIME=1440,
// REGION=2000K,
// DPRTY=(7,5),
// PARM='E(E086) F(23) M(02) SSYS(HSC0) RECONFIG'
//*
//SLSSYS02 DD DSN=your.parmlib.(member),DISP=SHR
//STEPLIB DD DSN=sys1.your.linklib,DISP=SHR
```

## PARMLIB Example

The following JCL example represents the reconfiguration procedure using CDSDEF and RECDEF statements in the PARMLIB.

Refer to Chapter 3, “HSC Control Statements and HSC Start Procedure” for more RECDEF PARMLIB examples.

### PARMLIB Example of RECDEF Control Statement

```
/*
CDSDEF DSN1=SLS.DBASEPRM
RECDEF DSN1=SLS.NEW.DBASEPRM,+
       DSN2=SLS.NEW.DBASESEC
*/
```

## Output Description

Output resulting from the execution of the Reconfiguration utility includes a message stating whether or not the utility ran successfully.

## REStore Utility

The REStore utility provides a way to re-create the library control data set from a previous backup copy of the data set. You also have the option to apply all journals (maximum of 99 files per run) since the last backup, if journaling is enabled.



**Caution: It is critical that you restore all data sets referenced by the HSC (primary, secondary, standby). Failing to restore all data sets can cause CDS mismatches.** Refer to “Control Data Set Recovery” on page 52 **and** “Reassigning Control Data Set Names in Database Heartbeat Record” on page 54 **for additional information.**

### Prerequisites



**Warning:** The host software must be **stopped** on all hosts when this utility is executed.

### Reasons for Running the REStore Utility

The REStore utility performs the following tasks:

- re-creates the library control data set from a backup copy
- applies contents of any journals having activity since the backup. This process occurs only if you have designated that journals are enabled. See “SLIRCVRY Macro” in the *HSC/MSP Configuration Guide* for information about enabling journaling



**Notes:** The HSC BACKup and REStore utilities can be used as part of a procedure to rename control data sets. Refer to “Renaming Control Data Sets” on page 56 for detailed information on renaming control data sets.

### How the REStore Utility Functions

The REStore utility is executed in the following phases:

- A hardware reserve is issued against the control data set.
- The library control data set is restored from a previous backup copy.
- If journaling is enabled, the installation optionally can apply journals (up to 99 files per run) to the restored library control data set. It is the user’s responsibility to include all journals and offload copies made since the last backup.
- The restored library control data set is duplicated in the secondary and standby control data sets if secondary and standby control data sets are being used. Refer to “Control Data Set Recovery” on page 52 for additional information about the control data set recovery scheme.

**Note:** The restored data set is formatted as RECFM=F, BLKSIZE=4096. The logical record length may be LRECL=0. In this case, LRECL=0 indicates to default to the block size, so you should not construe this as a problem.

- If GENERate (YES, Only, or Short) is specified in the REStore JCL, output of the discrepancies encountered is stored in the SLSAUDIT data set. For information on

# REStore Utility

resolving any discrepancies, see “How to Handle BACKup/REStore Discrepancies” on page 259.

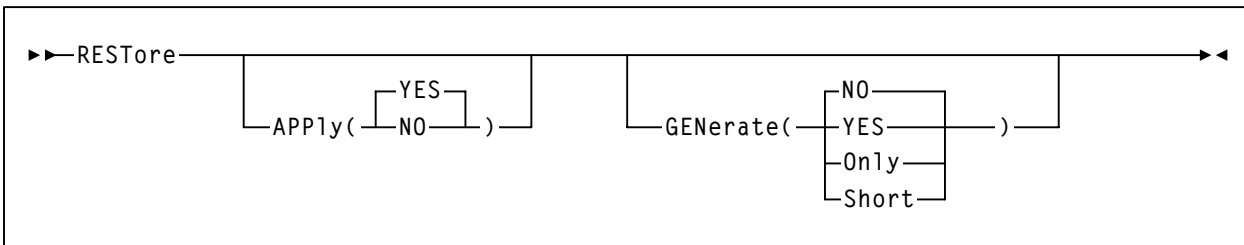
- The control data set is released, and the utility ends.

The REStore utility does not reset the journals. It is recommended that a backup be performed following the completion of the restore to reset the journals and reflect the newly restored control data set.

## Special Considerations for Control Data Sets Processing Independently

Special precautions should be taken for running BACKup and REStore when local/remote-linked libraries run control data sets independent of each other. These precautions should be followed when the link connecting the local and remote libraries is disrupted. Refer to “CDS Synchronization Between Local/Remote-linked Libraries” on page 176 for more information.

## Syntax



## Utility Name

**REStore**  
specifies that the restore operation is to be performed.

## Parameters

**APPLy**  
optionally specifies whether or not the journals are to be applied to the restore operation.

**(YES)**  
specifies that journals are to be applied. **YES is the default.**

**(NO)**  
specifies that journals are not to be applied.

**GENErate**  
optionally specifies what statements are output to the SLSAUDIT data set and whether or not control data sets are restored.



**(NO)**

specifies that NO statements are sent to the SLSAUDIT data set. The control data sets are also restored. **NO is the default.**

**(YES)**

specifies that statements are sent to the SLSAUDIT data set. The control data sets are also restored.



**Note:** If OPTion(Analyze) was specified for backup, this parameter should be specified for the restore.

**(Only)**

specifies that all statements are sent to the SLSAUDIT data set. The CDS and Journal DD statements need not be present. The control data sets are not restored.

**(Short)**

specifies that Audit statements only are sent to the SLSAUDIT data set. The control data sets are restored.

## JCL Requirements

The following definitions apply to RESTore utility JCL:

**SLSPRINT**

output messages from the utility program.

**SLSCNTL**

the primary control data set.

**SLSCNTL2**

the secondary copy of the CDS (optional).

**Notes:**

1. If this is a new data set (e.g., DISP=(NEW,...)), DCB=(DSORG=PS) must be coded to insure that the data set organization of the control data set is defined correctly.
2. The logical record length of the restored data set may be LRECL=0. This is not an indication of a problem. In this case, the LRECL for the restored data set defaults to BLKSIZE=4096.

**SLSBKUP**

the backup data set.

**SLSSTBY**

a standby copy of the control data set having only the heartbeat block updated (optional).

# RESTore Utility

## **SLSJRNnn**

if journaling is enabled, statements that define all journals since the last backup. There are two journals per host and up to 16 hosts. The possibility exists that the journals could have been off-loaded since the last control data set backup. If so, all archived journals must also be specified here.

It is the user's responsibility to specify the archived journals, since there are no means of checking for missing archived journals. There is also no provision for specifying more than 99 journals. **Allowable values for nn are 01 to 99, but numbers cannot be skipped.**

## **SLSAUDIT**

identifies where the UNSCratch, UNSElect, and AUDIt statements are to be placed. SLSAUDIT has a logical record length (LRECL) of 80 and a block size (BLKSIZE) of 80. These statements are in the optimal order and can be directly input to an execution of SLUADMIN. The data set name specified in SLSAUDIT can be used as SLSIN input to SLUADMIN.

## **SLSOUT**

sort message output. Required if APPLy(YES) is specified.

## **SLSIN**

input to the utility in the form of control cards.

## **SLSDELTA**

work data set created by the restore. The DD statement naming a temporary data set for the sorted deltas. The space allocation should be at least as large as the sum of all the SLSJRNnn data sets. This statement is only required when APPLy(YES) is specified.

## **SORTWKnn**

sort work data sets. Required if APPLy(YES) is specified.

## JCL Examples

Various examples showing JCL for running the RESTore utility are presented. Select the appropriate example matching the control data set conventions that you have used for specifying data sets.

The first example restores the control data sets using current data set conventions with the primary, secondary, and standby control data sets and journals applied.

### JCL for RESTore (with Journals Applied)

```
//JOBSTR      job (account),programmer,REGION=2048K
//S1          EXEC PGM=SLUADMIN,PARM=MIXED
//SLSBKUP     DD DSN=backup.set.name,DISP=(OLD)
//SLSCNTL     DD DSN=primary.set.name,DISP=(NEW,CATLG,DELETE),
//            DCB=(DSORG=PS),UNIT=,SPACE=
//SLSCNTL2    DD DSN=secondary.set.name,DISP=SHR
//SLSSTBY     DD DSN=standby.set.name,DISP=SHR
//SLSJRN01    DD DSN=journal1.set.name,DISP=SHR
//SLSJRN02    DD DSN=journal2.set.name,DISP=SHR
//SORTWK01    DD UNIT=,SPACE=
//SLSDELTA    DD UNIT=,SPACE=
//SLSAUDIT    DD DSN=dataset.name,DISP=SHR
//SLSPRINT    DD SYSOUT=*
//SLSOUT      DD SYSOUT=*
//SLSIN       DD *
              RESTORE APPLY(YES)
/*
```

The second example shows JCL for the RESTore utility using the GENERate(Only) parameter.

### JCL for RESTore (with GENERate Only)

```
//JOBSTR      job (account),programmer,REGION=2048K
//S1          EXEC DD DSN=backup.set.name,DISP=OLD
//SLSAUDIT    DD DSN=dataset.name,DISP=SHR
//SLSPRINT    DD SYSOUT=*
//SLSIN       DD*
              RESTORE GENERATE(ONLY)
```

The third example shows JCL for restoring the library control data set without journals applied and without sending the output of the restore operation to the SLSAUDIT data set.

# REStore Utility

## JCL for REStore (without Journals or Output to SLSAUDIT)

```
//JOBSTR      job (account),programmer,REGION=2048K
//S1          EXEC PGM=SLUADMIN,PARM=MIXED
//SLSBKUP    DD DSN=backup.set.name,DISP=(OLD)
//SLSCNTL    DD DSN=primary.set.name,DISP=(NEW,CATLG,DELETE),
//           DCB=(DSORG=PS),UNIT=,SPACE=
//SLSCNTL2   DD DSN=secondary.set.name,DISP=SHR
//SLSSTBY    DD DSN=standby.set.name,DISP=SHR
//SORTWK01   DD DSN=temp.sort,DISP=(NEW,KEEP),UNIT=
//SLSDELTA   DD DSN=temp.delta,DISP=(NEW,KEEP),UNIT=
//SLSPRINT   DD SYSOUT=*
//SLSIN      DD *
            RESTORE APPLY(NO) GENERATE(NO)
/*
//
```

The fourth example shows JCL for restoring the library control data set with data set naming conventions. The example runs REStore with journals applied (APPLY(YES)) and a secondary CDS active.

## JCL for REStore (with Secondary [Shadow] and Journals)

```
//JOBSTR      job (account),programmer,REGION=2048K
//S1          EXEC PGM=SLUADMIN,PARM=MIXED
//SLSBKUP    DD DSN=backup.set.name,DISP=(OLD)
//SLSCNTL    DD DSN=primary.set.name,DISP=(NEW,CATLG,DELETE),
//           DCB=(DSORG=PS),UNIT=,SPACE=
//SLSDELTA   DD DSN=journal1.set.name,DISP=(,DELETE,DELETE),UNIT=,SPACE=
//SLSJRN01   DD DSN=journal1.set.name,DISP=OLD
//SLSJRN02   DD DSN=journal2.set.name,DISP=OLD
//SLSPRINT   DD SYSOUT=A
//SLSCNTL2   DD DSN=secondary.set.name,DISP=(NEW,KEEP),UNIT=,SPACE=
//SORTWK01   DD DSN=journal1.set.name,DISP=(,DELETE,DELETE),UNIT=,SPACE=
//SLSOUT     DD SYSOUT=A
//SLSIN      DD *
            RESTORE APPLY(YES)
/*
//
```

**Note:** The UNIT= and SPACE= parameters for SLSCNTL are completed with the same information defined for the Data Set Initialization JCL section in “Creating Data Set Initialization JCL” in the *HSC/MSP Configuration Guide*.

The fifth example shows JCL for restoring the library control data set with data set naming conventions. The example runs REStore with journals applied (APPLY(YES)) and the output of the restore operation placed in the SLSAUDIT data set (GENERATE(YES)).

## JCL for RESTore (Journals and Output to SLSAUDIT)

```
//JOBSTR   job (account),programmer,REGION=2048K
//S1       EXEC PGM=SLUADMIN,PARM=MIXED
//SLSCNTL  DD DSN=primary.set.name,DISP=SHR
//SLSCNTL2 DD DSN=secondary.set.name,DISP=SHR
//SLSBKUP  DD DSN=backup.set.name,DISP=OLD
//SLSPRINT DD SYSOUT=*
//SLSIN    DD *
RESTORE  APPLY(YES) GENERATE(YES)
```

## Output Description

Output resulting from the execution of the RESTore utility includes:

- a restored library control data set. A shadow or secondary data set is also output if specified in the JCL.
- a listing of input commands with appropriate messages when syntax errors occur
- messages associated with error conditions resulting from an unsuccessful attempt to execute RESTore processing
- a condition code indicating successful/unsuccessful restore processing (see Figure 17 on page 258)
- a control card output for CDS discrepancies.

# RESTore Utility

```
SLUADMIN (n.n.n)          StorageTek Automated Cartridge System Utility          PAGE 0001
TIME hh:mm:ss            Control Card Image Listing                DATE yyyy-mm-dd

RESTORE GENERATE(YES)

SLUADMIN (n.n.n)          StorageTek Automated Cartridge System Utility          PAGE 0002
TIME hh:mm:ss            Restore Utility                          DATE yyyy-mm-dd

SLS1212I JCL has been verified for the RESTORE utility
SLS1199I The Backup being restored is from 20040301 at 14:08:04
SLS0161I Control database is successfully copied from the backup copy
SLS0391I All host DHBEFLAGS reset in CDS
SLS1219I SLSCNTL2 data set was successfully restored from SLSCNTL
SLS1219I SLSSTBY data set was successfully restored from SLSCNTL

SLUADMIN (n.n.n)          StorageTek Automated Cartridge System Utility          PAGE 0003
TIME hh:mm:ss            Restore Utility                          DATE yyyy-mm-dd
                        Statement Generation Summary Report

UNSCR VOL(EVT181-EVT182,EVT184-EVT187,EVT190-EVT191,EVT193-EVT194)
UNSCR VOL(EVT286-EVT288,EVT386-EVT388,EVT480-EVT483,EVT485-EVT488)
UNSEL VOL(E51233)
UNSEL VOL(EVT180)
.
.
.
UNSEL VOL(EVT488)

SLUADMIN (n.n.n)          StorageTek Automated Cartridge System Utility          PAGE 0004
TIME hh:mm:ss            Restore Utility                          DATE yyyy-mm-dd
                        Statement Generation Summary Report

AUDIT ACS(00) LSM(00) PAN(00) ROW(00) COL(00)
AUDIT ACS(00) LSM(00) PAN(01) ROW(00) COL(03)
.
.
.
AUDIT ACS(01) LSM(00) PAN(19) ROW(03) COL(01)
SLS0155I Condition code for utility function is 0
```

**Figure 17. Restore Utility Sample Output**

## How to Handle BACKup/REStore Discrepancies

Under abnormal circumstances (CDS mismatch, link down, and so on), the backup operation must be performed periodically. During this operation, discrepancy blocks are generated within the SLSBKUP data set. Then, during the restore process, the discrepant records are formatted into control card statements and output to the SLSAUDIT data set.

After the HSC is reactivated, the statements defining discrepancies are input to SLUADMIN, and AUDIt, UNSCratch, and UNSElect are performed to resolve the discrepancies.

## Scratch Conversion (SLUCONDB) Utility

### Scratch Conversion (SLUCONDB) Utility

The SLUCONDB program generates scratch transactions from CA-1, CA-DYNAM/TLMS, and DFSMSrmm tape management systems, or from a file extracted from a client system by the SMC SMCUDBX utility (refer to the *SMC Configuration and Administration Guide* for more information).

It generates the scratch transactions in a format acceptable to the Scratch Update utility. In addition, the LIBONLY parameter can be coded on the EXEC JCL statement, which scratches the selected volume serial numbers in the HSC CDS using the HSC Programmatic Interface.



**Warning:** The Scratch Update utility should not be executed while the Scratch Conversion utility is running.

#### **Data Space Consideration**

Some installations utilize the IEFUSI exit to limit the size of data spaces in a job. The IEFUSI exit must allow SLUCONDB to either:

- allocate two 1GB data spaces, or
- be modified by the user to create data spaces of a size allowed by IEFUSI, yet large enough to contain the necessary data for SLUCONDB processing.

One data space must be a minimum of 16 times the maximum number of volumes defined in the HSC CDS, for real and virtual volumes, at any given time. The other data space must be a minimum of 16 times the maximum number of volumes defined as “scratch” in the TMS data base at any given time.

### SLUCONDB

SLUCONDB processes the CA-1 Tape Management Catalog (TMC), CA-DYNAM/TLMS VMF, or DFSMSrmm and selects volume serial numbers for processing based on the date parameter(s) specified on the EXEC JCL statement.



**Note:** Volume serial numbers selected are those **not** already in scratch status in the CDS.

If a parameter is NOT specified on the EXEC JCL statement, defaults are assigned. These defaults are described in the Parameters section below.

SLUCONDB calls one of three routines to read either CA-1 TMC (SLUDRCA1), CA-DYNAM/TLMS VMF (SLUDRTLTM), or DFSMSrmm (SLUDRRMM).

SLUCONDB can also be used to read the SMC TMS scratch extract file generated by the SMCUDBX utility. In this mode, SLUCONDB generates scratch transactions **only** for HSC volumes with a “last select time” earlier than the time of the SMCUDBX run.



**Caution:** If you have made any modifications to previous releases of these modules, the StorageTek routines must be modified, reassembled, and linked using the sample provided. New releases can introduce changes in operation.



# Scratch Conversion (SLUCONDB) Utility

## SLUDRCA1

SLUDRCA1 utilizes CA-1 macros to map the layout of the CA-1 TMC. The macro names which map the CA-1 TMC have changed from Release 4.9 to Release 5.0. Both macros are located at the end of this module with the CA-1 Release 4.9 macro as a comment. The version of SLUDRCA1 supplied in SAMPLIB utilizes CA-1 Release 5.0 macro and was assembled using this macro.

If you are using CA-1 Release 4.9 or earlier, you must comment out the Release 5.0 macro, remove the asterisk in column 1 of the Release 4.9 macro, and reassemble this module. Make sure the appropriate CA-1 macro library is used in the assemble SYSLIB concatenation.

If you are running CA-1 Release 5.0 without any local modifications, this module does not need to be reassembled and nothing further must be done to this module. If you have local modifications, you must reassemble this module.

## SLUDRTL

SLUDRTL utilizes a CA-DYNAM/TLMS COPY member to map the layout of the VMF. This module must be re-assembled if you are running TLMS Release 5.4 or if you have local modifications. If you must re-assemble this module, make sure the appropriate CA-DYNAM/TLMS source library is used in the assemble SYSLIB concatenation.

## SLUDRRMM

SLUDRRMM is called to read the DFSMSrmm report extract file if RMM is specified in the EXEC JCL statement. This program utilizes the DFSMSrmm EDGRVEXT macro to map the layout of the extract file. Fields read in the extract file include:

- RVTTYPE (record type)
- RVVOLSER (volser number)
- RVLCDATE (last change date)
- RVNAME (unit type)
- RVSTATUS (volume status)
- RVEXPDT (volume expiration date)
- RVEXPDTO (volume original expiration date)
- RVLABEL (volume label type).

SLUDRRMM processes the extract and passes the volume record information to SLUCONDB, which builds scratch card images to be input to SLUADMIN. Volume scratch status (scratch/nonscratch) is then updated in the CDS for each volume record in the extract file.

Dates on the RMM report must be in Julian date format (EDGHSKP run with PARM 'DATEFORM(J)'). Tapes listed on the RMM report without expiration dates will be skipped by SLUDRRMM.

# Scratch Conversion (SLUCONDB) Utility

## SLUDRSMC

SLUDRSMC is called to read the extract file created by the SMCUDBX utility from a client tape management system. This file includes one record for every scratch volume extracted that contains the volume serial number and the time of the extract run.

During execution, correct scratch synchronization is provided by matching the time (in GMT format) of the scratch extract run with the volume's "last select time." Any volume selected after the scratch selection run is skipped in SLUCONDB processing.

## Link Edit Parameters

The following is an example of the Link Edit control statements to be used for SLUCONDB if user modifications are required.

### Link Edit Control Statements for SLUCONDB

```
//*  
//S000001 EXEC PGM=IEWL,COND=(0,NE),  
// PARM='SIZE=(400K,96K),LIST,XREF,NCAL'  
//SYSPRINT DD SYSOUT=*  
//ASLSLINK DD DISP=SHR,DSN=your.hsc.smp/e.loadlib  
//USEROBJ DD DISP=SHR,DSN=your.user.objlib  
//SYSLMOD DD DISP=SHR,DSN=your.user.loadlib  
//SYSLIN DD *  
INCLUDE ASLSLINK(SLSFLLVT)  
INCLUDE ASLSLINK(SLSXCAL)  
INCLUDE USEROBJ(SLUCONDB)  
ENTRY SLUCONDB  
SETCODE AC(1)  
NAME SLUCONDB(R)  
/*
```

The following is an example of the Link Edit control statements to be used for SLUDRCA1, SLUDRTL, or SLUDRRMM.



**Note:** The SLUDRCA1, SLUDRTL, and SLUDRRMM modules are shared with the MVS/CSC and SMC products. These load modules are distributed in the SMC SMCLINK library during SMP/E installation.

# Scratch Conversion (SLUCONDB) Utility

## Link Edit Statements SLUDRCA1/SLUDRTL/SLUDRRMM

```
/*  
//S000001 EXEC PGM=IEWL,COND=(0,NE),  
//          PARM='SIZE=(400K,96K),LIST,XREF,NCAL'  
//SYSPRINT DD  SYSOUT=*  
//USEROBJ  DD  DISP=SHR,DSN=your.user.objlib  
//SYSLMOD  DD  DISP=SHR,DSN=your.user.loadlib  
//SYSLIN   DD  *  
           INCLUDE USEROBJ(SLUDR___)  
           ENTRY  SLUDR___  
           SETCODE AC(1)  
           NAME   SLUDR___(R)  
/*
```

The following is an example of the assembly and link edit JCL required for SLUCONDB if user modifications are required.

## Assembly and Link Edit JCL for SLUCONDB

```
//SLUCONAS JOB (acctg info),'SLUCONDB',...  
/*  
//ASM      EXEC PGM=ASMA90,PARM='OBJECT,NODECK',REGION=1024K,  
//SYSPRINT DD  SYSOUT=*  
//SYSLIB   DD  DISP=SHR,DSN=SYS1.MACLIB  
//          DD  DISP=SHR,DSN=your.hsc.smp/e.maclib  
//SYSUT1   DD  UNIT=VIO,SPACE=(CYL,(1,1))  
//SYSLIN   DD  DISP=(,PASS),UNIT=SYSDA,SPACE=(TRK,(1,1))  
//SYSIN    DD  DISP=SHR,DSN=slucondb.asm.dataset  
/*  
//LKED     EXEC PGM=IEWL,COND=(0,NE),REGION=1024K,  
//          PARM='SIZE=(400K,96K),LIST,XREF,NCAL'  
//SYSPRINT DD  SYSOUT=*  
//ASLSLINK DD  DISP=SHR,DSN=your.hsc.smp/e.loadlib  
//SYSLMOD  DD  DISP=SHR,DSN=your.user.loadlib  
//SYSLIN   DD  DISP=(OLD,DELETE),DSN=*.ASM.SYSLIN  
//          DD  *  
           INCLUDE ASLSLINK(SLSFLLVT)  
           INCLUDE ASLSLINK(SLSXCAL)  
           ENTRY  SLUCONDB  
           SETCODE AC(1)  
           NAME   SLUCONDB(R)  
/*  
//
```

The following is an example of the assembly and link edit JCL required for SLUDRCA1, SLUDRTL or SLUDRRMM if user modifications are required.

# Scratch Conversion (SLUCONDB) Utility

## Assembly/Link-Edit JCL SLUDRCA1/SLUDRTL/SLUDRRMM

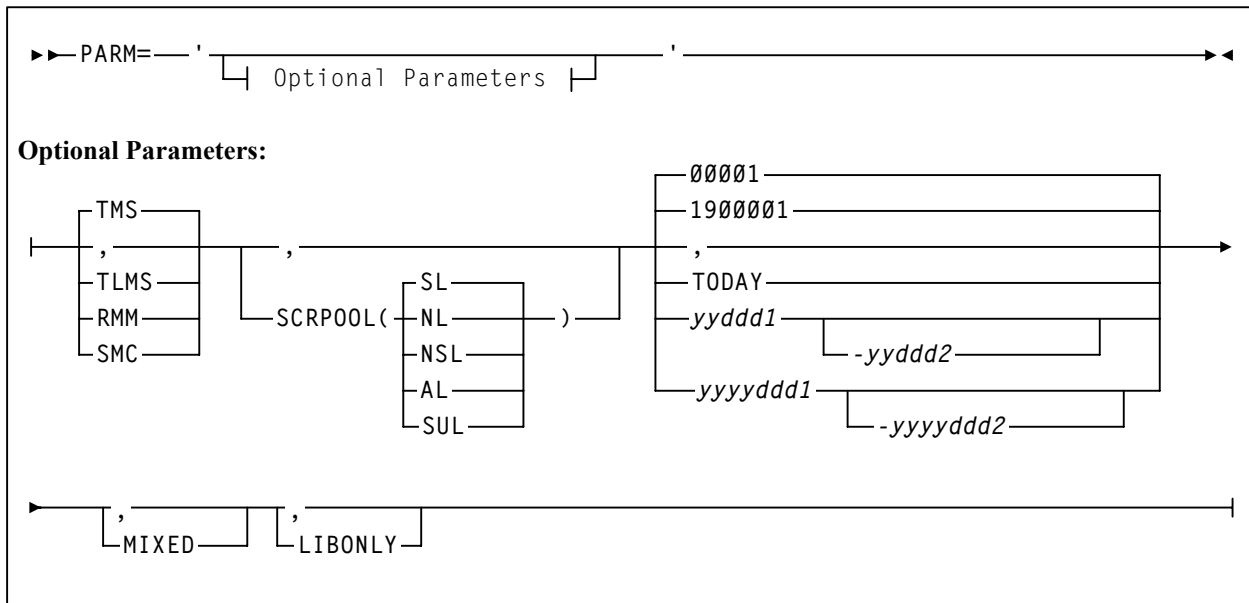
```

//SLUDRASL JOB (acctg info),'SLUDR___',...
//*
//ASM      EXEC PGM=ASMA90,PARM='OBJECT,NODECK',REGION=1024K,
//SYSPRINT DD  SYSOUT=*
//SYSLIB   DD  DISP=SHR,DSN=SYS1.MACLIB
//         DD  DISP=SHR,DSN=your.hsc.smp/e.maclib
//         DD  DISP=SHR,DSN=your.tms.maclib
//SYSUT1   DD  UNIT=VIO,SPACE=(CYL,(1,1))
//SYSLIN   DD  DISP=(,PASS),UNIT=SYSDA,SPACE=(TRK,(1,1))
//SYSIN    DD  DISP=SHR,DSN=sludr___.asm.dataset
//*
//LKED     EXEC PGM=IEWL,COND=(0,NE),REGION=1024K,
//         PARM='SIZE=(400K,96K),LIST,XREF,NCAL'
//SYSPRINT DD  SYSOUT=*
//SYSLMOD  DD  DISP=SHR,DSN=your.user.loadlib
//SYSLIN   DD  DISP=(OLD,DELETE),DSN=*.ASM.SYSLIN
//         DD  *
//         ENTRY SLUDR___
//         SETCODE AC(1)
//         NAME SLUDR___(R)
//
//

```

### Syntax

When running SLUCONDB (for processing the control database), optional PARM values on the EXEC statement in the JCL may be specified. The PARM values are positional. PARM option and values are:



# Scratch Conversion (SLUCONDB) Utility

## Parameters

### PARM=

specifies the parameters that follow can be accessed by the program indicated in the PGM parameter in the JCL.

The defaults for the PARM are:

- TMS
- SL
- all scratches from **January 1, 1900** to the current system date
- uppercase only for TMS-generated reports.

The keywords for the PARM are positional. There are several ways to invoke the defaults.

- If you accept the system defaults, do not specify the PARM. The system takes the defaults.
- Code the PARM as: PARM="" or PARM=',,,,,'

### TMS

specifies the CA-1 tape management system (TMS)

### TLMS

specifies the TLMS: CA-DYNAM/TLMS tape management system

### RMM

specifies the DFSMSrmm tape management system

### SMC

specifies the extract file from the SMC utility SMCUDBX. If SMC is specified, label and date parameters are not permitted. (Label and date selection are performed by the SMC utility when it creates the extract file.)

### SCRPOOL

is the scratch pool label type used by the library. This is required to make sure that the label type matches the label type specified for scratch tape label type specified during LIBGEN (SLILIBRY macro SCRLABL parameter).

The acceptable values for label type are as follows:

#### (SL)

the default, standard label

#### (NL)

nonlabeled

#### (NSL)

nonstandard label.

# Scratch Conversion (SLUCONDB) Utility

(AL)  
ANSI label

(SUL)  
standard user label

## **00001 or 190001**

This is the default for date. It means January 1, 1900.

## **TODAY**

is the current system date. If TODAY is not specified, the only other acceptable date for the range is also the current system date. Therefore, TODAY is usually specified instead of a range.

## *yyddd1 or yyyyddd1*

If a single date is specified, that date becomes the “from” date. The “to” date is the current system date (which is not specified). All specified dates are in Julian notation.

## *yyddd1-yyddd2 or yyyyddd1-yyyyddd2*

specifies the date range in which the volumes became scratch. Neither of these dates can be greater than the current system date.

**Note:** If this keyword is not specified, the system defaults to **January 1, 1900 (00001)**.

## **MIXED**

specifies to print all the headings and messages in mixed case characters (uppercase and lowercase characters).



**Note:** If a comma is specified, or if this keyword is not specified, the system defaults to **uppercase letters**.

## **LIBONLY**

specifies that volumes are to be placed in scratch status through the HSC Programmatic Interface. If this parameter is specified, you can omit the SLUADMIN step that runs the Scratch Update utility from the invoking JCL (refer to “JCL Examples” on page 170). The HSC must be active.



**Note:** If this parameter is specified, the Scratch Conversion utility to be used must reside in an APF-authorized library.

## **JCL Requirements**

The following definitions apply to Scratch Conversion utility JCL to process scratch report files.

### **SLSTMS or DBTMS**

input to the utility in the form of either the CA-1 TMC, CA-DYNAM/TLMS Volume Master File (VMF), or DFSMSrmm report extract file. **This statement is required.**

# Scratch Conversion (SLUCONDB) Utility

## SLSSOUT

output from the utility specifying the Scratch Update utility control statement. **This statement is required.**

If specifying a temporary or permanent data set for 'DSN=' in the JCL, be sure to include the appropriate DCB information (i.e., LRECL=72).

## SLSIN

input to the utility in the form of scratch card images. **This statement is required.**

## SLSPRINT

output messages from the utility program. **This statement is required.**



**Note:** The Scratch Conversion utility uses the Batch API to extract volume and VTV records from the CDS. The Batch API requires read access to the CDS, either from statements in the JCL or by getting the data set information from an active HSC. The SLSCNTL, SLSCNTL2, and SLSSTBY DD statements are optional if an active HSC is running on the same system. Refer to Appendix H, "Batch Application Program Interface (API)".

## SLSCNTL

the primary control data set. **This statement is optional.**

## SLSCNTL2

the secondary control data set. If a secondary CDS exists, it should be specified so that if a switch occurs and the secondary data set is now active, the CDSs can be reordered to maintain database integrity. **This statement is optional.**

## SLSSTBY

the standby control data set. If a standby exists, it should be specified so that if a switch occurs and the standby data set is now active, the CDSs can be reordered to maintain database integrity. **This statement is optional.**

## JCL Examples

In the following examples, specifying **LIBONLY** on the SLUCONDB EXEC statement causes SLUCONDB to directly update the CDS. In this case, you can omit the SLUADMIN job step that runs the Scratch Update utility.

The library referred to as "your.smc.smp/e.loadlib" in the following examples refers to the SMCLINK library generated during the NCS installation containing the TMS extract modules SLUDR\*. If you reassemble these modules as described in "SLUCONDB" on page 260, this library is the output of your link edit.



**Note:** The UNIT, SPACE, and DCB parameter settings are determined by the user.

# Scratch Conversion (SLUCONDB) Utility

## JCL to Process Tape Management Databases (Without CDS DDnames)

```
//JOBSCUP JOB (account),programmer
//*
//STEP1 EXEC PGM=SLUCONDB,
// PARM=('TLMS,SCRPOOL(NL),2002100,MIXED')
//STEPLIB DD DISP=SHR,DSN=your.hsc.smp/e.loadlib
// DD DISP=SHR,DSN=your.smc.smp/e.loadlib
//SLSTMS DD DSN=TMS.MASTER.FILE,DISP=OLD
//SLSSOUT DD DSN=&&SCUPINPT,DISP=(NEW,PASS),UNIT=,SPACE=,DCB=
//SLSPRINT DD SYSOUT=A
//*
//STEP2 EXEC PGM=SLUADMIN,COND=(4,LT,STEP1),PARM=MIXED
//SLSIN DD DSN=&&SCUPINPT,DISP=(OLD,DELETE)
//SLSPRINT DD SYSOUT=A
//
```

## JCL to Process Tape Management Databases (With CDS DDnames)

```
//JOBSCUP JOB (account),programmer
//*
//STEP1 EXEC PGM=SLUCONDB,
// PARM=('TLMS,SCRPOOL(NL),2002100-2002110,MIXED')
//STEPLIB DD DISP=SHR,DSN=your.hsc.smp/e.loadlib
// DD DISP=SHR,DSN=your.smc.smp/e.loadlib
//SLSTMS DD DSN=TMS.MASTER.FILE,DISP=OLD
//SLSSOUT DD DSN=&&SCUPINPT,DISP=(NEW,PASS),UNIT=,SPACE=,DCB=
//SLSPRINT DD SYSOUT=A
//SLSCNTL DD DSN=primary.control.dataset,DISP=SHR
//SLSCNTL2 DD DSN=secondary.control.dataset,DISP=SHR
//SLSSTBY DD DSN=standby.control.dataset,DISP=SHR
//*
//STEP2 EXEC PGM=SLUADMIN,COND=(4,LT,STEP1),PARM=MIXED
//SLSIN DD DSN=&&SCUPINPT,DISP=(OLD,DELETE)
//SLSPRINT DD SYSOUT=A
//
```



# Scratch Conversion (SLUCONDB) Utility

## JCL to Process DFSMSrmm Database

```
//JOBSCUP JOB (account),programmer
//*
//STEP1 EXEC PGM=EDGHSKP,PARM='RPTXT,DATEFORM(J)'
//MESSAGE DD DSN=rmm.message.dataset,DISP=SHR
//REPTXT DD DSN=rmm.report.extract,DISP=SHR
//*
//STEP2 EXEC PGM=SLUCONDB,
// PARM=('RMM,SCRPOOL(SL),2002100-2002110,MIXED')
//STEPLIB DD DISP=SHR,DSN=your.hsc.smp/e.loadlib
// DD DISP=SHR,DSN=your.smc.smp/e.loadlib
//SLSTMS DD DSN=rmm.report.extract,DISP=SHR
//SLSSOUT DD DSN=&&SCUPINPT,DISP=(NEW,PASS),UNIT=,SPACE=,DCB=
//SLSPRINT DD SYSOUT=A
//*
//STEP3 EXEC PGM=SLUADMIN,COND=(4,LT,STEP2),PARM=MIXED
//SLSIN DD DSN=&&SCUPINPT,DISP=(OLD,DELETE)
//SLSPRINT DD SYSOUT=A
//
```

## JCL to Process SMC Extract File

```
//JOBSCUP JOB (account),programmer
//*
//STEP1 EXEC PGM=SLUCONDB,PARM='SMC,,MIXED,LIBONLY'
//STEPLIB DD DISP=SHR,DSN=your.hsc.smp/e.loadlib
// DD DISP=SHR,DSN=your.smc.smp/e.loadlib
//DBTMS DD DISP=SHR,DSN=your.smc.extract.file
//SLSSOUT DD DUMMY
//SLSPRINT DD SYSOUT=A
/*
```

# Scratch Conversion (SLUCONDB) Utility

## Output Description

Output resulting from the execution of the Scratch Conversion utility includes:

- a listing of input commands with appropriate messages when syntax errors occur
- messages associated with error conditions resulting from an unsuccessful attempt to execute scratch conversion processing
- messages indicating errors and/or actions occurring during processing (see Figure 18 and Figure 19 on page 270).
- updated library control data set containing the new scratch lists.

```
StorageTek Automated Library Conversion Utility    Page 001
Time hh:mm:ss                                     Date yyyy-mm-dd

SLS0286I  000008 volumes have been selected
SLS0155I  Condition code for utility function is 0
```

**Figure 18. Scratch Conversion Utility Sample Output - Without LIBONLY**

```
StorageTek Automated Library Conversion Utility    Page 001
Time hh:mm:ss                                     Date yyyy-mm-dd

SLS0167I  Volume 001284 successfully added to library as scratch
SLS0167I  Volume 001294 successfully added to library as scratch
SLS0167I  Volume 001495 successfully added to library as scratch
SLS0167I  Volume 001652 successfully added to library as scratch
SLS0167I  Volume 001673 successfully added to library as scratch
SLS0167I  Volume 001677 successfully added to library as scratch
SLS0167I  Volume 001679 successfully added to library as scratch
SLS0167I  Volume 001680 successfully added to library as scratch
SLS1312I  000008 volumes successfully scratched
SLS0155I  Condition code for utility function is 0
```

**Figure 19. Scratch Conversion Utility Sample Output - With LIBONLY**

## Scratch Redistribution Utility

The Scratch Redistribution utility provides you with a way to balance the number of scratch volumes across the ACS. It permits the redistribution of scratch volumes either:

- among LSMs implied by the specification of an ACS, or
- among the LSMs explicitly identified through an optional parameter.

This utility allows the user to select one media type and recording technique. If specified, scratch volume redistribution will be based on the MEDia and RECtech settings.



**Note:** If neither MEDia nor RECtech is specified, volumes are redistributed without regard to media type or recording technique.

### How the Scratch Redistribution Utility Functions

When only the ACS parameter is specified, the redistribution method transfers cartridges from LSMs with a greater number of scratch volumes to LSMs with a lesser number of scratch volumes. The process is repeated until the number of scratch volumes in each LSM is within the defined scratch tolerance level.

Distribution in an ACS containing a mix of LSMs (4410s, 9310s, 9360s, 9740s) is performed based on a percentage of scratch cartridges in the ACS. That is, the utility causes each LSM to have the same percentage of scratch tapes within the ACS as the LSM has cells within the ACS. For example, in an ACS where a 9310 LSM contains 80 percent of the cells within the ACS, 80 percent of the scratch tapes will reside in the 9310.



**Note:** The SL8500 is a standalone library and cannot be combined with any other LSM type.

After Scratch Redistribution is completed, only the specified LSMs contain scratch cartridges, if the LSM parameter was specified.

Concurrent redistributions among different ACSs are accomplished by multiple executions of this utility program.

Redistribution moves non-scratch cartridges to make space for scratch cartridges. The actual number of scratch cartridges moved may vary depending on the number of free cells and the number of scratch cartridges available.

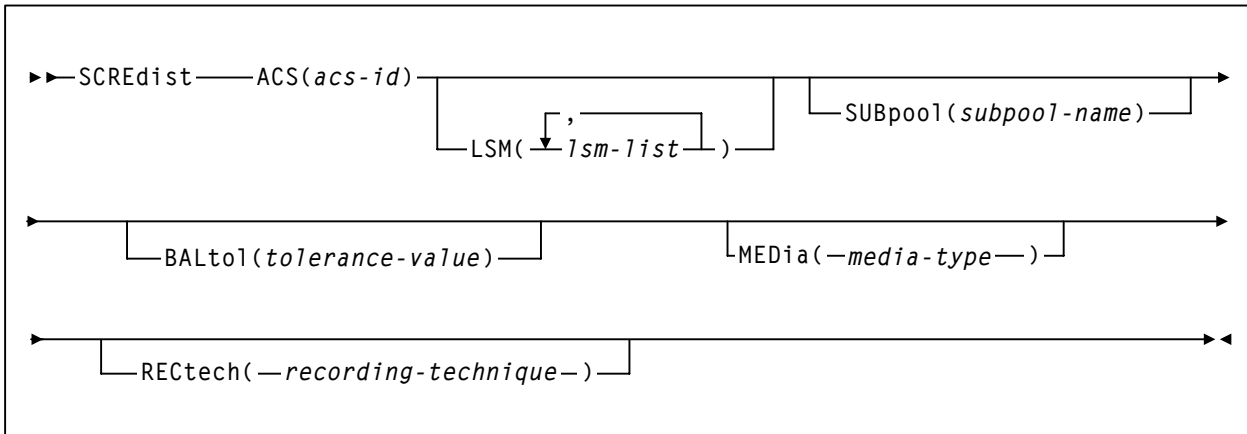


**Notes:**

1. The Scratch Redistribution utility cannot be run concurrently with the Scratch Update utility, or when either the Audit or Initialize Cartridge (with the scratch option) utilities are being run in the same ACS as the Scratch Redistribution utility. An HSC message is generated, and the utility must be resubmitted.
2. Cartridges cannot be transferred to a frozen panel.

# Scratch Redistribution Utility

## Syntax



## Utility Name

### SCREdist

specifies that a scratch redistribution is to be performed.

## Parameters

### ACS

specifies one ACS in the library in which the scratch volumes are to be redistributed.

#### (acs-id)

identifies the ACS. The one or two digit hexadecimal ACS identifier.

### LSM

optionally, specifies that only certain LSMs within an ACS are to contain scratch cartridges (if not specified, scratch volumes are redistributed across all LSMs in the ACS).

#### (lsm-list)

*lsm-list* can be a single LSM or a list of LSMids. An LSMid (*lsm-id*) is made up of the ACSid (hexadecimal 00-FF) and the LSM number (hexadecimal 00-17) separated by a colon (:). An LSM range is not allowed.

The element(s) contained in an *lsm-list* must be enclosed in parentheses; multiple elements must be separated by blanks or commas.

### SUBpool

optionally, specifies the subpool name from which scratch volumes are to be redistributed.

#### (subpool-name)

*subpool-name* identifies the subpool.

# Scratch Redistribution Utility

## **BALtol**

optionally, specifies a balance tolerance value. Scratch volumes are distributed based on this specified value.

### **(tolerance-value)**

*tolerance-value* specifies a percent value that identifies when cartridge redistribution ends. Valid values are 1 through 999, where the values indicate a percentage from .1 to 99.9 (i.e., 1 signifies .1 percent; 999 equals 99.9 percent). **The initial value for the HSC is 1. If *tolerance-value* is not specified in this utility, HSC uses the initial value for scratch redistribution.**

The utility finishes redistributing scratch cartridges when the percentage of scratch tapes in all specified LSMs is within tolerance-value / 2 percentage points of each LSM's percentage of cells in the ACS.

For example, assume an ACS has one 4410 LSM with 5,000 cells, one 9360 (WolfCreek) LSM with 1,000 cells, and 600 total scratch tapes in the ACS. Scratch Redistribution attempts to put 500 scratches in the 4410 and 100 scratches in the 9360.

Entering BALtol(100) specifies a setting of 10 percent, which means that the utility ends when all LSMs are within  $\pm 5$  percent of the expected number of scratches for each LSM (500 for the 4410, 100 for the 9360).

The expected number can be determined as follows:

$$\text{expnumlsm} = \text{totscracs} * \frac{\text{totcellslsm}}{\text{totcellsacs}}$$

where:

### **expnumlsm**

expected number of scratches for each LSM.

### **totscracs**

total number of scratches in the ACS.

### **totcellslsm**

total number of cells in the LSM.

### **totcellsacs**

total number of cells in the ACS.

In the previous example, the 4410 should have a range 470-530 scratches and the 9360 a range of 70-130. To determine the BALtol range BALtol range

# Scratch Redistribution Utility

$$\text{BALtol range} = \text{expnumlsm} \pm \frac{\text{baltol} / 1000 * \text{totscracs}}{2}$$

where:

**BALtol range**

range of balance tolerance value.

**expnumlsm**

expected number of scratches for each LSM (see above).

**baltol**

user-supplied percent value (*tolerance-value*) that specifies when scratch cartridge redistribution ends.

**totscracs**

total number of scratches in the ACS.

**MEDia**

optionally, specifies the type of cartridge to redistribute across the ACS.



**Note:** The SL8500 library supports only the T9840A, T9840B, T9840C, T9940B, and T10000 media types and recording techniques.

***media-type***

identifies the media type. Valid media types are:

**LONGItud**

indicates any Standard or ECART cartridge.

**Standard**

indicates a standard length, 3480 cartridge. It can be read on any longitudinal drives (4480, 4490, 9490, or 9490EE). Data can be written in 36-track mode on a 4490, 9490, or 9490EE transport but cannot be read on an 18-track (4480) drive. Synonyms for this type of cartridge include:

- CST
- MEDIA1
- STD
- 1
- 3480

## **ECART**

indicates a 3490E, extended capacity cartridge. It can be used only on a 36-track drive (4490, 9490, or 9490EE). Synonyms include:

- E
- ECCST
- ETAPE
- Long
- MEDIA2
- 3490E

## **ZCART**

indicates a 3490E, extended capacity cartridge that provides greater storage capacity than an ECART. It can be used only on a 9490EE drive.

ZCART can be abbreviated as Z.

## **DD3**

indicates any DD3A, DD3B, or DD3C (HELical) cartridge. HELical is a synonym for DD3.

## **DD3A, DD3B, DD3C**

indicates a helical cartridge. The media indicator in the external label is encoded with the cartridge type (A, B, or C). DD3A, DD3B, or DD3C can be abbreviated to A, B, or C, respectively.

Types of helical cartridges, along with their associated media capacities, are:

- A — 10GB
- B — 25GB
- C — 50GB.

Data capacity differences between DD3A, DD3B, and DD3C cartridges are related to the length of the tape in the cartridge, not to the recording density of the data.

## **STK1**

indicates any T9840 cartridge.

## **STK1R**

indicates a T9840 cartridge. The media indicator in the external label is encoded with the cartridge type (R). STK1R can be abbreviated to R.

T9840 cartridge media capacities are 20GB (T9840A and T9840B) or 40GB (T9840C).

## **STK2**

indicates any T9940 cartridge.

# Scratch Redistribution Utility

## **STK2P**

indicates a T9940 data cartridge. The media indicator in the external label is encoded with the cartridge type (P). STK2P can be abbreviated to P.

T9940 cartridge media capacities are 60GB (T9940A) or 200GB (T9940B).

## **T10000T1** or **T1**

indicates a full-capacity 500GB T10000 cartridge. **T10000T1** can be abbreviated as **T1**.

## **T10000TS** or **TS**

indicates a smaller-capacity 120GB T10000 cartridge. **T10000TS** can be abbreviated as **TS**.

## **RECtech**

optionally, specifies the method used to record data tracks on the tape surface.



### **Notes:**

1. **The SL8500 library supports only the T9840A, T9840B, T9840C, T9940B, and T10000 media types and recording techniques.**
2. If RECtech is not specified, the next scratch cartridge is selected depending on the MEDIA type that has been specified.



## *recording-technique*

identifies the recording technique. Valid recording techniques are:

### **LONGitud**

indicates any device that uses longitudinal recording.

### **18track**

indicates a 4480 transport.

### **36track**

indicates a 4490, 9490, or 9490EE transport (any device that records in 36-track mode).

### **36Atrack**

indicates a 4490 (Silverton) transport.

### **36Btrack**

indicates a 9490 (Timberline) transport.

### **36Ctrack**

indicates a 9490EE transport.

### **HELical**

indicates a device using helical recording.



# Scratch Redistribution Utility

**DD3**

indicates a device using helical recording.

**STK1R**

indicates any 9840 transport.

**STK1R34**

indicates any 3490E-image 9840 transport.

**STK1R35**

indicates any 3590-image 9840 transport.

**STK1RA**

indicates a 3490E or 3590-image T9840A transport.

**STK1RA34**

indicates a 3490E-image T9840A transport.

**STK1RA35**

indicates a 3590-image T9840A transport.

**STK1RB**

indicates a 3490E or 3590-image T9840B transport.

**STK1RB34**

indicates a 3490E-image T9840B transport.

**STK1RB35**

indicates a 3590-image T9840B transport.

**STK1RAB**

indicates a 3490E or 3590-image T9840A or T9840B transport.

**STK1RAB4**

indicates a 3490E-image T9840A or T9840B transport.

**STK1RAB5**

indicates a 3590E-image T9840A or T9840B transport.

**STK1RC**

indicates a 3490E or 3590-image T9840C transport.

**STK1RC34**

indicates a 3490-image T9840C transport.

**STK1RC35**

indicates a 3590-image T9840C transport.

**STK2P**

indicates any 9940 transport.

# Scratch Redistribution Utility

**STK2P34**

indicates any 3490E-image 9940 transport.

**STK2P35**

indicates any 3590-image 9940 transport.

**STK2PA**

indicates a T9940A transport.

**STK2PA34**

indicates a 3490E-image T9940A transport.

**STK2PA35**

indicates a 3590-image T9940A transport.

**STK2PB**

indicates a T9940B transport.

**STK2PB34**

indicates a 3490E-image T9940B transport.

**STK2PB35**

indicates a 3590-image T9940B transport.

**T1A**

indicates any T10000 transport.

**T1AN**

indicates a non-encryption enabled 3490E- or 3590-image T10000 transport.

**T1A34**

indicates a non-encryption enabled 3490E-image T10000 transport.

**T1A35**

indicates a non-encryption enabled 3590-image T10000 transport.

**T1AE**

indicates an encryption-enabled 3490E- or 3590-image T10000 transport.

**T1AE34**

indicates an encryption-enabled 3490E-image T10000 transport.

**T1AE35**

indicates an encryption-enabled 3590-image T10000 transport.

## JCL Requirements

The following definitions apply to Scratch Redistribution utility JCL:

### SLSPRINT

output messages from the utility.

### SLSIN

input to the utility in the form of control statement card images.

## JCL Examples

The following example shows JCL for redistributing scratch volumes within all LSMs in an ACS.

### JCL to Perform Scratch Redistribution

```
//JOBSCRD   job (account),programmer,TIME=1439
//S1        EXEC PGM=SLUADMIN,PARM=MIXED
//SLSPRINT  DD SYSOUT=A
//SLSIN     DD *
            SCREDIST ACS(01)
/*
//
```

The following example shows JCL for redistributing 36-track scratch volumes within all LSMs in ACS 00.

### JCL to Perform Scratch Redistribution

```
//JOBSCRD   job (account),programmer,TIME=1439
//S1        EXEC PGM=SLUADMIN,PARM=MIXED
//SLSPRINT  DD SYSOUT=A
//SLSIN     DD *
            SCREDIST ACS(00) MEDIA(STD) RECTECH(36)
/*
//
```

## Scratch Redistribution Utilities

The following example shows JCL for redistributing helical DD3A (10GB) scratch volumes within LSM 01 in ACS 01.

### JCL to Perform Scratch Redistribution

```
//JOBSCRD   job (account),programmer,TIME=1439
//S1        EXEC PGM=SLUADMIN,PARM=MIXED
//SLSPRINT  DD SYSOUT=A
//SLSIN     DD *
            SCREDIST ACS(01) LSM(01) MEDIA(DD3A)
/*
//
```

# Scratch Redistribution Utilities

## Output Description

Output occurring from execution of the Scratch Redistribution utility includes:

- updated library control data set reflecting the redistribution of scratch volumes
- messages detailing actions or attempts to provide an even distribution of scratch volumes across LSMs in an ACS (see Figure 20). Scratch Update Utilities

```
SLUADMIN (n.n.n)          StorageTek Automated Cartridge System Utility          PAGE 0001
TIME hh:mm:ss             Control Card Image Listing          DATE yyyy-mm-dd

SCREDIST ACS(00) LSM(03)

SLUADMIN (n.n.n)          StorageTek Automated Cartridge System Utility          PAGE 0002
TIME hh:mm:ss             Scratch Redistribution          DATE yyyy-mm-dd

SLS0244I Scratch Redistribution completed successfully for ACS 00
SLS0155I Condition code for utility function is 0
```

**Figure 20. Scratch Redistribution Utility Sample Output**

# Scratch Update Utilities

## Scratch Update Utilities

Scratch Update utilities provide three basic functions:

- SCRAtch utility — allows you to scratch a volume, a list of volumes, or a range of volumes
- UNSCratch utility — allows you to unscratch a volume, a list of volumes, or a range of volumes. The entire scratch list in the library control data set can be deleted by using the UNSCratch utility.
- REPLace utility — allows you to clear the entire scratch list and then add a volume, a list of volumes, or a range of volumes to the scratch list(s) in the library control data set. When using the Replace utility, additions to the scratch list(s) are made **after an initial clearing of the scratch list(s)**.



**Caution:** The maximum length of a control statement is 32,767 characters. Exceeding this limit causes message SLS0241I to be displayed, which indicates an invalid utility control statement.

### Output Options - SLUADMIN

In addition to plain text, SLUADMIN supports output types added through Unified User Interface (UI) requests. Refer to “SLUADMIN Output” on page 144 or the *NCS/VTCS XML Guide* for more information.

### Syntax

```
▶▶ SCRAtch—VOLser(—vol-list—)—————▶▶
```

```
▶▶ UNSCratch—VOLser(—vol-list—)—————▶▶
```

```
▶▶ REPLacea11—————▶▶  
    VOLser(—vol-list—)
```

## Utility Names

### **SCRAtch**

specifies that scratch list additions are to be made in the library control data set.

### **UNSCratch**

specifies that scratch list deletions are to be made in the library control data set.

### **REPLaceall**

specifies that all scratch lists in the control data sets are to be cleared.

## Parameters

### **VOLser**

specifies the list of volume serial numbers to be added, deleted, or replaced in the scratch list(s).

#### *(vol-list)*

vol-list specifies the volume serial numbers; this can be a single volume, a list of volume serial numbers, ranges of volume serial numbers, or combinations of lists with ranges delimited by commas. The entire list must be enclosed in parentheses.

## JCL Requirements

The following definitions apply to the Scratch Update utilities JCL:

### **SLSPRINT**

output from the utility program.

### **SLSIN**

input to the utility in the form of control cards.

## JCL Example

The following example shows JCL for scratching cartridges and the alternatives of unscratching cartridges or clearing the scratch lists in the control data set.



**Note:** For REPLaceall, if the scratch pool size is large, specify TIME=1440 on the JOB-STEP statement. The time required to clear the entire scratch list may exceed the Job Wait Time (JWT in SMSPRMxx in SYS1.PARMLIB) specified for the system, which results in a system abend.

# Scratch Update Utilities

## JCL to Scratch, Unscratch, and Replace

```
//JOBSCUP   job (account),programmer
//S1        EXEC PGM=SLUADMIN,PARM=MIXED
//SLSPRINT  DD SYSOUT=A
//SLSIN     DD *
            SCRATCH VOLSER(102412,102414,VACANT)
            UNSCRATCH VOLSER(A1B1C1,A1B1C2,A1B1C3,A1B1C4)
            REPLACEALL VOLSER(A1B1C1-A1B1C4)
/*
//
```



## Output Description

Output resulting from the execution of the Scratch Update utilities includes:

- a listing of input commands with appropriate messages when syntax errors occur
- messages indicating any errors encountered during execution of the utility (see Figure 21)
- messages indicating successful scratching or unscratching of specific volumes
- an update to the library control data set reflecting volumes added to or deleted from the scratch lists, or that scratch lists have been cleared or replaced.

```
SLUADMIN (n.n.n)          StorageTek Automated Cartridge System Utility          PAGE 0001
TIME hh:mm:ss            Control Card Image Listing                DATE yyyy-mm-dd

SCRATCH VOL(102412,102414)

SLUADMIN (n.n.n)          StorageTek Automated Cartridge System Utility          PAGE 0002
TIME hh:mm:ss            Scratch Update                        DATE yyyy-mm-dd

SLS0167I Volume 102412 successfully added to library as scratch
SLS0164I Volume 102414 already defined in library as scratch
SLS0155I Condition code for utility function is 4
```

**Figure 21. Scratch Update Utilities Sample Output**

## SET Utility

## SET Utility

The SET utility allows you to change certain library configuration information without performing a library reconfiguration. The utility performs operations directly on the control data set.

In many cases, SET may be run with an active HSC. However, with the exception of the two SET options below, **changes made are not effective until the HSC has been brought down and then reactivated.**

Exceptions include:

- SET FREEZE(ON|OFF), where frozen or unfrozen panels or LSMs are recognized immediately by all active HSCs
- SET NEWHOST(*newhost*), where the new host will be ready to be brought online to the HSC.

In other cases, the SET function requires that the HSC on a specific system be shut down, or that all HSCs be shut down. This means that the heartbeat record indicates that the host is not active, which can be achieved via the MSP STOP (P) command. Table 15 shows whether affected HSCs and all other HSCs can be active for each SET option. Further information can be found in each individual option description.

**Table 15. HSC State to Run SET Options**

SET Option	Affected HSCs	All Other HSCs
ACSDRV	Down	Active
CLNPRFX	Down	Down
COMPRFX	Active	Active
DELDISP	Active	Active
DRVHOST	Active	Active
EJCTPAS	Active	Active
FREEZE	Active	Active
HOSTID	Down	Active
HSCLEVEL	Down	Active
MAJNAME	Down	Down
NEWHOST	Active	Active
NNLBDRV	Down	Active
SCRLABL	Active	Active
SLIDRIVS	Down *	Down *
SLISTATN	Active	Active
SMF	Active	Active
TCHNIQE	Down	Down

\* In some cases, the SLIDRIVS parameter can be run effectively with the HSC active. Refer to “Running SET SLIDRIVS With the HSC Active” on page 302 for more details.

If a host has abended, the active flag is left on. If the host cannot be restarted and ended normally, use the SET HSCLEVEL utility to reset the active flag.

## How the SET Utility Functions

One of the facilities provided by the SET utility is to change the RESERVE QNAME that was defined during LIBGEN and stored in the CDS. The RESERVE QNAME is used by the HSC and utilities running on each host to ensure that access to the CDS is serialized. The SET utility and HSC use an additional StorageTek-defined RESERVE QNAME to maintain serialization while the customer-defined RESERVE QNAME is being changed.

The SET utility issues two RESERVEs against the CDS prior to an update, consisting of:

- a RESERVE with the StorageTek-defined QNAME “STKENQNM”

## SET Utility

- a RESERVE using the existing customer-defined QNAME (or the default value of “STKALSQN”).

When the HSC is started on any host, it initially serializes on the CDS using the StorageTek-defined QNAME. This prevents the HSC from being started while the customer-defined QNAME is potentially in the process of being changed. If this is successful (no SET utility in progress), the customer-defined QNAME is read from the CDS and is used for future serialization requests.

The SET utility does not perform changes that require the structure of the database to be changed. This includes changing the following:

- number of ACSs
- number of LSMs
- panel types.

### Considerations Before Running the SET Utility

It is advisable to back up the CDS before running the utility. Note that this utility does not update the journals. After running the utility, a backup should be performed. Otherwise, a restore removes the changes made, and the SET utility must be rerun.

This utility does not in any way change the LIBGEN macros and does not update the journals. Either manually edit the LIBGEN macros to change them to match the SET changes or run the Database Decompile utility to create a new LIBGEN database (refer to “Database Decompile (LIBGEN) Utility” on page 187).

Access to the SET function can be restricted by password protecting the HSC CDSs, or by using RACF or functionally equivalent product to restrict access to the CDS.

Before running this utility, ensure that the SLUADMIN program resides in an APF-authorized library. The SET function can be invoked only when SLUADMIN is invoked APF authorized, key 0 through 7, or supervisor state. The load module invoked by SET is SLUSET. Restricting access to this module restricts access to the SET function.

## Summary of SET Utility Options

Table 16 provides a summary of the options available for the SET utility.



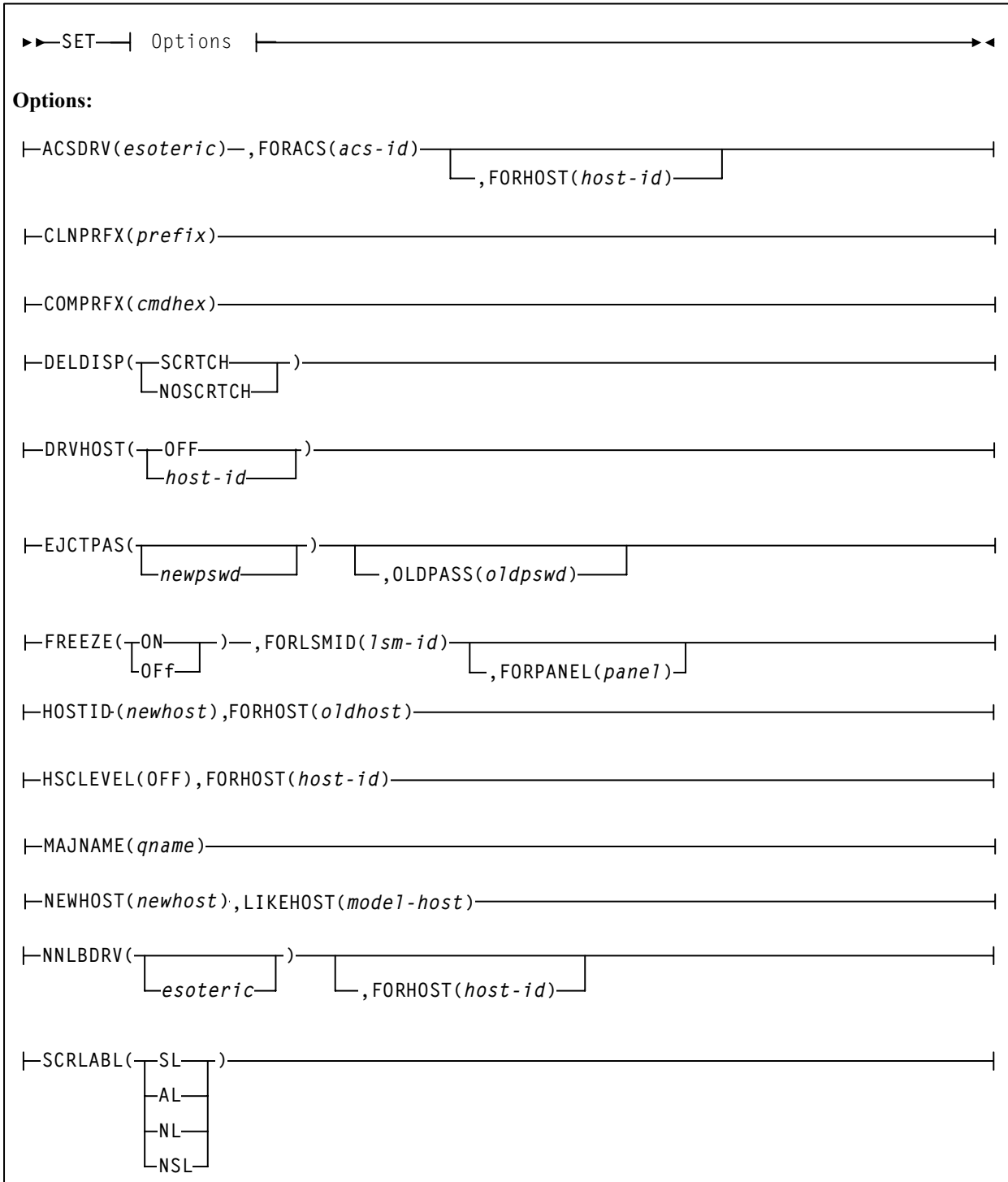
**Note:** You can enter only one option in each SET statement. However, you can specify multiple SET statements within a single execution of the utility. Refer to “JCL Examples” on page 170 for an example showing multiple SET statements.

**Table 16. SET Utility Options**

SET Option	SET Utility Function and Location of Description
ACSDRV	“SET ACS Esoteric” on page 291
CLNPRFX	“SET Cleaning Prefix” on page 292
COMPRFX	“SET HSC Command Prefix” on page 292
DELDISP	“SET Delete Disposition” on page 294
DRVHOST	“SET Drive Host” on page 295
EJCTPAS	“SET Eject Password” on page 295
HOSTID	“SET Host ID” on page 297
HSCLEVEL	“SET HSC Level” on page 298
MAJNAME	“SET ENQ/DEQ/RESERVE QNAME” on page 298
NEWHOST	“SET New Host” on page 299
NNLBDRV	“SET Nonlibrary Drive Esoteric” on page 299
SCRLABL	“SET Scratch Label Type” on page 300
SLIDRIVS	“SET Device Numbers for Drives” on page 300
SLISTATN	“SET LMU Station Address Numbers” on page 303
SMF	“SET SMF Record Type” on page 304
TCHNIQE	“SET Recovery Technique” on page 304

# SET Utility

## Syntax



This syntax diagram is continued on the next page.

## Syntax (continued)



### Utility Name

#### SET

specifies that the SET function is to be invoked.

### Parameters

#### SET ACS Esoteric

##### ACSDRV

specifies that the esoteric for the specified ACS is to be changed. The change does not take effect until the relevant HSC(s) are recycled.

##### (esoteric)

specifies a 1- to 8-character esoteric that represents all of the drives in the specified ACS.

##### FORACS

specifies that the operation is being restricted to a specific ACS.

# SET Utility

*(acs-id)*

specifies the ACSid whose esoteric is being changed.

## FORHOST

specifies that the operation is being restricted to a specific host. Only the specified hosts' esoteric is set. If omitted, the esoterics for all hosts are changed.

*(host-id)*

specifies the 1- to 8-character host ID for the host to which the operation is restricted.

## SET Cleaning Prefix

### CLNPRFX

specifies that the cleaning prefix is to be set. This parameter requires that the HSC on all systems be shut down before changing the cleaning prefix.

*(prefix)*

specifies a 3-character prefix for the cleaning cartridges. Valid characters are A-Z, 0-9, \$, #, and @.

## SET CLNPRFX Procedure

Follow this procedure to change a cleaning cartridge prefix:

1. Eject **all** cleaning cartridges from **all** ACSs. The HSC records information about cleaning cartridges in the CDS.
2. Terminate the HSC on all hosts.
3. Change the cleaning prefix using SET CLNPRFX.
4. Initialize the HSC on any desired hosts.
5. Enter new cleaning cartridges identified with the new prefix into all ACSs.



**Note:** It is preferable to enter new cleaning cartridges because a cartridge's select count is set to zero when it is ejected and reentered. The select count tracks the number of times a cleaning cartridge has been used.

## SET HSC Command Prefix

### COMPRFX

specifies that the HSC command prefix is to be set. HSCs that were brought up before using this function still use the old command prefix. HSCs that are brought up after the function use the new command prefix.

*(cmdhex)*

specifies the 2-character hexadecimal code of the command prefix. Do not choose a value that conflicts with values assigned to other subsystems. The characters associated with each code are shown in Table 17 on page 293.



**Notes:**

1. Ensure that the prefix character used does not conflict with any of the following:
  - another subsystem's command prefix character (such as "\$" for JES or ";" the delimiter for TSS PFD).
  - a JES line editing character as specified in the JES installation statements or default. For JES the initialization statement is CONDEF. Descriptions of these statements and default values can be found in the appropriate JES *Initialization and Tuning Guide*.
2. If you are running the HSC on a VM host that shares the CDS with an HSC running on MSP, make sure that your command prefix character does not conflict with any of the VM facilities, such as the CP line editing symbol.

**Table 17. Mapping of Command Prefix Codes to Characters**

Hex	Character	Description
40	null	blank
4A	¢	cent
4B	.	period
4C	<	less than
4D	(	left parenthesis
4E	+	plus
4F		vertical bar
50	&	ampersand
5A	!	exclamation point
5B	\$	dollar sign
5C	*	asterisk
5D	)	right parenthesis
5E	;	semicolon
5F	¬	not symbol
60	-	minus
61	/	slash
6B	,	comma
6C	%	percent
6D	_	underscore
6E	>	greater than
6F	?	question mark

**Table 17. Mapping of Command Prefix Codes to Characters**

Hex	Character	Description
7A	:	colon
7B	#	crosshatch
7C	@	at sign
7E	=	equals sign
7F	“	double quote

**Note:** If you specify a null command prefix (hex 40), you must use the MSP MODIFY command to perform any HSC operator command.  
 Example: F SLS0 MOUNT EDU050,B30  
 where:  
**F** an abbreviation for the MSP MODIFY command  
**SLS0** an HSC subsystem  
**MOUNT** an HSC operator command  
**EDU050** a VOLSER ID  
**B30** a designated tape drive

## SET Delete Disposition

### DELDISP

specifies that the delete disposition parameter is to be set. The delete disposition parameter controls how the HSC interprets the delete disposition on a dismount message. HSCs that were brought up before using this function still use the old delete disposition. HSCs that are brought up after the function use the new disposition.



**Note:** This parameter is used only by SMC 6.0 clients. In SMC 6.2, the MOUNTDEF command replaces DELDISP. Refer to the *SMC Configuration and Administration Guide* for information about MOUNTDEF.

### (SCRATCH)

specifies that the volume is to be placed in the scratch pool when the operating system indicates delete disposition.

### (NOSCRATCH)

specifies that delete disposition is to be ignored. Because CA-1(TMS) and CA-DYNAM/TLMS provide a grace period, users of these products should specify NOSCRATCH.

## SET Drive Host

### DRVHOST

specifies to allow all SMC client systems to use device addresses defined in the SMC DRIVEMAP command to influence allocation and request mounts and dismounts. Refer to the *SMC Configuration and Administration Guide* for more information about DRIVEMAP.

### OFF

indicates that each HSC reports device addresses to SMC clients based on drives defined for that host in the HSC SLILIBRY LIBGEN macro.

### *hostid*

indicates one of the host names defined in the CDS.

## SET Eject Password

### EJCTPAS

specifies that the eject password is to be set. HSCs that were brought up before using this function still use the old password. HSCs that are brought up after the function use the new password.

### *(newpswd)*

specifies a 1- to 8-character eject password. The new password must be alphanumeric: A-Z (capital letters only) and 0-9. If newpswd is omitted, eject password checking is disabled. Note that the newpswd will not be displayed on SLSPRINT.

### OLDPASS

specifies that the old eject password is being specified. The old password must be specified to change or delete a password. To delete an old password, omit it from the syntax, i.e., OLDPASS(). If there is not currently an eject password, this parameter can be omitted.

### *(oldpswd)*

specifies the 1-to 8-character old eject password. Note that oldpswd is not displayed on SLSPRINT.

# SET Utility

## SET Freeze

### FREEZE

specifies to disallow (freeze) or allow (unfreeze) additional cartridges to be stored on a panel or LSM.



#### Notes:

- If frozen panels already exist in an LSM, and then you freeze the entire LSM, **all** panels will be unfrozen when you unfreeze the LSM.

If you want some panels to remain frozen after unfreezing the entire LSM, you can add `SET FREEZE ON FORLSMID FORPANEL` statements to the same `SLUADMIN JOBSTEP`.

- When an LSM is frozen, no new cell allocations occur. However, any cartridge from the frozen LSM that is currently mounted on a drive will return to its home cell.
- Frozen or unfrozen panels and LSMs are recognized immediately by all active HSCs. It is not necessary to stop and reinitialize active HSCs to detect changes made by `SET FREEZE`.
- On a frozen panel, if a panel type is changed by running the `MERGEcds` or Reconfiguration utility, the new panel is not frozen. If the panel type **did not** change, the panel remains frozen after a merge or reconfiguration.

### ON

specifies to freeze a panel or LSM, which prevents additional cartridges from being moved to it. This restriction includes allocating new cartridge locations on a panel or LSM as a result of:

- a `MOVE` command, utility, or `PGMI` request
- cartridge entry into the ACS
- float, scratch dismount, or scratch redistribution processing.

If a cartridge on a frozen panel is selected (e.g., through a mount request), it may be returned to its home cell on the frozen panel after fulfilling the request.

Cartridges already located on a frozen panel or LSM must be deliberately moved off using the `MOVE` command, utility, or `PGMI` request, or cartridges can be ejected by running the `EJECT` command or `EJECT` utility.

### OFF

specifies to unfreeze a panel or LSM, which allows additional cartridges to be moved to it.

## FORLSMID

specifies that the operation is being restricted to a specific panel or LSM.

### *(lsm\_id)*

indicates the LSMid (*AA:LL*) of the LSM being frozen or unfrozen. An LSMid (*lsm-id*) is made up of the ACSid (hexadecimal 00-FF) and the LSM number (hexadecimal 00-17) separated by a colon (:).

## FORPANEL

optionally, specifies that the operation is being restricted to a specific panel.

### *(panel)*

indicates the 2-digit ID of the panel to be frozen or unfrozen. The specified panel must be an existing drive panel in the LSM.

## SET Host ID

### HOSTID

specifies that the old host ID is being changed to a new name.

#### *(newhost)*

specifies a 1- to 8-character host ID which also serves as the SMF system ID for JES. *newhost* cannot already be defined in the CDS.

### FORHOST

specifies the old host ID.

#### *(oldhost)*

specifies a 1-to 8-character host ID. This host must not be marked active in the CDS. An HSC can be down but still marked active. SET HOSTID would fail to run. To be marked inactive, the HSC, in the host that is down, must be brought up and then shut down. Also, another host could perform cross-host recovery on the HSC that is down, but marked active. Either of these change the status in the CDS of the down HSC from active to inactive. See “SET HSC Level” for information about resetting operating flags.



**Note:** You must delimit the HOSTID (*newhost* or *oldhost*) with quotes when this ID is in lower case.

# SET Utility

## SET HSC Level

### HSCLEVEL

specifies that the HSC active and release level indicators are to be cleared for the designated host.



**Note:** If used, HSCLEVEL should be performed **only when the host designated in *host-id* is inactive.**

These indicators remain set after an abrupt termination of the HSC has occurred (e.g., a cancellation of the HSC or a crash of the operating system).

### (OFF)

specifies that the HSC active and HSC release level indicators for the designated host are to be cleared.

### FORHOST

specifies that the active indicators are to be cleared for the designated host.

### (*host-id*)

specifies the 1- to 8-character host ID of the host to which the operation is restricted.



**Note:** StorageTek recommends the following alternatives to executing SET HSCLEVEL because they reset the HSC indicators and recover resources owned by the failing host:

- Restart the HSC on the host.
- Enter the RECOVER *host-id* FORCE operator command.

## SET ENQ/DEQ/RESERVE QNAME

### MAJNAME

specifies that the ENQ/DEQ/RESERVE QNAME is to be set. This parameter requires that the HSC on all systems be shut down before changing the QNAME.

### (*qname*)

specifies a 1- to 8-character QNAME. The QNAME is blank padded on the right. The name should conform to the requirements for a QNAME. If any hosts are MSP hosts, to prevent conflicts with the operating system, the QNAME should not start with “SYSA” through “SYSZ.” Since the HSC is authorized, the “SYSA” through “SYSZ” names would be allowed, but deadlock may result.

## SET New Host

### NEWHOST

specifies that a new host is to be added. The new host to be added cannot exceed the maximum limitation of 16 hosts.

#### *(newhost)*

specifies a 1- to 8-character host ID which also serves as the SMF system ID for JES. *newhost* cannot already be defined in the CDS.



**Note:** You must delimit the HOSTID with quotes when this ID is in lower case.

### LIKEHOST

specifies that an existing configuration, as currently defined in the LIBGEN, is to be used for the new host. Settings used include:

- SLILIBRY>NNLBDRV (nonlibrary drive esoteric)
- SLIACS ACSDRV (ACS drive esoteric)
- SLISTATN ADDRESS (ACS 3270 station addresses)
- SLIDRIVS ADDRESS (drive addresses).

#### *(model-host)*

specifies a 1- to 8-character host ID.

## SET Nonlibrary Drive Esoteric

### NNLBDRV

specifies that the nonlibrary drive esoteric is being set. The change does not take effect until the relevant HSC(s) is(are) recycled. A relevant HSC is one that resides in the host specified in FORHOST. If FORHOST is omitted, all HSCs are relevant because the operation is not restricted to a specific host.



**Note:** This parameter is no longer used in HSC or SMC allocation processing.

#### *(esoteric)*

specifies a 1-to 8-character esoteric. If the value is omitted, this means that there are no nonlibrary drives installed.

### FORHOST

specifies that the operation is being restricted to a specific host. Only the specified hosts' nonlibrary drive esoteric is to be set. If omitted, the nonlibrary esoterics for all hosts are to be changed.

#### *(host-id)*

specifies the 1- to 8-character host ID of the host to which the operation is restricted.

# SET Utility

## SET Scratch Label Type

### SCRLABL

specifies the scratch label type is to be set. To add to the scratch pool, the REPLaceall function is run before the Scratch Update utility. Otherwise, the scratch update utility should be run to update the scratch pools after using this function.

### (SL)

specifies that nonspecific requests for standard-labeled tapes are to be automated.

### (AL)

specifies that nonspecific requests for ANSI-labeled tapes are to be automated.

### (NL)

specifies that nonspecific requests for nonlabeled tapes are to be automated.

### (NSL)

specifies that nonspecific requests for nonstandard labeled tapes are to be automated.

## SET Device Numbers for Drives

### SLIDRIVS

specifies that the device numbers for the drives in a particular panel are being changed or added. The change does not take effect until the affected HSC(s) is recycled. Refer to “Running SET SLIDRIVS With the HSC Active” on page 302 for more information.

### *(addr0,...addr19)*

specifies the device numbers for the panel. The numbers are from the top of the panel down. If a device number is omitted, this means that the host cannot access a drive in that particular position in the panel, or the drive does not exist.



### Notes:

1. Blanks as well as commas may be used to separate the drive specifications.
2. The total number of drives specified (including comma placeholders) must be 4, 10, 16 (for an SL8500), or 20. You cannot specify 20-drive panels on 9740 (TimberWolf) LSMs or SL8500 (StreamLine) libraries.

10-drive and 20-drive panels cannot be specified on 4410 LSMs.

3. Before this utility can be executed, all cells in the panel must be empty if the user is moving to or from a 20-drive panel configuration.
4. The user can change a drive panel between a 4- or 10-drive panel (normal) and a 20-drive panel (wide) without running a reconfiguration. Affected panels must be empty and no cells in the panels can be allocated to cartridges.



To ensure that drive panels being changed from normal to wide configurations (or vice versa) remain empty, freeze them with the SET FREEZE utility. Then, move all cartridges to other panels or LSMs.

If a panel type is changed by SET SLIDRIVS, the new panel will not be frozen. Frozen panels whose panel type did **not** change remain frozen after SET SLIDRIVS.

5. HSC does not allow duplicate addresses for drives.

If it becomes necessary to exchange the drive addresses on one panel with the drive addresses on another panel, the addresses on one of the panels must first be changed to temporary addresses that are not currently defined. For example:

```
LSM0, PANEL10, ADDRESSES-400,401,402,403
LSM1, PANEL11, ADDRESSES-404,405,406,407
```

If the 400-403 addresses are to be moved to LSM1 and 404-407 are to be moved to LSM0, the SET utility must first be run to change the LSM0 addresses (400-403) to 900-903 (or some other addresses that are not currently defined). The SET utility is then run to change the LSM1 addresses to 400-403. The utility is run a third time to change the temporary LSM0 addresses (900-903) to 404-407.

6. On all LSMs, drives are defined to the HSC from top to bottom, with *addr0* representing the topmost drive and *addrn* the bottommost drive.

However, on a 9740 10-drive panel LSM, the drives are populated and configured to the 9740 LSM from bottom to top. (9740 4-drive panels are configured to the 9740 LSM from top to bottom, as are all other LSM drive panels.)

An example showing how to define a 9740 10-drive panel containing five 9840 drives is:

```
SET SLIDRIVS( , , , , BD4, BD3, BD2, BD1, BD0 ), FORLSMID(lsm-id),
FORPANEL(panel)
```

## FORLSMID

specifies that the operation is being restricted to a specific LSM.

### *(lsm-id)*

specifies the LSMid (*AA:LL*) containing the drive panel whose addresses are being changed. An LSMid (*lsm-id*) is made up of the ACSid (hexadecimal 00-FF) and the LSM number (hexadecimal 00-17) separated by a colon (:).

## FORPANEL

specifies that the operation is being restricted to a specific panel.

*(panel)*

specifies the 2-digit ID of the panel containing the drives whose addresses are being changed.



**Note:** The specified panel must be an existing drive panel in the LSM.

## FORHOST

specifies that the operation is being restricted to a specific host. Only the specified hosts' drive device numbers are set. If omitted, the device numbers for all hosts are changed.



**Note:** The number of drive positions for a specific host must equal the number of drive positions defined globally (issuing SET SLIDRIVS without the FORHOST parameter).

*(host-id)*

specifies the 1- to 8-character host ID of the host, to which the operation is restricted.

## Running SET SLIDRIVS With the HSC Active

Ideally, the HSC should be shut down on all hosts when you specify this parameter. In some cases, however, the HSC can be left active without causing adverse results. Table 18 defines options for running SET SLIDRIVS.

**Table 18. HSC State/SET SLIDRIVS Operation**

HSC State	Effect on SET SLIDRIVS
Down	If the HSC is down on all hosts, the HSC recognizes all new drive locations when it is initialized.
Active	The HSC can be up on all hosts only if <i>new drives are being added at new drive locations</i> . The HSC recognizes the new drive locations when it is recycled on a host.
Active	If unit addresses are changed or deleted for an <i>existing drive location</i> , either <ul style="list-style-type: none"><li>the affected LSM must be offline until the HSC has been recycled on all hosts, or</li><li>the affected ACS must be offline to all affected hosts that access an HSC that has not been recycled.</li></ul>

## SET SLIDRIVS Procedure

The following procedure shows one method for changing unit addresses with the HSC active.

- For one host:
  1. Modify the affected LSM offline (MODify *lsm-id* OFFline). The LSM will be offline to all hosts.
  2. Use SET SLIDRIVS to update the CDS drive records while the StorageTek CSE(s) is making the hardware changes.
  3. Recycle the HSC on one host.
  4. Vary the affected ACS offline (Vary ACS(*acs-id*) OFFline) on all hosts running an HSC that has not been recycled.
  5. Modify the affected LSM online (MODify *lsm-id* ONline). The LSM will be online to all hosts where the ACS is online.



**Note:** Only hosts that are online to the ACS and running a recycled HSC will mount to drives connected to this LSM.

- For the remaining hosts, recycle the HSC, and the affected ACS will come up.

## SET LMU Station Address Numbers

### SLISTATN

specifies that the LMU station addresses are to be set. The change does not take effect until the affected HSC(s) is recycled. An affected HSC is one that resides in the host specified in FORHOST. If FORHOST is omitted, all HSCs are relevant because the operation is not restricted to a specific host.

#### *(stat1,...,stat16)*

specifies the LMU station addresses associated with a particular ACS. No station addresses are required. Up to 16 can be specified, separated by commas.



#### **Notes:**

1. When adding one or more station addresses to an existing list of stations, you must specify all old stations as well as new ones. Any stations (for this ACS and Host ID) not specified here will be deleted and no longer available for use.
2. To remove station addresses for an ACS or host, do not specify station addresses following the SLISTATN parameter. For example,

```
SET SLISTATN( ), FORACS(01), FORHOST(HSCA)
```

# SET Utility

## FORACS

specifies the ACS for which station addresses are being changed.

### *(acs-id)*

specifies the ACSid whose stations are being changed (00 - FF).

## FORHOST

specifies that the operation is being restricted to a specific host. Only the specified hosts' stations are set. If omitted, the stations for all hosts are changed.

### *(host-id)*

specifies the 1- to 8-character host ID for the host to which the operation is restricted.

## SET SMF Record Type

### SMF

specifies that the SMF record type used by the HSC is to be set. Until the HSC is brought down and back up on all CPUs, the Activities Report utility produces incorrect results. This is because some HSCs are writing records with the old SMF record type, and some with the new record type.

### *(libtype)*

specifies the SMF record type. The range is from 0 to 255, inclusive. Since 128 through 255 are for user-defined records, it is recommended that a number from 128 through 255 be chosen, and that the number does not conflict with other user-defined record types.

## SET Recovery Technique

### TCHNIQE

specifies that the control data set recovery technique is to be set. This SET utility replaces the recovery technique that is currently defined in the CDS. Refer to "SLIRCVRY Macro" in the *HSC/MSP Configuration Guide* for a complete description of the LIBGEN SLIRCVRY macro. A recovery technique value must be specified; there is no default value.

### NONE

specifies no form of recovery is used for the control data set. Thus, the primary control data set must be rebuilt, if inaccessible.

### JOURNAL

specifies that there is to be only one primary control data set and that journals are kept. These data sets are to be used for recovery purposes.

The journals contain a record of all transactions that update the control data set. There are two journals per host. It is recommended that they are placed on separate HDAs from the primary control data set DASD volume.

## **SHADOW**

specifies that there is to be two distinct copies of the control data set (primary and secondary) for recovery purposes. It is recommended that these data sets reside on separate HDAs and separate strings. A journal is not recorded.

## **BOTH**

specifies that two distinct copies of the control data set (primary and secondary) and journals are specified for recovery purposes. **The default is BOTH.**

## **STANDBY**

specifies that primary, secondary, and standby control data sets are to be recorded for recovery purposes. No journals are recorded during HSC operation.

## **ALL**

specifies that all control data sets (primary, secondary, and standby) and journals are to be kept and available for recovery purposes.

## **SET TCHNIQE Procedure**

Use the following procedure to invoke the TCHNIQE utility and to set the appropriate recovery technique value:

1. ALLOCATE, based on existing CDS definitions, any new CDS copies that will be needed for the subsequent SET recovery technique.
2. Stop the HSCs on all hosts configured to use the CDS you are intending to update with SET recovery technique.
3. Run the BACKup utility.
4. Run the RESTore utility to restore all CDS copies required to support the current recovery technique. If the recovery technique update in the following step requires new CDS copies, then include them in this restore.
5. Run the SET utility with the appropriate recovery technique value. It is important to note that the SET utility for this recovery technique update must include DD statements for all CDS copies defined in either the old or the new recovery technique.
6. Run the BACKup utility again. This backup provides you with the ability to restore the updated CDS.

## **JCL Requirements**

The following definitions apply to the JCL for SET utilities:

### **SLSPRINT**

output messages from the utility program.

### **SLSCNTL**

the primary control data set. A primary control data set is required.

# SET Utility

## **SLSCNTL2**

the secondary control data set. This statement is used only if you have configured and initiated a secondary control data set for your installation. A secondary control data set is optional, but highly recommended.

## **SLSSTBY**

the standby control data set. This statement is used only if you have configured and initiated a standby control data set for your installation.

## **SLSIN**

input to the utility in the form of control cards.

## JCL Examples

The following example shows basic JCL that is required for executing the SET utility. Statements that represent individual utility functions are included in the JCL, as you deem necessary, to comprise the HSC configuration that you want to invoke.

### JCL for Set Utility

```
//JOBSET    job (account),programmer
//S1        EXEC PGM=SLUADMIN,PARM=MIXED
//SLSCNTL   DD DISP=SHR,DSN=control.set.name
//SLSCNTL2  DD DISP=SHR,DSN=secondary.set.name
//SLSSTBY   DD DISP=SHR,DSN=standby.set.name
//SLSPRINT  DD SYSOUT=A
//SLSIN     DD *
/* List individual utility statements following this comment
      .
      .
      (utility statements)
      .
/*
//
```



**Note:** JCL statements for SLSCNTL2 and SLSSTBY are optional. However, if you have configured your library to have a secondary and standby control data set, you **must** include statements for these control data sets. It is highly recommended that you operate your library with a secondary and standby control data set.

The following example shows JCL that makes these modifications:

- changes the host ID from HSCB to HSC2
- sets the library station device numbers to 0CD and 0DD for ACS 00 on host HSC2
- changes the nonlibrary drive esoteric to “CTAPE” for hosts CPUA and CPUB
- changes the device numbers for ACS 00 LSM 0 panel 10 on all hosts.



#### Notes:

1. Only one option can be specified per SET statement. This example demonstrates that multiple SET statements can be entered for each execution of the utility.
2. In the SET SLIDRIVS statement below, note that a continuation character (+) has been added to allow 10-drive panels to be specified on one statement.

# SET Utility

## JCL for Multiple SET Statements

```
//JOBSET  job (account),programmer
//S1      EXEC PGM=SLUADMIN,PARM=MIXED
//SLSCNTL DD DISP=SHR,DSN=control.set.name
//SLSCNTL2 DD DISP=SHR,DSN=secondary.set.name
//SLSPRINT DD SYSOUT=A
//SLSIN   DD *
        SET HOSTID(HSC2) FORHOST(HSCB)
        SET SLISTATN(ØCD,ØDD) FORACS(ØØ) FORHOST(HSC2)
        SET>NNLBDV(CTAPE) FORHOST(CPUA)
        SET>NNLBDV(CTAPE) FORHOST(CPUB)
        SET SLIDRVS(16ØB,16ØC,16ØD,16ØE,16ØF,23ØB,23ØC,23ØD,23ØE,23ØF), +
          FORLSMID(ØØØ) FORPANEL(Ø1)
/*
//
```

## Output Description

Output resulting from the execution of the SET command includes:

- a listing of input commands with appropriate messages when syntax errors occur
- messages associated with error conditions resulting from an unsuccessful attempt to execute SET processing
- an updated CDS with the changed parameters
- a condition code indicating successful or unsuccessful CDS update.



## UNSElect Utility

The UNSElect utility allows you to “unselect” a volume that the HSC leaves in a selected state. Usually, this is an error. The “unselect” operation is performed without cycling the HSC.



**Note:** Use this utility only if you are certain that the HSC has incorrectly left the volume selected. Incorrect use of this utility can result in HSC abends and errant volumes.

Issue a Display Volume DETail command to determine which host has the volume in question. Then, issue Display DRives and Display Requests commands on the host that has the volume in question to see if that volume is being used.

If the selected volume is mounted on a transport, issue a DISMount command for the transport. If there is a request active to the LMU for the volume, wait for the request to complete. If the overdue response handler indicates the request has timed out, you may want to abort the request.



**Note:** For detailed information about the Display and DISMount commands, refer to “DISPLAY Command” and “DISMOUNT Command” in the *HSC/MSP Operator’s Guide*.

The HSC must be running on the same host that is running the UNSElect utility. If the selected volume is selected by another active (not marked inactive in the CDS) host, the HSC on that host must be running. Both hosts must be connected to the same LMU. In an environment with multiple ACSs, this can be any LMU, as long as it is the same LMU.

If the **FORCE** option is specified, the volume is “unselected” regardless of the other host being active. Using this option can result in a greater likelihood of abends if the host is running.

If the host running UNSElect cannot communicate because both hosts are not connected to the same LMU, rerun UNSElect on the host with the volume selected. Do not use the FORCE parameter in this case.

The UNSElect function can only be invoked when SLUADMIN is invoked APF authorized, key 0 through 7, or supervisor state. The load module invoked by UNSElect is SLUNSEL. Restricting access to this module restricts access to this utility function.

### Syntax

```
▶—UNSElect—VOLser(volser)———▶
      |
      |, FORCE———▶
```

# UNSElect Utility

## Utility Name

### UNSElect

specifies that the UNSElect function is to be performed.

## Parameters

### VOLser

indicates that a VOLSER is being specified for unselection.

### *(volser)*

volser specifies the VOLSER to be unselected.

### FORCE

optionally indicates that the volume is to be unselected even if communication with the host that has the volume selected is not possible.

## JCL Requirements

The following definitions apply to UNSElect utility JCL:

### SLSPRINT

output messages from the utility program.

### SLSIN

input to the utility in the form of control cards.

## JCL Example

The following example shows JCL for unselecting volume BWX119.

### JCL to Unselect a Volume

```
//JOBUNSEL  job (account),programmer
//S1       EXEC PGM=SLUADMIN{,PARM=MIXED}
//SLSPRINT DD SYSOUT=A
//SLSIN    DD *
           UNSELECT VOLSER(BWX119)
/*
//
```

## Output Description

Output occurring from execution of the UNSElect utility includes:

- a listing of input commands with appropriate messages when syntax errors occur
- messages associated with error conditions resulting from an unsuccessful attempt to execute UNSElect processing
- messages indicating actions occurring during processing (see Figure 22)
- an updated control data set indicating the volume is unselected
- a condition code indicating successful or unsuccessful unselection (see Figure 22).

```
SLUADMIN (n.n.n)           StorageTek Automated Cartridge System Utility           PAGE 0001
TIME hh:mm:ss              Control Card Image Listing                                DATE yyyy-mm-dd

UNSELECT VOL(BWX119)

SLS0376I Volume BWX119 is now unselected; owning host was HSC1
SLS0155I Condition code for utility function is 0
```

**Figure 22. Unselect Utility Sample Output**

# Volume Report Utility

## Volume Report Utility

The function of the Volume Report utility is to produce a listing of the physical location for volumes residing in an LSM. This utility is used primarily for informational purposes and provides history and usage statistics on specific library volumes.

The Volume Report utility program functions as a stand-alone process in batch mode and does not require that the HSC be operational in order to execute. If the HSC is operational, Volume Report can extract CDS and VOLATTR information from the active HSC.

In addition to the reporting capability, the utility can produce a “flat file” which may be used as a data source for manipulating the data for user-defined reports with other software products. **This option is still supported, but may be discontinued in future releases.**



**Note:** It is recommended that a 2 megabyte region size be used when running the Volume Report utility.

## Sort Options

A report may be sorted or unsorted. When the SORT option is specified, volume data can be sorted by:

- volume serial numbers
- location of volumes
- select count (usage) of volumes
- date volumes were inserted into the library control data set
- last date volumes were selected.

Sorting may be done in ascending or descending order.

- The report sorted by volume serial number is useful when a listing of library information is needed in ascending VOLSER sequence.
- The report sorted by location can be utilized for either the mass transfer of volumes or assessing the potential impact of a component failure. With this information, the installation can avoid jobs which access volumes within failed components.
- The report sorted by usage lists volumes by selection count. This report is useful for either ejecting low use volumes or replicating information on high use volumes.

## Output Options - Volume Report

The utility output may include a variety of information, depending upon the user-specified parameters. For example, volume information can be specifically included or excluded from a report based on:

- scratch status
- errant status
- external label status
- selected status.

Specifying of report parameters can range from the ACS or LSM level to as specific as a single volume serial number or list of volume serial numbers. Whenever a report is generated using library element parameters (i.e., LSM and/or ACS), the Volume Report utility may also output messages identifying empty but allocated cells.

The volume location information in this report is accurate only up to the time that the volume information is read from the database. For recovery purposes, a listing from a Volume Report run, while the HSC is down on all hosts, must be used to assist locating the required volumes.



**Note:** Volume movement occurs as a result of:

- mount activity, dismount activity, enter activity, or eject activity
- invoking the Scratch Redistribution utility
- invoking the MOVE command or utility.

## Output Options - SLUADMIN

In addition to plain text, SLUADMIN supports output types added through Unified User Interface (UUI) requests. Refer to “SLUADMIN Output” on page 144 or the *NCS/VTCS XML Guide* for more information.

# Volume Report Utility

## Media Type and Recording Technique Considerations

Volume reports can display media type (MEDia) and recording technique (RECtech).

MEDia data is extracted from either the CDS volume attribute record (VAR) or the VOLATTR statements. The VAR media information is updated when the volume external media label is read by the robotic vision system and is transmitted back to the HSC through the LMU. This can occur as a result of mounts, CAP enters, or audits.

RECtech is extracted from the VOLATTR statement. If the VOLATTR statement does not contain the recording technique for the volume, or if the VOLATTR media value conflicts with the media value that is present in the VAR, the RECtech value is determined from the MEDia value that is being reported. This RECtech value will include all recording techniques that the reported MEDia value allows (e.g., if the media value is Standard and the recording technique value defaults to LONGitud, then 18track, 36track, 36Atrack, 36Btrack, and 36Ctrack recording techniques also are included).

The report indicates if the VAR media type has been verified by the LMU. If the LMU verified the media type, the VAR media value is reported. If the media type has not been verified by the LMU, the VOLATTR MEDia value is used if it exists. If both VOLATTR and VAR media type information do not exist, the volume is considered to be Standard. At a minimum, a VOLATTR statement must be present for all volumes that are not Standard cartridges. This is because:

- the vision system cannot recognize two-tone (ECART) cartridges without an external media label



**Note:** It is recommended that users provide an external media label for all ECARTs. ZCART, DD3, and STK1 media **must** have external labels.

- for scratch purposes, volume categorization occurs based on the media type. Therefore, it is extremely important that accurate VOLATTRs be defined to maintain accurate scratch counts.

Run the Volume Report utility to verify that your VOLATTR statements and the VARs are in agreement.

To determine which volumes are mismatched between the VAR and the VOLATTR statements, specify either INCLUDE(NONMEDEQ) or EXCLUDE(MEDEQUAL) in the Volume Report syntax. Refer to the syntax and parameter descriptions sections of this utility for more information.

If the VAR is not synchronized with the VOLATTR statements, take one of the following actions to resolve the mismatch.

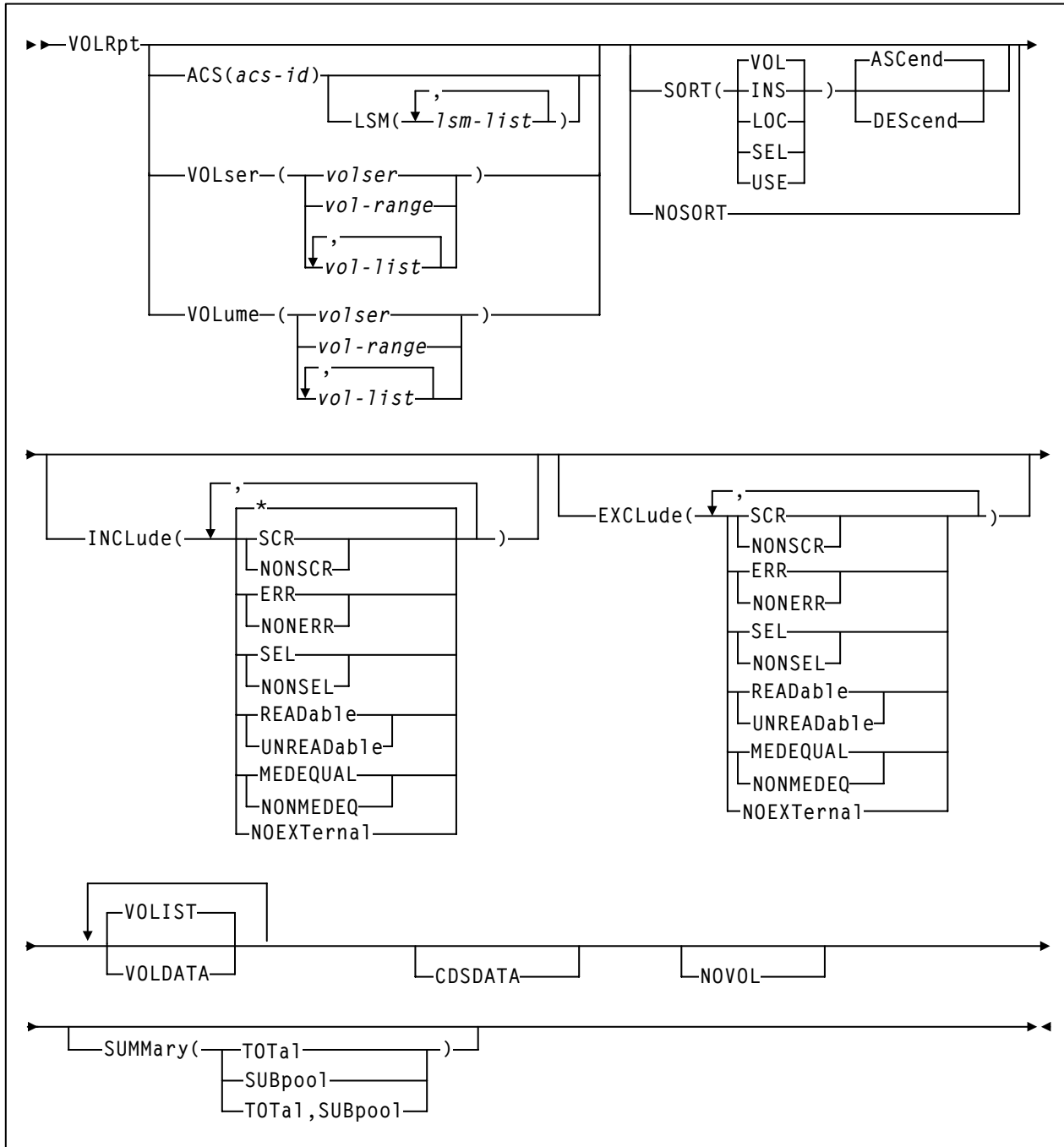
- change the VOLATTR statement(s)
- add an external media label to cartridges that are not Standard
- mount the cartridges
- enter the cartridges through the CAP
- run an audit.



**Note: Be aware that if you choose to run an audit to update the VAR, audits can be very time-consuming and can slow HSC processing.**

# Volume Report Utility

## Syntax



## Utility Name

### VOLRpt

specifies that a volume report is to be produced.



## Parameters

### ACS

optionally specifies that a report is to be produced for only a particular ACS.

#### *(acs-id)*

The one or two digit hexadecimal ACS identifier.

### LSM

optionally specifies that a report is to be produced for only certain LSMs within an ACS.

#### *(lsm-list)*

*lsm-list* indicates the LSMs. An *lsm-list* can be a single LSM number or a list of LSM numbers. An LSM number is hexadecimal 00-17.

An LSM range is not allowed. If a list is specified, the elements must be separated by blanks or commas, and the entire list enclosed in parentheses.

### VOLser or VOLume

optionally specifies that the report only contain information on certain VOLSERS.

#### *(volser or vol-range or vol-list)*

*volser*, *vol-range*, and *vol-list* indicate the volume serial numbers requested. Any subranges of volumes specified in the *vol-list* that are not in the control data set are listed in the Control Card Image Listing portion of the report using one line per subrange.

A percent sign (“%”) may be used as a “wildcard” character in the VOLSER to specify pattern matching. The percent sign designates that any single character can match the corresponding position in the VOLSER.

For example, A9%%%% specifies that all of the six-character volume serial numbers that begin with the characters “A9” are selected for the report.

Q%12% specifies that all five-character VOLSERS that begin with “Q” and have a “12” in the third and fourth positions of the VOLSER are selected for the report. The percent sign cannot be specified in a range specification. Therefore, “A%0000-A%9999” is invalid.

In the Volume Report Listing of the utility, the volumes requested which are not in the control data set are not listed.

# Volume Report Utility

## **SORT**

optionally specifies a specified sort sequence. The following options are available:

### **VOL**

indicates that the report is to be sorted by volume serial number (**VOL** is the default).

### **LOC**

indicates that the report is to be sorted by location.

### **USE**

indicates that the report is to be sorted by selection count.

### **INS**

indicates that the report is to be sorted by date and time the volume was inserted into the control data set.

### **SEL**

indicates that the report is to be sorted by date and time the volume was last selected.

Multiple sort criteria may be specified. The order, from left to right, specifies the order in which the report is to be sorted.

For example, **SORT(INS,USE)** produces a report sorted by date inserted in the control data set, and then for each date, sorted by select count. **SORT is mutually exclusive with NOSORT.**

## **NOSORT**

specifies that an unsorted report is to be produced. **NOSORT is mutually exclusive with SORT, ASCend, and DEScend.**

## **ASCend**

optionally specifies that the report is to be sorted in ascending order. **ASCend is the default.** This parameter is ignored if **NOSORT** is specified. **ASCend is mutually exclusive with NOSORT and DEScend.**

## **DEScend**

optionally specifies that the report is to be sorted in descending order. This parameter is ignored if **NOSORT** is specified. **DEScend is mutually exclusive with NOSORT and ASCend.**

## **INCLude**

optionally specifies the criteria for including volume information in the report. If this keyword is specified, all volumes that match at least one of the specified criteria are tentatively selected for the report. Information about volumes may be removed from the list of volumes selected for the report if other options, such as **EXCLUDE**, **VOL**, **ACS**, or **LSM** are specified.

## **Notes:**

- **INCLude** parameters are applied before **EXCLude** parameters in volume selection.
- Parameter values are not checked for the existence of their opposite values (for example, “SEL” is still flagged even if “NONSEL” is specified, and vice versa).
- Positive attributes are applied before negative attributes (for example, SCR is applied before NONSCR).

\*

indicates that all volumes in the library are considered for being included in the report. **The default is \***. If more than one of the following parameters is specified, the parameters must be separated by commas.

## **SCR**

specifies that scratch volumes match the specified criteria.

## **NONSCR**

specifies that nonscratch volumes match the specified criteria.

## **ERR**

specifies that errant volumes match the criteria.

## **NONERR**

specifies that non-errant volumes match the criteria.

## **SEL**

specifies that selected volumes match the criteria.

## **NONSEL**

specifies that nonselected volumes match the criteria.

## **READable**

specifies that volumes with a readable external label match the criteria.

## **UNREADable**

specifies that volumes with an unreadable external label match the criteria.

## **MEDEQUAL**

specifies that volumes for which the media types of the VOLATTR and the VAR are equal match the criteria.

# Volume Report Utility

## **NONMEDEQ**

specifies that volumes for which the media types of the VOLATTR and the VAR are not equal match the criteria.

## **NOEXternal**

**NOEXternal** specifies that volumes without an external label match the criteria.

For example, **INCLUDE(SEL,ERR)** tentatively chooses only selected and errant volumes for the report. **INCLude** parameters are applied before **EXCLude** parameters in volume selection.

## **EXCLude**

optionally specifies the criteria for excluding volume information from the report. Any volumes that match one or more of the exclusion criteria are excluded from the report.

**EXCLude** parameter values are the same as **INCLude** values, except for the “\*” parameter (see the **INCLude** options list above).

As an example, **EXCL(NONSEL)** excludes nonselected volumes from the report.

## **Notes:**

- **INCLude** parameters are applied before **EXCLude** parameters in volume selection.
- Parameter values are not checked for the existence of their opposite values (for example, “SEL” is still flagged even if “NONSEL” is specified, and vice versa).
- Positive attributes are applied before negative attributes (for example, SCR is applied before NONSCR).

## **VOLDATA**

optionally specifies that a flat file, not a volume report, is to be produced.

When this keyword is specified, the utility attempts to write the volume data to a data set defined by the SLSCDATA DD statement (refer to the SLSCDATA description “JCL/Parameter File Requirements” on page 322).

If both **VOLDATA** and **CDSDATA** (see below) are specified, a single flat file is produced that contains volume and non-volume information.

## **VOLIST**

optionally specifies that the utility produce a volume report. This parameter is used in combination with **VOLDATA** so that both a flat file and a volume report can be created. Normally, you would not specify **VOLIST** without also designating **VOLDATA**.

If **VOLIST**, **VOLDATA**, and **CDSDATA** (see below) are specified, a volume report is created and a single flat file is produced that contains volume and non-volume information.

## **CDSDATA**

optionally specifies that the Volume Report utility is to produce non-volume CDS data for the data set defined by the **SLSCDATA** DD statement (refer to **SLSCDATA** “JCL/Parameter File Requirements” on page 322). **CDSDATA** is independent of **VOLDATA** and does not keep a volume report from being produced.

## **NOVOL**

optionally specifies to display summary and/or subpool totals without producing volume detail. **NOVOL** is **mutually exclusive with ACS, VOLser, VOLume, SORT, NOSORT, INCLude, EXCLude, VOLIST, and VOLDATA**.

## **SUMM**ary

optionally specifies that the utility provide totals of volume attributes on an LSM and ACS basis, and/or subpool data on an ACS or LSM basis. Totals are affected by the use of limiting parameters such as **ACS** (and possibly **LSM**), **VOLser/VOLume**, and **INCLude** and/or **EXCLude**.

If both **TOTAL** and **SUBpool** are specified, both reports are provided. The time and date displayed in the header for the Summary Report(s) are the same as the Volume Report Listing header.

## **TOTAL**

specifies that totals of scratch, selected, errant, available cells, and external label status types be provided on an LSM, ACS, and library basis in the report.

The totals are listed on a separate listing, on a new page from the Volume Report Listing and the Control Card Listing. An example depicting the totals is in Figure 23 on page 330.

## **SUBpool**

specifies that subpool totals be provided on an LSM, ACS, and library basis in the report.

Subpool information must be provided in one of the following ways:

- through **PARMLIB SCRPOOL** control statements (refer to “Scratch Subpool Control Statement” on page 96). These statements are contained in an **HSC PARMLIB** data set pointed to by the **SLSSCRPL** DD statement (refer to “JCL/Parameter File Requirements” on page 322) or used by the active **HSC** on this host.

# Volume Report Utility

- through an accessible SLSUX03 user exit (refer to the *NCS User Exit Guide*). This exit must be in a library included somewhere in the MSP load library search order.

SCRPOOL control statements are the preferred method of subpool definition. If the HSC PARMLIB data set pointed to by the SLSSCRPL DD statement or used by the active HSC on this host is missing or invalid, a search for a valid SLSUX03 is made. If the exit cannot be found or if a code of 64 is returned on its initial call, a message is issued and a utility return code 4 is set.

The totals are listed on a separate listing, on a new page from the Volume Report Listing, the Control Card Listing, and the Volume Report Totals Listing. An example displaying subpool information is shown in Figure 24 on page 331.

If subpools overlap (i.e., a volume belongs to more than one subpool), then each volume is reported only within the first subpool in which it occurs, and totals for the other subpools may be inaccurate.

## JCL/Parameter File Requirements

The following definitions apply to Volume Report utility JCL:

### **SORTWKnn**

sort work files to optimize the sorting of volume records into the requested order. SORTWK statements are optional. Up to 99 SORTWK statements are allowed.

### **SLSCNTL, SLSCNTL2, SLSSTBY**

HSC control data set to be processed.

If these statements are omitted, the data sets used by the active HSC on the host are accessed. If the HSC on the host is inactive, one or more of these DD statements are required.

The utility attempts to select the primary CDS from the data sets specified.

### **SLSPRINT**

output messages and report from the utility. A message is displayed detailing the data set names being used to produce the report.

### **SYSOUT**

sort message output.

### **SLSIN**

input to the utility in the form of control statement card images.

## **SLSCDATA**

statement required if VOLDATA and/or CDSDATA parameters are specified to request CDS data.

The data set defined by SLSCDATA must be sequential and have a variable record format. Optionally, DCB parameters LRECL and BLKSIZE may be specified by the user.

The minimum LRECL should be 2376 if CDSDATA is specified or 136 if VOLDATA is specified.

It is recommended that the LRECL be set larger than the minimum LRECL to accommodate any future changes.

BLKSIZE can be any valid block size and must be at least LRECL + 4.

If individual DCB parameters are not specified at execution time, the following defaults are provided:

- RECFM=VB
- LRECL=2376 or 136
- BLKSIZE=LRECL + 4

If any DCB parameters are specified which conflict with any of the requirements described above, the defaults are used.

## **SLSSCRPL**

points to a data set containing HSC PARMLIB statements. The SCRPOOL scratch subpools and MNTD MAXclean values are defined in these control statements.

If this statement is omitted, the data set used by the active HSC on the host is accessed. If the HSC on the host is inactive, SLSSCRPL is required to produce a SUMMARY(SUBPOOL) report.

# Volume Report Utility

## SLSVA

statement that points to the data set containing the VOLATTR statements for the CDS being reported on.

If SLSVA or VOLATTRs are omitted, several different scenarios can occur depending on the HSC state. Table 19 describes these situations.

**Table 19. SLSVA Effect on Volume Report**

HSC State:	SLSVA Specified:	SLSVA Not Specified:
Active	Use VOLATTRs pointed to by SLSVA. *	Use VOLATTRs used by the HSC. *
Inactive	Use VOLATTRs pointed to by SLSVA.*	The HSC generates an error message saying that SLSVA is missing and incorrect data may be reported. In addition, no prefix characters appear before the “Media” field on the report to identify media type discrepancies.

\* If VOLATTRs have been defined, media prefix characters are displayed before the “Media” field if the media types reported by the LMU and the VOLATTR statements do not agree. If VOLATTRs are not present, media prefix characters are not displayed.



## JCL Examples

The following example shows JCL to produce a Volume Report for several LSMs sorted by selection count.

### JCL to produce a Volume Report (LSMs Sorted by Selection Count)

```
//JOBVOLR  job (account),programmer
//S1       EXEC PGM=SLUADMIN,PARM='NOHDR,MIXED'
//STEPLIB DD DSN=sys.your.linklib,DISP=SHR
//SLSCNTL DD DSN=control.dataset.name,DISP=SHR
//SORTWK01 DD UNIT=SYSDA,SPACE=(TRK,(space),,CONTIG)
//SORTWK02 DD UNIT=SYSDA,SPACE=(TRK,(space),,CONTIG)
//SLSPRINT DD SYSOUT=A
//SYSOUT  DD SYSOUT=A
//SLSIN   DD *
          VOLRPT ACS(01) LSM(00,01,05) SORT(USE)
/*
//
```

The following example shows JCL to produce a Volume Report using work files.

### JCL to produce a Volume Report (Using Work Files)

```
//JOBVOLR  job (account),programmer
//S1       EXEC PGM=SLUADMIN,PARM='NOHDR,MIXED'
//STEPLIB DD DSN=sys.your.linklib,DISP=SHR
//SLSCNTL DD DSN=control.dataset.name,DISP=SHR
//SLSPRINT DD SYSOUT=A
//SYSOUT  DD SYSOUT=A
//SORTWK01 DD UNIT=SYSDA,SPACE=(TRK,(space),,CONTIG)
//SORTWK02 DD UNIT=SYSDA,SPACE=(TRK,(space),,CONTIG)
//SORTWK03 DD UNIT=SYSDA,SPACE=(TRK,(space),,CONTIG)
//SORTWK04 DD UNIT=SYSDA,SPACE=(TRK,(space),,CONTIG)
//SLSIN   DD *
          VOLRPT VOLSER(ABCD01-ABCD99)
/*
//
```

The optional parameter “NOHDR” suppresses page headings on the volume report.

The following example shows JCL to produce a Volume Report using work files and scratch subpool PARMLIB definitions.

SORTWK $nn$  DD statements are optional and should be included if sorting is to be done. Up to 99 SORTWK DD statements are allowed. The SLSSCRPL DD statement is necessary if subpool information is to be obtained from SCRPOOL PARMLIB statements.

This example sorts volumes by date last selected; calls for subpool totals by LSM, ACS, and library; and sends non-volume CDS data to the data set specified in SLSCDATA.

# Volume Report Utility

## JCL to produce a Volume Report (Using Scratch Subpool Definitions)

```
//JOBVOLR    job (account),programmer
//S1         EXEC PGM=SLUADMIN,PARM='NOHDR,MIXED'
//STEPLIB   DD DSN=sys.your.linklib,DISP=SHR
//SLSPRINT  DD SYSOUT=A
//SYSOUT    DD SYSOUT=A
//SORTWK01  DD UNIT=SYSDA,SPACE=(TRK,(prim),,CONTIG)
//SORTWK02  DD UNIT=SYSDA,SPACE=(TRK,(prim),,CONTIG)
//SORTWK03  DD UNIT=SYSDA,SPACE=(TRK,(prim),,CONTIG)
//SLSCNTL   DD DSN=control.dataset.name,DISP=SHR
//SLSSCRPL  DD DSN=your.hsc.parmlib.name(SLSSYSnn),DISP=SHR
//SLSCDATA  DD DSN=your.cdsdata.name,
//           DISP=(,CATLG,DELETE),
//           UNIT=SYSDA,
//           SPACE=(TRK,(prim,sec),RLSE)
//SYSIN     DD *
            VOLRPT SORT(SEL) SUMMARY(SUBPOOL) CDSDATA
/*
//
```

This example shows JCL to produce a Volume Report listing media types that are mismatched between the CDS VAR and VOLATTR control statements. The SLSVA DD statement must be present to identify the VOLDEF data set containing the VOLATTR statements.

## JCL to produce a Volume Report (Comparing VAR/VOLATTR)

```
//JOBVOLR    job (account),programmer
//S1         EXEC PGM=SLUADMIN,PARM='NOHDR,MIXED'
//STEPLIB   DD DSN=sys.your.linklib,DISP=SHR
//SLSPRINT  DD SYSOUT=A
//SYSOUT    DD SYSOUT=A
//SORTWK01  DD UNIT=SYSDA,SPACE=(TRK,(prim),,CONTIG)
//SORTWK02  DD UNIT=SYSDA,SPACE=(TRK,(prim),,CONTIG)
//SORTWK03  DD UNIT=SYSDA,SPACE=(TRK,(prim),,CONTIG)
//SLSCNTL   DD DSN=control.dataset.name,DISP=SHR
//SLSVA     DD DSN=voldef.dataset.name,DISP=SHR
//SYSIN     DD *
            VOLRPT SORT(VOL) SUMMARY(TOTAL) EXCLUDE(MEDEQUAL)
/*
//
```

## Output Description

A report in the specified sort order provides details about the library volumes in the ACSs/LSMs for which the report is produced. Other outputs may include error messages to the listing.

## Report Detail Lines

The following sections describe the detailed volume information reported for each volume.

### Media and Recording Technique Origin

The media and recording technique are derived from the media type reported by the LMU (recorded in the VAR) and the applicable VOLATTR statement, if one exists. If the media type from the LMU is compatible with the VOLATTR statement, the VOLATTR's media type and recording technique is reported. If the LMU and VOLATTR data and VOLATTR data is incompatible, or the VOLATTR is not provided, the LMU media type is used.

### Media Type Prefix Characters

If discrepancies exist between the media type reported by the LMU (in the VAR) and the VOLATTR information, the media type is prefixed by one of the following characters:

- \* displayed if the VAR media type and VOLATTR information do not match. In this case, the user should correct the erroneous VOLATTRs.
- displayed if **both** of these conditions are true:
  - a VOLATTR cannot be found for an ECART, ZCART, helical, or STK1 cartridge (anything other than a Standard cartridge), and
  - the cartridge external media label has been verified by the LMU.
- @ displayed if **both** of these conditions are true:
  - a VOLATTR exists for an ECART, ZCART, helical, or STK1 cartridge (anything other than a Standard cartridge), and
  - the cartridge external media label has not been verified by the LMU.

### Cell Location Fields

The cell location (Cell Loc) fields show the location of cartridges by ACS (AA), LSM (LL), panel (PA), row (RO), and column (CO). The LSMid has been changed from 0-F to 0-17 hexadecimal to support greater than 16 LSMs.

# Volume Report Utility

## Errant, Scratch, Selected Fields

A flag of “Y” (yes) under the Errant (Err), Scratch (Scr), or Selected (Sel) headings indicates that the volume is currently in that status.

A volume in Errant (Err) status shows the volume’s home cell in the Cell Loc column.

Under the Selected heading, a flag of “Y” indicates that the volume is currently selected, that is, being mounted, dismounted, ejected, or moved. A flag of “M” indicates that the volume is currently mounted. The Selected column on the totals report includes both selected and mounted volumes. The volume’s home cell appears in the Cell Loc column.

## External Label Field

Under the heading External Label (Ext Lbl), “R” indicates that the volume has a readable external label. A flag of “U” (unreadable) means that the cartridge has an external label which the camera system is unable to read. “N” indicates that the cartridge has no external label.

## Cartridge Usability (CLN USE) Field

An “N” indicates a cartridge which is not usable, for example, a spent cleaning cartridge that is not usable because it has exhausted its cleaning surface. An “M” means that a cleaning cartridge has exceeded its maximum usage set by the VOLATTR MAXclean or MNTD MAXclean value.

## Subpool ID Field

Scratch subpools for volumes are listed if:

- SUMMery(SUBpool) is specified and
- scratch subpool definitions have been provided either by SCRPOOL control statements or User Exit 03.

If the VOLSER is not within any scratch subpool range,

**\*\* DEFAULT \*\***

appears in this field.

## Times Selected Field

The Times Selected count is the number of times the volume has been selected for use by a host. A single selection may represent a mount/dismount pair, the volume’s initial entry, participation in scratch redistribution, or any update to its scratch status.



**Note:** The count is valid only for the time that the volume exists in a CDS.

## Totals Reports

Two totals reports can be produced:

- volume report totals
- subpool totals.

## Volume Report Totals

Total of cartridges with various characteristics are displayed for LSMs, ACSs, and the entire library.

The total selected volumes is the sum of the number of volumes currently selected and the number of volumes currently mounted.



**Note:** The free storage cells reported do not include free cells on frozen panels. An LSM with at least one frozen panel is indicated by an asterisk after the free cell count.

## Subpool Totals

Totals of cartridges by subpool are produced for LSMs, ACSs, and the entire library.

## Volume Report Flat Files

Specifying the **VOLDATA** parameter produces a volume flat file. The layout of the volume records is defined by the SMP/E-distributed **SLUVVDAT** macro. Refer to “**SLUVVDAT**” on page 614 in Appendix D, “Record Formats” to see the **SLUVVDAT** record format.

When **VOLDATA** is specified under CMS, only the volume information that passed all of the selection criteria is written to the specified output data set, one volume per record.

The **CDSDATA** parameter creates a non-volume CDS flat file. The following SMP/E-distributed macros define the non-volume information:

- **SLUVADAT** (flat file ACS/LSM information DSECT)
- **SLUVCDAT** (flat file static configuration data DSECT)
- **SLUVHDAT** (flat file host information DSECT)
- **SLUVIDAT** (flat file CDS information DSECT).

Refer to “Volume Report and Batch API Records” on page 594 in Appendix D, “Record Formats” for the layouts of these records.

An optional parameter, “**NOHDR**,” may be specified in the JCL to eliminate printing page headings. This option enables the user to customize the output data to produce reports in various formats.

# Volume Report Utility

SLUADMIN (n.n.n)		StorageTek Automated Cartridge System Utility										PAGE 0001		
TIME hh:mm:ss		Control Card Image Listing										DATE yyyy-mm-dd		
VOLRPT SUMMARY(TOTAL) VOLUME(CLN400-CLN418)														
SLUADMIN (n.n.n)		StorageTek Automated Cartridge System Utility										PAGE 0002		
TIME hh:mm:ss		Volume Report Utility										DATE yyyy-mm-dd		
Volume	Cell Loc	Ext Cln	--- Inserted ---		--- Last Used--		Times							
Serial Media	Rectech	AA:LL:PA:RO:CO	Err	Scr	Se1	Lbl	Use	Subpool	ID	Date	Time	Date	Time	Selected
CLN400	STK1U	STK1R	01:01:14:00:17			R	N	**Default**		20040216	12:56:56	20040216	13:11:10	23
CLN401	STANDARD	18TRACK	01:01:18:00:19			R		**Default**		20040216	12:56:57	20040216	13:11:17	98
CLN402	STANDARD	18TRACK	01:01:01:00:23			R	M	**Default**		20040216	12:56:59	20040216	13:11:20	101
CLN403	STANDARD	18TRACK	01:01:04:00:23			R		**Default**		20040216	12:57:00	20040216	13:11:25	96
CLN404	STK1U	STK1R	01:01:06:00:20			R	NM	**Default**		20040216	12:57:01	20040216	13:11:27	105
CLN405	STK1U	STK1R	01:01:07:01:10			R	N	**Default**		20040216	12:57:03	20040216	13:11:30	26
CLN406	*STANDARD	18TRACK	01:00:03:30:01			R		**Default**		20040216	12:57:04	20040216	13:05:51	3
CLN407	*STANDARD	18TRACK	01:00:00:15:02			R		**Default**		20040216	12:57:05	20040216	13:05:53	3
CLN408	STANDARD	18TRACK	01:00:02:15:05			R		**Default**		20040216	12:57:06	20040216	13:05:54	3
CLN409	STANDARD	18TRACK	01:00:03:30:02			R		**Default**		20040216	12:57:06	20040216	13:05:56	3
CLN410	@DD3D	DD3	01:00:00:15:03			R	M	**Default**		20040216	12:57:08	20040216	13:05:58	3
CLN411	@DD3D	DD3	01:00:02:16:00			R	M	**Default**		20040216	12:57:08	20040216	13:06:00	3
CLN412	DD3D	DD3	01:00:03:31:00			R	M	**Default**		20040216	12:57:11	20040216	13:06:02	3
CLN413	-DD3D	DD3	01:00:00:15:04			R	M	**Default**		20040216	12:57:12	20040216	13:06:04	3
CLN414	DD3D	DD3	01:00:02:16:01			R	M	**Default**		20040216	12:57:13	20040216	13:06:05	3
CLN415	DD3D	DD3	01:00:03:31:01			R	M	**Default**		20040216	12:57:14	20040216	13:06:07	3
CLN416	DD3D	DD3	01:00:00:15:05			R	M	**Default**		20040216	12:57:17	20040216	13:06:11	3
CLN417	DD3D	DD3	01:00:02:16:02			R	M	**Default**		20040216	12:57:18	20040216	13:06:14	3
CLN418	DD3D	DD3	01:00:03:31:02			R	M	**Default**		20040216	12:57:20	20040216	13:06:16	3
SLUADMIN (n.n.n)		StorageTek Automated Cartridge System Utility										PAGE 0003		
TIME hh:mm:ss		Volume Report Totals										DATE yyyy-mm-dd		
Type	Loc	Errant	Selected	No External	Un Readable	External Readable	Scratch	Non Scratch	Not Usuable	Over MAXclean	All	Free Cells		
LSM	00:00	0	0	0	0	0	0	0	0	0	0	4069		
ACS	00	0	0	0	0	0	0	0	0	0	0	4069		
LSM	01:00	0	0	0	0	13	0	13	0	9	13	346		
LSM	01:01	0	0	0	0	6	0	6	3	2	6	4660		
ACS	01	0	0	0	0	19	0	19	3	11	19	5006		
ALL		0	0	0	0	19	0	19	3	11	19	9075		

Figure 23. Volume Report SUMMARY(TOTAL) Sample Output

# Volume Report Utility

SLUADMIN (n.n.n)		StorageTek Automated Cartridge System Utility										PAGE 0001		
TIME hh:mm:ss		Control Card Image Listing										DATE yyyy-mm-dd		
VOLRPT SUMMARY(SUB) VOLUME(EE0000-EE9999)														
SLUADMIN (n.n.n)		StorageTek Automated Cartridge System Utility										PAGE 0002		
TIME hh:mm:ss		Volume Report Utility										DATE yyyy-mm-dd		
Volume	Cell Loc	Ext CIn	--- Inserted ---		--- Last Used---		Times							
Serial Media	Rectech	AA:LL:PA:RO:CO	Err	Scr	SeI	LbI	Use	Subpool	ID	Date	Time	Date	Time	Selected
EE0000	ZCART	36TRACK 01:00:02:00:01				R		SUB1	20040214	15:14:39	20040221	10:16:59		5453
EE0001	ZCART	36TRACK 01:00:03:01:00		Y		R		SUB1	20040210	11:30:51	20040221	16:23:56		28
EE0002	ZCART	36TRACK 01:00:00:00:00		Y		R		SUB1	20040210	11:30:55	20040221	16:23:56		29
EE0003	ZCART	36TRACK 01:00:01:36:01	Y	Y	Y	R		SUB1	20040210	11:31:01	20040221	16:23:57		25
EE0004	ZCART	36TRACK 01:00:02:01:02		Y		R		SUB1	20040210	11:31:07	20040221	16:23:57		27
EE0005	ZCART	36TRACK 01:00:03:01:01		Y		R		SUB1	20040210	11:31:12	20040221	16:23:57		23
EE0006	ZCART	36TRACK 02:00:00:00:00		Y		R		SUB1	20040214	14:48:10	20040218	10:33:07		6
EE0007	ZCART	36TRACK 02:01:00:04:03		Y		R		SUB1	20040214	09:39:53	20040218	10:33:08		100
EE0008	ZCART	36TRACK 02:00:01:39:01		Y		R		SUB1	20040214	09:40:07	20040218	10:33:08		45
EE0009	ZCART	36TRACK 02:00:00:02:00			M	R		SUB1	20040214	09:40:19	20040221	16:34:17		676
EE0010	ZCART	36TRACK 02:01:01:39:02		Y		R		SUB1	20040214	09:40:33	20040221	16:23:58		82
EE0011	ZCART	36TRACK 02:01:00:08:01		Y		R		SUB1	20040214	14:24:46	20040221	16:24:00		15
EE0012	ZCART	36TRACK 02:00:01:36:01		Y		R		SUB1	20040214	08:33:30	20040218	10:33:08		19
EE0800	ZCART	36TRACK 01:01:01:00:04				R		SUB2	20040210	10:58:04	20040221	16:26:39		64
EE0801	ZCART	36TRACK 01:01:14:00:04		Y		R		SUB2	20040210	10:57:13	20040218	12:44:54		34
EE0802	ZCART	36TRACK 01:01:03:31:01		Y		R		SUB2	20040210	10:57:20	20040218	10:33:09		30
EE0803	ZCART	36TRACK 01:01:16:00:06		Y		R		SUB2	20040210	10:57:27	20040218	13:12:31		34
EE0804	ZCART	36TRACK 01:01:17:00:10		Y		R		SUB2	20040210	10:57:35	20040218	10:33:09		30
EE0805	ZCART	36TRACK 01:01:18:00:06		Y		R		SUB2	20040210	10:57:43	20040218	10:33:09		7
EE0806	ZCART	36TRACK 01:01:19:00:05		Y		R		SUB2	20040210	10:57:49	20040218	12:54:17		34
EE0807	ZCART	36TRACK 01:01:00:00:01		Y		R		SUB2	20040210	10:57:58	20040218	13:08:24		34
EE0808	ZCART	36TRACK 01:01:13:00:02		Y		R		SUB2	20040210	10:53:06	20040218	13:04:13		34
EE0809	ZCART	36TRACK 02:01:01:36:00		Y		R		SUB2	20040220	10:33:04	20040218	10:33:10		50

**Figure 24. Volume Report Utility SUMMARY(SUBpool) Sample Output (1 of 2)**

# Volume Report Utility

SLUADMIN (n.n.n)		StorageTek Automated Cartridge System Utility				PAGE 0003
TIME hh:mm:ss		Subpool Totals, All Ranges				ATE yyyy-mm-dd
SUBPOOL ID		LABEL TYPE		RANGE LIMITS		
SUB1		SL		N/A - N/A		
		NON				
ACS	LSM	SCRATCH	SCRATCH	Media	Rectech	
00	00:00	0	0			
ACS Total		0	0			
01	00:10	5	1	ZCART	36TRACK	
	00:10	0	0			
ACS Total		5	1			
02	00:20	3	1	ZCART	36TRACK	
	00:21	3	0	ZCART	36TRACK	
ACS Total		6	1			
Library Total		11	2			

**Figure 24. Volume Report Utility SUMMARY(SUBpool) Sample Output (2 of 2)**



# Chapter 5. Software Diagnostics and Recovery

---

## Overview

This chapter describes the overall diagnostic capabilities supported by all components of the HSC. Diagnostic capabilities include:

- **Generalized Trace Facility (GTF) Tracing (GTRACE)** — This facility provides a history of the processing before a failure.
- **Supervisor Call (SVC), Dump (SDUMP), and Abnormal End (ABEND) Dumps** — Record information on dumps is made available at the time of failure by using these dumps.
- **Error Recording Data Sets (ERDS)** — Software failures are logged into these error recording data sets.
- **Allocation Data Area Trace** — Allocation data areas are displayed, both before and after HSC modification, for cartridge requests.

These diagnostic tools can be helpful to you in diagnosing software problems and useful when discussing any problems with StorageTek Support Services.

## Generalized Trace Facility

The Generalized Trace Facility (GTF) provides a low level history of the recent past. The HSC issues GTRACE requests for significant events during operation. Format ID and Event ID (FID and EID) are specified as parameters on the EXEC statement (PARM=) of the HSC JCL procedure (refer to “Creating an HSC START Procedure” in the *HSC/MSP Configuration Guide* for an example procedure).

## Supervisor Call and Abnormal End Dumps (ABEND)

SVC and ABEND dumps are taken where appropriate to diagnose software failures. Do not use SYSUDUMP, SYSMDUMP or SYSABEND DD statements in HSC JCL. These ABEND types do not provide enough information on the HSC address space.

## Error Recording Data Set Records

4480 Cartridge Subsystem and 3278 Terminal Subsystem Error Recording Data Set (ERDS) records are written by MSP routines. The HSC writes software records to the ERDS to record:

- software failures for task/service request block (SRB) end
- LSM access door opening events
- LSM and LMU status responses
- LMU error responses
- control data set inaccessible
- control data set copy inaccessible
- both journals filled
- current journal inaccessible
- a switch to the copy of the control data set
- dual LMU status change in a dual LMU environment
- a switch of the host-to-host communication method level.

Library software uses normal ESTAE and FRR capabilities to log task/SRB termination records to the ERDS. Information in the variable recording area of the software record is used to record data pertinent to each subtype of HSC software ERDS records.

## Allocation Data Area Trace

Allocation data area traces can be output to different media based upon options specified in the TRace command (refer to the “TRACE Command” in the *HSC/MSP Operator’s Guide*). Choices available for output include:

- GTF trace data set
- SYSLOG
- JOBLOG.

Additionally, the user can choose to generate an unformatted storage dump.

## HSC Diagnostic Commands

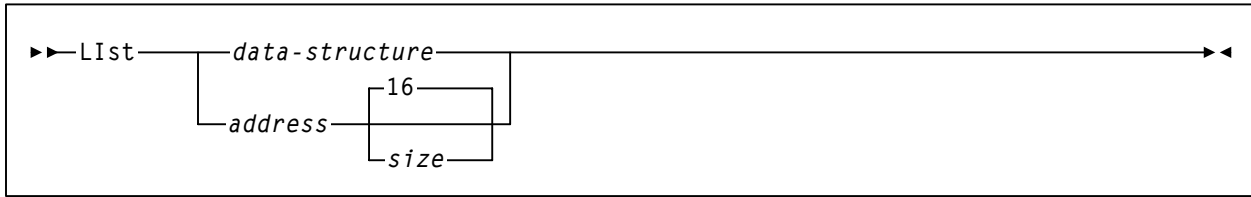
The following HSC diagnostic commands are provided:

- Llist
- Display.

### Llist Command

The Llist command is used to display an HSC data structure and to provide for diagnostic support for the HSC. **Use this command under the direction of StorageTek support personnel.**

## Syntax



### Command Name

**LList**  
initiates the LList command.

### Parameters

***data-structure***  
specifies the name of a single HSC data structure. It may be any one of the following:

**LVT**  
Library Vector Table (large output produced)

**BCVT**  
Initialization/Termination Communication Vector Table

**CCV**  
CAP Communication Vector Table

**DCV**  
Database Server Communications Vector Table

**FCVT**  
Configuration Control Communication Vector Table

**HCVT**  
Host Communication Vector Table

**JCVT**  
Job Processing Communication Vector Table

**LCVT**  
LMU Communication Vector Table

**MCVT**  
Mount/Dismount Vector Table

**OCVT**  
Operator Command Vector Table

**QVT**  
Ascomm Vector Table

**RCVT**  
Recovery Communication Vector Table

**UCT**  
Utilities Communication Vector Table

**VCT**  
Volume Cell Communication Table

***address***  
specifies a hexadecimal address of memory.

***size***  
specifies the amount of memory (in decimal) to display. The default size is 16.

### **Display Command**

The Display command offers several options that are useful for diagnostic purposes. For more information on the Display command and its uses for diagnostics, refer to “DISPLAY Command” in the *HSC/MSP Operator’s Guide*.

## CDS Recovery Capabilities

Capabilities to recover the CDS from certain hardware and software failures are inherent in the HSC. CDS recovery capabilities include:

- dynamic recovery of the control data set
- control data set error diagnostics
- initializing/running on one copy of the control data set
- switching to another copy of the control data set
- control data set integrity during BACKUp and RESTore
- detecting mismatch of control data sets

Additional recovery information is available in the *HSC/MSP Operator's Guide* pertaining to the following topics:

- cartridge recovery
- errant cartridge recovery
- switch to standby LMU
- automatic downward switch of the host-to-host communication method level
- starting the HSC at the base service level.

### Control Data Set Recovery

#### Dynamic Recovery of the Control Data Set

At HSC installation, specifying additional control data sets, secondary and standby, in the LIBGEN SLIRCVRY macro indicates that these additional copies of the control data set are maintained by the HSC during library operation and kept on DASD. In addition, a CDS operator command provides you with the capability to enable or disable any of the various control data sets. An auto-enable function of the command sets the automatic switch capability of the HSC to automatically switch operation to another control data set.

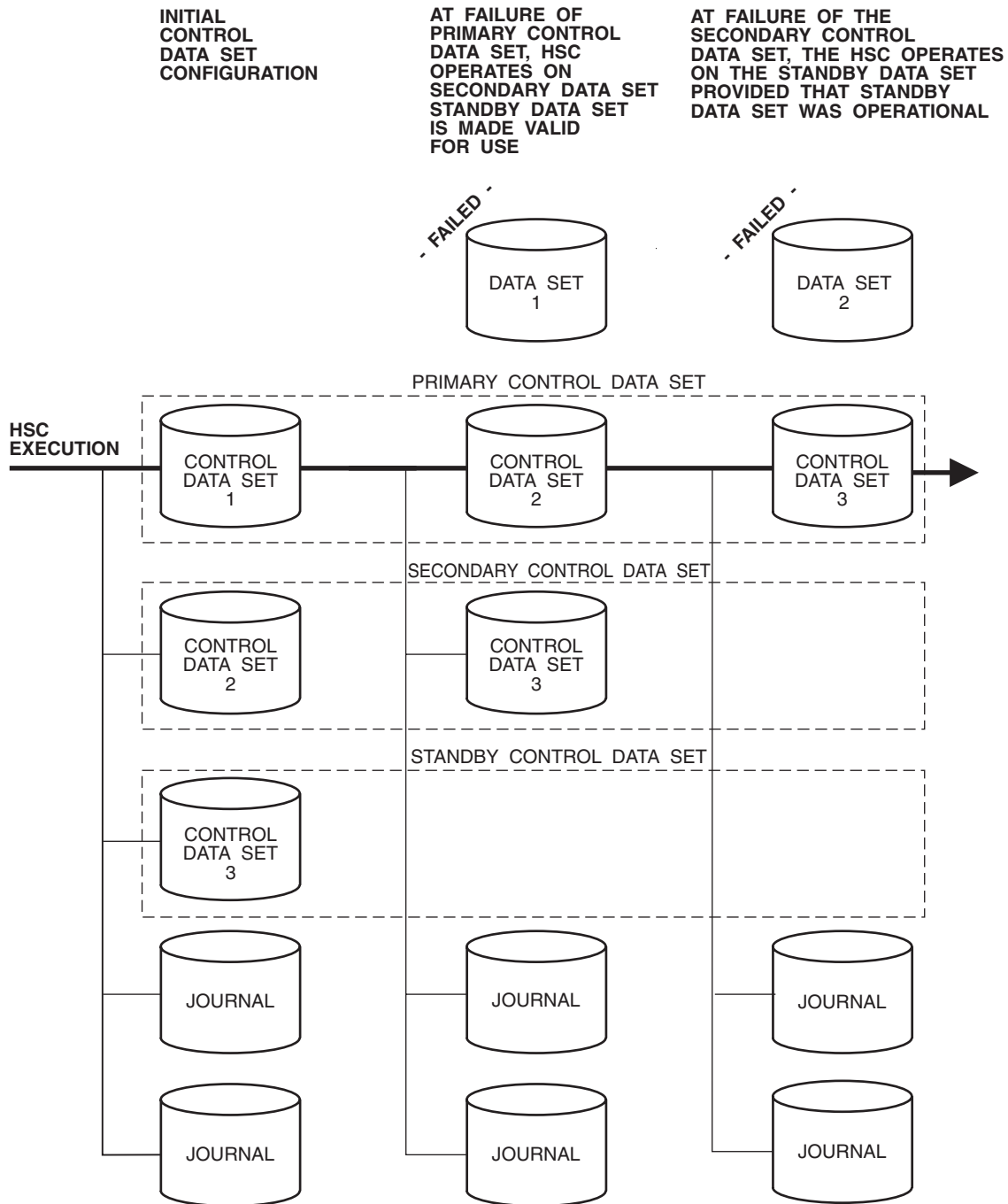
If a failure occurs accessing the primary control data set, the HSC automatically switches operation to the secondary control data set. At the time that the switch to the secondary control data set occurs, the standby control data set becomes valid. After library operation continues with the secondary control data set, should the secondary control data set become inaccessible, the standby control data set is accessed and used by the HSC to keep the library operating.



**Note:** If the primary and secondary control data sets fail simultaneously, without sufficient time for the HSC to make the standby data set valid and accessible, HSC operation is impaired.

These backup data sets replace a failing control data set; however, they retain their original data set name.

Figure 25 on page 338 illustrates the built-in recovery scheme for the control data sets.



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Figure 25. Control Data Set Recovery Scheme

All HSCs in operation must be stopped to perform the restore operation.

If the three control data sets fail, the journal(s) can be used to restore a valid control data set. Refer to “BACKUp Utility” on page 174 for information about backing up a CDS or “RESTore Utility” on page 251 for information about restoring a CDS.

## Control Data Set Error Diagnostics

Numerous messages are provided to permit you to diagnose problems pertaining to the control data sets. The messages describe error circumstances including:

- block mismatches between copies of the control data sets
- missing DD statements required for control data set initialization
- various backup and restore actions
- discrepancy block information, and other pertinent diagnostic information.

Refer to the *HSC/MSP Messages and Codes Manual* for more information about messages encountered that pertain to the control data sets and the BACKUp and RESTore utilities.

## Control Data Set Processes

Several important processes are available to you for recovery purposes. These are designed to permit you to keep your library running when there are apparent problems with the primary control data set. Processes include how to:

- initialize and run the HSC on one copy of the control data set
- switch to any backup copy of the control data set
- switch the control data set in a multiple-host environment.

### Initializing/Running the HSC on One Copy of the Control Data Set

You have the option of initializing and running the HSC on only one copy of the control data set. With the available PARMLIB control statements, you can specify backup control data sets (secondary and standby control data sets); however, if for any reason, the HSC can run on only one of the control data sets, the HSC continues to run normally.

The HSC has the capability of determining which of any number of control data sets are valid and consequently chooses a valid data set with which to continue operation.

It is highly recommended that you initialize, in addition to the primary control data set, a secondary and a standby control data set. With these data sets, you can recover from problems with the primary control data set.

### Switching to a Backup Copy of the Control Data Set

If you have initialized your HSC subsystem with the additional backup copies of the control data set, you can dynamically switch operation to any one of the copies without affecting the HSC and library operation.

With an operator command, you can enable or disable specific copies of the control data set. When a copy of the CDS is disabled, the specified control data set is taken offline while the current standby control data set (if present) is brought online; HSC does not terminate during the switch.

When a new control data set is brought online, all work within a library complex requiring CDS access halts until the switch function completes. Depending on the size of the complex, this switching time can take a few minutes. However, this is a better alternative than an HSC shutdown and subsequent restore of data sets, especially in a multiple-host environment.

Operator commands are available to display the status of current control data sets or to enable, disable, or auto-enable any copy of the control data set. Refer to the *HSC/MSP Operator's Guide* for detailed information about the commands.

### **Switching the Control Data Set in a Multiple-host Environment**

In a multiple-host environment, the HSC automatically provides communications to all hosts when a control data set switch has occurred. Communications is based on settings from the COMMPATH command and control statement (refer to the “Communications Path (COMMPATH) Command and Control Statement” in the *HSC/MSP Operator's Guide*).

### **Recommended Recovery Actions**

Once you are aware that a switch of the control data set has occurred, it is recommended that the following actions be taken:

1. Run the BACKUP utility.
2. Retain a backup copy of each control data set for diagnostic purposes.
3. Run the RESTORE utility.
4. If DASD hardware errors are found, reallocate valid control data sets to a good storage device.

If you are unsuccessful in recovering from mismatch errors, contact StorageTek Software Support (refer to the guide *Requesting Help from Software Support*).

### **Control Data Set Integrity During RESTORE**

Refer to “RESTORE Utility” on page 251 for more information about running the Restore utility.

### **Detecting Mismatch of Control Data Sets**

Control data set mismatch occurs when the HSC has determined that the primary and secondary (or shadow) control data sets are not synchronized. Normally, the HSC automatically determines which copy of the control data set is valid and switches operation to that data set.

The recovery performed by the HSC is transparent to you, except for the issuance of appropriate messages to the operator. Through the messages, the operator is made aware of the switching that has occurred.

In cases where the HSC cannot determine which control data set is valid, you must run the BACKUP and RESTORE utilities to recover the data sets. Refer to “CDS Synchronization



Between Local/Remote-linked Libraries” on page 176 for some special considerations concerning control data sets.

### **Using a Periodic Backup When Journaling is Not Present**

Periodic backups retain information current up to the time they are taken. If the backup copies are restored at some later time, a full audit may be required. However, backups do provide the majority of the inventory information necessary to keep your shop running.

If a corrupted CDS exists, one method of recovery is to run BACKUP OPTION(ANALYZE) specifying the old periodic backup copy and the current corrupted CDS. The CDS parameter should specify the old backup.

If the analyze process is successful or indicates that the corrupted CDS returned an I/O error after the DVAR blocks were processed, the discrepancy list should be correct or close to correct.

An audit run as a background task is still a good idea after the restore, subsequent to bringing up the HSC and running SLSAUDIT, AUDIT, UNSCRATCH, and UNSELECT statements. Recovery time for mission-critical cartridges is less if this is done.

### **Information Required for StorageTek Diagnosis**

To aid diagnosis, collect the following information:

- backup copies of the primary, secondary, and standby control data sets at the time of the error
- console logs for a period of one hour before the mismatch condition was detected.

### **Gather Diagnostic Materials**

During problem resolution, Software Support may request that you provide them with specific diagnostic material. While printed format may be accepted, it is most desirable that you provide machine readable data (on magnetic tape). For small amounts of data, Software Support may request that you FAX the data, instead of mailing it. Sending small amounts of data by FAX may significantly reduce the time taken to resolve problems.

### **Diagnostic Materials**

HSC diagnostic material may be requested by Software Support and, as appropriate to the problem, may include one or more of:

- MSP SYSLOG
- JESMSG data set
- SYSMSG data set
- SYSPRINT data set
- SLSPRINT data set
- system dump data sets
- database DUMPS/DEBUG if master
- EREP - Type 'S'; from LOGREC
- details of circumstances

- ISPF/PDF PANEL IMAGES/SPFLOG
- external TRACE for HSC via GTF
- CCW traces
- copy of database files
- allocation data trace
- INISH deck
- IOCDS
- SAE dumps
- JCL/JOBLOGS.

### **Tape Format**

If Software Support requests a tape of your SYSMDUMP or SYS1.DUMP, follow the format requirement listed below for your operating system type. Failure to follow this requirement may result in a delayed resolution to the problem you are reporting.

Dump using IEBGENER or PIC

```
DCB=(RECFM=FB,LRECL=4104,BLKSIZE=4104)
```

### **Tape Return**

When requested, Software Support will return any tapes which the sending party has labeled with a return address. Refer to the guide *Requesting Help from Software Support* for more information.

# Chapter 6. Performance Considerations

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## Overview

After installing your Automated Cartridge System you will notice an improvement in your site system performance, especially for jobs and programs where tape cartridge handling is involved. Without any tuning, the ACS should significantly decrease mount/dismount times, shorten batch elapse times, open production windows, and reduce operator intervention. By making minor performance adjustments, you may achieve even more efficiency from your library.

The performance of a library is related to the following:

- overall library activity
- actions performed by systems programmers, at installation or during library operation
- daily operations controlled by an operator.

This chapter contains recommendations and highlights performance techniques that can be helpful to you in making your library operate more efficiently.

## How Library Activity Affects Library Performance

Overall library activity and the type of activities involved are great influences on the performance of the library. In a large data center, the vast volume of jobs running that require entering and ejecting of cartridges, mounting, swapping, dismounting, tape drive cleaning, and pass-thrus determine the performance of the library.

Without proper planning and implementation of techniques to control how all of these activities affect performance, a library may not operate as intended or preferred. Therefore, it is important that you customize techniques and employ standard methods developed especially for your data center to optimize the overall performance of your library.

## How System Programmers Control Library Performance

Systems programmers command extensive control of overall library performance. This control of performance is inherent with how a systems programmer:

- initially configures the library (during the LIBGEN process)
- uses available utilities and commands
- monitors and analyzes performance
- participates in the development of standard methods and procedures for the data center.

## How Operators Control Library Performance

An operator may participate in the initial configuration of a library; however, an operator usually does not have control to change the majority of the static parameters set for library operation at installation time. There are exceptions. Some commands relate to the same functions initially set by PARMLIB control statements. These commands are available for use by an operator for resetting some library parameters initially set at HSC installation and initialization.

An operator impacts library performance primarily during daily operations with the use of operator commands. These commands may be used when operator intervention is required or when it is necessary to reset some static library parameter to improve performance.

## Monitoring Library Activity and Performance

There are several methods to monitor library activity and performance:

- running the Activities Report utility to produce a detailed report identifying performance values for various library activities.

The data in the report can be easily analyzed to produce performance criteria for your installation.

- using the StorageTek Performance Measurement and Predictive Maintenance System (PM2) to collect performance information
- using Expert Library Manager (ExLM) to monitor performance and to balance workload. For more information on ExLM, refer to the *Expert Library Manager User Guide and Reference*.

### Using the Activities Report Utility

The Activities Report utility can be used to effectively record, monitor, and analyze library performance. Running the utility on a regular basis in addition to comprehensive analyses can provide you with information disclosing total performance characteristics for your library.

The Activities Report utility generates a report listing relative activity by volume groups. Information reflected on this report can be used to redistribute resources and, if necessary, to balance the cartridge activity load in a library.

This utility provides the library administrator with the information necessary to balance mount/dismount activity across ACSs and LSMs within a library. The information is based on statistics contained in SMF records that are tallied for each cartridge movement. Total Mount and Dismount activity is categorized to show a percentage for:

- scratch mount/total mounts and average time per mount
- nonscratch mounts/total mounts, and average time per mount
- scratch mounts in a different LSM/total mounts, average time per mount, and average number of pass-thrus
- nonscratch mounts in a different LSM/total mounts, average time per mount, and average number of pass-thrus.

Refer to “Activities Report Utility” on page 151 for detailed information on the Activities Report utility.

## Using the Performance Measurement and Predictive Maintenance System (PM2)

The Performance Measurement and Predictive Maintenance System generates performance and error reports on various StorageTek equipment, including the library.

There are two categories of reports that provide information about library operation:

- ACS Daily Report
- Tape Volume Report.

### ACS Daily Report

The ACS Daily Report contains the following information:

- Library Subsystem Error Report
- LMU Response Summary
- Problem Volume Serial List
- ACS Deblocking Error Report
- ACS Door Open Summary
- ACS LMU Degraded Summary
- ACS Database Journaling Entry
- ACS Primary/Shadow Switch Record
- ACS Audit Required Summary
- ACS Host Recovery Summary.

### Tape Volume Report

The Tape Volume Report contains the following information:

- Tape Volume Select
- Tape Volume Analysis.

Refer to *PM2 Report Description & Analysis Manual - Install User's Manual* for detailed information about PM2 and the reports that can be helpful to you in monitoring library performance.

## Redistribute Scratch Volumes in the Library

The Scratch Redistribution utility allows you to redistribute scratch volumes across the LSMs within a particular ACS. You can choose to have the scratch volumes go to only specified LSMs or all LSMs within an ACS.

Redistribution is performed to an evenness defined by the balance tolerance level which is specified via the Scratch Redistribution utility. If necessary, the Scratch Redistribution utility swaps scratch volumes with nonscratch volumes to equalize the count of scratch cartridges in an ACS.

Refer to “” on page 270 for detailed information on the Scratch Redistribution utility, syntax, and parameters.

## Maintain Quantities of Scratch Cartridges

Typically, in a high-activity environment, if there are insufficient quantities of scratch volumes available within a library, production time can be lost. Scratch volumes are maintained in scratch pools that are defined across the library LSMs. It is important that the number of cartridges maintained in the scratch pools are sufficient enough for normal library operation at your data center. The operator or the systems programmer can control when the HSC warns of low quantities of scratch cartridges.

The Warn command establishes thresholds which control when the HSC notifies the operator of an insufficient quantity of scratch cartridges in an ACS. The scratch pool depletion warning notifies the operator when the number of scratch volumes in an ACS falls below a specified minimum value.

By specifying warning thresholds, you can know when the number of scratch cartridges is too low for normal library operation.

Refer to “Commands, Control Statements, and Utilities” in the *HSC/MSP Operator’s Guide* for more information about the command, syntax, and parameters.

## Define CAP Preferences

The physical configuration of your library, especially the location of CAPs, can affect both library performance and operator performance. For a more efficient operation, ideally the operator should be located close to the CAPs being used the most. You can control which CAPs are most used.

The CAP preference (CAPPref) command enables you to specify preference values for CAPs. If CAP preferences are not specified, the CAP preference value is set to zero. A CAP with a preference value of zero is never selected (defaulted to) by the HSC unless specifically requested. The CAP preference list specified in the command establishes an ordered list of CAPs for use during cartridge entry and ejection. The HSC chooses an available CAP from this list by starting at the highest priority and moving down the list until a nonbusy, nonzero-priority CAP is identified.

If ejects and/or enters of large numbers of cartridges are frequent, you may want to set higher CAP preferences for enhanced CAPs.

Refer to the “CAP Preference (CAPPref) Command and Control Statement” in the *HSC/MSP Operator’s Guide* for information.



## Use SMF Records to Collect Performance Data

Library performance data can be accumulated from SMF records. The SMF operand of the SLILIBRY macro for LIBGEN or the SMF parameter of the HSC SET utility determines the SMF record type written by the HSC. The MSP SET SMF command is used to enable recording of SMF data for specific SMF record subtypes to be collected. With SMF recording enabled, a record of various library activities is made for the specified record subtypes. Each library activity, such as each time the VIEW command (optional subtype(8)) is used, each time a cartridge is entered or ejected, etc., is recorded as an SMF subtype record.

The SMF database that is created can be used to analyze library performance. Software analytical tools can be used to manipulate the data and create various performance statistics.

The HSC SAMPLIB contains SAS layout statements that can be used to convert SMF data to SAS formatted data. Various SAS reports and graphs can be produced from the formatted data.

Refer to Appendix D, “Record Formats” for information about SMF record subtypes. Refer to “SET Utility” on page 286 for information about the SET utility, syntax, and parameters.

## Use PARMLIB to Define Static Parameters

Control statements can be entered into a user-defined PARMLIB data set at HSC installation to statically set various performance criteria. The systems programmer may specify these control statements to be executed when the HSC software is initialized. Most of the statically set parameters can be changed at any time after initialization by issuing an appropriate operator command.

Table 20 on page 350 summarizes the PARMLIB control statements with corresponding operator commands. Any of the PARMLIB control statements can be used to improve various performance aspects of library operation.

Refer to “PARMLIB Control Statements” on page 77 for detailed information about using PARMLIB control statements.

**Table 20. Performance Parameters Controlled by PARMLIB Control Statements**

Statements Performance Parameter	Control Statement	Operator Command
Device Allocation	ALLOC	ALLOC
CAP Preference	CAPPref	CAPPref
Control Data Set Definition	CDSDEF	
Host-to-Host Communications Path	COMMPath	COMMPath
Control Message Prefix,Eid,Fid,and Hostid	EXECPARM	
Journal Definition	JRNDEF	Journal (specify FULL=Abend or FULL=Continue)
Journals	JRNDEF	Journal (specify FULL=Abend or FULL=Continue)
Mount Processing	MNTD	MNTD
General Purpose Options	OPTion	OPTion
Scratch Subpool	SCRPool	Warn (specify SUBpool option)
User Exit	UEXIT	UEXIT

## Define Dispatching Priority for NCS Products

Depending on your requirements, set these products so the amount of resources available to them is as follows:

- HSC — greater than batch and any started task or application requiring quick access to tape, but less than an online system
- SMC — greater than the HSC, or if the HSC is inactive, greater than batch and any started task or application requiring quick access to tape, but less than an online system
- VTCS — around the middle of the performance environment at the customer site, greater than batch and any started task or application requiring quick access to tape, but less than an online system
- HTTP server — around the level of an online system.

Customer requirements may dictate that these products be given access to greater or lesser resources than we recommend here, but you must determine this for your environment. The information above is meant only to serve as a guideline.

During initialization, the HSC uses SYSEVENT TRANSWAP to make its address space non-swappable. The HSC address space cannot be swapped out once this has been accomplished.

## Set High-performance Host-to-Host Communications

In a multi-host ACS configuration, host-to-host communications allows hosts to notify each other of a CDS switch. Host-to-host communications can be accommodated through two performance levels of communications, ranked as follows:

- LMU(s)
- CDS.

The high-performance telecommunications method is through the LMU(s). This method is recommended by StorageTek. Host-to-host communications through the control data set should be used only as a backup facility. You should implement the highest level of host-to-host communications available.

“Communication Functions” and “Communications Path (COMMPath) Command and Control Statement” in the *HSC/MSP Operator’s Guide* describe how multiple hosts are connected by any of the three possible communication methods. You have the capability to set or dynamically switch the host-to-host communication method between each pair of hosts. You can monitor the level of communication using the Display COMMPath command. If a level of communications fails, it automatically drops to the next lower level, allowing the HSC to continue without interruption.

The communications parameters can be modified dynamically, using the COMMPath command, without halting HSC execution.

### Detailed Information about Host-to-Host Communications

Refer to “Communication Functions” and “Communications Path (COMMPath) Command and Control Statement” in the *HSC/MSP Operator’s Guide* for a general description of communication functions.

Refer to “PARMLIB Control Statements” on page 77 for how to define communication functions in a PARMLIB control statement.

The “Communications Path (COMMPath) Command and Control Statement” in the *HSC/MSP Operator’s Guide* contains information about the operator commands for controlling the host-to-host communication path.

### Functioning of Host-to-Host Communications

The method hierarchy that is established is, from highest to lowest, LMU, CDS. Initially, both methods are set to CDS. Appropriate entries can be placed in the PARMLIB statement to set the communications method at HSC initialization. If an error in communications occurs during communications with the current communication method, a method switch is performed.

If the current method is LMU, the system attempts to find the next LMU available from the list, or switches from LMU to CDS.



**Note:** After a downward switch has occurred, you **must** issue an operator command to perform an upward switch (for example, from CDS to LMU).

Figure 7 on page 71 illustrates how various combinations of communication methods can exist at the same time between multiple hosts.

## Designation of Communication parameters

When specifying communication parameters in the operator command, the parameters can designate different actions depending upon whether or not the host specified in the command is the host that is executing the command.

When the command is defining parameters for the host executing the command, the method parameter defines the highest method in the hierarchy allowed to be defined on that host.

If a command defining parameters for another host specifies a higher method, the current method for this other host is set to the executing host's limit, if possible. To change a host's method hierarchy limit, the command must be issued on that host, except during HSC initialization when the method is set from a PARMLIB control statement.

When the command is defining parameters for the host executing the command, the LMUpath parameter defines those LMUs this host is allowed to use for sending messages. For two hosts to communicate via an LMU, there must be matching entries in their respective LMUpath lists.

Careful analysis should be performed when defining the communication method in the PARMLIB control statement because of how the system handles the switching.

## Define Secondary and Standby Control Data Sets

Various controls and services are in place in the HSC subsystem to ensure that the primary control data set maintains its integrity. Included among the controls are the capability to:

- designate secondary and standby control data sets as backup
- run BACKup and RESTore utilities
- designate journal data sets for use in recovery of control data set errors.

However, though all of these means are available, you must configure your installation to take advantage of the capabilities. At installation, when defining the library configuration, it is important that you initialize the additional control data sets.

It is highly recommended that secondary and standby data sets be used to ensure the performance and reliability of your library.

Refer to “Initializing the Control Data Sets” in the *HSC Configuration Guide* for information about defining control data set requirements at HSC installation.

See “SWITCH Command” in the *HSC/MSP Operator's Guide* for information about the operator commands to control switching of control data sets.

## Limit View Time to Maintain High Performance

Certain conditions within a library can significantly affect performance. These conditions may occur because of software issues or simply because of daily procedures used within a data center. The VView command is invoked to improve performance because it can be used to quickly resolve problems. It can often eliminate the need for an operator to open an LSM door and enter the LSM to resolve a problem.



**Note:** The SL8500 library does not contain a camera, so the VView command is not useful in that environment.

Excessive use of the VView command is a typical example of how library performance can be drastically affected unless you plan and consider how it can impact the performance of your library.

Though the VView command is primarily used by operators, it is important for systems programmers to know that excessive use of the VView command for extended periods of time can impact the performance of an LSM and your library. However, you should use the VView command to inspect the interior of an LSM rather than place the LSM in manual mode and physically enter the LSM. If it is necessary to inspect the robot, its hands, and/or cameras, you must modify the LSM offline and enter through the access door.

Default view time can be controlled with the OPTion Viewtime command. The system default for view time is 10 seconds. However, you can change this default value to fit your needs.

Refer to Appendix C, “Macros, Control Statements, Utilities, and Commands Syntax Reference” for the OPTion Viewtime command syntax or to “Commands, Control Statements, and Utilities” in the *HSC/MSP Operator’s Guide* for information about the command, syntax, and parameters.

### Excessive Use of View Command Affects Performance

Each time the VView command is invoked, the automatic functioning occurring within an LSM is interrupted. During the interruption, the robot hands and associated cameras are stopped from performing HSC directed library functions to focus on some specified area within the LSM for some specified time interval. Any manual intervention with library functioning can have a negative effect on the throughput of an LSM and consequently affect overall library performance.

## How to Monitor Usage of the VView Command

There are two facilities available for monitoring use of the VView command:

- enabling SMF logging
- running and analyzing the Activities Report.

It is highly recommended that you enable recording of the subtype 8 SMF record. After each successful use of the VView command, a subtype 8 SMF record is written. The record documents the component that was viewed, the view time requested, and the actual view time used. Be aware that the time actually used can be shorter than time requested at the invocation of the command, if the operator responds to the outstanding WTOR before the expiration of the requested time interval. Refer to the post-installation tasks information in the *HSC/MSP Installation Guide* for details on how to specify the SMF parameters.



**Note:** Subtype 8 SMF record logging is not a default and must be specified in accordance with the instructions contained in the referenced paragraph.

Another useful technique to monitor the use of the VView command is to run the Activities Report utility and to thoroughly analyze the resulting report. Heavy use of the VView command results in low levels for performance criteria delineated in an Activity Report. Depending upon system load for the specified time reported in an Activity Report, most performance parameters are adversely affected by excessive use of the command. For example, LSM ARM USE percentages reflected in an Activities Report are most likely to be low during heavy use of the command.

Each successful use of the VView command is counted as one robotic motion for reliability measuring (R+) purposes. Refer to Appendix E, “Logging ACS Robotics Motion” for more information.

## Advantages of Using the VView Command

There are definite advantages for using the VView command in place of other alternatives. Obvious benefits for using the command include:

- The VView command easily permits monitoring of tape drives and other LSM components with the execution of a single command entered at the system console.
- The LSM does not need to be modified offline to execute the command.
- The operator does not enter the LSM.
- The camera can be focused on a specific component that is considered as suspect; thus, time is saved by avoiding the lengthy process of physically entering the LSM.
- With the use of SMF logging, accurate records can be accumulated for system analysis or to monitor system status.

## Loading Cartridges into the Library

There are different methods that can be used to load an LSM with cartridges at installation time. There are advantages and disadvantages involved for each method. The following brief discussions may help you determine which loading method is best for your installation.

### Loading Cartridges for Immediate Use in a Newly Installed LSM

If you are loading cartridges into an LSM that must be placed into production, it may be advantageous to begin entering volumes a few at a time through the CAP.

Tape cartridges can be entered into an LSM by several methods:

- using the ENter command to enter cartridges through the CAP
- setting a CAP to automatic mode and opening and filling the CAP repeatedly
- loading the CAP and running the Cartridge Initialization utility to load the cartridges into the LSM and to write the magnetic label on the cartridges (provided that they are in scratch status in the tape management system).

Refer to “Initialize Cartridge (INITIALIZE) Utility” on page 215 for information about the Initialization utility, the syntax, and parameters. Refer to the “CAP Preference (CAPPref) Command and Control Statement” in the *HSC/MSP Operator’s Guide* for information about how to set the CAP in automatic mode. Refer to “ENTER Command” in the *HSC/MSP Operator’s Guide* for information about the ENter command.



**Note:** The control data set is updated with each load of cartridges entered through the CAP.

If you begin entering cartridges containing data sets known to be required by regularly scheduled jobs, these volumes are immediately available for use. The obvious advantage of using this method is that the LSM and any cartridges entered are immediately available for use.

### Loading Cartridges for Later Use in a Newly Installed LSM

If you are loading cartridges into an LSM that is not scheduled for production immediately, it may be to your advantage to manually load the entire LSM. The cartridges must be previously initialized to use this method.

After all cartridges are loaded into cells, run the AUDIt utility for the LSM to update the control data set.

This method of loading cartridges into an LSM is faster for physically moving the cartridges and takes less operator time. However, running the AUDIt utility for an entire LSM can take a significant amount of time.



## Reduce Pass-Thrus

The number of pass-thrus required to mount, dismount, and replace cartridges in LSMs can impact library performance. In a large or busy ACS, this impact may be significant especially during periods of heavy mount activity. There are three categories of pass-thrus:

- unavoidable
- unnecessary
- scheduled.

### Unavoidable Pass-Thrus

The HSC attempts to minimize the number of pass-thrus required; however, depending upon available tape transports and locations of cartridges, pass-thrus often cannot be avoided. By running Activities Reports on a regular basis and examining the results, you can see that mounts for different LSMs take longer than mounts for the same LSM.

### Unnecessary Pass-Thrus

Scratch mounts, dismounts, enters, and ejects that require pass-thrus are unnecessary and should be avoided. These types of activities divert the robot from productive work especially during periods of peak activity.

If scratch subpools are properly defined and managed, scratch cartridges normally are not involved in pass-thrus. Scratch mounts are the same as specific mounts as far as pass-thrus that cannot be avoided. In general, you should never see a scratch pass-thru. But, if you do see a scratch pass-thru, it was unavoidable.

The effect of unnecessary pass-thrus is not obvious in the Activities Report. You must compare their number with average mount times to see the effect on performance.

## Scheduled Pass-Thrus

Using the Scratch Redistribution utility to balance scratch cartridges involves moving cartridges to various LSMs to achieve scratch balancing. This type of activity involves heavy pass-thru usage. If you must balance scratch volumes across your library, schedule such activity during off peak hours. This approach will ensure that the pass-thru activity involved does not directly interfere with mounts and dismounts for high-priority production.

You can use Expert Library Manager (ExLM) to schedule pass-thrus. Refer to the *Expert Library Manager User and Reference Guide* for more information.

## Ways to Reduce Pass-Thru Activity

There are various ways to reduce pass-thru activity. Each of these ways is briefly discussed in the following paragraphs.

### Set MNTD Float to ON

The Float option of the MNTD command specifies whether the HSC is to select a new home cell location when it dismounts a volume that requires a pass-thru when it is dismounted.

When MNTD Float is set to ON, cartridges are not passed back to their original LSM. The cartridges are assigned new cells in the LSM where they are dismounted. This action eliminates most unnecessary pass-thrus.

### Set MNTD SCRDISM to CURRENT

When MNTD SCRDISM is set to CURRENT, scratch cartridges mounted in a 9360 (WolfCreek) LSM are dismounted in the same device rather than being archived in the next largest storage device.

### Ensure adequate free cells

Setting MNTD Float to ON can be defeated if there are no free cells in the dismounting LSM. Dismounted cartridges are passed to other LSMs to find a new home cell.

Use the Display Lsm command to determine the number of free cells in each LSM. Use MOVE or EJECT to create free cells if they are needed.

### Eject through the CAP closest to the cartridge

If you eject a cartridge through the CAP of the LSM where it resides, no pass-thrus are required.

If you eject a cartridge without specifying a CAPid, the cartridge is ejected through the highest priority CAP that is not busy. This type of activity may cause one or more unnecessary, nonproductive pass-thrus.

The recommended way to accomplish ejects without affecting performance with pass-thrus, is to use multiple CAP option on the EJECT utility. By specifying multiple CAPs (i.e., CAP(00:00:00,00:00:01,00:00:02)), the desired effect (i.e., no pass-thrus) is achieved.

### **Redistribute cartridges during off-peak times**

You can use the MOVE command and utility to move cartridges within an LSM or between LSMs. The Scratch Redistribution utility can be used to move scratch cartridges between LSMs until an equilibrium is reached. Each inter-LSM movement of cartridges causes pass-thrus which delay robot movement in mounting a cartridge.

Depending on the number of cartridges to be redistributed, you may prefer to schedule moves and scratch redistribution during periods of low data center activity. The redistribution runs faster and performance is not affected during off peak times.

## **Reduce Operator Intervention**

Although the ACS runs mostly unattended, situations occur where operator intervention is required. Excessive and unnecessary operator intervention impacts library performance. There are specific ways in which operator intervention can be reduced. These include:

### **Set SMC ALLOCDef DEFer(ON)**

If a keep is issued for a cartridge while it is being mounted, the HSC issues a message indicating that the robot cannot dismount the volume. An operator must unload the tape transport and then reply “R” to the message.

This situation is caused by programs allocating cartridges through JCL, not opening the data set on the cartridge, and terminating before the mount completes. It causes unnecessary mounts, extends dismount time, and delays the availability of cartridges and transports.

If a message requiring operator intervention occurs frequently, you may want to set ALLOCDef DEFer(ON) so ACS mounts are deferred until the data set is opened. Alternatively, you can code User Exit 09 for JES with SETUP processing to selectively defer a subset of ACS mounts.

### **Set CAP Preference**

In a multiple-LSM ACS, the CAPPref command establishes an ordered list of CAPs to use should the operator or HSC start an activity that requires a CAP without specifying a CAPid.

To motivate operators to enter or eject cartridges faster, set CAPPref such that the CAP closest to the cartridge racks is preferred. This minimizes operator travel distance.

In large ACS configurations, of five or more LSMs, consider setting CAPPref such that a CAP in the middle of the ACS has the highest priority. This may make the operators walk further, but it reduces the number of pass-thrus should the default (highest priority) CAPid be used for ejecting cartridges.

### **Prefetch Enters**

Nonlibrary cartridges that are mounted on library transports are delayed while the operator fetches and enters them. This is a common occurrence for HSC sites with all transports attached to the library.

If you or your scheduling system can predict which nonlibrary cartridges will be mounted in the library before a mount message appears, your operator can improve performance by entering those cartridges in advance.

### **Avoid Crashing Test Systems**

Library attached hosts own library resources, including CAPs, tape drives, and cartridges. If a host fails, another host must clean up the resources held by the failing host. This delays mounts and dismounts on the recovering host while recovery takes place.

You should attempt to shut down the HSC properly before IPLing a system. This is especially important for test systems that may be restarted several times a day.

### **Use GDG Separation**

GDG separation can improve library performance by eliminating the need for operators to enter or eject cartridges when an entire GDG is requested. Without separation, a tape transport is selected based on the location of the first GDG volume.

You can use the ALLOC command to set Gdgall to SEP and enable GDG unit affinity separation. This allows the HSC to allocate multiple devices for a GDG if some data set generations reside inside the library and others reside outside (or in multiple ACSs). Alternatively, you can code User Exit 10 for JES with SETUP processing to selectively enable GDG separation for a subset of allocations.

### **Use Unit Affinity Separation**

Unit affinity separation can improve library performance by eliminating the need for operators to enter or eject tape cartridges when volumes are requested with unit affinity. Without unit affinity separation, a tape transport is selected based on the location of the first volume.

Refer to the *SMC Configuration and Administration Guide* for information about the ALLOCDef command SEPLvl parameter, which specifies the exclusion level at which affinity chains are separated.

### **Reduce Tape Transport Contention**

Balanced use of library tape transports results in better robotic and system performance. In a multiple LSM library, you want the workload to be spread evenly among the robots rather than having one robot overloaded while the others are idle. Within each LSM, you want mounts to be evenly distributed among transports rather than having the robot wait for a cartridge to be rewound so it can mount the next cartridge on the same tape transport.

Tape transport contention can be reduced by:

- ensuring scratch cartridge balance
- managing multi-host tape transports
- avoiding dedicating tape transports
- using two tape transports for multi-volume files.

## Reduce Scheduling Contention

Effective scheduling can increase library performance. Controlling the following scheduling related areas can help significantly in further increasing library performance:

- strive for a balanced workload
- schedule nonproductive library activities during low-demand times.

### **Balancing the Workload**

If you experience higher than expected average mount times, but at the same time experience an improvement in production throughput, it could be an indication that your system is periodically flooded with work rather than having a balanced workload.

For example, all of your production jobs may be getting submitted at the beginning of a shift so that the library robots are overworked for the first few hours of the shift. Then, the robots may remain idle for the remainder of the shift. If you are using a scheduling software package and it releases jobs every hour on the hour, there may be tremendous tape transport contention for the first few minutes of each hour while the transports are unused for the remainder of each hour.

These situations tend to elevate average mount times; however, as long as the work is performed on time, there is probably no need to change conditions. However, if the work is not getting performed on schedule, you can improve performance by balancing your production workload.

### **Scheduling Nonproductive Activities During Low-Demand Times**

There are several library utilities, which, though very essential, severely impact the library's ability to mount and dismount cartridges. The following utilities should not be run when high-priority production jobs are pending:

- AUDIt
- EJECT
- Initialize Cartridge
- MOVE
- Scratch Redistribution
- Scratch Update.

These utilities should be scheduled during quiet periods so they do not contend with mounts and dismounts. Running these activities during quiet periods also ensures that the tasks complete faster. In the case of mass enters or ejects, operator's time can also be optimized.

## Use Deferred Mounting in a Manual Mode LSM

Using the SMC ALLOCDef command with the DEFer parameter set to ON in a manual mode LSM can improve performance. Under the conditions set to defer mounting of cartridges, a cartridge is not mounted at step allocation time, but is only mounted if a data set on the volume is required to be opened by a calling program. Thus, unnecessary mounts and dismounts by the operator can be avoided.



**Caution: StorageTek strongly recommends that you do not place SL8500 libraries in manual mode.** To use manual mode, all LSMs in the SL8500 must be offline, and that means all CAPs and drives are unavailable for automated operations.

Additionally, SL8500s have been designed for high cartridge density, so there is limited room for manually mounting and dismounting cartridges.

Refer to the “Precautions” topic in the *SL8500 Modular Library System User’s Guide* for safety requirements and physical restrictions if you decide that you must enter the library.

## Use Performance Log Reblocker to Format Data

The performance log reblocker (SLUPERF) prepares the performance log file produced by the SCP for use by the library Activities Report utility. The utility executes in both MSP and VM environments, for which different versions of the utility are produced.

## Use the AUDIt Utility Effectively

The AUDIt utility causes the robot to read cartridge labels. Tape cartridge information is uploaded to the CDS. In a quiesced LSM, performing an audit on a full panel can take up to 15 minutes, depending upon the LSM type, size, and configuration.

You should keep in mind that empty cells slow down an audit. If the robot cannot read a cartridge label, it must reach out to determine if the cell is empty. Each empty cell takes approximately three times longer to audit than a cell containing a cartridge.

If you are partially filling an LSM before running an audit, you should fill as many complete panels as possible and then audit only those filled panels. Avoid auditing empty cells.

## Use LSMs as Scratch Loaders in a Mixed ACS

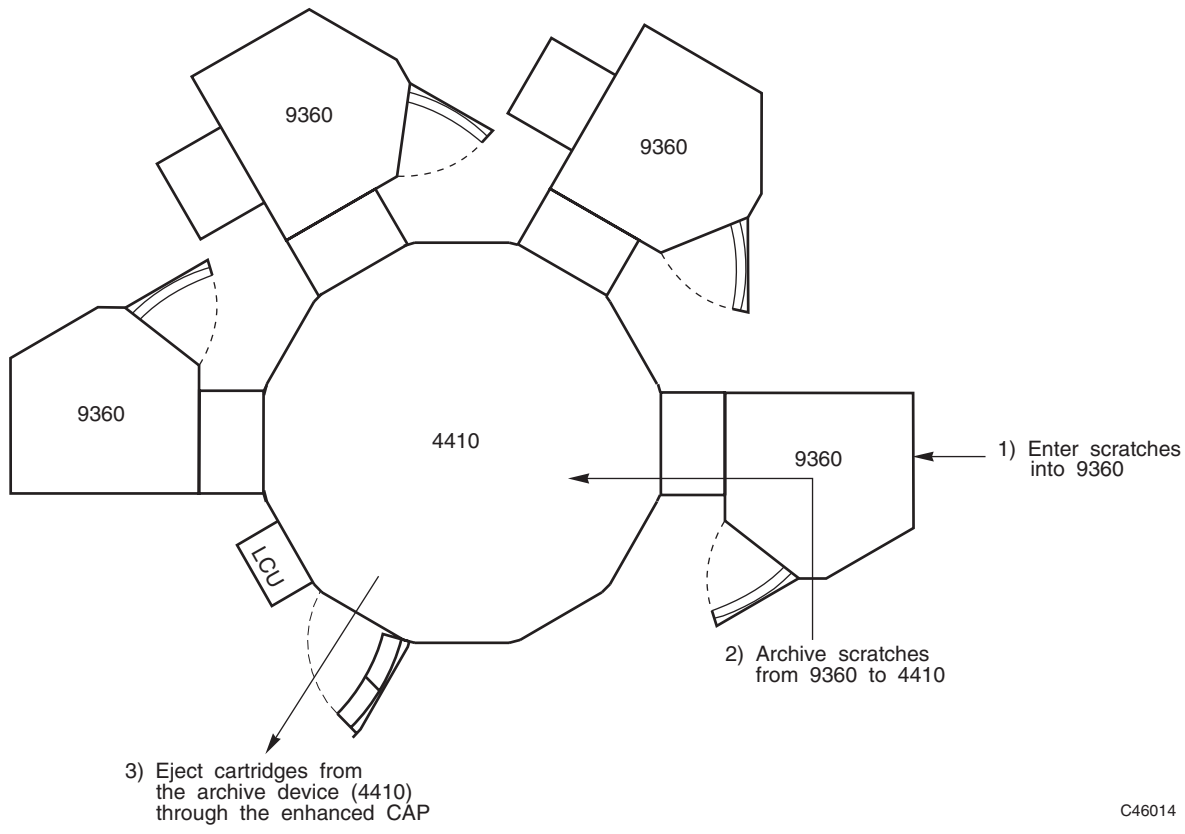
In an environment where massive cartridge input is required or a lot of cartridge movement occurs, 9360 (WolfCreek) or 9310 (PowderHorn) LSMs can be used to simulate scratch loaders intermixed with 4410 LSMs to improve library performance.

1. Specify the following operator commands:
  - MNTD SCRDISM(ARCHIVE)
  - ALLOC SCRtech(ROTATE)

2. Run scratch redistribution frequently or enter scratches into devices previously selected by the ALLOC LSMpref command.
3. Eject cartridges when necessary from the archive device (4410 or 9310).

Figure 26 on page 365 shows a 9360 used as a scratch loader.





C46014

**Figure 26. Using LSMs as Scratch Loaders**



# Chapter 7. Software Interaction

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## Overview

The HSC subsystem operates in conjunction with various other third-party software. However, StorageTek can only recommend some techniques to ensure complete compatibility of the HSC with these third-party packages.

There are distinct areas of software interaction possible:

- third-party software interaction
- customized programmatic interfaces.

## Third-Party Software Interaction



**Note:** Exercise caution if you use any third-party software that modifies the Eligible Device List (EDL) and therefore the MSP Device Allocation process. These products may compromise the functionality of the HSC and lead to unpredictable results.

### Global Device Manager

Global Device Manager (GDM) is a software product produced by Fujitsu. GDM is used in a multi-host environment to control the allocation of transports to a particular host.

If devices within the library are managed by GDM for device selection, users need to be aware that the default GDM parameters controlling the time the device is allocated to a host and the delay period before GDM varies the device offline to a particular host, may not be appropriate in all cases.

In particular, when using 9840 and 9940 devices, increase the value for the PATROL parameter to at least 25 (i.e., PATROL=25 should be coded on the GDM initialization parameters) to enable sufficient time for the drive to complete the rewind/unload process and write out the Buffered Log data.

Failure to set this parameter to a suitable setting results in channel errors being reported for the tape devices that GDM is controlling. Refer to the appropriate Fujitsu documentation for details on the GDM initialization parameters.



**Warning:** To prevent response or lockout problems, StorageTek strongly recommends that GDM-shared data sets do not reside on the same volume with the HSC's CDS or journal files.

### CA-ASM2

Automatic Reload uses Open Type J for auto data set reload. The user explicitly specifies the appropriate transport pool (ACS or manual) for auto data set reload.

- If it is desired to have all reloads done for the library, specify the esoteric associated with ACS transports.
- If it is **not** desired to have all reloads done for the library, specify the manual transport esoteric.

## Serializing CDSs

### Background

Resource serialization in the Fujitsu MSP/EX operating system is generally accomplished using either the Fujitsu Global Resource Serialization (GRS) facility or a third-party software product such as Unicenter CA-MIM/MII.

A resource is identified by two names:

- an 8-character QNAME,
- and a 1-255 character RNAME.

The relationship between the two names is hierarchical; different RNAMEs can be used to describe specific different resources that are generically related to a single QNAME.

- The HSC QNAME STKALSQL can be changed and is used by the HSC to serialize access to the HSC CDS and by ExLM to serialize LSM-related processing.



**Note:** If you have changed STKALSQL to a different QNAME, just substitute your name for the STKALSQL references in this documentation.

- The HSC QNAME STKENQNM cannot be changed and is used to serialize HSC utilities.

In GRS environments only, resources can be serialized across multiple systems by global (SCOPE=SYSTEMS) requests or serialized on individual systems only by local (SCOPE=SYSTEM) requests. GRS provides three ways (Resource Name Lists) to change how a request is to be processed:

- The Systems Exclusion Resource Name List (referred to as the Systems Exclusion List) allows global requests to be converted to local requests.
- The Systems Inclusion Resource Name List allows local requests to be converted to global requests.
- The Resource Conversion Resource Name List (referred to as the Reserve Conversion List) allows RESERVE requests to be suppressed.

These three lists are built from statements specified in the KANGQT00 member of SYSx.IPLLIB in GRS environments.

Note when a RESERVE is issued, there is also an enqueue associated with the RESERVE. If a matching entry is found in the Systems Exclusion List, the RESERVE is issued, and the enqueue associated with a RESERVE is issued as a local enqueue request. If a matching entry is not found in the Systems Exclusion List, the RESERVE is issued and the enqueue associated with a RESERVE is issued as global enqueue request.



**Caution:** If no matching entry is found in the Systems Exclusion List and the Reserve Conversion List, double serialization occurs. Avoid this at all costs. The Fujitsu OS I/MSP *Task Management General Description AF II* document contains further information on GRS.

## Multiple HSC Library Complex Considerations

If you have multiple HSC library complexes (each library complex must use a different set of primary, secondary, and standby CDSs) within the same GRS or MIM/MII serialization complex, make sure you change the default HSC QNAME STKALSQN to a different value for each HSC library complex. This ensures the serialization resources for one library complex does not delay the serialization of resources for the other library complexes. The default name can be changed either through the MAJNAME parameter on the SLILIBRY macro in LIBGEN or through the SET MAJNAME command of the SLUADMIN utility.



**Note:** With multiple library complexes, remember to replicate the STKALSQN examples shown in this documentation as many times as necessary and change STKALSQN to the different values you chose for each library complex.

### Example

For two HSC library complexes, you could change the default HSC QNAME of STKALSQN to HSCPLEX1 for one library complex and HSCPLEX2 for the other. This allows the two library complexes to operate simultaneously without interference with each other.

As a specific case, ExLM management runs issue global enqueues for the HSC QNAME and an RNAME of PROCESSLSM $aa:ll$ , where  $aa$  is the ACSid and  $ll$  is the LSMid. In a configuration of two HSC library complexes, there is an LSM 00 in an ACS 00 for each library complex, which results in the same RNAME of PROCESSLSM00:00. Two simultaneous ExLM management runs for LSM 00 in ACS 00. Two simultaneous ExLM management runs for LSM 00 in ACS 00 will conflict unless the HSC QNAMEs are different for the two library complexes.

## HSC CDS Performance and Sharing Tips

Follow these tips for optimal CDS performance and sharing:

1. Place each copy of the HSC CDS (primary, secondary, and standby) on its own dedicated volume with no other data sets on those volumes. This is especially important when you do not convert HSC RESERVEs. A RESERVE issued by one system locks out access to all data on the volume for all other systems, so if you put a catalog or the TMC on the same volume as an HSC CDS, you will create a performance problem. Isolating the HSC CDSs to dedicated volumes can also simplify recovery after an outage.
2. Make sure all HSC CDS devices are genmed as SHARED in your I/O device definitions. To do this, assign a value of YES to the SHARED feature for the device on the HCD View Device Parameter/Feature Definition panel and then activate the Input/Output Definition File (IODF) containing the change.
3. Make sure you use the VTAM communication method for all HSC host-to-host communication. This is specified by the METHOD parameter on the COMMPATH command and control statement.

4. If you use both HSC and VTCS software, and all hosts are running on release 6.1 or later, consider converting the CDS to the “F” level format (or later), which reduces CDS I/O during HSC/VTCS initialization and periodically thereafter when VTCS refreshes its cache.
5. If you use VTCS in a sysplex configuration and you believe you have a CDS performance problem because of VTCS, contact Sun StorageTek Software Support to have the problem analyzed before implementing VTCS lock data in a Coupling Facility structure.

### Unicenter CA-MIM/MII Considerations

Start the HSC only after the CA-MII address space has fully initialized.

Follow Computer Associates’ recommendations to start the CA-MII address space using their MIMASC utility, make sure the CA-MII address space is in the WLM SYSTEM service class so that it runs with a dispatching priority of FF, and add a PPT entry in the SYS1.PARMLIB(SCHED $_{xx}$ ) member on all systems in the MIM/MII serialization complex for the MIMDRBGN program. Refer to the CA documentation for other tuning recommendations.

Whenever you need to add a QNAME statement for the HSC, you must specify SCOPE=SYSTEMS and not SCOPE=RESERVES on the QNAME statement, since other NCS products (ExLM and LibraryStation) issue global enqueues that must be propagated to all systems. Specifying SCOPE=RESERVES prevents these enqueues from being propagated and will cause problems.

### When HSC RESERVEs Must Remain as RESERVEs (All Environments)



**Warning: Do not convert HSC RESERVEs to global enqueues in the following configurations and environments, or CDS data integrity will be compromised and CDS damage will occur.**

- No serialization facility or product (e.g., GRS or CA-MIM/MII) is used, and the HSC CDSs are on devices that are shared by multiple systems.
  - Even unconverted RESERVEs are insufficient to guarantee data integrity in this case. You should consider why you are trying to share data without a serialization product.

- A serialization facility or product is used, but the HSC CDSs are on devices shared by multiple serialization complexes (GRS or MIM/MII).
  - Even unconverted RESERVEs are insufficient to guarantee data integrity in this case. In the Fujitsu *OS I/MSP Task Management General Description AF II* document, it indicates that multiple serialization complexes cannot share resources.
  - Computer Associates cites this restriction in their paper *Unicenter CA-MII Data Sharing for z/OS*.
- The environment consists of a GRS star configuration that attempts to share the HSC CDSs between a sysplex and a system that is not part of the sysplex.
  - Fujitsu cites this restriction in the *OS I/MSP Task Management General Description AF II* document.
- The HSC CDSs reside on devices shared by z/OS and z/VM systems.
  - Fujitsu cites this restriction in the *OS I/MSP Task Management General Description AF II* document.
  - Computer Associates cites this restriction in their paper *Unicenter CA-MII Data Sharing for z/OS*.

### **When You May Want to Leave HSC RESERVEs as RESERVEs**

You may not want to convert HSC RESERVEs to global enqueues in the following configurations and environments.

- You use GRS in a ring configuration and converting HSC RESERVEs affects ring performance.
  - Fujitsu cites this restriction in the *OS I/MSP Task Management General Description AF II* document.
  - Performance can suffer due to propagation delays in GRS ring configurations. Deciding whether or not to convert RESERVEs is best determined by actual experience, but as an arbitrary rule, do not convert RESERVEs if there are more than three or four systems in your GRS ring.
- You use GRS in a ring configuration and converting HSC RESERVEs affects HSC/VTCS performance.
  - Because of ring propagation delays for global enqueues, HSC and VTCS throughput may significantly degrade during periods of high HSC and/or VTCS activity.



- You have a large virtual tape configuration. For example, if you have several million Virtual Tape Volumes (VTVs) defined and have not yet migrated the CDS to the “F” level format, you may experience slow HSC/VTCS initialization times and higher CDS I/O activity due to the need for VTCS to initialize and periodically refresh its cache of VTV information.

## How to Leave HSC RESERVEs as RESERVEs in a GRS Environment

If you do not convert HSC RESERVEs, remove all resource name registration statements for the HSC from the KANGQT00 member on all systems.

## How to Leave HSC RESERVEs as RESERVEs in an MIM/MII Environment

For PROCESS=SELECT and PROCESS=ALLSYSTEMS environments:

- Whenever you need to add a QNAME statement for the HSC, specify SCOPE=SYSTEMS and not SCOPE=RESERVEs on the QNAME statement, since other NCS products (ExLM and LibraryStation) issue global enqueues that must be propagated to all systems. Specifying SCOPE=RESERVEs prevents enqueues from being propagated and causes problems.

For PROCESS=SELECT and PROCESS=ALLSYSTEMS environments with ExLM and/or LibraryStation:

- To not convert the CDS RESERVEs but propagate the other STKALSQN global enqueue requests, use an Exempt List and specify the QNAME statements as follows:

```
STKALSQN EXEMPT=YES, GDIF=YES, RESERVEs=KEEP, SCOPE=SYSTEMS
STKENQNM EXEMPT=NO, GDIF=NO, RESERVEs=KEEP, SCOPE=SYSTEMS
```

- Make sure an Exempt List can be used. If the GDIINIT statement specifies EXEMPT=NONE, either change it to specify EXEMPT=*membername*, or remove the EXEMPT parameter to cause the default member name of GDIEXEMPT to be used.
- In the GDIEXEMPT member (or whatever you named it) of the MIM parameter data set, specify:

```
LOCAL QNAME=STKALSQN RNAME=hsc.primarycds.datasetname
LOCAL QNAME=STKALSQN RNAME=hsc.secondarycds.datasetname
LOCAL QNAME=STKALSQN RNAME=hsc.standbycds.datasetname
GLOBAL QNAME=STKALSQN
```

- Enter the following in the MIM commands member for **every** system in the MIM/MII serialization complex.

```
SET GDIF EXEMPTRESERVES=YES
```



**Warning: The same value of EXEMPTRESERVES=YES must be specified and in effect on all systems in the MIM/MII serialization complex at the same time, otherwise, a data integrity exposure will exist for all shared data. If you have any questions about changing to EXEMPTRESERVES=YES, contact Computer Associates before making the change.**

For PROCESS=SELECT environments without ExLM and LibraryStation:

- You have a choice. PROCESS=SELECT implies that only those resources that are explicitly defined with QNAME statements will be processed by CA-MIM/MII, so you can do **one** of the following:
  - Make sure there are **no** QNAME statements or Exempt List entries for the HSC, and CA-MIM/MII will leave all HSC RESERVEs alone. If no QNAME statements or Exempt List entries previously existed for the HSC, you are done.
  - Explicitly add and enable new QNAME statements for the HSC, and make sure that Exempt List entries do not exist for the HSC. If you choose this option, you must specify GDIF=NO, RESERVES=KEEP, and SCOPE=SYSTEMS on the QNAME statements for the HSC. As a precaution, also specify EXEMPT=NO on the QNAME statements to prevent the Exempt List from overriding any QNAME statement values. For example:

```
STKALSQN EXEMPT=NO, GDIF=NO, RESERVES=KEEP, SCOPE=SYSTEMS
STKENQNM EXEMPT=NO, GDIF=NO, RESERVES=KEEP, SCOPE=SYSTEMS
```

For PROCESS=ALLSYSTEMS environments without ExLM and LibraryStation:

- Add and enable new QNAME statements for the HSC and make sure Exempt List entries do not exist for the HSC.

Specify GDIF=NO, RESERVES=KEEP and SCOPE=SYSTEMS on the QNAME statements for the HSC. As a precaution, also specify EXEMPT=NO on the QNAME statements to prevent the Exempt List from overriding any QNAME statement values. You must code your HSC QNAME statements as shown below, since the dynamic addition of HSC resources by PROCESS=ALLSYSTEMS inappropriately defaults to assign the EXEMPT=YES and GDIF=YES attributes. For example:

```
STKALSQN EXEMPT=NO, GDIF=NO, RESERVES=KEEP, SCOPE=SYSTEMS
STKENQNM EXEMPT=NO, GDIF=NO, RESERVES=KEEP, SCOPE=SYSTEMS
```

## How to Convert HSC RESERVEs to Global Enqueues in a GRS Environment

For both GRS ring and star configurations:

- Include one RNL(CON) statement for the STKALSQN resource and one RNL(CON) statement for the STKENQNM resource:

```
RNLDEF RNL(CON) TYPE(GENERIC) QNAME(STKALSQN)
RNLDEF RNL(CON) TYPE(GENERIC) QNAME(STKENQNM)
```

- Remove all RNLDEF RNL(EXCL) statements for the HSC from the GRSRNLxx member on all systems, otherwise, the HSC RESERVEs will not be converted to global enqueues. The Reserve Conversion List is not searched if an entry is found for the HSC RESERVE in the Systems Exclusion List.

## How to Convert HSC RESERVEs to Global Enqueues in an MIM/MII Environment

For both PROCESS=SELECT and PROCESS=ALLSYSTEMS environments:

- Specify GRSRNL=EXCLUDE in the IEASYSxx member of SYSx.PARMLIB on all systems to prevent RNL processing by GRS.
- If any systems are in a sysplex, refer to “Sysplex Considerations” in the “Advanced Topics” chapter of the *MII System Programmer’s Guide* for other IEASYSxx requirements.
- Whenever you need to add a QNAME statement for the HSC, specify SCOPE=SYSTEMS and not SCOPE=RESERVES on the QNAME statement since other NCS products (ExLM and LibraryStation) issue global enqueues that must be propagated to all systems. Specifying SCOPE=RESERVES prevents these enqueues from being propagated and causes problems.

For PROCESS=SELECT environments:

- Specify GDIF=YES, RESERVES=CONVERT, and SCOPE=SYSTEMS on the QNAME statements for the HSC. Make sure Exempt List entries do not exist for the HSC, and as a precaution, also specify EXEMPT=NO to prevent the Exempt List from overriding any QNAME statement values. For example:

```
STKALSQN EXEMPT=NO, GDIF=YES, RESERVES=CONVERT, SCOPE=SYSTEMS
STKENQNM EXEMPT=NO, GDIF=YES, RESERVES=CONVERT, SCOPE=SYSTEMS
```

For PROCESS=ALLSYSTEMS environments:

- If the GDIINIT statement specifies RESERVES=KEEP, you must specify the same QNAME statements as required for PROCESS=SELECT environments since the dynamic addition of HSC resources by PROCESS=ALLSYSTEMS will not (by default) assign the RESERVES=CONVERT attribute needed to convert the RESERVE:

```
STKALSQN EXEMPT=NO, GDIF=YES, RESERVES=CONVERT, SCOPE=SYSTEMS  
STKENQNM EXEMPT=NO, GDIF=YES, RESERVES=CONVERT, SCOPE=SYSTEMS
```

- If the GDIINIT statement specifies or is defaulted to RESERVES=CONVERT, you do not need to specify any QNAME statements unless you have special requirements that conflict with the defaults assigned to dynamically added QNAMES. See “Selecting the GDIF Processing Mode” in the *Unicenter CA-MII Systems Programming Guide* for the defaults assigned to dynamically added QNAMES.

## CONTROL-T Tape Management System

HSC provides limited support for the CONTROL-T tape management system. Refer to the BMC publication *CONTROL-T for OS/390 Implementation Guide* for more information.

## Customized Programmatic Interfaces

The HSC can interface with custom programs provided that the specifications described in Appendix G, “Programmatic Interface (PGMI)” are followed.

The HSC is capable of providing various services and information to custom programs with which it interfaces. The appendix provides the following:

- descriptions of the services and information that the HSC can provide
- how to use the interface
- macros, including usage considerations, syntax, parameter descriptions, and return codes.

# Appendix A. HSC Support for the SL8500 Library

---

## Overview

This appendix discusses a variety of topics relating only to the SL8500 library. The following information appears here:

- considerations before you configure the HSC for the SL8500
- connecting the SL8500 to the HSC
- how the HSC handles differences between SL8500 internal addresses and other library addresses
- SL8500 CAP behavior
- merging ACSs
- removing PTPs and splitting ACSs
- partitioning LSMs
- TCP/IP communications - important considerations
- dual IP connections to an SL8500 library
- HSC requirements before powering down the SL8500.

Additionally, information about dynamic hardware reconfiguration for the SL8500 can be found in Appendix B, “HSC Support for Near Continuous Operation (NCO)”. These topics are discussed:

- adding and configuring additional SL8500s
- adding and removing expansion panels.

## Before Configuring the HSC for the SL8500

Before you configure the HSC for the SL8500, verify that all components of the SL8500 are operational. The HSC builds its library configuration from the information reported by the library. If SL8500 components are not operational, the library information may not be reported to the HSC, and the HSC configuration of the SL8500 is incomplete.

### Verifying that all SL8500 Components are Operational

To verify that all the components of the SL8500 are operational, use the SLConsole (either the panel on the SL8500 or a remote SLConsole).

To do this, select `Tools`, then select `System Detail`.

- All SL8500 components should be green. If the components are not green, and you have already configured the SL8500 to the HSC, the missing components probably have not been configured.
- If the drives are red, the drive configuration can be updated dynamically using the `SET SLIDRIVS` utility (refer to the *HSC System Programmer's Guide*) and the `MODIFY CONFIG` command (see the *HSC Operator's Guide*). If only the drives are red, you can proceed with the HSC configuration.
- The elevators (Elevator Folder) must be green. If the elevators are not green, **do not** configure the SL8500 to the HSC. The elevators are the logical pass-thru-ports (PTPs). Without PTPs, the HSC will not know that the SL8500 rails are connected.

Once the SL8500 components are operational, continue with the configuration, as discussed in “Configuring the HSC Environment” in the *HSC Configuration Guide*.



## Connecting the SL8500 to the HSC

The SL8500 library uses TCP/IP protocol over an Ethernet physical interface to manage and communicate with the host and the HSC. This interface enables the HSC to connect to and communicate with the SL8500.

- All hosts should communicate with only one SL8500 library.

This is critical when you create an SL8500 library complex, that is, when you connect libraries together with pass-thru ports. All hosts must connect to only one library in the complex; preferably, to the first or rightmost library in the complex.

Making multiple host communication connections to each library will cause problems.

- The SL8500 library should be attached to a separate subnet or a controlled network to protect it from floods of ARP broadcasts.

## SL8500 Internal Addresses and HSC Addresses

The SL8500 library identifies cartridge locations by library, rail, column, side, and row. Other libraries supported by the HSC distinguish software address cartridge locations by LSM, panel, row, and column.

### LSM Numbering

The SL8500 library contains four rails on which four handbots travel. Optionally, you can upgrade to eight handbots, two per rail, for redundancy. The HSC considers each SL8500 rail as a separate LSM.

SL8500 numbering conventions are different as compared with previous libraries. From top to bottom, SL8500 rails are numbered 1-4. HSC LSMs (rails) are numbered from 0-3. For example, in Table 21, SL8500 rail 1 is HSC LSM 0.

**Table 21. SL8500/HSC LSM Mapping**

SL8500 Mapping	HSC Mapping
Rail 1	LSM 0
Rail 2	LSM 1
Rail 3	LSM 2
Rail 4	LSM 3

### Panels

SL8500 addresses do not include panels. For the HSC:

- Panel 0 = CAP panel
- Panel 1 = drive panel
- Panels 2 through  $n$  = cell storage panels. The total number of panels depends on the configuration of the library.
  - base library — 2-10
  - With one expansion panel — 2-18 (expansion panel is 8-15)
  - With two expansion panels — 2-26 (expansion panels are 8-23)
  - With three expansion panels — 2-34 (expansion panels are 8-31).

### Column Numbers

As viewed from inside the library, SL8500 column numbers are positive starting with +1 to the right of the center line of the drive bays. They are negative starting with -1 to the left of the drive bays.

The HSC reports two columns for each cell storage panel (columns 0 and 1).

### **Inside/Outside Numbers**

For the SL8500 library, sides are numbered such that the outer wall = 1 and the inner wall = 2.

### **Row Numbers**

Within each LSM (rail), rows are numbered consecutively from the top down. Row numbers start with 1 for the SL8500 and 0 for the HSC.

## SL8500 CAP Behavior

SL8500 CAPs span three rails (2-4). For the HSC, this is LSMs 1-3. The SL8500 includes one CAP with an optional second CAP. Each CAP contains three magazines with 13 cells per magazine. Each magazine is adjacent to a separate rail, and can only be accessed by handbots on that rail.

- If the second CAP is not present, the HSC reports that the CAP is offline, non-operational, or non-existent. To prevent any messages regarding the CAP from being displayed, vary the non-existent CAP to an offline state using the MODify command. This also prevents any mistaken attempts to use the second CAP where it does not exist.
- If the SL8500 library has two physical CAPs, both should be online and operational.

The CAP is treated as an independent component, and does not belong to any one rail. This means that one of the CAPs can be reserved for other uses, such as entering and ejecting cartridges to and from any LSM.

Considerations:

- The SL8500 CAP can be online and operational even though the LSM identified in the *capid* is offline or not operational.
- If LSM 1 is varied offline, the SL8500 CAP(s) is not automatically varied offline.
- If LSM 1 is varied online, the HSC does not automatically vary the SL8500 CAP(s) online.
- The SL8500 CAP(s) can be online and used to enter and eject cartridges to and from LSM0 as long as at least **one** of the other LSMs (1-3) is online.

## Enter or Eject Operations

During an enter, the HSC tries to move the cartridge to an LSM (rail) adjacent to the CAP magazine. For ejects, the HSC attempts to eject cartridges to a CAP cell adjacent to the LSM containing the cartridge.

If these two operations are not possible, the library controller takes care of moving the cartridge through the elevator to another LSM. This requires movements between two handbots and the elevator.

## Merging ACSs

SL8500 PTP support allows multiple, separate SL8500s to be combined into a single ACS by running the MERGEcds utility. To minimize losing information about cartridges and to reduce operational downtime, follow the procedures described in this section.



**Note:** The HSC communicates to only one SL8500 in a library complex (ACS). All HSC requests and responses are routed through this SL8500, which forwards HSC requests to the other SL8500s as needed.

Two configurations are shown below. In the first, the ACSs to be merged are numbered from right to left (as you face them from the CAP side). In the second, they are numbered from left to right. It is assumed that the resulting ACS uses the lower or lowest ACSid.

### Configurations for ACSs Numbered Right to Left

Figure 27 and Figure 28 illustrate merging three ACSs numbered right to left, as you face them from the CAP side.

ACS2	ACS1	ACS0
LSM 02:00	LSM 01:00	LSM 00:00
LSM 02:01	LSM 01:01	LSM 00:01
LSM 02:02	LSM 01:02	LSM 00:02
LSM 02:03	LSM 01:03	LSM 00:03

**Figure 27. Existing Right to Left Configuration - Three Separate ACSs**

ACS0				
LSM 00:08		LSM 00:04		LSM 00:00
LSM 00:09	P	LSM 00:05	P	LSM 00:01
LSM 00:0A	T	LSM 00:06	T	LSM 00:02
LSM 00:0B	P	LSM 00:07	P	LSM 00:03

**Figure 28. Desired Configuration - Single ACS**

## Configurations for ACSs Numbered Left to Right

Figure 29 and Figure 30 illustrate merging three ACSs numbered left to right, as you face them from the CAP side.

ACS0	ACS1	ACS2
LSM 00:00	LSM 01:00	LSM 02:00
LSM 00:01	LSM 01:01	LSM 02:01
LSM 00:02	LSM 01:02	LSM 02:02
LSM 00:03	LSM 01:03	LSM 02:03

**Figure 29. Existing Left to Right Configuration - Three Separate ACSs**

ACS0				
LSM 00:08		LSM 00:04		LSM 00:00
LSM 00:09	P	LSM 00:05	P	LSM 00:01
LSM 00:0A	T	LSM 00:06	T	LSM 00:02
LSM 00:0B	P	LSM 00:07	P	LSM 00:03

**Figure 30. Desired Configuration - Single ACS**

## Merging ACSs using MERGEcds

The MERGEcds utility preserves volume information and runs quickly. This procedure requires that you terminate and restart the HSC, however, you must stop and restart the HSC if you are removing an ACS, so this is not an additional restriction for MERGEcds.

1. Assemble a LIBGEN to create a new CDS. Define all LSMs as a part of a single ACS.
2. Validate the LIBGEN by running SLICREAT to create a trial CDS with a different name.
3. Stop the HSC on all hosts.
4. Add new SL8500s to the library complex. Refer to “Adding and Configuring SL8500s” on page 465 for more information.
5. Run the BACKup utility to back up the CDS before the configuration change.
6. Run the RESTore utility to re-create the CDS that was active before the configuration change. Specify new CDS files with different names. This becomes the “from” CDS in the MERGEcds JCL example shown below.



**Note:** This restore resets the DSNs in the copies of the CDS.

The following is sample RESTore utility JCL.

```
//SLSREST JOB 505135,RESTORE,CLASS=A,MSGCLASS=1,MSGLEVEL=(1,1),
//          NOTIFY=SPRT,REGION=4096K
//*
//STEP0    EXEC PGM=SLUADMIN,PARM=MIXED
//STEPLIB DD DSN=NCS600.SOS6000.SLSLINK,DISP=SHR
//SLSBKUP  DD DSN=backup.name,DISP=(OLD)
//SLS_CNTL DD DSN=from.primary.cds,DISP=(NEW,CATLG,DELETE),
//          DCB=(DSORG=PS),UNIT=,SPACE=
//SLSCTL2  DD DSN=from.secondary.cds,DISP=(NEW,CATLG,DELETE),
//          DCB=(DSORG=PS),UNIT=,SPACE=
//SORTWK01 DD DSN=temp.sort,DISP=(NEW,DELETE,DELETE),
//          UNIT=,SPACE=
//SLSPRINT DD SYSOUT=*
//SLSIN    DD *
//          RESTORE APPLY(NO
//          /*
//          //
```

7. Execute SLICREAT to create the new real CDS.
8. Bring up the HSC to the BASE service level for the new CDS. This prevents mounts during the merge operation. Otherwise,
  - enters of new cartridges collide with existing cartridges.

- movements of cartridges to existing (renumbered) LSMs collide with cartridges already in the cells,
9. Run the MERGEcds utility to remap all the volume addresses in the new CDS. For the “from” CDS, use the restored HSC backup that was run before the configuration change. Refer to step 6.

The following is sample MERGEcds utility JCL.

```
//SLSMCDs JOB 505135,MERGECDs,CLASS=A,MSGCLASS=1,MSGLEVEL=(1,1),
//          NOTIFY=SPRT,REGION=4096K
//*
//STEP0    EXEC PGM=SLUADMIN,PARM=MIXED
//STEPLIB  DD DSN=NCS600.SOS6000.SLSLINK,DISP=SHR
//SLSFCNTL DD DSN=from.primary.cds,DISP=SHR
//SLSFCTL2 DD DSN=from.secondary.cds,DISP=SHR
//SLSPRINT DD SYSOUT=*
//SLSIN    DD *
MERGECDs
/*
/* Do NOT specify REALONLY because we must transfer all information
/* to the new CDS
//SLSMERGE DD *

/* Merge Statements, see below
/*
//
```

### ***SLSMERGE Statements - ACSs Numbered Right to Left***

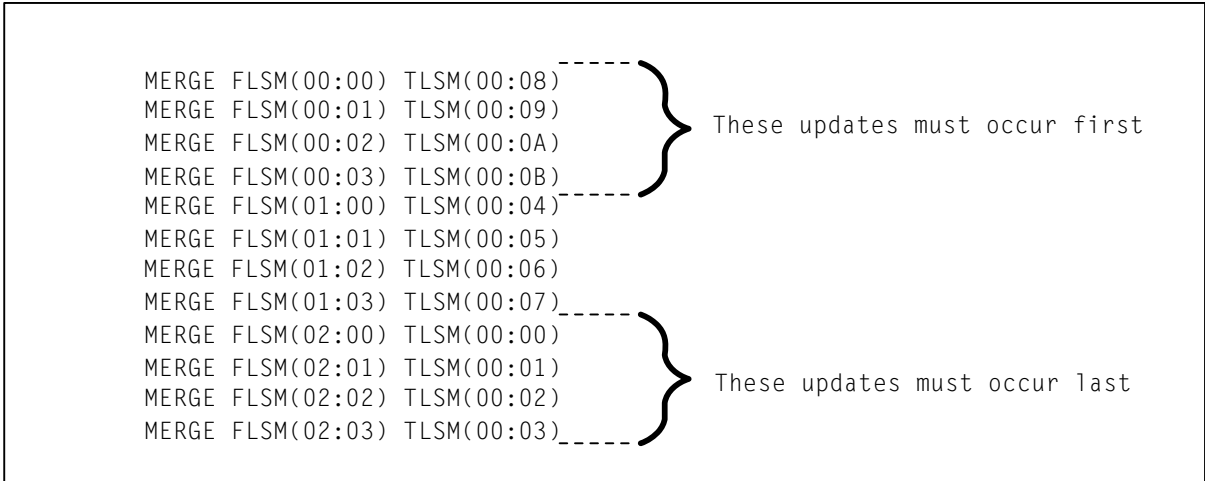
When you merge LSMs numbered right to left, the order the SLSMERGE statements are processed is not important. The “to” (TLSM) LSMs are not also the “from” (FLSM) LSMs.

```
MERGE FLSM(01:00) TLSM(00:04)
MERGE FLSM(01:01) TLSM(00:05)
MERGE FLSM(01:02) TLSM(00:06)
MERGE FLSM(01:03) TLSM(00:07)
MERGE FLSM(02:00) TLSM(00:08)
MERGE FLSM(02:01) TLSM(00:09)
MERGE FLSM(02:02) TLSM(00:0A)
MERGE FLSM(02:03) TLSM(00:0B)
```



### **SLSMERGE Statements - ACSs Numbered Left to Right**

When you merge LSMs numbered from left to right, **the order the SLSMERGE statements are processed is important**. In the example below, the “to” LSMs for the pre-existing ACS 2 (02:00-02:03) become the “from” LSMs 00:00-00:03. You must first update ACS 0, LSMs 00:00-00:03 to be “from” LSMs 00:08-00:0B. Otherwise, the volumes from both “from” LSMs 00:00-00:03 and 02:00-02:03 will be assigned to 00:08-00:0B.



10. Run the BACKup utility to back up the CDS after the merge.
11. Bring the HSC service level back to FULL, and resume normal operations.
12. Run the Database Decompile (LIBGEN) utility to generate LIBGEN macro statements from a modified CDS.

## Merging ACSs using AUDIt

If you do not run the MERGEcds utility to transfer volume information to the new CDS, you can run AUDIt to add volumes to a new, empty CDS. These volumes will not contain any customer-supplied scratch status information, and all usage records for cleaning cartridges is also lost.

The following procedure explains how to use the AUDIt utility to add volumes to a new CDS:

1. Assemble a LIBGEN to create a new CDS. Place all LSMs in a single ACS.
2. Validate the LIBGEN by running SLICREAT to create a trial CDS with a different name.
3. Stop the HSC on all hosts.
4. Add the new SL8500s to the library complex.
5. Run the BACKUp utility to back up the CDS before the configuration change.
6. Execute SLICREAT to create the new real CDS.
7. Run the BACKUp utility to back up the CDS after the configuration change.
8. Start the HSC with the new CDS on only one host. Keep the drives offline to MSP, since there is no reason to support automated mounts until AUDIt has added the volumes to the new CDS.
9. Run the AUDIt utility to audit the LSMs added to the ACS.
  - a. If you are merging ACSs that were numbered right to left, the order they are audited is not important. The entire ACS or all LSMs can be audited at the same time. AUDIt adds the volumes the volumes to the new CDS.
  - b. If you are merging ACSs that were numbered left to right, the order they are audited is important. **Audit the LSMs first in the SL8500 that retains the same ACS number.**

You want AUDIt to find these volumes in their new LSM addresses before you audit the LSMs that are now assigned to the old LSM addresses. The LSM addresses are updated for all volumes in these SL8500s.

10. Run the BACKUp utility to back up the CDS after the audits.
11. Restart the HSC on all hosts. Vary the drives online to MSP.
12. Run the Database Decompile (LIBGEN) utility to generate LIBGEN macro statements from a modified CDS.

## Removing PTPs and Splitting ACSs

You can remove PTP mechanisms that connect two SL8500s and separate a single ACS into two ACSs. This configuration change is the reverse of merging two ACSs into a single ACS.

Figure 31 shows an existing one ACS configuration.

ACS0						
LSM 00:0C	P T P	LSM 00:08	P T P	LSM 00:04	P T P	LSM 00:00
LSM 00:0D		LSM 00:09		LSM 00:05		LSM 00:01
LSM 00:0E		LSM 00:0A		LSM 00:06		LSM 00:02
LSM 00:0F		LSM 00:0B		LSM 00:07		LSM 00:03

**Figure 31. Existing One ACS Configuration**

Figure 32 shows the desired configuration, with ACS 0 split into two ACSs.

ACS1			ACS0		
LSM 01:04	P T P	LSM 01:00	LSM 00:04	P T P	LSM 00:00
LSM 01:05		LSM 01:01	LSM 00:05		LSM 00:01
LSM 01:06		LSM 01:02	LSM 00:06		LSM 00:02
LSM 01:07		LSM 01:03	LSM 00:07		LSM 00:03

**Figure 32. Desired Two ACS Configuration**

## Positioning a New ACS

StorageTek **recommends you locate the new ACS to the left side of the split**, which ensures that the HSC assigns higher-numbered LSMs to the new ACS and avoids renumbering the LSMs that remain in the existing LSM.

If you create a new ACS to the right side of the split, all volume addresses must be remapped using MERGEcds. The procedures below do not discuss creating the new ACS to the right of the split.

You can use either of these two utilities to add the new ACS on the left side of the split:

- MERGEcds
- AUDIt.

## Splitting an ACS using MERGEcds

MERGEcds is the preferred method to split an ACS, since it preserves volume information and runs quickly. When you add an ACS, you must terminate and restart the HSC with a new CDS.

1. Assemble a LIBGEN to create a new CDS. Place all LSMs in a single ACS.
2. Validate the LIBGEN by running SLICREAT to create a trial CDS with a different name.
3. Stop the HSC on all hosts.
4. Remove the four PTP mechanisms that connect the SL8500s you want to separate.
5. Run the BACKup utility to back up the CDS before the configuration change.
6. Run the RESTore utility to re-create the CDS that was active before the configuration change. Specify new CDS files with different names. This becomes the “from” CDS in the MERGEcds JCL example shown below.



**Note:** This restore resets the DSNs in the copies of the CDS.

The following is sample RESTore utility JCL.

```

//SLSREST JOB 505135,RESTORE,CLASS=A,MSGCLASS=1,MSGLEVEL=(1,1),
//          NOTIFY=SPRT,REGION=4096K
//*
//STEP0    EXEC PGM=SLUADMIN,PARM=MIXED
//STEPLIB DD DSN=NCS600.SOS6000.SLSLINK,DISP=SHR
//SLSBKUP DD DSN=backup.name,DISP=(OLD)
//SLSCNTL DD DSN=from.primary.cds,DISP=(NEW,CATLG,DELETE),
//          DCB=(DSORG=PS),UNIT=,SPACE=
//SLSCTL2 DD DSN=from.secondary.cds,DISP=(NEW,CATLG,DELETE),
//          DCB=(DSORG=PS),UNIT=,SPACE=
//SORTWK01 DD DSN=temp.sort,DISP=(NEW,DELETE,DELETE),
//          UNIT=,SPACE=
//SLSPRINT DD SYSOUT=*
//SLSIN    DD *
//          RESTORE APPLY(NO)
//*
//

```

7. Execute SLICREAT to create the new real CDS.
8. Bring up the HSC to the BASE service level for the new CDS. This prevents mounts during the merge operation. Otherwise,
  - mounts fail because cartridges cannot be found in their last known addresses.
  - until the audits update the HSC map of the empty cells in the renumbered LSMs:
    - enters of new cartridges collide with existing cartridges.
    - movements of cartridges to existing (renumbered) LSMs collide with cartridges already in the cells,
9. Run the MERGEcds utility to remap all the volume addresses in the CDS for the LSMs (rails) that are now in the new ACS. For the “from” CDS, use the restored HSC backup that was run before the configuration change. Refer to step 6.

The following is sample MERGEcds utility JCL.

```

//SLSMCD S JOB 505135,MERGECD S,CLASS=A,MSGCLASS=1,MSGLEVEL=(1,1),
//          NOTIFY=SPRT,REGION=4096K
//*
//STEP0   EXEC PGM=SLUADMIN,PARM=MIXED
//STEPLIB DD DSN=NCS600.SOS6000.SLSLINK,DISP=SHR
//SLSFCNTL DD DSN=from.primary.cds,DISP=SHR
//SLSFCTL2 DD DSN=from.secondary.cds,DISP=SHR
//SLSPRINT DD SYSOUT=*
//SLSIN   DD *
MERGECD S
/*
//* Do NOT specify REALONLY because we must transfer all information
//* to the new CDS
//SLSMERGE DD *

//* Merge Statements, see below
/*
//

```

An example of the MERGE statements is shown below, with the new ACS being created from SL8500s on the right. The order of the statements is not important, since the “to” LSMs are not also the “from” LSMs.

```

MERGE FLSM(00:08) TLSM(01:00)
MERGE FLSM(00:09) TLSM(01:01)
MERGE FLSM(00:0A) TLSM(01:02)
MERGE FLSM(00:0B) TLSM(01:03)
MERGE FLSM(00:0C) TLSM(01:04)
MERGE FLSM(00:0D) TLSM(01:05)
MERGE FLSM(00:0E) TLSM(01:06)
MERGE FLSM(00:0F) TLSM(01:07)

```

10. Run the BACKup utility to back up the CDS after the merge.
11. Bring the HSC service level back to FULL, and resume normal operations.
12. Run the Database Decompile (LIBGEN) utility to generate LIBGEN macro statements from a modified CDS.

## Splitting an ACS using AUDIt

If you do not run the MERGEcds utility to transfer volume information to the new CDS, you can run AUDIt to add volumes to a new, empty CDS. These volumes will not contain any customer-supplied scratch status information, and all usage records for cleaning cartridges is also lost.

The following procedure explains how to use the AUDIt utility to add volumes to a new CDS:

1. Assemble a LIBGEN to create a new CDS. Place all LSMs in a single ACS.
2. Validate the LIBGEN by running SLICREAT to create a trial CDS with a different name.
3. Stop the HSC on all hosts.
4. Add the new SL8500s to the library complex.
5. Run the BACKup utility to back up the CDS before the configuration change.
6. Execute SLICREAT to create the new real CDS.
7. Run the BACKup utility to back up the CDS after the configuration change.
8. Start the HSC with the new CDS on only one host. Keep the drives offline to MSP, since there is no reason to support automated mounts until AUDIt has added the volumes to the new CDS.
9. Run the AUDIt utility to audit the newly configured LSMs. The order in which the LSMs are audited does not matter, and the entire ACS or all LSMs can be audited at the same time. AUDIt adds the volumes to the new CDS.
10. Run the BACKup utility to back up the CDS after the audits.
11. Restart the HSC on all hosts. Vary the drives online to MSP.
12. Run the Database Decompile (LIBGEN) utility to generate LIBGEN macro statements from a modified CDS.

# Partitioning LSMs

## Overview

SL8500 LSM partitioning supports from one to four partitions established along LSM boundaries. There are many advantages to partitioning your library, for example, enabling service centers to keep a client from accessing another client's tapes, keeping various departments within the same company separate, and dividing a library between production and test environments.

The following procedures describe how to configure HSC partitioning on the SL8500 library.

- starting from scratch – LIBGEN, SLICREAT
- converting a non-partitioned ACS to a partitioned ACS
- converting a partitioned ACS to a non-partitioned ACS
- removing an LSM from a partition
- adding an LSM to a partition
- removing the **last** LSM from an ACS partition
- moving the **last** allocated LSM to another ACS partition
- moving an allocated LSM to another ACS partition.

In addition, these related topics are discussed:

- error recovery
- message changes
- LMUPATH control statement parameter update to connect to a specific partition
- SET FREEZE utility update to freeze an entire LSM
- Display command output changes.

## Partitioning Requirements and Prerequisites

Address these items before partitioning your library:

- Read the *SL8500 Best Practices Guide*.
- Call Sun Software Support to schedule a CSE to configure the SL8500. **This is required.**
- Make sure you are running HSC 6.1 or higher.
- Make sure you have installed firmware Version 3.7x or higher **and** SLConsole version FRS 3.25 or higher.



**Note:** Customers **MUST** be current on maintenance:

- HSC 6.1 (MSP) - LF61016 and any follow-on PTFs
- HSC 6.1 (MVS) - L1H13GW and any follow-on PTFs
- HSC 6.1 (VM) - L1H13GX and any follow-on PTFs.



## Restrictions

- Partitioning applies to a single SL8500 box containing only four rails (LSMs).
- Pass-thru ports (PTPs) to another SL8500 library are not supported.
- Hosts prior to HSC 6.1, or hosts without the partitioning PTF, cannot bring the partitioned ACS online.
- If the SL8500 being partitioned is not part of the CDS, it cannot be dynamically added to the CDS. A LIBGEN/SLICREAT/MergeCDS process must be performed.
- Whichever hosts own the other partitions (ACSLs, another HSC, etc.), the configuration is not complete until the inverse of the procedures is run. That is:
  - If an LSM is moving from one partition group to another, an ADD to one partition group implies a DELETE must be run on the other.
  - A DELETE to one partition group implies nothing; the ADD can occur to the other partition group at a later time.
- Volumes remaining in an LSM that is unallocated from one host group are deleted from that CDS when the ACS is reconfigured.

If the last LSM in an ACS host group is being unallocated, follow the “Remove the Last LSM from an ACS Partition” procedure shown on page 413.

- Volumes remaining in an LSM that is allocated to a host group are added to that CDS after running an AUDIt or MERGEcds.

Volume history is only preserved if MERGEcds is run.

- If a volume is mounted on a drive in an LSM that is unallocated before the drive goes offline, the volume is deleted from the CDS, and any future mount to that drive ends in an error.
- When moving volumes from one partition group to another, duplicate volumes **must** be considered.
- Prior to backing up the CDS described in the procedures that follow, NCS and VTCS systems **must** be in an idle state. This means draining all batch tape initiators, varying **all** automated MSP tape devices offline (real and virtual) and varying **all** RTDs defined in the VTCS configuration offline to VTCS.
- When a VTCS CONFIG RESET is required, **all** host systems must be down.

## LIBGEN Considerations

There are no changes to LIBGEN for partitioning.

## CAP Considerations

Partitioning affects CAP usage. Consider two situations that can be a common occurrence:

- **AUTO CAP** – In partitioning mode, AUTO CAP is disabled. If you are using AUTO CAP prior to partitioning the library, change it to manual. If it is not changed, the HSC changes it.
- **Overriding a CAP Reservation** – Consult the *SL8500 Best Practices Guide*.

## VM Considerations

For the most part, this documentation applies to both VM and MSP, with some specific references to the MSP environment. In references to the MSP environment, you must determine whether the reference is relevant to the VM environment and how it might apply to VM.

For example, this document refers to varying drives offline and online to MSP. Your configuration and operating environment determines if varying drives offline and online to VM is relevant.

## VTCS Considerations

For the most part, this document applies to both NCS and VTCS products, with some specific references to the VTCS environment. In regards to the VTCS product, references to tape activity includes **both** real and virtual tape processing.

## MVS/CSC Considerations

When you add drives, you must update the LIBUNIT and UNITMAP parameters with the new drives and drive locations. MVS/CSC must now be recycled. To use these new drives, recycling must take place **after** the drives have been added to LibraryStation. Devices can now be varied online to MVS to be eligible for allocation.

When you delete drives, to prevent further allocations, issue the SMC UNITATTR command, specifying the deleted drives and the MODEL IGNORE parameter. Update the LIBUNIT and UNITMAP parameters to remove these drives definitions. MVS/CSC loads these updated parameters the next time it is initialized. Failure to update these parameters prevents MVS/CSC from initializing.

## Definitions

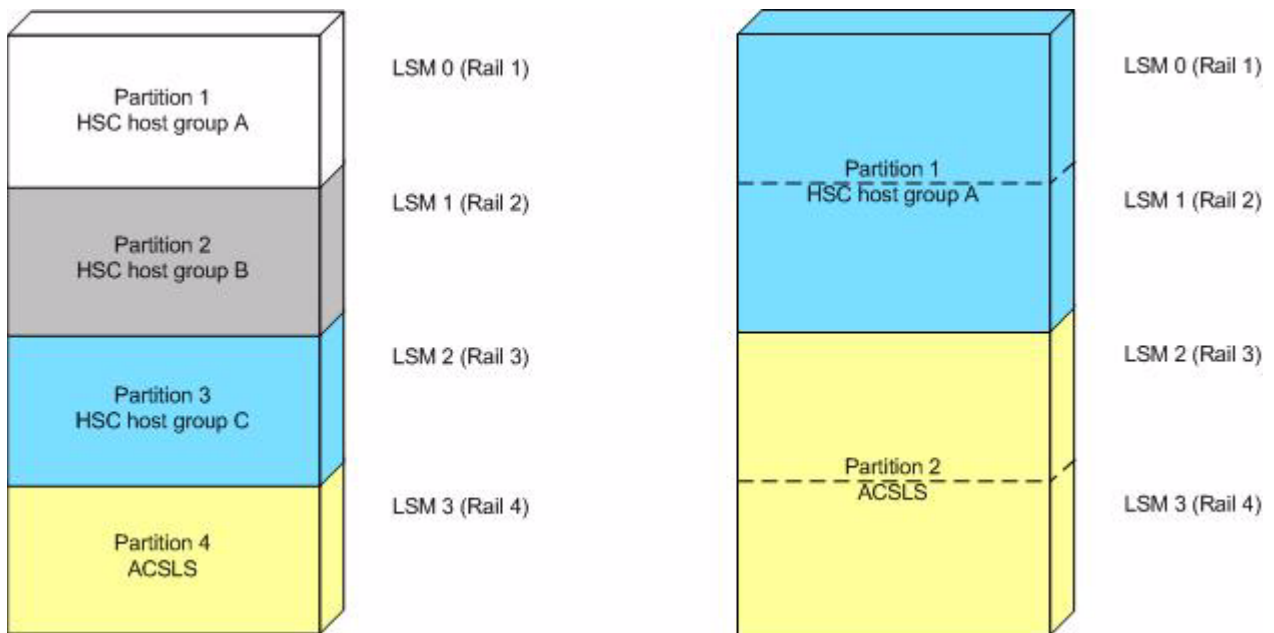
### Host Group

A set of hosts connected to an ACS and sharing one CDS. For the HSC, there can be up to 16 hosts in a host group.

### Partition

A partition is a segment of one SL8500 unit consisting of one or more LSMs for a maximum of four partitions (one LSM per partition). A partition gives exclusive control of cell and drives. When you define a partition, the LSMs (Rails) must be adjacent.

Figure 33 illustrates a partition and host group configuration.



**Figure 33. Partition and Host Group Example**

### Allocated LSM

An LSM assigned to an HSC partition from the Library Console.

### Unallocated LSM

An LSM that is either assigned to another partition or unassigned.

## Basic Procedures

### Start from Scratch – LIBGEN, SLICREAT

This procedure creates a partitioned SL8500 from scratch. No LIBGEN changes are required.

- 1. Run an HSC 6.1 or later LIBGEN assemble and the SLICREAT program.**

Create a new CDS using the procedures found in the “Initializing the Control Data Sets” chapter in the *HSC Configuration Guide*. The HSC must use HSC 6.1 or later SMP/E libraries. After running the SLICREAT program, a standard CDS is created.



**Note:** If virtual tape is being implemented, VTCS CONFIG must be run to define the configuration to VTCS.

- 2. Run the “Convert a Non-partitioned ACS to a Partitioned ACS” procedure shown on page 401 to partition the library.**

The SL8500 is now partitioned with all four LSMs in a single partition and is available for use. Start the HSC as usual. At a later time, if desired, use the “Remove an LSM from a Partition” procedure shown on page 405 to remove one to three LSMs from that partition.

## Convert a Non-partitioned ACS to a Partitioned ACS

This procedure converts an existing non-partitioned ACS to a partitioned ACS. The ACS must contain only one SL8500.

After completing the following steps, you will create a partitioned SL8500 with four LSMs in a single partition. At a later time, to remove any LSMs from this partition, use the “Remove an LSM from a Partition” procedure shown on page 405.

### 1. (Optional) Stop activity for drives in the affected ACS.

In preparation for reconfiguring the partition, stop all tape activity (both real and virtual) in that ACS from all active hosts.



**Note:** If activity is not stopped, jobs currently running continue to run. No new mount activity occurs and dismounts are delayed until the ACS is brought back online.

### 2. Issue the Display Cap command.

Issue the Display Cap command to verify the CAP is in manual status since this procedure does not go through the NCO process. If the CAP status is AUTOMATIC, issue the CAP Preference command to change the CAP to MANUAL:

```
CAPP prefval cap-id MANUAL
```

### 3. Vary the affected ACS offline to all hosts.

The ACS to be partitioned must be offline to **all** hosts. Issue the HSC command:

```
VARY ACS acs-id OFFLINE
```

### 4. Back up the CDS.

Before making changes to the CDS, it is best practice to create a backup copy for recovery purposes. This backup copy can be restored, if problems are encountered, to recover to a known CDS state using documented HSC recovery procedures.

Use the HSC BACKUp utility to create the backup CDS copy.



**Note:** If VTCS is involved, **all tape activity (real and virtual) must be stopped**. All virtual tape drives must be varied offline to MSP. All RTDs defined in the VTCS configuration must be varied offline to VTCS. It is highly recommended that all initiators be drained that feed both real and virtual tape drive processing. NCS and VTCS must be in an idle state prior to creating the backup copy of the CDS to avoid possibility of data loss.

### 5. Change the SL8500 configuration file to partition the ACS.

The internal configuration file in the SL8500 must be changed to show all LSMs are assigned to a partition ID. This change is made through the SLConsole.

## 6. Modify the HSC LMUPATH parameter in PARMLIB.

Add the PARTID(00*n*) keyword to the LMUPATH HSC parameter in PARMLIB. The ID(*n*) is obtained from the SLConsole.

Example: LMUPATH ACS(*acs-id*) LMUADDR(*ip-address*) PARTID(00*n*)



**Note:** Refer to the “LMUPATH Control Statement” on page 103 for further information.

## 7. Issue the HSC LMUPDEF command on all hosts.

To activate the modified LMUPATH statement, issue the HSC command:

```
LMUPDEF DATASET(dataset.name)
```

## 8. Vary the affected ACS online to all Hosts.

Issue the HSC command:

```
VARY ACS acs-id ONLINE
```

The HSC retains the online/offline status of each pre-existing LSM. If the LSMs do not modify online when the ACS is varied online, issue the HSC command:

```
MODIFY LSM lsm-id ONLINE
```

No additional mounts occur to the ACS until the ACS is varied online.



**Note:** Virtual tape environments are required to vary any RTDs online to VTCS. Additionally, any virtual tape drives varied offline need to be varied online to MSP.

## 9. Re-establish connections to all defined libraries (if necessary).

Re-establish connections to all defined libraries to acquire drive configuration information from these libraries. To re-drive any outstanding mounts that may have been lost due to hardware or communication errors, issue the SMC RESYNCHRONIZE command.

The ACS is now partitioned and available for use with all four LSMs in a single partition. If you are running multiple HSC hosts, the new configuration is propagated automatically to all hosts.

## Convert a Partitioned ACS to a Non-partitioned ACS

This procedure converts an existing partitioned ACS to a non-partitioned ACS. The ACS must contain only one SL8500, and all four LSMs are converted from partitioned to non-partitioned.

### 1. (Optional) Stop activity for drives in the affected ACS.

In preparation for reconfiguring the partition, stop all tape activity (both real and virtual) in that ACS from all active hosts.



**Note:** If activity is not stopped, jobs currently running continue to run. No new mount activity occurs, and dismounts are delayed until the ACS is brought back online.

### 2. Vary the affected ACS offline to all hosts.

The ACS to be unpartitioned must be offline to **all** hosts. Issue the HSC command:

```
VARY ACS acs-id OFFLINE
```

### 3. Back up the CDS.

Before making changes to the CDS, it is best practice to create a backup copy for recovery purposes. This backup copy can be restored, if problems are encountered, to recover to a known CDS state using documented HSC recovery procedures.

Use the HSC BACKUP utility to create the backup CDS copy.



**Note:** If VTCS is involved, **all tape activity (real and virtual) must be stopped**. All virtual tape drives must be varied offline to MSP. All RTDs defined in the VTCS configuration must be varied offline to VTCS. It is highly recommended that all initiators be drained that feed both real and virtual tape drive processing. NCS and VTCS must be in an idle state prior to creating the backup copy of the CDS to avoid the possibility of data loss.

### 4. Change the SL8500 configuration file to unpartition the ACS.

The internal configuration file in the SL8500 must be changed to show all LSMs are unassigned. This change is made through the SLConsole.

### 5. Modify the HSC LMUPATH parameter in PARMLIB.

Remove the PARTID(00*n*) keyword from the HSC LMUPATH parameter in PARMLIB.

Example: LMUPATH ACS(*acs-id*) LMUADDR(*ip-address*)



**Note:** Refer to “LMUPATH Control Statement” on page 103 for further information.

## 6. Issue the HSC LMUPDEF command on all hosts.

To activate the modified HSC LMUPATH statement, issue the HSC command:

```
LMUPDEF DATASET(dataset.name)
```

## 7. Vary the affected ACS online to all hosts.

Issue the HSC command:

```
VARY ACS acs-id ONLINE
```

The HSC retains the online/offline status of each pre-existing LSM. If the LSMs do not modify online when the ACS is varied online, issue the HSC command:

```
MODIFY LSM lsm-id ONLINE
```

No additional mounts occur to the ACS until the ACS is varied online. All other hosts complete their configuration process when the ACS is varied online.



**Note:** Virtual tape environments are required to vary any RTDs online to VTCS. Additionally, any virtual tape drives varied offline need to be varied online to MSP.

## 8. Re-establish connections to all defined libraries (if necessary).

Re-establish connections to all defined libraries to acquire drive configuration information from these libraries. To re-drive any outstanding mounts that may have been lost due to hardware or communication errors, issue the SMC RESYNCHRONIZE command.

The ACS is now unpartitioned and available for use. If you are running multiple HSC hosts, the new configuration is propagated automatically to all hosts.



## Remove an LSM from a Partition

This procedure removes an LSM from an existing partition.



**Note:** To remove all LSMs from a partition, the ACS cannot be deleted without a LIBGEN/MergeCDS. If the HSC is recycled, the ACS attempts to come online, fails, and goes into recovery. After a timeout, it remains offline. The HSC continues to initialize even with this failure. To delete the last LSM in a partitioned ACS, use the “Remove the Last LSM from an ACS Partition” procedure shown on page 413.

Also, to move an LSM from one partition to another and to **retain volume history** (usage counts, encryption state, etc.), use the “Move the Last Allocated LSM to Another ACS Partition” procedure shown on page 418.

### 1. Stop activity for drives in the affected ACS.

In preparation for reconfiguring the partition, stop all tape activity (both real and virtual) from all active hosts, including RTD tape processing, in that ACS. **Failure to do so results in lost cartridges and errors on dismount.**

Vary drives (both real and virtual) offline to **all** MSP hosts that will no longer have access to the drives. From the MSP console, issue

```
D U, , ,xxx-yyy
```

where xxx-yyy is the drive ID or UCB range, to see if the drives in the affected LSM are offline to MSP. If not, vary the drives offline with the MSP command:

```
VARY xxx-yyy OFFLINE
```

Additionally, any RTDs that reside on the affected LSM need to be varied offline. To do this, issue the VTCS command:

```
.VT V RTD(rtid_id) OFF
```



**Warning:** Failure to perform this step may result in the devices being removed becoming allocated. This may cause severe operational consequences including loss of access for any cartridge mounted at the time of the partitioning.

## 2. Back up the CDS.

Before making changes to the CDS, it is best practice to create a backup copy for recovery purposes. This backup copy can be restored, if problems are encountered, to recover to a known CDS state using documented HSC recovery procedures.

Use the HSC BACKUP utility to create the backup CDS copy.



**Note:** If VTCS is involved, **all tape activity (real and virtual) must be stopped.** All virtual tape drives must be varied offline to MSP. All RTDs defined in the VTCS configuration must be varied offline to VTCS. It is highly recommended that all initiators be drained that feed both real and virtual tape drive processing. NCS and VTCS must be in an idle state prior to creating the backup copy of the CDS to avoid possibility of data loss.

## 3. Run the SET Freeze utility to freeze affected LSM.

To stop cartridges from migrating to the LSM to be unallocated, run the SET FREEZE utility:

```
SET FREEZE(ON) FORLSMID(lsm-id)
```



**Note:** When an LSM is frozen, no new cell allocations occur, however, any cartridge from the LSM that is currently mounted on a drive returns to its home cell.

## 4. Run the Volume Report utility.

Run a volume report on the affected LSM and keep the output. This data can be used later to verify which volumes were in the LSM before it was unallocated.



**Note:** Systems with VTCS should run an MVC report for cross reference purposes.

## 5. Move cartridges out of the affected LSM.

Move all cartridges from the affected LSM to other online LSMs within the same partition. Use ExLM, the HSC MOVE command, or the HSC MOVE utility. If cartridges are not to remain under library control, they can be ejected.

Do not enter the library and physically remove the cartridges; use the HSC MOVE command or utility or use ExLM to clear the LSM. This ensures the CDS is properly updated.



**Note:** If the cartridges are not moved out of the LSM prior to removing the LSM from the configuration, the volume history in the CDS is deleted when the configuration change is completed. To retain the volume history when the LSM is moved to a different partition, use the “Move the Last Allocated LSM to Another ACS Partition” procedure shown on page 418.

**6. Vary the affected ACS offline to all host groups.**

The ACS must be offline to **all** host groups. Issue the HSC command:

```
VARY ACS acs-id OFFLINE
```

**7. Run the SET SLIDRIVS utility (match CDS drive configuration to the library).**

Remove drives from the HSC for the affected LSM by running the SLUADMIN utility or command for SET SLIDRIVS.

```
SET SLIDRIVS(,,,,,,,,,,,,,) +  
FORLSMID(lsm-id),FORPANEL(01)
```



**Notes:**

- If the drives are not removed prior to removing the LSM from the ACS, the drives displays a type of “unknown.”
- If VTCS is involved, any RTDs moving out of the CDS require a VTCS CONFIG RESET to be run to remove the specific RTDs out of the VTCS configuration.

**8. Change the SL8500 configuration file to remove the affected LSM from the partition.**

The internal configuration file in the SL8500 must be changed to unallocate the LSM. This change is made through the SLConsole.

**9. Vary the affected ACS online to all host groups.**

Issue the HSC command:

```
VARY ACS acs-id ONLINE
```

The HSC retains the online/offline status of each pre-existing LSM. If the LSMs do not modify online when the ACS is varied online, issue the HSC command:

```
MODIFY LSM lsm-id ONLINE
```

No additional mounts occur to the ACS until the ACS is varied online. All other hosts complete their configuration process when the ACS is varied online.



**Notes:**

- Virtual tape environments are required to vary any RTDs online to VTCS. Additionally, any virtual tape drives varied offline need to be varied online to MSP.

- **Prior to performing this step, ensure that SET SLIDRIVS (step 7.) is performed so that the CDS drive configuration matches EXACTLY to the new drive configuration on the SL8500 library. Since this partitioning process involves unallocating an LSM and removing all associated drives from the configuration, the SET SLIDRIVS statement should look as follows:**

```
SET SLIDRIVS(,,,,,,,,,,,,,) +  
FORLSMID(lsm_id),FORPANEL(01)
```

**10. Re-establish connections to all defined libraries (if necessary).**

Re-establish connections to all defined libraries to acquire drive configuration information from these libraries. To re-drive any outstanding mounts that may have been lost due to hardware or communication errors, issue the SMC RESYNCHRONIZE command.

The LSM is removed from the configuration, and the remaining LSMs are available for use. If running multiple HSC hosts, the new configuration is propagated automatically to all hosts.

## Add an LSM to a Partition

This procedure adds an LSM to a partition. It assumes the SL8500 is already partitioned and an additional LSM is being added to that partition.

If the ACS is not partitioned, use the “Convert a Non-partitioned ACS to a Partitioned ACS” procedure shown on page 401 to make it partitioned.



**Note:** If the SL8500 to be partitioned is not part of the CDS, it cannot be dynamically added. A LIBGEN/MERGEcds must be performed.

To retain volume history, use the “Move the Last Allocated LSM to Another ACS Partition” procedure shown on page 418.

### 1. Stop activity for drives in the affected ACS.

In preparation for reconfiguring the partition, stop all tape activity (both real and virtual) from all active hosts, including RTD tape processing, in that ACS. **Failure to do so results in lost cartridges and errors on dismount.**

Vary drives (both real and virtual) offline to **all** MSP hosts that will no longer have access to the drives. From the MSP console, issue

```
D U, , ,xxx-yyy
```

where xxx-yyy is the drive ID or UCB range, to see if the drives in the affected LSM are offline to MSP. If not, vary the drives offline with the MSP command:

```
VARY xxx-yyy OFFLINE
```

Additionally, any RTDs that reside on the affected LSM need to be varied offline. To do this, issue the VTCS command:

```
.VT V RTD(rtd_id) OFF
```



**Warning: Failure to perform this step may result in the devices being removed becoming allocated. This may cause severe operational consequences including loss of access for any cartridge mounted at the time of the partitioning.**

### 2. Back up the CDS.

Before making changes to the CDS, it is best practice to create a backup copy for recovery purposes. This backup copy can be restored, if problems are encountered, to recover to a known CDS state using documented HSC recovery procedures.

Use the HSC BACKUP utility to create the backup CDS copy.



**Note:** If VTCS is involved, **all tape activity (real and virtual) must be stopped.** All virtual tape drives must be varied offline to MSP. All RTDs defined in the VTCS configuration must be varied offline to VTCS. It is highly recommended that all initiators be drained that feed both real and virtual tape drive processing. NCS and VTCS must be in an idle state prior to creating the backup copy of the CDS to avoid possibility of data loss.

### 3. Ensure the new LSM is available.

The LSM being allocated may have been owned at one time by another host system (ACSLs, another HSC, etc.). Verify the LSM obtained has been properly cleared and processed.

Run the “Remove an LSM from a Partition” procedure on page 405 and remove all cartridges.

### 4. Vary the affected ACS offline to all host groups.

The ACS must be offline to **all** host groups. Issue the HSC command:

```
VARY ACS acs-id OFFLINE
```

### 5. Change the SL8500 configuration file to add the LSM to the partition.

The internal configuration file in the SL8500 must be changed to show that the newly added LSM(s) is assigned to a partition ID. This change is made through the SLConsole. Verify the PARTID from the SLConsole is the same as the PARTID in the HSC LMUPDEF.

### 6. Run the SET SLIDRIVS utility (match the CDS drive configuration to the library).

Add drives to the new LSM by running the SLUADMIN utility or command for SET SLIDRIVS.

```
SET SLIDRIVS(drv1,drv2,drv3,,,,,,,,,,,,,) +  
FORLSMID(lsm-id),FORPANEL(01)
```



**Note:** If VTCS is involved, any RTDs moving into the CDS require a VTCS CONFIG RESET to be run to add the specific RTDs to the VTCS configuration.

### 7. Vary the affected ACS online to all host groups.

Issue the HSC command:

```
VARY ACS acs-id ONLINE
```

The HSC retains the online/offline status of each pre-existing LSM. If the LSMs do not modify online when the ACS is varied online, issue the HSC command:

```
MODIFY LSM lsm-id ONLINE
```

No additional mounts occur to the ACS until the ACS is varied online.

All other hosts complete their configuration process when the ACS is varied online.



### Notes:

- Virtual tape environments are required to vary any RTDs online to VTCS. Additionally, any virtual tape drives varied offline need to be varied online to MSP.
- Prior to performing this step, ensure that SET SLIDRIVS (step 6. in this procedure) is performed so that the CDS drive configuration matches EXACTLY to the new drive configuration on the SL8500 library.

### 8. Run the SET Freeze utility to un-freeze the affected LSM.

To allow you to use all cartridge cells, run the SET FREEZE utility:

```
SET FREEZE(OFF) FORLSMID(lsm-id)
```

### 9. Run the HSC AUDIt utility.

Run the HSC AUDIt utility against all LSMs in the ACS.

This step may be bypassed if no volumes have been added, deleted, or moved. It must be run if new LSMs have been allocated to the configuration.

Follow company standard procedures for any cartridges found in the newly allocated LSM.

### 10. Run the HSC Scratch Update utility (if necessary).

Run the HSC Scratch Update utility.

This step may be bypassed if no volumes have been added, deleted, or moved.

### 11. Vary drives online to MSP (if necessary).

From the MSP console, issue

```
D U, , ,xxx-yyy
```

where xxx-yyy is the drive ID range (both real and virtual), to see if the new drives are online to MSP. If they are not, bring them online with the MSP command:

```
VARY xxx-yyy ONLINE
```

### 12. Vary RTDs online to VTCS (if necessary).

From the MSP console, issue

```
.VT V RTD(rtd-id) ON
```

for the RTDs that reside on the LSMs being allocated.

### **13. Re-establish connections to all defined libraries (if necessary).**

Re-establish connections to all defined libraries to acquire drive configuration information from these libraries. To re-drive any outstanding mounts that may have been lost due to hardware or communication errors, issue the SMC RESYNCHRONIZE command.

The LSM is now added to the configuration and is available for use. If running multiple HSC hosts, the new configuration is propagated automatically to all hosts.



## Remove the Last LSM from an ACS Partition

Normally, use the “Remove an LSM from a Partition” procedure shown on page 405 to remove an LSM from a partitioned ACS. If you are attempting to remove the last LSM from an ACS, the HSC will no longer be able to communicate with that ACS. Therefore, use this procedure to remove the last LSM from the CDS.

Figure 34 on page 417 illustrates the procedure described below.



**Note:** This set of procedures is disruptive, since it requires a LIBGEN/MERGEcds and cannot be done dynamically using Near Continuous Operation (NCO). If the ACS removing its last LSM is the only ACS in that CDS, steps pertaining to a separate LIBGEN (steps 1 through 8) do not need to be performed.

### 1. Stop activity for drives in the affected ACS.

In preparation for reconfiguring the partition, stop all tape activity (both real and virtual) from all active hosts in that ACS, including RTD tape processing. **Failure to do this results in lost cartridges and errors on dismount.**

Vary drives offline to **all** MSP hosts that will no longer have access to the drives. From the MSP console, issue

```
D U, , ,xxx-yyy
```

where xxx-yyy is the drive ID or UCB range, to see if the drives in the affected LSM are offline to MSP. If not, vary the drives offline with the MSP command:

```
VARY xxx-yyy OFFLINE
```

Additionally, any RTDs that reside on the affected LSM need to be varied offline. To do this, issue the VTCS command:

```
.VT V RTD(rtd_id) OFF
```



**Warning: Failure to perform this step may result in the devices that are being removed becoming allocated.** This may cause severe operational consequences including loss of access for any cartridge mounted at the time of the partitioning.

## 2. Back up the CDS containing the LSM to be unallocated (CDS01).

Before running a MERGEcds utility, it is best practice to create a backup copy for recovery purposes. This backup copy can be restored, if problems are encountered, to recover to a known CDS state using documented HSC recovery procedures.

Use the HSC BACKup utility to create the backup CDS copy.



**Note:** If VTCS is involved, **all tape activity (real and virtual) must be stopped.** All virtual tape drives must be varied offline to MSP. All RTDs defined in the VTCS configuration must be varied offline to VTCS. It is highly recommended that all initiators be drained that feed both real and virtual tape drive processing. NCS and VTCS must be in an idle state prior to creating the backup copy of the CDS to avoid possibility of data loss.

## 3. Use SLICREAT to create a new CDS (CDS03).

Use SLICREAT to create a new CDS identical to CDS01, except the ACS containing the last LSM to be unallocated is not in the SLICREAT.



**Note:** If virtual tape is being implemented, VTCS CONFIG must be run to define a virtual tape configuration to the new (CDS03).

## 4. Stop all Active HSC(s) for hosts connected to CDS01.

Stop all active HSC(s) for the partition where the last LSM is being unallocated. Normal tape activity must cease until the new CDS is available.

## 5. Remove the HSC LMUPATH parameter in PARMLIB.

Remove the HSC LMUPATH parameter in PARMLIB for the ACS being removed.

## 6. Start Single HSC pointing to new CDS (CDS03) using BASE mode.

Start the HSC for the partition where the last LSM is being unallocated. The HSC must be started at the BASE service level to run MERGECDs. This can be accomplished by adding the HSC command

```
START HSC,PRM='BASE'
```

to the HSC start up PARMLIB member.

## 7. Run MERGEcds.

Input is CDS01. Output is the CDS (CDS03) minus the ACS containing the last LSM. The example below shows going from three ACSs to two ACSs with ACS 01 being removed. For other examples, refer to the the MERGEcds utility in the *HSC Systems Programmer's Guide*.

```
//jobcard
//STEP1 EXEC PGM=SLUADMIN,PARM='MIXED'
//STEPLIB DD DISP=SHR,DSN=dataset.name
//*
//SLSPRINT DD SYSOUT=*
//*
//SLSFCNTL DD DSN=CDS01.primary,DISP=SHR
//*
//SLSIN DD *
MERGECDs
//SLSMERGE DD *
MERGE FACS(00) TACS(00)
MERGE FACS(02) TACS(01)
/*
//
```

## 8. Set the Service Level to full.

Set the service level to full for the HSC pointing to the new CDS (CDS03). Issue the HSC command:

```
SRVLEV FULL
```

## 9. Start the remaining HSC(s) using CDS03.

All HSCs should successfully initialize using the updated configuration.



**Note:** From the HSC perspective for this host group, the procedure is complete. From a library perspective, to restore the LSM to an unallocated state, perform the remaining steps.

## 10. Vary the affected ACS offline to all host groups.

The ACS containing the LSM to be unallocated must be offline to **all** host groups. Issue the HSC command:

```
VARY ACS acs-id OFFLINE
```

## 11. Change the SL8500 configuration file using CDS03 (with LSM unallocated).

The internal configuration file in the SL8500 must be changed to unallocate the LSM. This change is made through the SLConsole.

## 12. Vary the affected ACS online to all host groups.

Issue the HSC command:

```
VARY ACS acs-id ONLINE
```

The HSC retains the online/offline status of each pre-existing LSM. If the LSMs do not modify online when the ACS is varied online, issue the HSC command:

```
MODIFY LSM lsm-id ONLINE
```

No additional mounts occur to the ACS until the ACS is varied online.

All other hosts complete their configuration process when the ACS is varied online.



**Note:** Virtual tape environments are required to vary any RTDs online to VTCS. Additionally, any virtual tape drives varied offline need to be varied online to MSP.

## 13. Re-establish connections to all defined libraries (if necessary).

Re-establish connections to all defined libraries to acquire drive configuration information from these libraries. To re-drive any outstanding mounts that may have been lost due to hardware or communication errors, issue the SMC RESYNCHRONIZE command.

If you are running multiple HSC hosts, the new configuration is propagated automatically to all hosts.

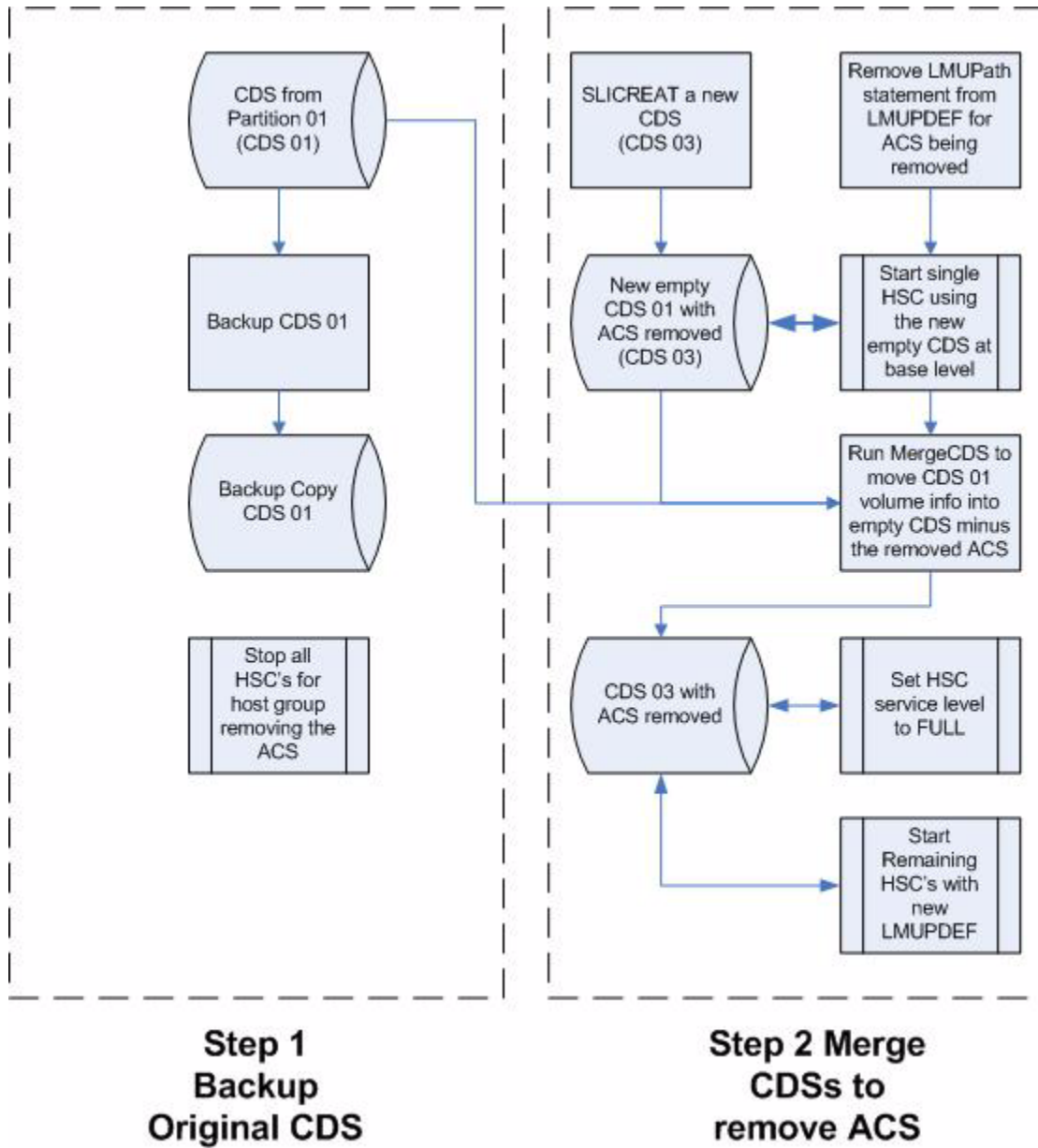


Figure 34. Process Flow to Remove the Last LSM in an ACS

## Move the Last Allocated LSM to Another ACS Partition

This procedure moves the last allocated LSM to another partitioned ACS and preserves the history of the LSM volumes being added. Figure 35 on page 422 illustrates the procedure described below.



**Note:** This set of procedures is disruptive since it requires a LIBGEN/MERGEcds and cannot be done using Near Continuous Operation (NCO).

- 1. Complete steps 1 through 10 in the “Remove the Last LSM from an ACS Partition” procedure shown on page 413.**

To remove all LSMs from a partitioned ACS, including the last LSM, follow steps 1 through 10 in the same procedure.

- 2. Back up the CDS that will receive the LSM (CDS02).**

Before running a MERGEcds, it is best practice to create a backup copy for recovery purposes. This backup copy can be restored, if problems are encountered, to recover to a known CDS state using documented HSC recovery procedures.

Use the HSC BACKUp utility to create the backup CDS copy.



**Note:** If VTCS is involved, **all tape activity (real and virtual) must be stopped.** All virtual tape drives must be varied offline to MSP. All RTDs defined in the VTCS configuration must be varied offline to VTCS. It is highly recommended that all initiators be drained that feed both real and virtual tape drive processing. NCS and VTCS must be in an idle state prior to creating the backup copy of the CDS to avoid possibility of data loss.

### 3. Run MERGEcds again.

Input is CDS01. Output is an updated CDS (CDS02). This example moves the LSM 03 volume history from ACS 00 (CDS01) to LSM 03 in ACS 01 (CDS02). For other examples, refer to the MERGEcds utility in the *HSC Systems Programmer's Guide*.

```
//jobcard
//STEP1 EXEC PGM=SLUADMIN,PARM='MIXED'
//STEPLIB DD DISP=SHR,DSN=dataset.name
//*
//SLSPRINT DD SYSOUT=*
//*
//SLSFCNTL DD DSN=CDS01.primary,DISP=SHR
//*
//SLSIN DD *
MERGECDs
//SLSMERGE DD *
MERGE FLSM(00:03) TLSM(01:03)
/*
//
```

### 4. Run the SET SLIDRIVS utility (match the CDS drive configuration to the library).

Add drives to the new LSM by running the SLUADMIN utility or command for SET SLIDRIVS.

```
SET SLIDRIVS(drv1,drv2,drv3,,,,,,,,,,,,) +
FORLSMID(lsm_id),FORPANEL(01)
```



**Note:** If VTCS is involved, any RTDs moving into the CDS require a VTCS CONFIG RESET to be run to add the specific RTDs to the VTCS configuration.

### 5. Change the SL8500 Configuration file using CDS02 (with the new LSM added).

The internal configuration file in the SL8500 must be changed to move the LSM from one partition to another. This change is made through the SLConsole.

## 6. Vary the affected ACS online to all host groups.

Issue the HSC command:

```
VARY ACS acs-id ONLINE
```

The HSC retains the online/offline status of each pre-existing LSM. If the LSMs do not modify online when the ACS is varied online, issue the HSC command:

```
MODIFY LSM lsm-id ONLINE
```

No additional mounts occur to the ACS until the ACS is varied online. All other hosts complete their configuration process when the ACS is varied online.



**Note:** Virtual tape environments are required to vary any RTDs online to VTCS. Additionally, any virtual tape drives varied offline need to be varied online to MSP.

## 7. Run the HSC Scratch Update utility (if necessary).

Run an HSC Scratch Update utility.

This step may be bypassed if no volumes have been added, deleted, or moved. It must be run if new LSMs have been added to the configuration.

## 8. Run the SET Freeze utility to un-freeze the added LSM.

To allow you to use all cartridge cells, run the SET FREEZE utility:

```
SET FREEZE(OFF) FORLSMID(lsm-id)
```

## 9. Vary drives online to MSP (if necessary).

From the MSP console, issue

```
D U, , ,xxx-yyy
```

where *xxx-yyy* is the drive ID range (both real and virtual), to see if the new drives are online to MSP. If they are not, bring them online with the MSP command:

```
VARY xxx-yyy ONLINE
```

## 10. Vary RTDs online to VTCS (if necessary).

From the MSP console, issue

```
.VT V RTD(rtd-id) ON
```

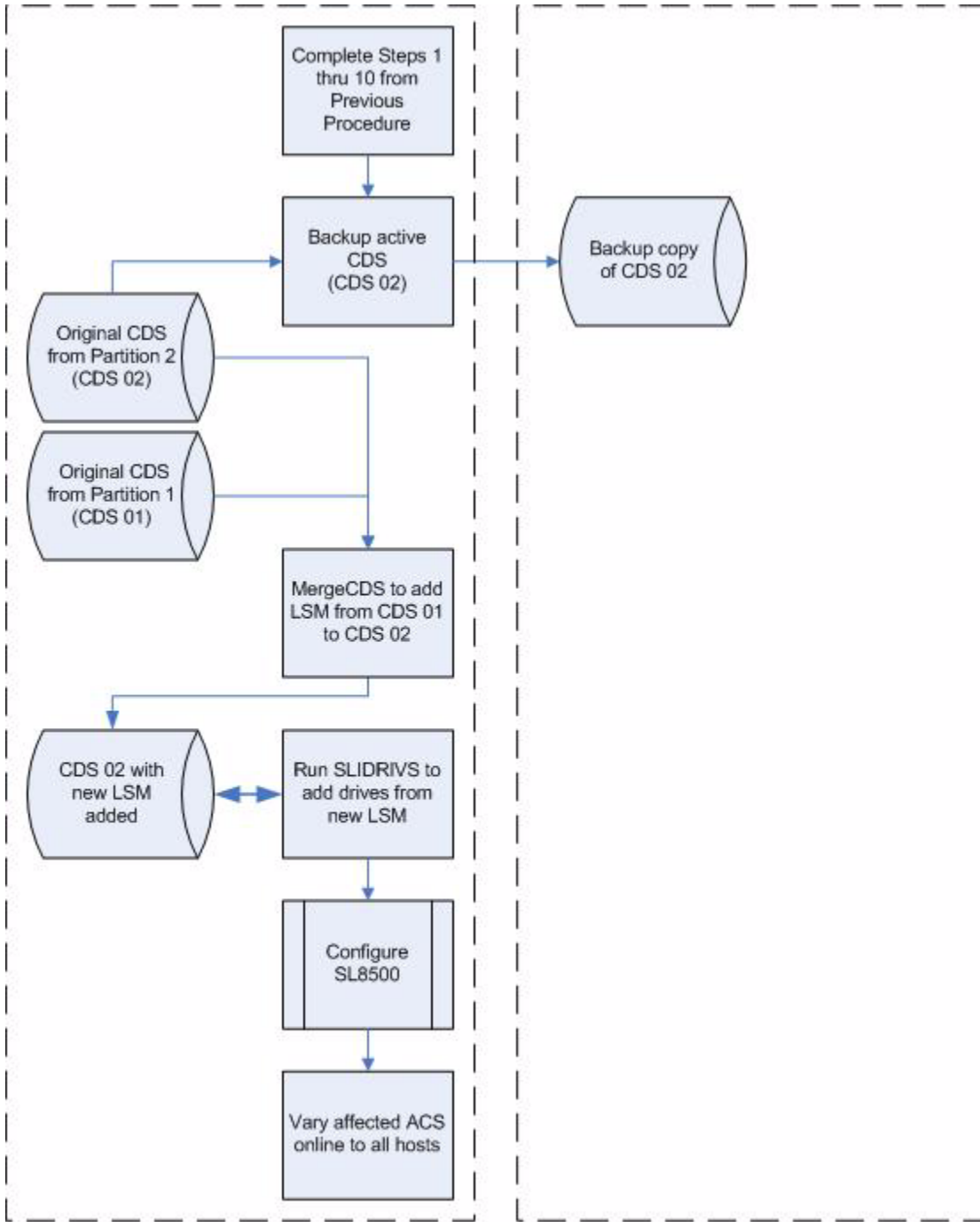
for the RTDs that reside on the LSMs being allocated.



**11. Re-establish connections to all defined libraries (if necessary).**

Re-establish connections to all defined libraries to acquire drive configuration information from these libraries. To re-drive any outstanding mounts that may have been lost due to hardware or communication errors, issue the SMC RESYNCHRONIZE command.

If you are running multiple HSC hosts, the new configuration is propagated automatically to all hosts.



**STEP 1**

**Move LSM to another CDS**

*Figure 35. Process Flow to Move the Last LSM to Another ACS Partition*

## Move an Allocated LSM to another ACS Partition

This procedure moves an allocated LSM to another partitioned ACS and preserves the history of the LSM volumes being allocated. Figure 36 on page 428 illustrates the procedure described below.



**Note:** This set of procedures is disruptive as it requires a LIBGEN/MERGEcds and cannot be done using Near Continuous Operation (NCO).

### 1. Stop activity for drives in the affected ACS.

In preparation for reconfiguring the partition, you must stop all tape activity (both real and virtual), from all active hosts, including virtual tape processing, in that ACS. **Failure to do this results in lost cartridges and errors on dismount.**

Vary drives offline to **all** MSP hosts that will no longer have access to the drives. From the MSP console, issue

```
D U, , ,xxx-yyy
```

where *xxx-yyy* is the drive ID or UCB range, to see if the drives in the affected LSM are offline to MSP. If they are not, bring them offline with the MSP command:

```
VARY xxx-yyy OFFLINE
```

Additionally, any RTDs that reside on the affected LSM need to be varied offline. To do this, issue the VTCS command:

```
.VT V RTD(rtid_id) OFF
```



**Warning:** Failure to perform this step to vary these drives offline from MSP results in these devices becoming allocated while removing the LSM from the partition. This may cause severe operational consequences including loss of access for any cartridge that was mounted at the time of the partitioning.

### 2. Vary the affected ACS offline to all host groups.

The ACS must be offline to **all** host groups. Issue the HSC command:

```
VARY ACS acs-id OFFLINE
```

### 3. Back up the CDS containing the LSM to be unallocated (CDS01).

Before running a MERGEcds, it is best practice to create a backup copy for recovery purposes. This backup copy can be restored, if problems are encountered, to recover to a known CDS state using documented HSC recovery procedures.

Use the HSC BACKup utility to create the backup CDS copy.



**Note:** If VTCS is involved, **all tape activity (real and virtual) must be stopped.** All virtual tape drives must be varied offline to MSP. All RTDs defined in the VTCS configuration must be varied offline to VTCS. It is highly recommended that all initiators be drained that feed both real and virtual tape drive processing. NCS and VTCS must be in an idle state prior to creating the backup copy of the CDS to avoid possibility of data loss.

### 4. Backup all CDSs with partitions connected to the SL8500.

Before running a MERGEcds, it is best practice to create backup copies of the remaining CDSs for recovery purposes. These backup copies can be restored, if problems are encountered, to recover to a known CDS state using documented HSC recovery procedures.

Use the HSC BACKup utility to create the backup CDS copy.



**Note:** If VTCS is involved, **all tape activity (real and virtual) must be stopped.** All virtual tape drives must be varied offline to MSP. All RTDs defined in the VTCS configuration must be varied offline to VTCS. It is highly recommended that all initiators be drained that feed both real and virtual tape drive processing. NCS and VTCS must be in an idle state prior to creating the backup copy of the CDS to avoid possibility of data loss.

## 5. Run the MERGEcds utility.

Input is CDS01. Output is an updated CDS (CDS02). This example moves the LSM volume history from LSM 00 in ACS 00 (CDS01) to LSM 00 in ACS 01 (CDS02). For other examples, refer to the MERGEcds utility in the *HSC Systems Programmer's Guide*.

```
//jobcard
//STEP1 EXEC PGM=SLUADMIN,PARM='MIXED'
//STEPLIB DD DISP=SHR,DSN=dataset.name
//*
//SLSPRINT DD SYSOUT=*
//*
//SLSFCNTL DD DSN=CDS01.primary,DISP=SHR
//*
//SLSIN DD *
MERGECDs
//SLSMERGE DD *
MERGE FLSM(00:00) TLSM(01:00)
/*
//
```

## 6. Run the SET SLIDRIVS utility (match the CDS drive configuration to the library).

Add drives to the new LSM by running the SLUADMIN utility or command for SET SLIDRIVS.

```
SET SLIDRIVS(drv1,drv2,drv3,,,,,,,,,,,,) +
FORLSMID(lsm_id),FORPANEL(01)
```



**Note:** If VTCS is involved, any RTDs moving into the CDS require a VTCS CONFIG RESET to be run to add the specific RTDs to the VTCS configuration.

## 7. Change the SL8500 configuration file to move the LSM.

The internal configuration file in the SL8500 must be changed to move the LSM from one partition to another. This change is made through the SLConsole.

## 8. Vary the affected ACS online to all host groups.

Issue the HSC command:

```
VARY ACS acs-id ONLINE
```

The HSC retains the online/offline status of each pre-existing LSM. If the LSMs do not modify online when the ACS is varied online, issue the HSC command:

```
MODIFY LSM lsm-id ONLINE
```

No additional mounts occur to the ACS until the ACS is varied online.

All other hosts complete their configuration process when the ACS is varied online.



**Note:** Virtual tape environments are required to vary any RTDs online to VTCS. Additionally, any virtual tape drives varied offline need to be varied online to MSP.

## 9. Run the HSC Scratch Update utility (if necessary).

Run an HSC Scratch Update utility.

This step may be bypassed if no volumes have been added, deleted, or moved. It must be run if new LSMs have been added to the configuration.

## 10. Run the SET Freeze utility to un-freeze the added LSM.

To allow you to use all cartridge cells, run the SET FREEZE utility:

```
SET FREEZE(OFF) FORLSMID(lsm-id)
```

## 11. Vary drives online to MSP (if necessary).

From the MSP console, issue

```
D U,,,xxx-yyy
```

where *xxx-yyy* is the drive ID range (both real and virtual), to see if the new drives are online to MSP. If they are not, bring them online with the MSP command:

```
VARY xxx-yyy ONLINE
```

## 12. Vary RTDs online to VTCS (if necessary).

From the MSP console, issue

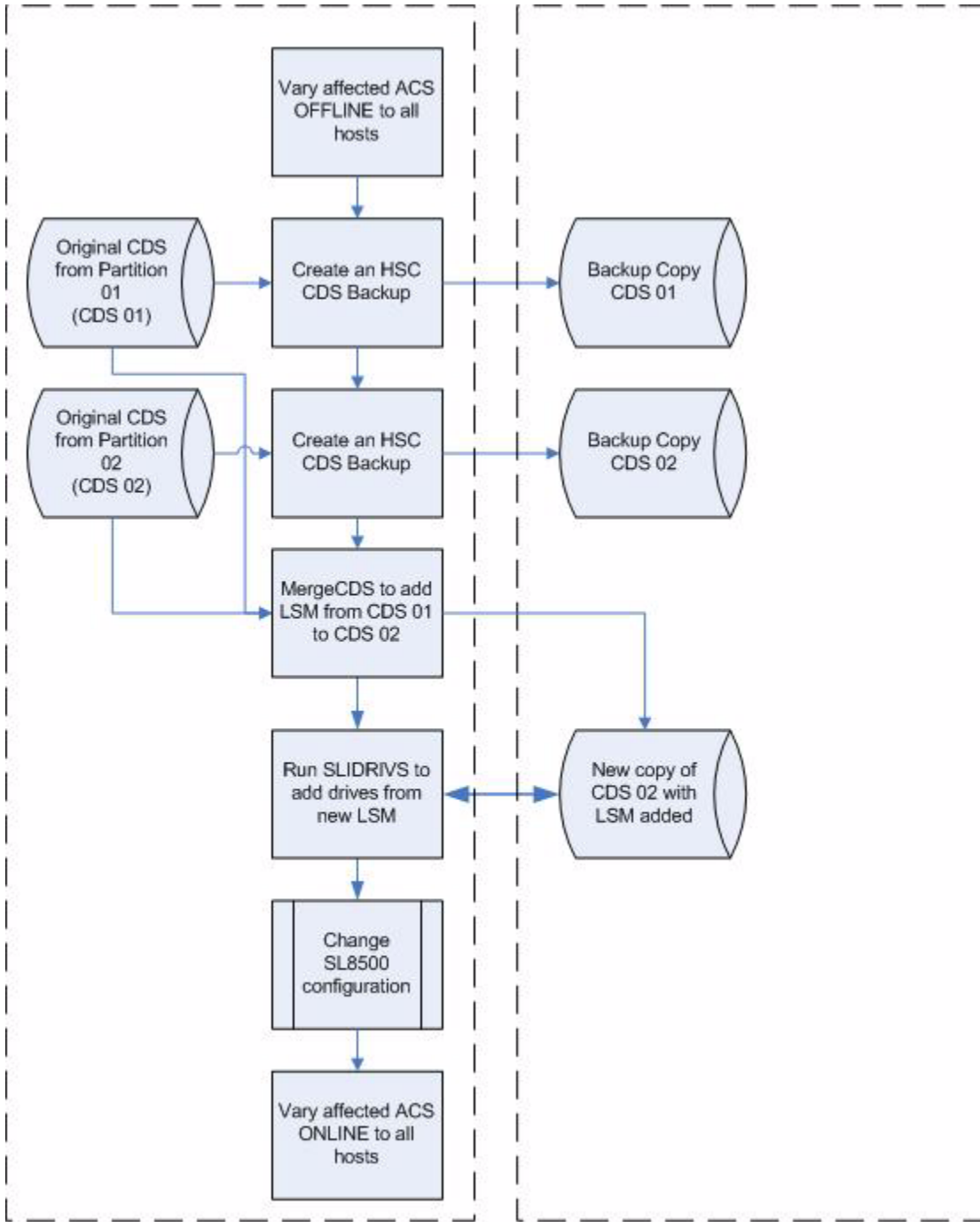
```
.VT V RTD(rtd-id) ON
```

for the RTDs that reside on the LSMs being allocated.

**13. Re-establish connections to all defined libraries (if necessary).**

Re-establish connections to all defined libraries to acquire drive configuration information from these libraries. To re-drive any outstanding mounts that may have been lost due to hardware or communication errors issue the SMC RESYNCHRONIZE command.

If running multiple HSC hosts, the new configuration is propagated automatically to all hosts.



**STEP 1**

**Move LSM to another CDS**

*Figure 36. Process Flow to Move an Allocated LSM to Another ACS Partition*



## **Error Recovery**

Deviation from the preceding procedures can result in unpredictable behavior. Although the SL8500 partitioning process uses Near Continuous Operation (NCO) to minimize or eliminate down time, failure to follow these procedures may result in unplanned down time.

The recommended procedure to recover from errors and to return the configuration to what it was before the partitioning attempt is to restore the CDS using the RESTore utility and perform an audit using the AUDIt utility to ensure the CDS matches the library. Once the cause of the problem is determined and fixed, start the procedures again.

Volumes physically remaining in an LSM that is being unallocated from the CDS are logically deleted unless it is the last LSM.

## Message Changes

The following new and changed error messages have been added to support partitioning. Refer to the *HSC Messages and Codes Guide* to see these messages.

- new messages:
  - SLS0073I
  - SLS0695I
  - SLS4232I
  - SLS4412I
  - SLS4413I
  - SLS4463I
- updated messages:
  - SLS0653I
  - SLS0663I
  - SLS1000I
  - SLS2008I
  - SLS4401I
  - SLS4407I
  - SLS4610I

## **LMUPATH Control Statement**

The LMUPATH control statement has been updated to include the PARTID parameter, which defines a partition ID for each ACS. Refer to the “Examples” on page 105 for more information.

## **SET FREEZE Utility**

The SET FREEZE utility has been modified to allow you to freeze an entire LSM at once, instead of being required to issue separate SET FREEZE statements for each panel in an LSM. Refer to the “SET Freeze” on page 296 utility for more information.

## Display Command

Display command output has been updated to include partitioning for the following subcommands:

- Display ACS
- Display LSM
- Display CAP
- Display Exceptions.

Refer to the *HSC Operator's Guide* for detailed information.

# TCP/IP Communications - Important Considerations

## Connections

When you create an SL8500 library complex by connecting libraries together with pass-thru ports, all hosts must connect to only **one** library in the complex— preferably to the first or rightmost library. **Multiple “host” communication connections to more than one SL8500 library will cause problems.**

## Shared Networks

The following are some examples of issues that can arise when you connect the SL8500 library to a shared network.

- A TCP/IP-connected library can handle standard host traffic, but it cannot resolve floods of *Address Resolution Protocol* (ARP) broadcasts. **For this reason, it is best to attach the library on a controlled network, such as behind a switch or router.**

Later generation networks, such as 1000Base-T and Gig-E, support earlier communication modes; however, devices that are communicating with the library may transmit data at bandwidths that could overwhelm the library.

It is best to attach the library on a controlled network, such as with a switch that can isolate the library from network broadcasts.

- When you connect the library on shared networks, and broadcasts are sent to all network nodes, they may also be directed to the library (even though it does not need them).

During the time the library is receiving these irrelevant broadcasts, it cannot receive requests or reply to others in a timely fashion. This heavy broadcast traffic on the network can saturate the library to the point that, to the host, it may appear that the TCP/IP connection has been lost.

- Heavy network traffic can also overwhelm the Ethernet controller causing the processor to continuously reset and re-initialize the controller, then recover the host-to-library communications.

## Dual IP Connection

The LMUPATH control statement allows users to define network LMU attachments (see “LMUPATH Control Statement” on page 103). In a dual IP connection environment for an SL8500, specify a second LMUADDR parameter to define dual IP. The HSC automatically determines whether or not the connection is dual IP or dual LMU.



**Note:** Vary the ACS offline and back online to pick up the revised LMUPATH statement that includes the second connection.

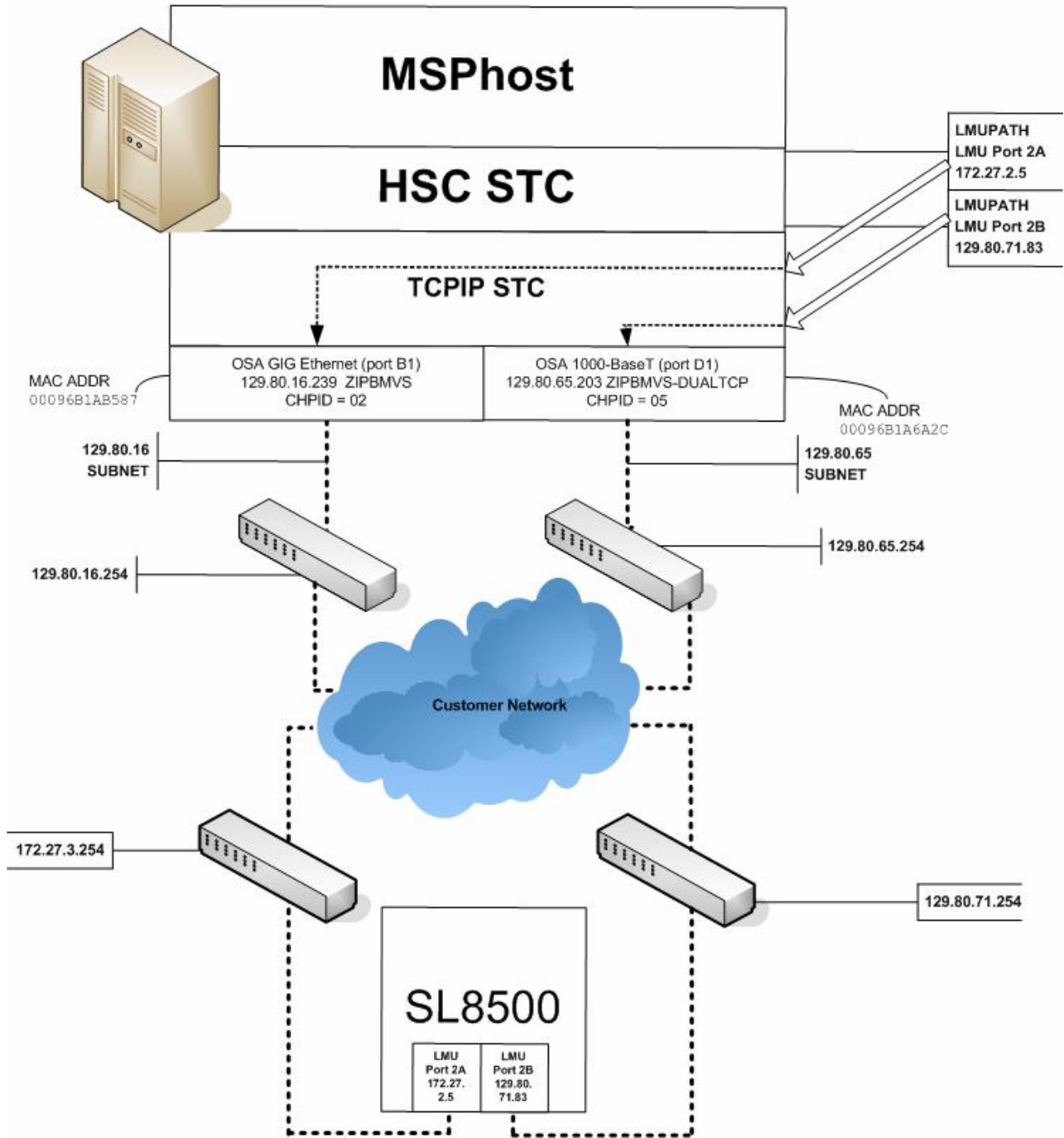
Figure 37 on page 436 and Figure 38 on page 440 show examples of a dual IP connection for the HSC.

### Two SL8500 Network Connections - Two Mainframe IP Addresses

To establish two dedicated routes on different subnetworks from the HSC to two dedicated routes to the SL8500, use the process described in this section. **To configure the SL8500 dual TCP/IP feature, refer to the *StreamLine SL8500 Modular Library System Dual TCP/IP Feature* document.**

Figure 37 on page 436 shows dual IP connections with two SL8500 network connections.

**LMUPATH ACS(00)**  
**LMUADDR(129.80.71.83,172.27.2.5)**



**Figure 37. Dual IP with Two SL8500 Network Connections - Different Subnetworks**



In the following examples, the entries *in italics* represent the second connection.

1. Complete the Network Entries Worksheet (see Table 22 for a sample) for each set of two dedicated routes to the SL8500. The worksheet can be found in the *StreamLine SL8500 Modular Library System Dual TCP/IP Feature* document.

**Table 22. Network Entries Worksheet**

Description		IP Address
<b>Port 2A</b>	HBC Card Port 2A	172.27.2.5
	Gateway Port 2A	172.27.3.254
	Netmask	/23
	Host to Port 2A	129.80.16.239
<b>Port 2B</b>	HBC Car Port 2B	129.80.71.83
	Gateway Port 2B	129.80.71.254
	Netmask	/23
	Host to Port 2B	129.80.65.203

2. Define a second DEVICE and LINK statement in your TCP/IP profile data set for a second mainframe network connection:

Example:

```
*   ONA #1
LANAA1 NODESETTYPE=LANA...
ONAA1  LANATYPE=IP,DEVICE=ONA,...
LSA1   LSHOST=ZIPBMSP
*   ONA #2
LANAB1 NODESETTYPE=LANA...
ONAB1  LANATYPE=IP,DEVICE=ONA,...
LSB1   LSHOST=ZIPB2MSP
```

3. Define a second home address in your TCP/IP profile data set.

Example:

```
KCETSPxx
IP=(ZIPBMSP,129.80.16.239,...)
IP=(ZIPB2MSP,129.80.65.203,...)
```

4. Define two dedicated static routes to the SL8500 destination port (2A and 2B) IP addresses over two different routers.

Example:

```
HSTRSCLM NODESETTYPE=HSTRSC,...  
LMUP2A  HOST  IP=172.27.2.5,OWNHOST=ZIPBMSP  
LMUP2B  HOSTIP=129.80.71.83,OWNHOST=ZIPB2MSP
```

5. Start the second mainframe network connection device.

```
V TCP/IP, tcp-stc-name, START, device_name
```

6. Define a second LMUADDR parameter for the port 2A IP address on the SL8500.

Example:

```
LMUPATH ACS(00) LMUADDR(129.80.71.83,172.27.2.5)
```

7. Enter the LMUPDEF command containing the LMUPATH statements that define the host name or IP address for each ACS.

```
LMUPDEF DSN('xxx.xxx.xxx(xxx)')
```

In the following example, LMUPDEF loads LMUPATH parameters from YOUR.DSN(MEMBER).

```
LMUPDEF DSN('YOUR.DSN(MEMBER)')
```

8. Allow the trained SL8500 service representative to enter the network connections to the SL8500 library for either port 2A and 2B, whichever is applicable.
9. Vary the ACS offline and back online to pick up the revised LMUPATH statement that includes the second connection. This can be done one host at a time to minimize down time.

## Sample Configuration - Two Dedicated Routes

Figure 38 shows a sample configuration with two dedicated routes, followed by the statements that apply to it.

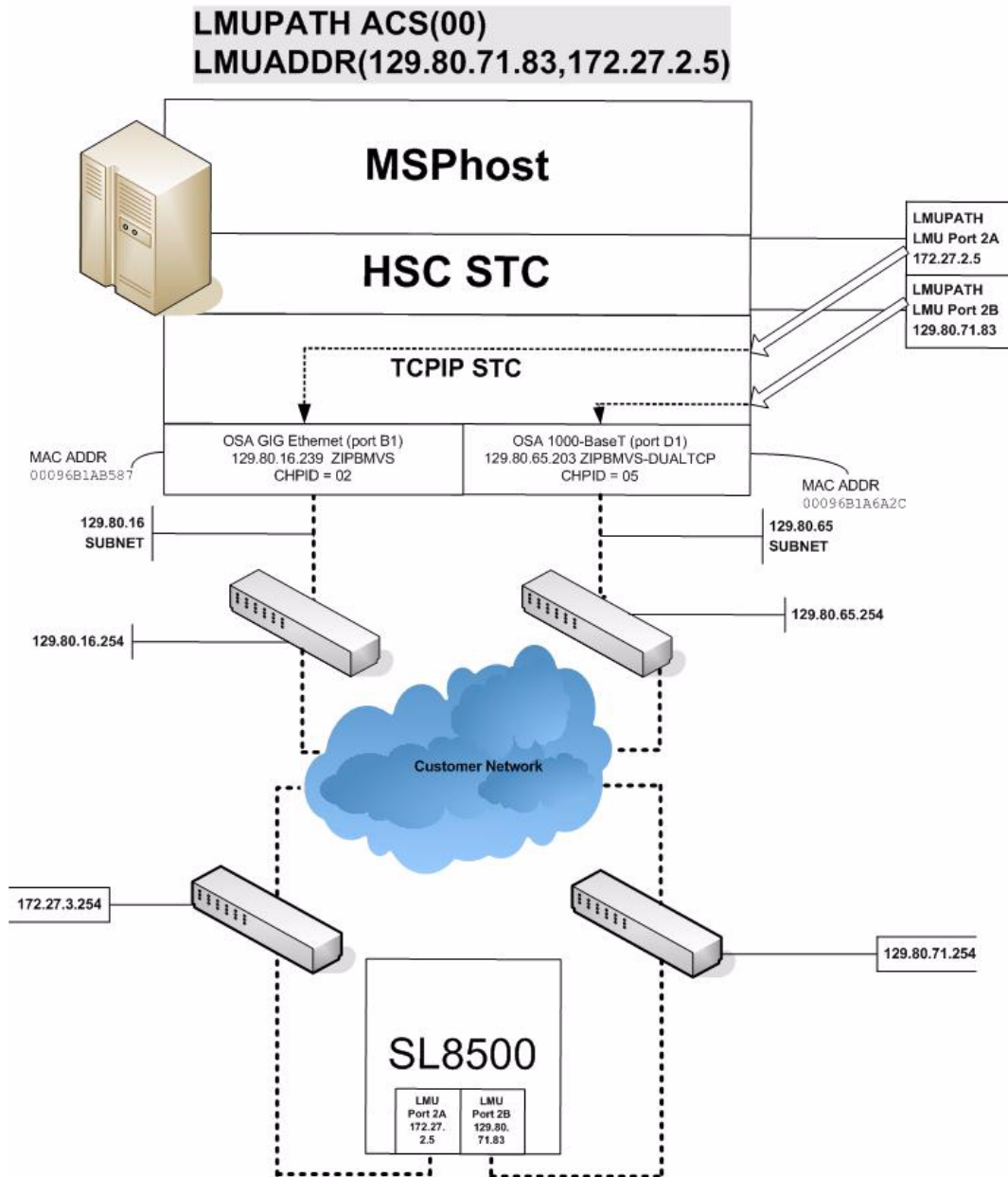


Figure 38. Dual IP Configuration Sample - Different Subnetworks

## Setup Statements and Displays

The following information shows the statements and displays used in Figure 38.

### HSC LMUPDEF PARMLIB Member

```
OPTION TITLE('DUAL TCPIP CONNECTING TO SL8500')
LMUPATH ACS(00) LMUADDR(129.80.71.83,172.27.2.5)
```

### TCP/IP Profile Data Set

```
*      ONA #1
LANAA1 NODESETTYPE=LANA...
ONAA1  LANATYPE=IP,DEVICE=ONA,...
LSA1   LSHOST=ZIPBMSP
*      ONA #2
LANAB1 NODESETTYPE=LANA...
ONAB1  LANATYPE=IP,DEVICE=ONA,...
LSB1   LSHOST=ZIPB2MSP

KCETSPxx
IP=(ZIPBMSP,129.80.16.239,....)
IP=(ZIPB2MSP,129.80.65.203,....)

HSTRSCLM NODESETTYPE=HSTRSC,...
LMUP2A  HOST IP=172.27.2.5,OWNHOST=ZIPBMSP
LMUP2B  HOSTIP=129.80.71.83,OWNHOST=ZIPB2MSP
```

## TCP/IP Console Displays

```
D NET,NODESETS
JCE159I DISPLAY ACCEPTED
JCE101I VTAM DISPLAY BEGINS 363          C
JCE139I NODE SET(S) :
JCE140I NAME      TYPE      STATUS
JCE141I SIPAPPLS  APPL SET  ACT
JCE141I SIPLOCAL  LOCAL SET  ACT
JCE141I HSTRSC21  HSTRSC SET  ACT
JCE141I LANA#G3   LANA SET   ACT
JCE141I TAPPLM3   TAPPL SET  ACT
JCE102I VTAM DISPLAY ENDS

D NET,ID=HSTRSC21,E
JCE159I DISPLAY ACCEPTED
JCE101I VTAM DISPLAY BEGINS 372          C
JCE103I NAME = HSTRSC21, TYPE = HSTRSC SET , STATUS = ACT
JCE836I ACTIVE HOST(S) = 8
JCE128I  NUMBER  NAME      NAME      NAME      NAME      NAME
JCE129I    1     MSP1     MSP2     LMUPRM    LMUSTY    NETGATE
JCE129I    6     IBMSTK1  IBMSTK2  DNSSEV3
JCE837I INACTIVE HOST(S) = 0
JCE838I IPRROUTE(S) = 1
JCE128I  NUMBER  NAME      NAME      NAME      NAME      NAME
JCE129I    1     ROUTE1
JCE102I VTAM DISPLAY ENDS

D NET,ID=LANA#G3,E
JCE159I DISPLAY ACCEPTED
JCE101I VTAM DISPLAY BEGINS 380          C
JCE103I NAME = LANA#G3 , TYPE = LANA SET , STATUS = ACT
JCE130I ACTIVE LINK(S) = 1
JCE128I  NUMBER  NAME      NAME      NAME      NAME      NAME
JCE129I    1     ONA#G3
JCE131I INACTIVE LINK(S) = 0
JCE102I VTAM DISPLAY ENDS

D NET,ID=MSP1,E
JCE159I DISPLAY ACCEPTED
JCE101I VTAM DISPLAY BEGINS 354          C
JCE103I NAME = MSP1 , TYPE = END STATION , STATUS = ACT
JCE104I NODE SET NAME = HSTRSC21, NODE SET TYPE = HSTRSC
JCE804I IP ADDRESS = 129.191.237.130
JCE805I TCP CONNECTIONS = 0 ( 0, 0, 0, 0, 0)
JCE706I SESSION TRACE = OFF
JCE806I DEFINED ALIAS NAME(S) = 0
JCE102I VTAM DISPLAY ENDS
```

```
D NET,ID=LMUPRM,E
JCE159I DISPLAY ACCEPTED
JCE101I VTAM DISPLAY BEGINS 384          C
JCE103I NAME = LMUPRM , TYPE = END STATION , STATUS = ACT
JCE104I NODE SET NAME = HSTRSC21, NODE SET TYPE = HSTRSC
JCE804I IP ADDRESS = 129.191.237.143
JCE805I TCP CONNECTIONS = 0 ( 0, 0, 0, 0, 0)
JCE706I SESSION TRACE = OFF
JCE806I DEFINED ALIAS NAME(S) = 0
JCE102I VTAM DISPLAY ENDS
```

### HSC Display Showing SL8500 Connection

```
D ACS
SLS0000I D ACS
SLS1000I ACS 00 STATUS: CONNECTED 334
ACTIVE QUEUE ELEMENTS                2
COMPATIBILITY LEVELS: HSC=13, LMU=13
DUAL LMU NOT CONFIGURED
IP ADDR 129.80.71.83 ONLINE
IP ADDR 172.27.2.5 ONLINE
SCRATCH VOLUMES AVAILABLE.....      210
FREE CELLS AVAILABLE.....            2008
D TCPIP,TCPIP,NETSTAT,HOME
EZZ2500I NETSTAT CS V1R4 TCPIP 252
HOME ADDRESS LIST:
ADDRESS      LINK          FLG
129.80.16.239  ZIPBMSP      P
129.80.65.203  ZIPB2MSP
127.0.0.1     LOOPBACK
3 OF 3 RECORDS DISPLAYED
```

## SLConsole Display of SL8500 Ports 2A/2B IP Addresses

The screenshot displays the Streamline Library Console interface. On the left, a tree view shows the library structure with green checkmarks next to each folder: Library:2,0,0,0,0, CAP Folder:2,0,0,0,0, Drive Folder:2,0,0,0,0, Elevator Folder:2,0,0,0,0, Ptp Folder:2,0,0,0,0, and Robot Folder:2,0,0,0,0. The main area is titled 'Library' and has tabs for 'Status' and 'Properties'. Under 'Properties', there are sub-tabs for 'General', 'Complex', 'Library Controller', and 'Drive Controller'. The 'General' tab is active, showing physical and host interface information.

Physical	
Vendor	STK
Frame Serial Number	516000000454
Expansion Module Count	0
Total Slot Count	1448
Empty Slot Count	954
Physical PTP Count	4
Drive Count	25
Robot Count	4
Cap Count	1
Elevator Count	2

Host Interface TCP/IP 2B	
DNS Domain Name	sl85001
IP Address	129.80.71.83
NetMask	255.255.254.0
MAC Address	00:10:4F:06:F8:32

Host Interface TCP/IP 2A	
IP Address	172.27.2.5
NetMask	255.255.254.0
MAC Address	00:10:4F:06:F8:33

At the bottom of the console, the STORAGETEK logo is on the left. In the center, there is a green checkmark icon followed by 'Comm Status', 'UserID: test', and another green checkmark icon followed by 'Library:SL85001'.



## Two SL8500 Network Connections - One Mainframe IP Address

To establish one host IP route from the HSC to two routes to the SL8500, use the process described in this section. **To configure the SL8500 dual TCP/IP feature, refer to the *StreamLine SL8500 Modular Library System Dual TCP/IP Feature* document.**

Figure 39 on page 446 shows dual IP (one host IP) with two SL8500 network connections.

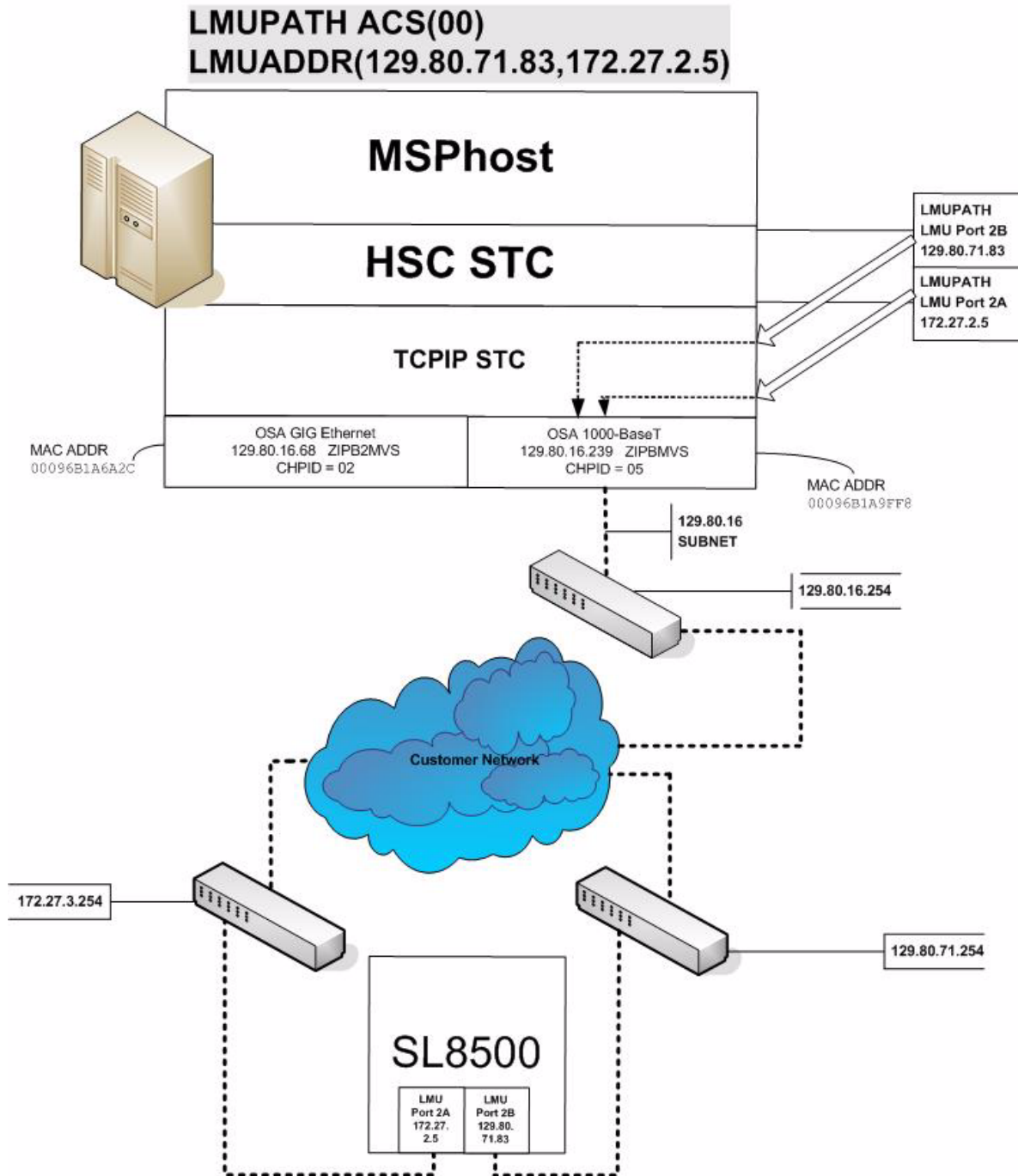


Figure 39. Dual IP (one host IP) with Two SL8500 Network Connections

In the following examples, the entries *in italics* represent the second connection.

1. Complete the Network Entries Worksheet (see Table 23 for a sample) for each set of routes to the SL8500. The worksheet can be found in the *StreamLine SL8500 Modular Library System Dual TCP/IP Feature* document.

**Table 23. Network Entries Worksheet**

Description		IP Address
<b>Port 2A</b>	HBC Card Port 2A	172.27.2.5
	Gateway Port 2A	172.27.3.254
	Netmask	/23
	Host to Port 2A	129.80.16.239
<b>Port 2B</b>	HBC Car Port 2B	129.80.71.83
	Gateway Port 2B	129.80.71.254
	Netmask	/23
	Host to Port 2B	129.80.16.239

2. Define a second LMUADDR parameter for the port 2A IP address on the SL8500.

Example:

```
LMUPATH ACS(00) LMUADDR(129.80.71.83,172.27.2.5)
```

3. Enter the LMUPDEF command containing the LMUPATH statements that define the host name or IP address for each ACS.

```
LMUPDEF DSN('xxx.xxx.xxx(xxx)')
```

In the following example, LMUPDEF loads LMUPATH parameters from YOUR.DSN(MEMBER).

```
LMUPDEF DSN('YOUR.DSN(MEMBER)')
```

4. Allow the trained SL8500 service representative to enter the network connections to the SL8500 library for either port 2A and 2B, whichever is applicable.
5. Vary the ACS offline and back online to pick up the revised LMUPATH statement that includes the second connection. This can be done one host at a time to minimize down time.

## Sample Configuration - One Host IP, Two SL850 Network Connections

Figure 40 shows a sample dual IP (one host IP) configuration with two SL850 network connections, followed by the statements that apply to it.

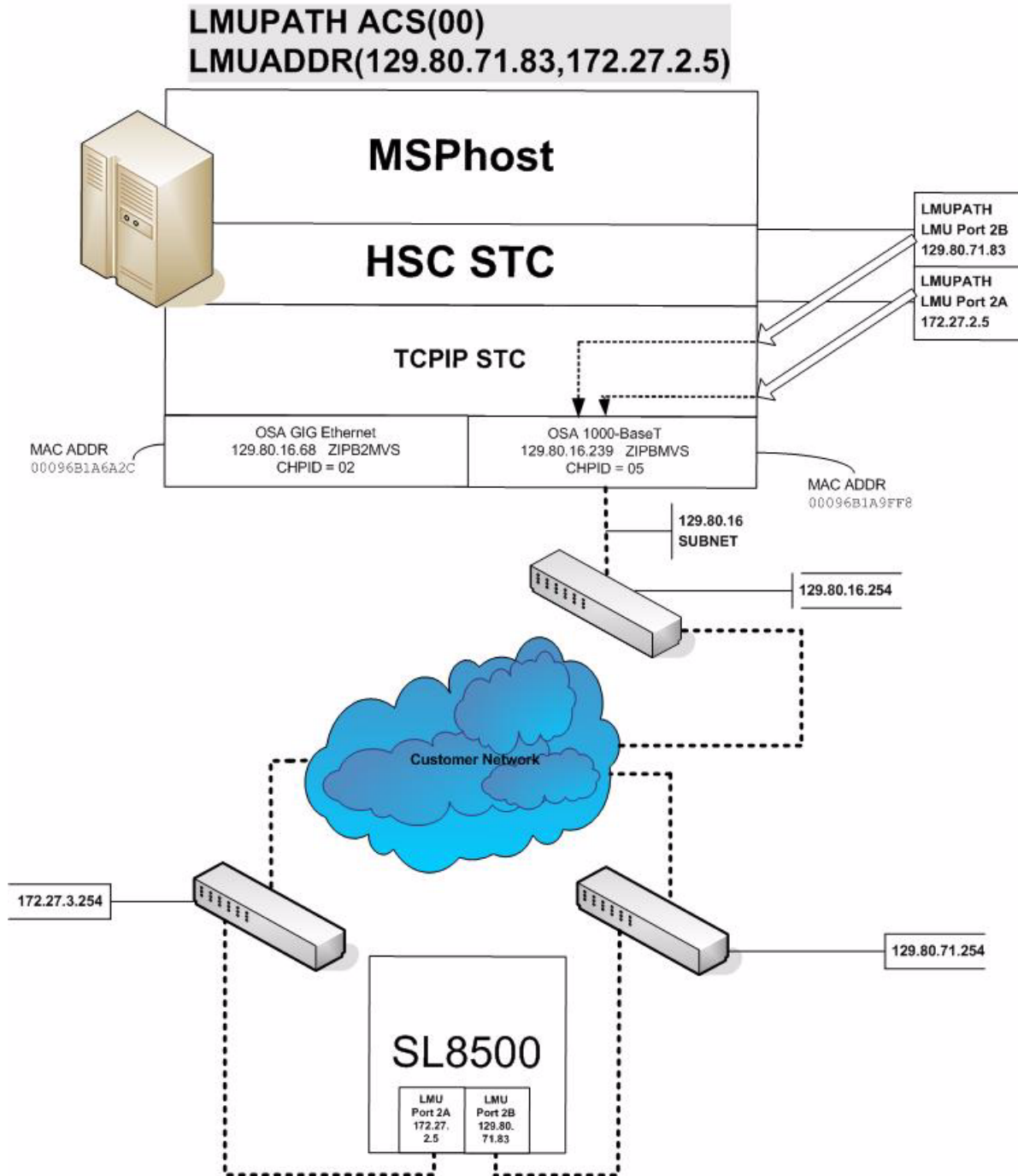


Figure 40. Dual IP (one host IP) with Two SL850 Network Connections

## Setup Statements and Displays

The following information shows the statements and displays used in Figure 40.

### HSC LMUPDEF PARMLIB Member

```
OPTION TITLE('DUAL TCPIP CONNECTING TO SL85001')
LMUPATH ACS(00) LMUADDR(129.80.71.83,172.27.2.5)
```

### TCP/IP Profile Data Set

```
*   ONA #1
LANAA1 NODESETTYPE=LANA...
ONAA1 LANATYPE=IP,DEVICE=ONA,...
LSA1 LSHOST=ZIPBMSP

KCETSPxx
IP=(ZIPBMSP,129.80.16.239,...)

HSTRSCLM NODESETTYPE=HSTRSC,...
LMUP2A HOST IP=172.27.2.5,OWNHOST=ZIPBMSP
```

## TCP/IP Console Displays

```
D NET,NODESETS
JCE159I DISPLAY ACCEPTED
JCE101I VTAM DISPLAY BEGINS 363          C
JCE139I NODE SET(S) :
JCE140I NAME      TYPE      STATUS
JCE141I SIPAPPLS  APPL SET  ACT
JCE141I SIPLOCAL  LOCAL SET  ACT
JCE141I HSTRSC21  HSTRSC SET  ACT
JCE141I LANA#G3   LANA SET   ACT
JCE141I TAPPLM3   TAPPL SET  ACT
JCE102I VTAM DISPLAY ENDS

D NET,ID=HSTRSC21,E
JCE159I DISPLAY ACCEPTED
JCE101I VTAM DISPLAY BEGINS 372          C
JCE103I NAME = HSTRSC21, TYPE = HSTRSC SET , STATUS = ACT
JCE836I ACTIVE HOST(S) = 8
JCE128I  NUMBER  NAME      NAME      NAME      NAME      NAME
JCE129I    1     MSP1      MSP2      LMUPRM     LMUSTY     NETGATE
JCE129I    6     IBMSTK1   IBMSTK2   DNSSEV3
JCE837I INACTIVE HOST(S) = 0
JCE838I IPRROUTE(S) = 1
JCE128I  NUMBER  NAME      NAME      NAME      NAME      NAME
JCE129I    1     ROUTE1
JCE102I VTAM DISPLAY ENDS

D NET,ID=LANA#G3,E
JCE159I DISPLAY ACCEPTED
JCE101I VTAM DISPLAY BEGINS 380          C
JCE103I NAME = LANA#G3 , TYPE = LANA SET , STATUS = ACT
JCE130I ACTIVE LINK(S) = 1
JCE128I  NUMBER  NAME      NAME      NAME      NAME      NAME
JCE129I    1     ONA#G3
JCE131I INACTIVE LINK(S) = 0
JCE102I VTAM DISPLAY ENDS

D NET,ID=MSP1,E
JCE159I DISPLAY ACCEPTED
JCE101I VTAM DISPLAY BEGINS 354          C
JCE103I NAME = MSP1 , TYPE = END STATION , STATUS = ACT
JCE104I NODE SET NAME = HSTRSC21, NODE SET TYPE = HSTRSC
JCE804I IP ADDRESS = 129.191.237.130
JCE805I TCP CONNECTIONS = 0 ( 0, 0, 0, 0, 0)
JCE706I SESSION TRACE = OFF
JCE806I DEFINED ALIAS NAME(S) = 0
JCE102I VTAM DISPLAY ENDS
```

```
D NET, ID=LMUPRM, E
JCE159I DISPLAY ACCEPTED
JCE101I VTAM DISPLAY BEGINS 384          C
JCE103I NAME = LMUPRM , TYPE = END STATION , STATUS = ACT
JCE104I NODE SET NAME = HSTRSC21, NODE SET TYPE = HSTRSC
JCE804I IP ADDRESS = 129.191.237.143
JCE805I TCP CONNECTIONS = 0 ( 0, 0, 0, 0, 0)
JCE706I SESSION TRACE = OFF
JCE806I DEFINED ALIAS NAME(S) = 0
JCE102I VTAM DISPLAY ENDS
```

### HSC Display Showing SL8500 Connection

```
D ACS
SLS0000I D ACS
SLS1000I ACS 00 STATUS: CONNECTED 942
ACTIVE QUEUE ELEMENTS          1
COMPATIBILITY LEVELS: HSC=13, LMU=13
DUAL LMU NOT CONFIGURED
IP ADDR 129.80.71.83 ONLINE
IP ADDR 172.27.2.5 ONLINE
SCRATCH VOLUMES AVAILABLE..... 210
FREE CELLS AVAILABLE.....      2007
```



## SLConsole Display of SL8500 Ports 2A/2B IP Addresses

The screenshot displays the Streamline Library Console interface. On the left, a tree view shows the library structure with green checkmarks indicating status for each component:

- Library:2,0,0,0,0
- CAP Folder:2,0,0,0,0
- Drive Folder:2,0,0,0,0
- Elevator Folder:2,0,0,0,0
- Ptp Folder:2,0,0,0,0
- Robot Folder:2,0,0,0,0

The main display area is titled "Library" and has tabs for "Status" and "Properties". Under "Properties", there are sub-tabs: "General", "Complex", "Library Controller", and "Drive Controller". The "General" tab is active, showing the following information:

**Physical**

Vendor	STK
Frame Serial Number	516000000454
Expansion Module Count	0
Total Slot Count	1448
Empty Slot Count	954
Physical PTP Count	4
Drive Count	25
Robot Count	4
Cap Count	1
Elevator Count	2

**Host Interface TCP/IP 2B**

DNS Domain Name	sl85001
IP Address	129.80.71.83
NetMask	255.255.254.0
MAC Address	00:10:4F:06:F8:32

**Host Interface TCP/IP 2A**

IP Address	172.27.2.5
NetMask	255.255.254.0
MAC Address	00:10:4F:06:F8:33

The status bar at the bottom shows the StoragTek logo, a green checkmark for "Comm Status", "UserID: test", and a green checkmark for "Library:SL85001".

## Powering Down the SL8500 - HSC Requirements

Prior to powering down the SL8500, the HSC requires that the following procedure must be followed:

1. Vary the drives offline at the MSP host level.
2. Modify the LSM(s) offline (see the MODify Command in the *HSC 6.2 Operator's Guide*).

For specific information about powering off the SL8500, refer to the *SL8500 User's Guide*.

# Appendix B. HSC Support for Near Continuous Operation (NCO)

---

## Overview

This appendix discusses Near Continuous Operation (NCO) for the HSC, which provides facilities and techniques that allow customers to make dynamic changes to the library that do not disrupt the library hardware and environment. In most cases, users can perform these procedures without requiring the HSC to be terminated and restarted.

This appendix describes two separate sets of NCO operations:

- dynamic hardware reconfiguration for the SL8500 library
- common NCO.

## Dynamic Hardware Reconfiguration for the SL8500 Library

NCO for the SL8500 library provides users with the ability to modify their hardware configuration dynamically without terminating the HSC. The following procedures are detailed:

- tape drives:
  - adding tape drives
  - removing tape drives
  - replacing tape drives
  - changing unit addresses for tape drives.
- expansion panels:
  - adding or removing
  - auditing after expansion
- SL8500s:
  - adding and configuring
  - updating LSM addresses.

Related SL8500 procedures that require you to terminate the HSC are discussed in Appendix A, “HSC Support for the SL8500 Library”. These include:

- merging ACSs
- removing PTPs and splitting ACSs.



### Notes:

- Adding SL8500 expansion panels is a hardware-disruptive change that requires you to vary the LSMs (rails) or the ACS offline and back online.
- CAPs are detected automatically when LSMs are added to an SL8500 library. For HSC 6.2, the optional second CAP is planned for a future release.

### Additional Considerations

- It is possible to remove LSMs from the SL8500 configuration without performing a LIBGEN, MERGEcds, and recycle of the HSC. However, **this operation requires assistance from StorageTek.**
- If you intend to add drives, run the SET SLIDRIVS utility to allow the HSC to recognize drive locations and associated UCB addresses and to ensure the CDS reflects the new tape drive configuration. Refer to the SET SLIDRIVS utility in the *HSC System Programmer's Guide*.

See the procedure “Adding Tape Drives” on page 458 for more information.

## Requirements/Recommendations



**Caution:** Do not run any CDS-related commands or utilities while dynamic hardware changes are being implemented.

- Back up the CDS before and after you perform a hardware reconfiguration.
- For any active HSC that accesses the CDS being modified by dynamic reconfiguration, **all ACSs and LSMs must be varied online** to maintain configuration integrity across hosts. An inactive HSC can be started after dynamic reconfiguration has completed on another host, but once an HSC becomes active, it must be at the full service level, and all ACSs and LSMs must be varied online.
- In a multi-host environment, StorageTek recommends that **all active hosts run HSC 6.2-level software**. Any hosts not at 6.2 level **must** be brought down before initiating dynamic hardware reconfiguration and brought back up after the hardware reconfiguration is complete. The non-6.2 hosts recognize the hardware changes at this time.

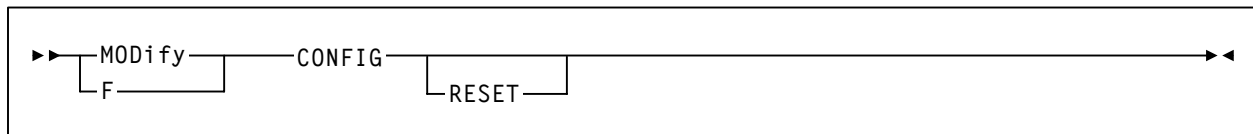
## Starting Dynamic Hardware Reconfiguration

Enter the MODify CONFIG command (see the MODify Command in the *HSC 6.2 Operator's Guide*) to initiate dynamic hardware reconfiguration.



**Warning: BEFORE you enter MODify CONFIG, RUN A BACKUP OF THE CDS.**

The syntax for this command is:



## Adding Tape Drives

This section discusses a procedure to add drives to an SL8500 library and HSC configuration. In this case, the SL8500 panel already contains operational tape drives, and the HSC remains active during this time.

1. Connect the additional tape drives to a drive panel in the SL8500 library. The new drives must be installed and powered on, and the user must run the SET SLIDRIVS utility to add the MSP drive address and drive location to the CDS.
2. Specify the SLUADMIN utility administrator program in your JCL to add the drives to the CDS. This example shows JCL to add two drives and specifies a primary and secondary CDS.

```
//DRVADD EXEC PGM=SLUADMIN
//*
//STEPLIB DD DSN=SYS1.SLSLINK
//*
//SLSCNTL DD DISP=SHR,DSN=SYS1.DBASEPRM
//SLSCNTL2 DD DISP=SHR,DSN=SYS1.DBASESEC
//SLSPRINT DD SYSOUT=*
//SLSIN DD *
    SET SLIDRIVS(A00,A01,A02,A03,A04,A05,A06,A07,A08,A09,+
                A10,A11,A12,A13,A14,A15),FORLSMID(00:00),FORPANEL(01)
/*
```

**Figure 41. Add Two Drives to the SL8500 and the HSC Configuration**

In this example, the user is adding two tape drives to fill the 16-drive panel for LSM 01 (rail 1) within an SL8500 library. A14 and A15 represent the new drives being added; A00-A13 are the existing operational drives.



**Note:** Panel 01 is the only drive panel within an SL8500 library.

3. **RUN A BACKUP OF THE CDS.**
4. Enter MODify CONFIG to start the dynamic reconfiguration process. Messages will be displayed that indicate the drive(s) has been added successfully.
5. Execute the Database Decompile (LIBGEN) utility to generate LIBGEN macro statements from a modified CDS. This ensures you have the source for the current LIBGEN.
6. **RUN A BACKUP OF THE CDS.**

## Removing Tape Drives

This section discusses a procedure to remove drives from an SL8500 library and HSC configuration. In this case, the SL8500 panel already contains operational tape drives, and the HSC remains active during this time.

1. Disconnect the tape drives to be removed from the drive panel in the SL8500 library. The drives to be removed must be powered off, and the user must run the SET SLIDRIVS utility to remove the MSP drive address and drive location from the CDS.
2. Specify the SLUADMIN utility administrator program in your JCL to remove the drives from the CDS. This example shows JCL to remove two drives and specifies a primary and secondary CDS.

```
//DRVREM EXEC PGM=SLUADMIN
//*
//STEPLIB DD DSN=SYS1.SLSLINK
//*
//SLSCNTL DD DISP=SHR,DSN=SYS1.DBASEPRM
//SLSCNTL2 DD DISP=SHR,DSN=SYS1.DBASESEC
//SLSPRINT DD SYSOUT=*
//SLSIN DD *
    SET SLIDRIVS(B00,B01,B02,B03,B04,B05,B06,B07,B08,B09,+
        B10,B11,B12,B13,,),FORLSMID(00:01),FORPANEL(01)
/*
```

**Figure 42. Remove Two Drives from the SL8500 and the HSC Configuration**

In this example, the user is removing two tape drives, leaving two open slots in the 16-drive panel for LSM 01 within an SL8500 library. B14 and B15 represent the drives being removed; B00-B13 represent the remaining operational drives.



**Note:** Panel 01 is the only drive panel within an SL8500 library.

3. **RUN A BACKUP OF THE CDS.**
4. Enter `MODIFY CONFIG` to start the dynamic reconfiguration process. Messages will be displayed that indicate the drive(s) has been removed successfully.
5. Execute the Database Decompile (LIBGEN) utility to generate LIBGEN macro statements from a modified CDS. This ensures you have the source for the current LIBGEN.
6. **RUN A BACKUP OF THE CDS.**

## Replacing Tape Drives

The following procedure describes how to change (replace) drive types on an SL8500 panel, while retaining the same unit addresses. The HSC remains active during this time.

1. Disconnect and remove all drives to be replaced and connect the appropriate replacement drives.
2. **RUN A BACKUP OF THE CDS.**
3. Enter `MODify CONFIG` to start the dynamic reconfiguration process if the drive type(s) change. Messages will be displayed that indicate the drive type has changed.



**Note:** You do not need to perform this step if you are replacing drives with the same drive type.



## Changing Unit Addresses for Tape Drives

The following procedure describes how to change the unit addresses for tape drives on an SL8500 panel that contains operational drives. The HSC remains active during this time.

1. Specify the SLUADMIN utility administrator program in your JCL to change unit addresses assigned to the tape drives. This example shows JCL to change unit addresses on all tape drives on a 16-drive panel and specifies a primary and secondary CDS.

```
//UNITADDR EXEC PGM=SLUADMIN
//*
//STEPLIB DD DSN=SYS1.SLSLINK
//*
//SLSCNTL DD DISP=SHR,DSN=SYS1.DBASEPRM
//SLSCNTL2 DD DISP=SHR,DSN=SYS1.DBASESEC
//SLSPRINT DD SYSOUT=*
//SYSOUT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SLSIN DD *
    SET SLIDRIVS(F00,F01,F02,F03,F04,F05,F06,F07,F08,F09,+
        F10,F11,F12,F13,F14,F15),FORLSMID(00:02),FORPANEL(01)
/*
```

**Figure 43. Change Unit Addresses for 16 Tape Drives**

In this example, the user is changing the unit addresses on tape drives on a 16-drive panel for LSM 00:02, F00 through F15.

2. **RUN A BACKUP OF THE CDS.**
3. Enter `MODify CONFIG` to start the dynamic reconfiguration process. Messages will be displayed that indicate the drive unit addresses have changed.



**Note:** Dynamic hardware reconfiguration changes unit addresses and drive model types at the same time.

4. **RUN A BACKUP OF THE CDS.**

## Adding/Removing Expansion Panels

Adding or removing SL8500 expansion panels is a hardware-disruptive process. However, the HSC can dynamically recognize changes and continue to support other libraries without the need to recycle the HSC.

The following procedure describes how to add or remove SL8500 expansion panels. The HSC remains active during this time.

1. Enter the `MODify LSM OFFline` command to modify all SL8500 LSMs offline to all HSC hosts in the affected library. See the `MODify` command in the *HSC 6.2 Operator's Guide* for syntax information. All drives and cartridges in that SL8500 are now unavailable to the complex.
2. Allow StorageTek service technicians to physically add or remove the expansion frame(s).
3. Enter the `MODify LSM ONline` command to modify the SL8500 LSMs online to the HSC.

During the modify online process, the HSC automatically discovers the panel configuration changes. A WTOR is issued to the operator describing the change and requesting confirmation to make the changes permanent to the CDS.

- Replying “NO” aborts the configuration change. The CDS is not updated and the old configuration is preserved.



**Note:** A problem can occur if an attempt is made to access a cell that has been removed. New cells are not recognized.

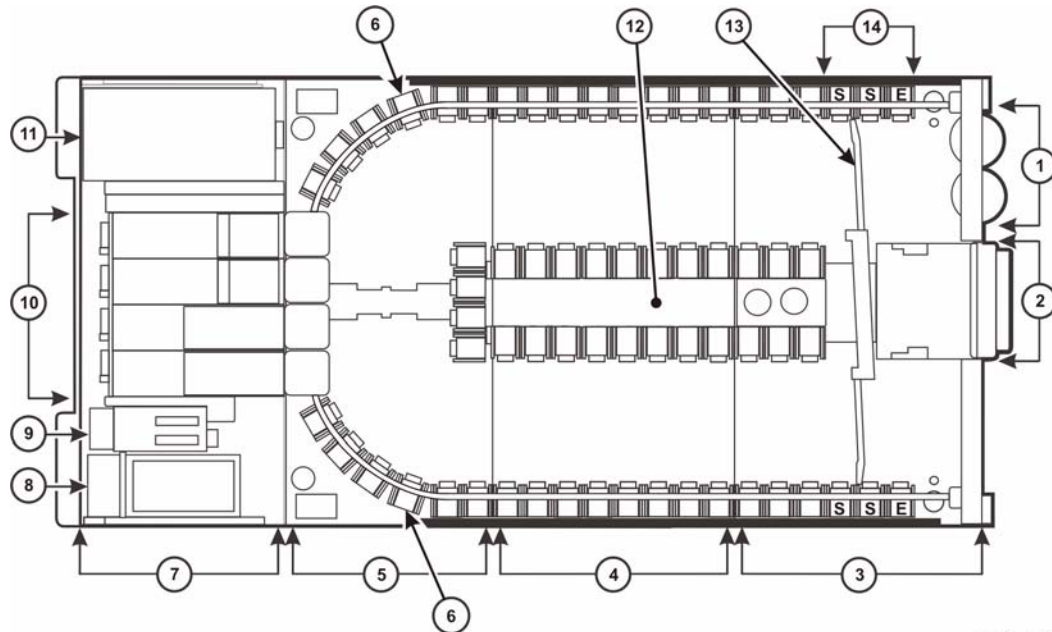
- Replying “YES” causes the CDS to be updated with the new configuration and also propagates the changes to all other active hosts in the complex. The HSC updates its in-memory control blocks.

4. **RUN A BACKUP OF THE CDS.**

## Auditing the SL8500 After Expansion

You can increase cartridge capacity in SL8500 libraries by installing Storage Expansion Modules between the Robotics Interface Module (RIM) and the Customer Interface Module (CIM). The CIM, which includes the CAP, is physically moved to accommodate new expansion modules. As a result, higher panel numbers are assigned to the three cell panels on the CIM.

Figure 44 shows an SL8500 library that includes a Storage Expansion Module.



L203\_054

- |  |  |
|--|--|
| 1. Cartridge Access Ports (2) Caps           | 8. AC Power Supplies Electronic Control Module |
| 2. Facade Operator Panel (Optional) Icey Pad | 9. DC Power Supplies                           |
| 3. Customer Interface Module                 | 10. Tape Drives                                |
| 4. Storage Expansion Module                  | 11. Accessory Racks                            |
| 5. Robotics Interface Module                 | 12. Inner Wall                                 |
| 6. PTP (Pass Through Port)                   | 13. Service Door                               |
| 7. Drive Electronics Module                  | 14. Reserved Columns                           |
|  | E= End Stop                                    |
|  | S= System Cell                                 |

**Figure 44. SL8500 Library with Storage Expansion Module**

When the cell panels in the CIM are assigned higher panel numbers, the addresses for all cartridges in the CIM change. You must audit these panels so the HSC updates the CDS with the new addresses of the volumes.



**Note:** If you have to remove any cartridges to attach the Storage Expansion Module, place them in an empty panel in the Storage Expansion Module. Then audit this panel after auditing the three highest panels in the CIM. This guarantees audit will find these cartridges in their new address.

When you audit the SL8500 after an expansion, you must perform the following steps to ensure that volume information is not lost:

1. Audit the three highest-numbered panels in each LSM (rail) to locate and update cartridges that have changed addresses. These three panels are located in the CIM.
  - When audit finds a cartridge in a new address, it checks the old address where it was previously recorded in the CDS to verify that it is not a duplicate volume.
  - If a cartridge has changed addresses, the HSC updates the CDS with the new address.



**Warning:** If the HSC first audits old cartridge addresses after an expansion, **it will not find the cartridges and will delete them.**

If the cartridges are deleted, they will be readded later when the HSC audits their new address. However, when the cartridges are readded, information about cleaning cartridge usage, number of times mounted, scratch status, and scratch pool assignments is lost.

2. Audit the entire LSM. **When you audit the entire LSM *last*, you do not lose any cartridge information.**

## Running an Audit After Expansion

The following procedure describes how to run an audit after adding one or more Storage Expansion Modules:

1. **RUN A BACKUP OF THE CDS.**
2. Enter `MODify CONFIG` to update the CDS.
3. Determine the highest panel number in the expanded SL8500.

In an SL8500 library without expansion modules, the highest panel number is 10. Each additional expansion module adds eight panels, so for an SL8500 with one expansion module, the highest panel number is 18; for two expansion panels the highest panel number is 26; and so forth.

The three highest panel numbers are in the CIM, so in an SL8500 containing one expansion module, panels 16, 17, and 18 are located in the CIM.

4. Audit the three panels containing the highest panel numbers in each LSM (rail) in the expanded SL8500.
5. Audit any panel that includes cartridges that may have been moved during installation of the Storage Expansion Module.
6. Audit each LSM in the expanded SL8500.
7. **RUN A BACKUP OF THE CDS.**

## Adding and Configuring SL8500s

The HSC supports multiple LSMs containing pass-thru ports (PTPs). The following procedures are discussed:

- adding new SL8500s
- merging ACSs
- removing PTPs and splitting ACSs.

### Before You Install a New SL8500

StorageTek recommends you perform these tasks before you add SL8500s to your ACS:

- Apply all relevant maintenance to your HSC systems.
- Optionally, audit existing SL8500s to update cartridge addresses.

### LSM Numbering - Multiple SL8500s

LSMs in an SL8500 complex are numbered top down, right to left, as viewed from the CAP end. Figure 45 demonstrates this numbering pattern.

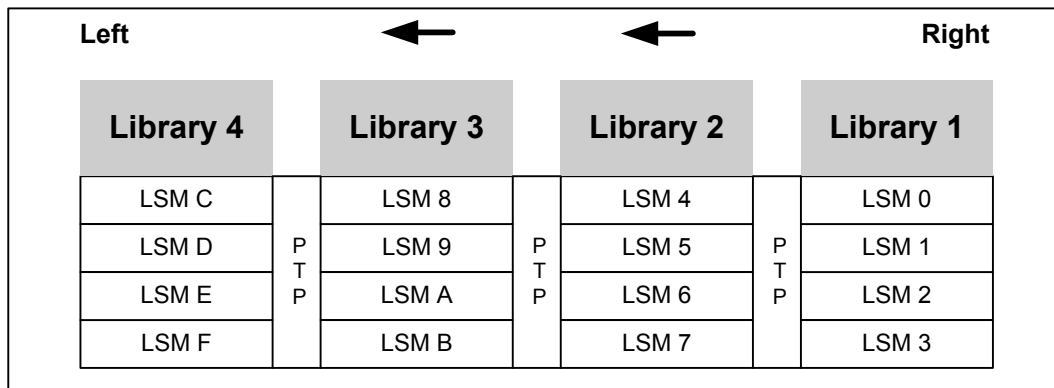


Figure 45. LSM Numbering for Four Connected SL8500s

Depending on the physical layout of your site, you may be adding a new SL8500 to the left or right of an existing SL8500.

- When a new SL8500 is added to the left of an existing SL8500, the new LSMs are assigned higher numbers, and the existing LSMs are not renumbered. **StorageTek recommends adding LSMs to the left if possible to avoid renumbering existing LSMs.**

Refer to “Adding a New SL8500 to the Left” on page 466.

- When a new SL8500 is added to the right of the existing SL8500, all existing LSMs are renumbered. As a result, the home cell addresses of all existing cartridges are changed.

Refer to “Adding a New SL8500 to the Right” on page 467.

## Adding a New SL8500 to the Left

Adding a new SL8500 to the left of an existing SL8500 does not require the existing LSM to be renumbered, however, if cartridges have been placed in cells in the new SL8500, you must run the AUDIt utility on the LSMs of the new SL8500 to add these cartridges to the CDS. The LSMs in the existing SL8500 can remain online during the audit.

## Modifying the HSC Configuration

The following procedure describes how to update your configuration when you add an SL8500 to the left:

1. Add the new SL8500(s) to the library complex.
2. **RUN A BACKUP OF THE CDS.**
3. Start the dynamic configuration process by entering the `MODi fy CONFIG` command.

After dynamically updating the ACS and LSM configurations, you must update the MSP Unit Addresses for the tape drives by running the SET SLIDRIVS utility. Then, enter `MODi fy CONFIG` again to refresh the HSC's in-memory tables.

4. **RUN A BACKUP OF THE CDS.**
5. If cartridges have been placed in the new SL8500, run the AUDIt utility to audit the LSMs (rails) in the new SL8500 and add these cartridges to the CDS.
6. Execute the Database Decompile (LIBGEN) utility to generate LIBGEN macro statements from a modified CDS. This ensures you have the source for the current LIBGEN.

## Adding a New SL8500 to the Right

When you add a new SL8500 to the right of an existing SL8500, the existing LSMs are renumbered and cartridge addresses change. As a result, if the HSC attempts to mount a volume whose address has changed, the mount fails because the HSC cannot find the volume.

## Modifying the HSC Configuration with MODify CONFIG

The following procedure describes how to update your configuration when you add an SL8500 to the right:

1. Enter the Vary ACS command to vary the ACS offline to all but one host.
2. On the remaining host, quiesce mount activity against the ACS by varying the drives offline to MSP (MSP VARY command) in the existing SL8500. If this is not done,
  - mounts fail because cartridges cannot be found in their last known addresses.
  - until the audits update the HSC map of the empty cells in the renumbered LSMs:
    - enters of new cartridges collide with existing cartridges.
    - movements of cartridges to existing (renumbered) LSMs collide with cartridges already in the cells,
3. Add the new SL8500(s) to the library complex.
4. **RUN A BACKUP OF THE CDS.**
5. Start the dynamic hardware reconfiguration process by entering the MODify CONFIG command.

After dynamically updating the ACS and LSM configurations, you must update the MSP Unit Addresses for the tape drives by running the SET SLIDRIVS utility. Then, enter MODify CONFIG again to refresh the HSC's in-memory tables.

6. **RUN A BACKUP OF THE CDS.**

7. Run the AUDIt utility to update cartridge addresses.
  - a. Audit the renumbered LSMs in the pre-existing SL8500 first.
    - **The order you audit the LSMs is critical to avoid losing cartridges. Audit each LSM (rail) in sequence from the highest-numbered LSM to the lowest-numbered LSM.** The audit will find all cartridges in their (renumbered) LSM addresses.

You can audit all four LSMs (rails) in an SL8500 at the same time.
  - b. Audit the LSMs in the newly-added SL8500. These LSMs have the lowest LSM numbers. After the audit is complete, the drives in these LSMs can be varied online to MSP and volumes in them can be mounted on tape drives.

Figure 46 shows an SL8500 configuration before adding a new SL8500 to the right.

SL8500			SL8500			SL8500	
LSM 8	P T P		LSM 4	P T P		LSM 0	
LSM 9		LSM 5	LSM 1				
LSM 10		LSM 6	LSM 2				
LSM 11		LSM 7	LSM 3				

**Figure 46. Original SL8500 Configuration**

Figure 47 represents the same ACS, with a new SL8500 library added to the right. Notice that the LSMs in the new SL8500 are assigned the lowest LSM numbers. The illustration also shows the recommended audit order, from highest to lowest LSM number.

SL8500 (1st Audits)			SL8500 (2nd Audits)			SL8500 (3rd Audits)			New SL8500 (Last Audits)	
Now LSM 12	P T P		Now LSM 8	P T P		Now LSM 4	P T P		New LSM 0	
Now LSM 13		Now LSM 9	Now LSM 5		New LSM 1					
Now LSM 14		Now LSM 10	Now LSM 6		New LSM 2					
Now LSM 15		Now LSM 11	Now LSM 7		New LSM 3					

**Figure 47. Updated Configuration - New SL8500 Added to Right**



8. **RUN A BACKUP OF THE CDS after the audits.**
9. Enter the Vary ACS command to vary the ACS online to all hosts.
10. Vary the drives online to MSP in the existing SL8500.
11. Execute the Database Decompile (LIBGEN) utility to generate LIBGEN macro statements from a modified CDS. This ensures you have the source for the current LIBGEN.

### Modifying the HSC Configuration using MERGEcds

The MERGEcds utility can be used to update LSM addresses quickly for all cartridges located in LSMs and/or ACSs that have changed addresses. MERGEcds requires an empty CDS, into which cartridges are merged.

The following procedure describes another method you can use to update your configuration when you add an SL8500 to the right:

1. Enter the Vary ACS command to vary the ACS offline to all but one host.
2. On the remaining host, quiesce mount activity against the ACS by varying the drives offline to MSP (MSP VARY command) in the existing SL8500(s). If this is not done,
  - mounts fail because cartridges cannot be found in their last known addresses.
  - until the audits update the HSC map of the empty cells in the renumbered LSMs:
    - enters of new cartridges collide with existing cartridges.
    - movements of cartridges to existing (renumbered) LSMs collide with cartridges already in the cells,
3. Add the new SL8500(s) to the library complex.
4. **RUN A BACKUP OF THE CDS.**
5. Start the dynamic configuration process by entering the `MODi fy CONFIG` command.

After dynamically updating the ACS and LSM configurations, you must update the MSP Unit Addresses for the tape drives by running the `SET SLIDRIVS` utility. Then, enter `MODi fy CONFIG` again to refresh the HSC's in-memory tables.

6. Use the MERGEcds utility to remap all volume addresses to the new LSMs.
  - a. Change the HSC service level to BASE. This prevents mount/dismount activity and other robotics operations during the merge.
 

```
SRVlev BASE
```
  - b. Run the RESTore utility to re-create the CDS that was active before the configuration change. Specify new CDS files with different names. This becomes the "from" CDS in the MERGEcds JCL example shown below.



**Note:** This restore resets the DSNs in the copies of the CDS.

The following is sample RESTore utility JCL.

```
//SLSREST JOB 505135,RESTORE,CLASS=A,MSGCLASS=1,MSGLEVEL=(1,1),
//          NOTIFY=SPRT,REGION=4096K
//*
//STEP0    EXEC PGM=SLUADMIN,PARM=MIXED
//STEPLIB DD DSN=NCS600.SOS6000.SLSLINK,DISP=SHR
//SLSBKUP DD DSN=backup.name,DISP=(OLD)
//SLSCNTL DD DSN=from.primary.cds,DISP=(NEW,CATLG,DELETE),
//          DCB=(DSORG=PS),UNIT=,SPACE=
//SLSCTL2 DD DSN=from.secondary.cds,DISP=(NEW,CATLG,DELETE),
//          DCB=(DSORG=PS),UNIT=,SPACE=
//SORTWK01 DD DSN=temp.sort,DISP=(NEW,DELETE,DELETE),
//          UNIT=,SPACE=
//SLSPRINT DD SYSOUT=*
//SLSIN    DD *
//          RESTORE APPLY(NO)
//          *
//          *
```

- c. Run the MERGEcds utility to update the volume addresses in the new CDS. MERGEcds uses the volume addresses from the old CDS.

In the MERGEcds statement, **do not specify the ALL parameter**, so that the utility reads the parameters specified in the SLSMERGE DD statement.

The following is sample MERGEcds utility JCL.

```
//SLSMCDS JOB 505135,MERGECDs,CLASS=A,MSGCLASS=1,MSGLEVEL=(1,1),
//          NOTIFY=SPRT,REGION=4096K
//*
//STEP0    EXEC PGM=SLUADMIN,PARM=MIXED
//STEPLIB DD DSN=NCS600.SOS6000.SLSLINK,DISP=SHR
//SLSFCNTL DD DSN=from.primary.cds,DISP=SHR
//SLSFCTL2 DD DSN=from.secondary.cds,DISP=SHR
//SLSPRINT DD SYSOUT=*
//SLSIN    DD *
MERGECDs REALONLY
/*
/* REALONLY is OK because we are only merging real volumes)
//SLSMERGE DD *

/* Merge Statements, see below
/*
//
```

When you add new SL8500s to the right of an existing SL8500, the order the SLSMERGE statements are processed is important. Update the volume addresses in order from highest LSM addresses to lowest LSM addresses to avoid assigning multiple sets of volumes to the same LSM.

```
MERGE FLSM(00:0B) TLSM(00:0F)-----
MERGE FLSM(00:0A) TLSM(00:0E)-----
MERGE FLSM(00:09) TLSM(00:0D)-----
MERGE FLSM(00:08) TLSM(00:0C)-----
MERGE FLSM(00:07) TLSM(00:0B)-----
MERGE FLSM(00:06) TLSM(00:0A)-----
MERGE FLSM(00:05) TLSM(00:09)-----
MERGE FLSM(00:04) TLSM(00:08)-----
MERGE FLSM(00:03) TLSM(00:07)-----
MERGE FLSM(00:02) TLSM(00:06)-----
MERGE FLSM(00:01) TLSM(00:05)-----
MERGE FLSM(00:00) TLSM(00:04)-----
```

These updates must occur first

These updates must occur last

- d. Change the HSC service level back to FULL. The HSC now supports mount/dismount activity and other robotics operations.

```
SRVlev FULL
```

7. **RUN A BACKUP OF THE CDS after the merge.**
8. Enter the Vary ACS command to vary the ACS online to all hosts.
9. Vary the drives online to MSP in the existing SL8500(s).
10. Execute the Database Decompile (LIBGEN) utility to generate LIBGEN macro statements from a modified CDS. This ensures you have the source for the current LIBGEN.

## Common Near Continuous Operation

This section discusses topics that are not specific to the SL8500 library but may be valuable to reduce system downtime. These include:

- using multiple CDS copies
- automatic recognition of configuration changes
- using the MERGEcds utility
- using the SET utility instead of LIBGEN and reconfiguration
- defining a new configuration to avoid future reconfigurations
- defining planned ACSs with no stations
- defining planned drives
- changing panels
- using CDS rename/relocate/expand
- swapping a CDS.

In addition, several other timesaving benefits are described in other places in the HSC documentation set. These are:

- resolving LSM and panel type configuration mismatches. Refer to either the *HSC Configuration Guide*, “Configuration Mismatches,” **or** see the *HSC System Programmer’s Guide*, “Configuration Mismatches.”
- changing drive panel types without running a MERGEcds or reconfiguration. Refer to the *HSC System Programmer’s Guide*, “SET Device Numbers for Drives.”
- automatic internal cold start for HSC 2.0.1 and later releases. Refer to either the *HSC Configuration Guide*, “Starting HSC Execution” **or** see the *HSC System Programmer’s Guide*, “Starting HSC Execution.”
- suppressing the “ACS Disconnected” message to allow for future hardware expansion. Refer to the OPTION Command and Control Statement in the *HSC 6.2 Operator’s Guide*.

### Using Multiple CDS Copies

When multiple copies of the CDS are defined and enabled, the HSC automatically recovers from errors on one of these copies. In a multiple-host environment, CDS recovery is coordinated among the HSCs on all hosts.

- When there is a mismatch between information on the same block on the primary and secondary CDS copy, the HSC automatically selects the most recent copy. When the CDS is updated, the modified block is written to both the primary and secondary CDS copies.
- If a secondary CDS copy is active, and a failure occurs in accessing the current primary CDS copy, the HSC automatically makes the secondary CDS copy the primary copy. If a standby CDS copy is active, the new primary CDS copy is copied over the standby CDS copy, and the standby becomes the new secondary copy.
- If a standby CDS copy is active, and a failure occurs in accessing the secondary CDS copy, the current primary CDS copy is copied over the standby CDS copy, and the standby becomes the new secondary copy.

To utilize full automatic CDS recovery capabilities of the HSC, StorageTek recommends that all three CDS copies (primary, secondary, and standby) should be used. CDS copies must be created (by the SLICREAT program), defined to the HSC (by the CDSDEF control statement in PARMLIB), and active (by the CDs Enable/Disable command). CDS copies should be located on different DASD volumes for redundancy.

For more details about automatic CDS recovery, refer to “Control Data Set Recovery” and “CDS Recovery Capabilities” in the *HSC System Programmer’s Guide*.

## Automatic Recognition of Configuration Changes

Some changes to the library configuration are automatically recognized by the HSC.

### Automatic Update of LSM from 4410 to 9310

When an LSM comes online, the LSM type is reported to the HSC by the LMU. If the LSM is defined in the CDS as a 4410, but it is actually a 9310 (PowderHorn), the LSM type is automatically updated in the CDS. Thus, an LSM upgrade from a 4410 to a 9310 is automatically recognized and recorded in the CDS without running the MERGEcds or Reconfiguration utilities.



**Note:** Replacing a 9310 with a 4410 LSM does not result in an automatic update of the LSM type. (In some cases the hardware report of this change may not be accurate.)

If an LSM is defined to the HSC as a 9310, but it is actually a 4410, the HSC manages it without problems, since the panel configurations and LMU requests and responses are the same for 4410 and 9310 LSMs. However, HSC preferencing by LSM type will not work correctly in the following cases:

- if ALLOC LSMpref(*lsm-type*) is specified for scratch requests
- if MNTD SCRDISM(CURRENT|ARCHIVE) is entered for scratch dismount requests.

### Run-time Recognition of 9740 CAP Configuration

The 9740 CAP can either be a 14-cell array, or it can hold a 10-cell removable magazine. The HSC recognizes the current CAP size when the LSM is modified online. This allows the user to change the 9740 CAP configuration without running the MERGEcds or Reconfiguration utilities or recycling the HSC.

## Using the MERGEcds Utility

The MERGEcds utility replaces the Reconfiguration utility and also copies volume information from specified ACSs and/or LSMs to other specified ACSs and/or LSMs. As a result, MERGEcds supports all of these activities:

- adding new ACSs and/or LSMs to a configuration or changing a configuration (currently, the Reconfiguration utility does this).
- merging two or more libraries and CDSs into a single library and CDS (without requiring an AUDIt to update the resulting CDS with volume information from the second and later libraries).
- splitting a single library and CDS into two or more libraries and CDSs, and using MERGEcds to copy the volume information from the old CDS to the new CDS for each library.
- merging two or more ACSs into a single ACS. For example, if you merge ACS 01 and 02 into a single ACS 01, and if both ACSs contain two LSMs, LSMs 020 and 021 become LSMs 012 and 013.
- splitting an ACS into two or more ACSs.
- changing the ACSid and/or LSMid of ACS(s) and/or LSM(s), and using MERGEcds to copy the affected volume information from the old CDS to the new CDS.

Refer to “MERGEcds utility” in the *HSC System Programmer’s Guide* for syntax and procedural information.

## Using the SET Utility Instead of LIBGEN and Reconfiguration

Changing a configuration using the MERGEcds or Reconfiguration utilities requires a global outage. Many of the changes made by the SET utility can be performed while HSC subsystems are up that are not directly affected. Then, these subsystems can be recycled (brought down and then restarted) to pick up the changed information. Cycling the affected HSCs can be done at a convenient time, with only one HSC down at a time. This permits an HSC server to remain up, servicing requests from clients such as MVS/CSC.



**Note:** In many instances, the SET utility can run while HSC subsystem(s) are active. However, some SET options require that the HSC(s) affected must be down, e.g., SET HOSTID.

In most cases, the LSM and/or ACS affected must remain offline until HSCs on affected hosts are recycled, e.g., when deleting or changing drive unit addresses with SET SLIDRIVS.

In most cases, all affected HSCs must be recycled to reinitialize and support the new configuration. Refer to SET Utility in the *HSC System Programmer’s Guide* for restrictions on the specific SET options and processes to follow when making configuration changes.

## Defining a New Configuration to Avoid Future Reconfigurations

When you define a new configuration with LIBGEN, you can add some flexibility to avoid running MERGEcds or reconfigurations in the future.

- If additional hosts may be added later, define dummy host IDs now. Entries for future hosts can be defined in the SLIBRARY macro, `HOSTID=(host0, . . . ,host23)` parameter. For example, host IDs of FREE1, FREE2, and FREE3 could be defined. Then, the SET utility HOSTID option can be used to change these “reserved” host IDs to the new ones being added to the configuration.

```
SET HOSTID(newhost),FORHOST(FREE1)
```

- When a CDS is created, it is desirable to allocate more than the minimum amount of space. The free blocks can be used later when additional drives are added.

## Defining Planned ACSs with no Stations

The HSC allows users to define an ACS without specifying station addresses (refer to the SLIACS macro in the *HSC Configuration Guide*).

Using this feature means that a planned ACS can be placed into the LIBGEN/SLICREAT process and remain disconnected without generating message SLS1664A (‘ACS AA is disconnected’) or requiring the user to enter the OPTion DISCmsg command to suppress SLS1664A.

If planned ACSs have been defined previously with dummy station addresses, these stations can be removed using the SET SLISTATN utility. In this case, the user does not specify any output stations. Refer to the SET utility, “SET LMU Station Address Numbers” in the *HSC System Programmer’s Guide* for more details.

When the planned ACS becomes available, SET SLISTATN can be used to add stations for the ACS. The ACS can then be brought online without recycling the HSC.



## Defining Planned Drives

For MSP/EX, unit addresses can be defined for devices that do not physically exist. The HSC allows users to exclude these drives from being allocated in the following cases:

- If drives are to be added outside the library, no changes are required. However, the SMC UNITATTR MOdel(IGNORE) command can be used to make sure allocation will never be directed to the nonexistent drive.
- If the drives are to be added inside the library, they can be excluded from allocation by using the SMC UNITATTR MOdel(IGNORE) command after they are added to the SLIDRIVS LIBGEN macro or SET SLIDRIVS utility.



**Note:** Drive panels can contain either four, ten, or twenty drive addresses. For example, by defining ten unit addresses for panels that contain only four physical drives, users can reserve addresses for planned drives.

## Changing Panels

The following procedures describe methods to make changes to panels. These include changing panel types in an LSM and removing cartridges to facilitate hardware changes.

- To change panel types in an LSM:
  1. Use the SET utility to freeze the panel, preventing any additional cartridges from being moved to it. This prohibits new cartridge home cell locations from being allocated on the frozen panel.

```
SET FREEZE(ON),FORLSMID(aa11),FORPANEL(pp)
```

2. Use the MOVE utility or the MOVE or EJECT commands to move all cartridges off the panel being changed

```
MOVE Flsm(aa11) Panel(pp) TLsm(aa11)
```

Because the panel has been frozen, cartridges cannot be moved to it, and it will remain empty.

3. Change the panel type, either using the SET SLIDRIVS utility to change between standard and wide drive panels or running the LIBGEN, SLICREAT, MERGEcds process to change other panel types.



### Notes:

- StorageTek CSEs will change the library hardware at the same time the panel type is being changed.
- The HSC must be recycled before the LSM and ACS containing the changed panel configuration can be brought online to the HSC.

4. After the hardware changes are complete, unfreeze the panel, if it is still frozen.

```
SET FREEZE(OFF),FORLSMID(aa11),FORPANEL(pp)
```

**Notes:**

- If a frozen panel type is changed by the MERGEcds or Reconfiguration utilities, the new panel is not frozen. Frozen panels that did not change remain frozen after a MERGEcds or reconfiguration.
- When SET SLIDRIVS is used to change panel types, SET FREEZE(OFF) can follow the SET SLIDRIVS statement.
- To remove cartridges from rows on panel(s) to facilitate hardware (e.g., cabling) changes:
  1. Use the SET utility to freeze the panel, preventing any additional cartridges from being moved to it. This prohibits new cartridge home cell locations from being allocated on the frozen panel.

```
SET FREEZE(ON),FORLSMID(aa11),FORPANEL(pp)
```

2. Use the MOVE utility or the MOVE or Eject commands to move all cartridges off the panel rows being changed.

```
MOVE Flsm(aa11) Panel(pp) TLsm(aa11)
```

Because the panel has been frozen, cartridges cannot be moved to it, and the rows will remain empty. The StorageTek CSEs will make the hardware changes required.

3. After the hardware changes are complete, unfreeze the panel, if it is still frozen.

```
SET FREEZE(OFF),FORLSMID(aa11),FORPANEL(pp)
```

## Using CDS Rename/Relocate/Expand

The HSC can rename, relocate, and expand an existing CDS(s) without requiring tape activity to be suspended or the HSC to be taken down on all hosts. To use these features, users must be at HSC 5.0 or later, however, compatible down-level releases of the HSC may be initialized after the CDS has been modified as long as the CDSDEF control statements are consistent with the active CDS definitions.

For a rename or relocation operation, the CDS must be disabled (inactive) on all HSC hosts to make sure that no active HSC hosts attempt to update or read the target CDS copy during a rename or relocation activity. When using the CDS EXpand function, all CDS copies are reformatted at the same time, so all CDSs must be enabled (active) on all hosts.

### CDs Command

The CDs operator command provides rename, relocation, and expand capabilities. Refer to “Commands, Control Statements, and Utilities” in the *HSC 6.2 Operator’s Guide* for a description of the keywords used to perform these operations.

### Renaming/Relocating a CDS - Scenarios

To rename and relocate a CDS copy, only one copy of the CDS must be disabled at a time. For example,

```
CDS DISABLE DSN(ACS.DBASEOLD)
```

### Renaming a CDS Copy

Before you enable the renamed CDS copy, assume only one CDS has been disabled using the CDs Disable command (see above), and ACS.DBASEOLD is renamed to ACS.DBASECPY. The inactive (disabled) data set is then enabled using the following command:

```
CDS ENABLE DSN(ACS.DBASECPY)
```

If the Enable command fails for the renamed CDS, CDS definitions are restored to what they were before the command was issued. Users must modify CDSDEF control statements to keep them consistent with the active CDS.

### Renaming and Relocating a CDS Copy

To relocate a CDS copy with the CDS Enable command, the user must first create a data set containing the appropriate CDS attributes: a fixed, 4096-byte record, single extent, physical sequential file. Optionally, users may rename the CDS.

The data set can be created using JCL as shown for the SLICREAT job discussed in the *HSC Configuration Guide* or using the TSS 3.2 Data Set Utility facility.



**Note:** TSS 3.2 may create a single extent data set even when no secondary quantity is specified.

It is not necessary to initialize the CDS copy, that is, you do not have to execute SLICREAT or copy another CDS copy to the new data set.

Assume that ACS.DBASECPY has been disabled and deleted (or uncataloged), and ACS.DBASENEW has been allocated and cataloged. The following command enables the renamed and relocated CDS:

```
CDS ENABLE DSN(ACS.DBASENEW) NEWLOC
```



**Note:** MSP uses catalog services to resolve the volume and unit definitions, if not specified.

If a rename or relocate operation fails, CDS definitions are restored to what they were before the command was issued. Users must modify CDSDEF control statements to keep them consistent with the active CDS.

### Relocating an Uncataloged CDS Copy

Assume that ACS.DBASECPY has been disabled and deleted (or uncataloged), and ACS.NOTCATLG has been allocated and cataloged. The following command relocates an uncataloged CDS copy:

```
CDS ENABLE DSN(ACS.NOTCATLG) NEWVOL(HSC001),NEWUNIT(ABC)
```

Users must modify CDSDEF control statements to make them consistent with the CDS definitions in this command. If a rename or relocate operation fails, CDS definitions are restored to what they were before the command was issued.



**Note:** The **NEWVOL** and **NEWUNIT** parameters are required for VM.

## Expanding a CDS - Scenario

Before expanding all CDSs, each CDS must be disabled one at a time and created with a larger space allocation in the JCL. Then, all CDS copies must be enabled before issuing the following command:

```
CDS EXPAND
```



**Warning:** StorageTek recommends backing up all CDS copies prior to issuing the CDS EXpand command. Failures during the expand operation usually cause the CDS to be unusable. It is important to back up the CDS before invoking the CDS EXpand command to make sure that the latest copy of the CDS is available in case of a failure during the expand operation.

The number of formatted blocks in the CDS remains constant for all copies of the CDS regardless of the physical space allocated for CDS copies. The number of formatted blocks is determined by the maximum number of 4096 blocks that can be written in the smallest CDS copy.

Users must modify CDSDEF control statements to make them consistent with the CDS definitions in this command.

## Swapping a CDS

### Releases Prior to 6.0

In previous releases, unit address information specified (or defaulted to) on the CDSDEF control statement was used during HSC initialization to locate the CDSs. The unit address information was stored in the CDS and remained in effect for the life of the HSC execution. The only way to reset the unit address information was to back up and restore the CDS using the SLUADMIN utility, but this required the HSC to be stopped and restarted.

If the CDS volume was defined as a PPRC Primary and/or participated in a swap operation using TDMF, FDRPAS, or P/DAS, the unit address information did not change and would not correctly reflect the new location of the CDS.



**Note:** By definition, a swap operation does not change a VOLSER since the devices are exact duplicates of each other.

While the out-of-date unit address information did not directly affect the HSC subsystem, it did affect HSC and VTCS utilities. Typical utility failure symptoms included the following:

- SLUCONDB SLS6053I QCDS ERROR (RC=0028) FOR FUNCTION OPEN VOL
- SLUADMIN SLS1203I MISSING OR INVALID SLSCNTL DD STATEMENT VOLRPT
- SWSADMIN SLS6771E UNABLE TO ALLOCATE TO THE CDS

### HSC 6.0 and Later

The HSC has been enhanced to dynamically correct the unit address information stored in the CDS within a few seconds after a TDMF, FDRPAS, or P/DAS swap operation takes place so that HSC and VTCS utilities always use the new CDS location.

This enhancement does not provide an unrestricted ability to move a CDS. Moving a CDS by a means other than a PPRC or swap operation requires a change to the VOLSER of the CDS. The traditional process of executing a SLUADMIN BACKup and RESTore of the CDS must be used to reset both unit address and volume serial information if the VOLSER of the CDS changes.

# Appendix C. Macros, Control Statements, Utilities, and Commands Syntax Reference

---

## Syntax Flow Diagrams

Syntax is illustrated using flow diagrams. These can include the following elements:

- syntax – the diagram itself.
- items – individual elements inside the diagram. Items can be keywords, variables, delimiters, operators, fragment references, and separators.
- groups – a collection of items or other groups.

The following sections describe syntax flow diagram features and include some generic examples.

## Specifying Commands

Commands are composed of command names, keyword parameters, and positional parameters. Command names initiate command execution, keyword parameters are operands that contain keywords and their related values, and positional parameters are operands that are identified by their position in the command string rather than by keywords.

- Keyword parameters can be specified in any order. The HSC accepts (tolerates) multiple occurrences of a keyword. The value assigned to a keyword reflects the last occurrence of a keyword within a command.
- Positional parameters must be entered in the order shown in the syntax diagram.
- Uppercase letters indicate the minimum abbreviation for the command name, keyword, or positional parameter.

## Variables

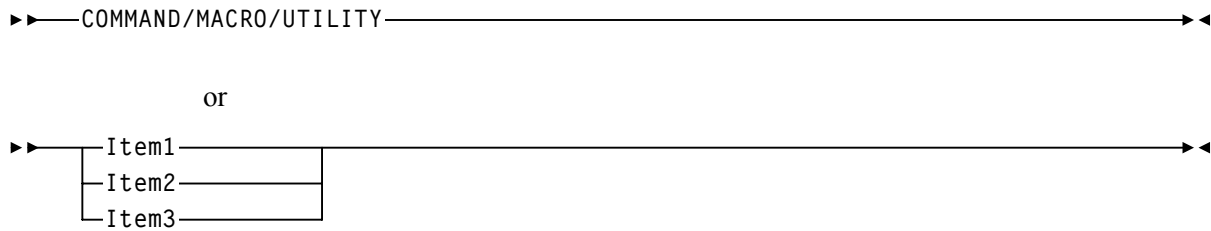
Variables are italicized.

## Delimiters

If a comma (,), a semicolon (;), or other delimiter is shown with an element of the syntax diagram, it must be entered as part of the statement or command.

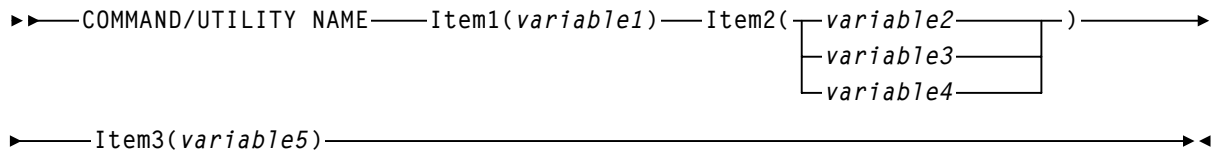
## Flow Lines

Syntax diagrams consist of horizontal and vertical lines and the text of a command, control statement, macro, or utility.



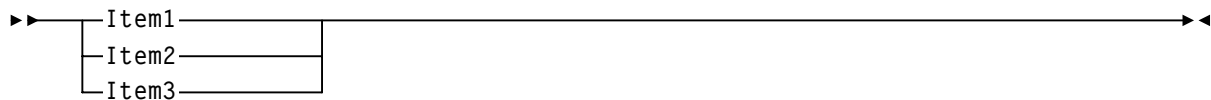
Diagrams are read left to right and top to bottom. Arrows indicate flow and direction.

- a statement begins with ▶▶
- a statement ends with ▶◀
- diagrams continuing to the next line begin with ▶
- fragments begin and end with |



## Single Required Choice

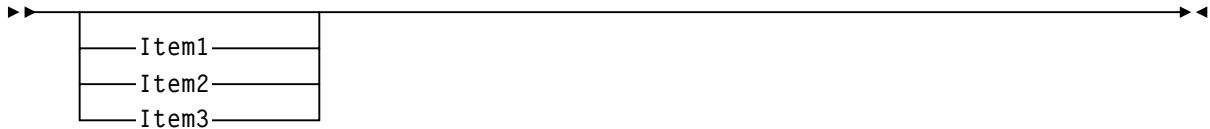
Branch lines, without repeat arrows, indicate that a **single** choice must be made. If one of the items from which a choice is being made is on the base line of the diagram, a single choice is required.





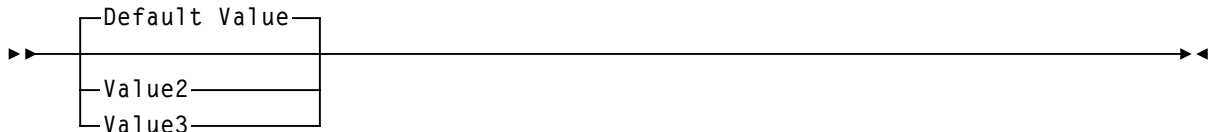
## Single Optional Choice

If the first item is on the line below the base line, a single choice of items in the stack is optional.



## Defaults

Default values and parameters appear above the syntax diagram line. In the following example, if a value is not specified with the command, Default Value is used by the HSC.

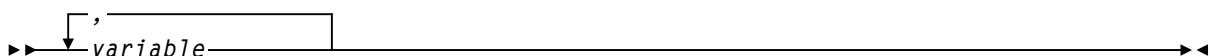


Some keyword parameters provide a choice of values in a stack. When the stack contains a default value, the keyword and the value choices are placed below the baseline to indicate that they are optional, and the default value appears above the keyword line. In the following example, if the keyword is not specified with the command, Keyword(Default Value) is used by the HSC.



## Repeat Symbol

A repeat symbol indicates that more than one choice can be made or that a single choice can be made more than once. The repeat symbol shown in this example indicates that a comma is required as the repeat separator.



## Syntax Continuation (Fragments)

Fragment references direct you to parts (fragments) of the syntax that contain more detail than can be shown in the main syntax diagram.

▶▶COMMAND/UTILITY NAME———| Fragment Reference |—————▶▶

### Fragment:

└Item1(———*variable1*———,———*variable3*———)  
          └———*variable2*———┘          └———*variable4*———┘—————▶

▶Item2(———*variable5*———,———*variable7*———)  
          └———*variable6*———┘          └———*variable8*———┘—————|

## Library Identification

Each ACS, LSM, and CAP is assigned a unique identification number during LIBGEN. Use this number in HSC commands and utilities when identifying a specific ACSid, LSMid, or CAPid.

- ACSid (*acs-id*) is a hexadecimal value from 00 through FF that identifies the LMU.

An *acs-id* is the result of defining the SLIALIST macro during a LIBGEN. See “LIBGEN Macros” in the *HSC Configuration Guide* for information about the SLIALIST macro. The first ACS listed in this macro acquires a hexadecimal identifier of 00, the second ACS listed acquires a hexadecimal identifier of 01, and so forth until all ACSs are identified.

- An LSM number (*ll*) is a hexadecimal value from 00 through 17. It differentiates an LSM from every other LSM connected to the same LMU.

An LSM number is the result of defining the SLIACS macro LSM, LSM2, LSM3, and LSM4 parameters. See the *HSC Configuration Guide* for information about the SLIACS macro. The first LSM listed for an ACS acquires a hexadecimal number of 00, the second LSM listed for an ACS acquires a hexadecimal number of 01, and so forth.

- An LSMid (*lsm-id*) is made up of the ACSid and the LSM number separated by a colon (:). It differentiates an LSM from every other LSM in a library.
- A CAP number is a hexadecimal value from 00 to 02. The CAP number identifies a specific CAP in an LSM that has more than one CAP.
- A CAPid (*cap-id*) is a hexadecimal value made up of the LSMid and the CAP number separated by a colon. Refer to “How to Specify a CAPid” on page 488 for more information.

Some HSC commands and utilities require, or optionally allow, the user to specify a host identifier or a VOLSER.

- The *host-id* for a given host is the identifier specified in the HOSTID parameter of the SLILIBRY macro in the LIBGEN. The HOSTID parameter is the SMF system identifier for JES. Valid characters for a HOSTID are A-Z, 0-9, #, \$, and @.
- A VOLSER (*volser*) identifies a volume serial number consisting of one to six characters. Valid characters are A-Z, 0-9, # (crosshatch), \$, ¥ (yen character), and optional trailing blanks. Leading blanks are not allowed.

## How to Specify a CAPid

A CAPid specifies a particular CAP in the library. Each CAP is identified by the LSMid of the LSM that the CAP is attached to and a CAP number to distinguish it from other CAPs in that LSM.

CAP configurations differ based on the LSM type. The following configurations are possible:

### LSM (Model 4410) and PowderHorn LSM (Model 9310)

can be configured with either the standard 21-cell CAP or an enhanced CAP. An enhanced CAP contains two 40-cell magazine-style CAPs and a one-cell priority CAP (PCAP). The 40-cell CAPs function independently.

### WolfCreek LSM (Models 9360-050, 9360-075, and 9360-100)

configured with a WolfCreek CAP which contains a 20-cell magazine-style CAP and a PCAP. An optional 30-cell, magazine-style CAP, called a WolfCreek optional CAP, may be added to the WolfCreek CAP.

### TimberWolf LSM (Model 9740)

configured with either a 14-cell permanent rack or a 10-cell removable magazine.

### StreamLine Library (Model 8500)

This library is configured with 3, 13-cell removable magazines. An optional 39-cell CAP can be added.

## CAPid Formats

There are two formats that can be used to specify a CAPid:

- *AA:LL*, where *AA* is the ACSid and *LL* is the LSM number. This format is referred to as the *lsm-id*.
- *AA:LL:CC*, where *AA:LL* is the LSMid and *CC* is the CAP number. This format is referred to as the *cap-id*.



### Caution:

**Do not use a colon as the MSP command delimiter because the system will process the colon in the new CAPid format as the end of the command. All information following the colon in an HSC command will not be processed.**

The appropriate format to use is determined by the CAP hardware and the command being specified.

- The *AA:LL* format can be specified in the following situations:
  - to specify a standard CAP
  - to allow the HSC to select a CAP based on CAP preference.

- The *AA:LL:CC* format can be specified for any CAP hardware in any command that accepts a CAPid. This is the preferred format. Valid CAP numbers are:

**00** indicates one of the following:

- a 21-cell standard CAP
- the right-hand 40-cell CAP of an enhanced CAP
- the 20-cell CAP of a WolfCreek CAP
- a 14-cell or 10-cell removable magazine 9740 TimberWolf CAP
- the 3, 13-cell removable magazines for an SL8500 CAP.

**01** indicates one of the following:

- the left-hand 40-cell CAP of an enhanced CAP
- the 30-cell CAP of a WolfCreek optional CAP
- the 3, 13-cell removable magazines for an optional SL8500 CAP.

**02** indicates the PCAP in either an enhanced CAP or a WolfCreek CAP.



**Note:** Refer to the individual command explanations for additional information on specifying CAPids.

## Ranges and Lists

HSC commands and utilities often allow the user to specify ranges and lists of elements.

1. An inclusive range is indicated by a pair of elements of the same length and data type, joined by a dash. The first element **must** be strictly less than the second element.
  - A hexadecimal range consists of a pair of hexadecimal numbers (for example, 0A2-0AD, or 000-0FC).
  - A decimal range consists of a pair of decimal numbers (for example, 1-9, or 010-094). Leading zeros are not required.
  - A numeric VOLSER range (*vol-range*) consists of a pair of VOLSER elements containing a decimal numeric portion of 1 to 6 digits (for example, ABC012-ABC025, or X123CB-X277CB). The decimal portion is referred to as an incremental range. The following additional restrictions apply:
    - The character positions of the incremental portion of both range elements must match.
    - The non-incremental characters of the first element must be identical to those of the second element.
    - You cannot increment two portions of a range element. If 111AAA is the first element, you cannot specify 112AAB for the second element.
    - If a VOLSER range contains more than one decimal portion, any portion is valid as the incremental range. For example:

A00B00      the largest range that can be specified is A00B00 through A99B99.

A0B0CC      the largest range that can be specified is A0B0CC through A9B9CC.

000XXX      the largest range that can be specified is 000XXX through 999XXX.



**Note:** A VOLSER range for most operator commands is limited to 100 entries. If a larger range is entered, only the first 100 VOLSERS in the range are acted on. If HSC utilities are used, the entire range is processed.

- An alphabetic VOLSER range (*vol-range*) consists of a pair of VOLSER elements containing an incremental portion of 1 to 6 characters (for example, 000AAA-000ZZZ, or 9AAA55-9ZZZ55). This portion is referred to as an incremental range. The following additional restrictions apply:
  - The character positions of the incremental portion of both range elements must match.
  - The non-incremental characters of the first element must be identical to those of the second element.

- You cannot increment two portions of a range element. If 111AAA is the first element, you cannot specify 112AAB for the second element.
- The alphabetic portion of the VOLSER range is defined as being from character A to Z. To increment multi-character sequences, each character increments to Z. For instance, ACZ is part of the AAA-AMM range. Examples are:

A00A0-A99A0 increments VOLSERs A00A0 through A09A0, then A10A0 through A99A0.

9AA9A-9ZZ9A increments VOLSERs 9AA9A through 9AZ9A, then 9BA9A through 9ZZ9A.

111AAA-111ZZZ increments VOLSERs 111AAA through 111AAZ, then 111ABA through 111ZZZ.

999AM8-999CM8 increments VOLSERs 999AM8 through 999AZ8, then 999BA8 through 999CM8

A3BZZ9-A3CDE9 increments VOLSERs A3BZZ9 through A3CAA9, then A3CAB9 through A3CDE9

AAAAAA-AAACCC increments VOLSERs AAAAAA through AAAAAZ, then AAAABA through AAACCC

CCCNNN-DDDNNN increments VOLSERs CCCNNN through CCCNNZ, then CCCNOA through DDDNNN\*

\* **Caution:** This is a very large range.

The number of volumes in an alphabetic VOLSER range depends on the number of elements in the incrementing portion of the VOLSER range. For an A to Z range in each character position, the number of volumes can be calculated by 26 to the power of the number of positions that are being incremented.

<b>A-Z</b>	$26^1$	26
<b>AA-ZZ</b>	$26^2$	676
<b>AAA-ZZZ</b>	$26^3$	17,576
<b>AAAA-ZZZZ</b>	$26^4$	456,976
<b>AAAAA-ZZZZZ</b>	$26^5$	11,881,376
<b>AAAAAA-ZZZZZZ</b>	$26^6$	308,915,776



**Note:** For most operator commands, a VOLSER range is limited to 100 entries. If a large range is entered, only the first 100 VOLSERS are acted upon. If HSC utilities are used, the entire range is processed.

2. A list consists of one or more elements. If more than one element is specified, the elements **must** be separated by a comma or a blank, and the entire list enclosed in parentheses.
  - For some HSC operator commands, an element may consist of a single item or a range. Refer to the individual command explanations for valid list entries.
  - In general, HSC utilities **do not allow** ranges to be specified in a list. The exception to this is a VOLSER list (*vol-list*) which does allow ranges to be specified. For VOLATTR control statements, you can use wildcard characters (% , ? , or \* ) to identify a list of VOLSERS.



## Control Statement Syntax Conventions

The control statement for each utility program consists of a command (indicating the utility function) followed by parameters, as applicable, in 80-character card-image records. The standard syntax conventions for control statements are as follows:

- The only valid control statement information area is from column 1 to column 72. Columns 73-80 are ignored.
- Parameters are separated by one or more blanks or a comma.
- A value is associated with a parameter by an equal sign (=) or by enclosing the value in parentheses, and concatenating it immediately after the parameter.
- Case (upper or lower) is ignored in actual control statements.
- Control statements may be interspersed with comments designated by an asterisk (\*) in column one.

For definition data sets (VOLATTRs, UNITATTRs and TAPEREQs) comments **must** be in the new format (/...\*/). Asterisk (\*) comments are not allowed. A /\*...\*/ comment in the first line is **not** required for definition data sets.

- A control statement is terminated if the statement is not continued. Comments cannot be nested, and mixing the two comment styles (\* and /\*) is not allowed.
- The 80-character card-image records use conventional continuation rules.
  - A space and a dash (-) following a parameter or parameter value indicates that a blank is to be inserted between the last nonblank character of this line and the first nonblank character of the next nonblank record.
  - A plus sign (+) specifies that the continued control information is to be concatenated directly after the character preceding the plus sign. The continued data starts at column two of the next nonblank record.



**Note:** You can use a continuation only after a new keyword or after the natural end of a value. Some examples follow.

The following examples illustrate continuations used correctly:

```
SCRPOOL NAME=STD36,RANGE+  
(AAA000-AAA999,ZZZ000-ZZZ999)
```

```
SCRPOOL NAME=STD36,RANGE(AAA000-AAA999,-  
ZZZ000-ZZZ999)
```

The following example illustrates a continuation used *incorrectly*:

```
SCRPOOL NAME=STD36,RANGE(AAA000-AAA999,ZZZ+  
000-ZZZ999)
```

- The maximum length of a control statement is 32,767 characters.
- The maximum length of a command (used as a command or in PARMLIB) is 126 characters.

## MEDIA, RECTech, and MODEL Parameters

Table 24 describes the HSC commands and control statements that accept MEDIA, MODEL, and RECTech parameters.

**Table 24. MEDIA, RECTech, and MODEL Cross-reference**

Name	Type	Related Parameters	MEDIA	RECTech	MODEL	Description
Display Drive	Command	DETail	Yes	Yes	Yes	Displays the transports that are capable of the specified MEDIA, RECTech, or MODEL.  When DETail is supplied, the MEDIA and MODEL are displayed for all transports.
Display SCRatch	Command	<i>acs-id</i> , <i>lsm-id</i> , SUBpool, DETail	Yes	Yes	No	Displays scratch counts that match the MEDIA and/or RECTech. The scope of the display may be limited to MEDIA and/or RECTech scratch counts within a subpool, ACS, or LSM.  When DETail is supplied, all MEDIA and RECTech information is displayed along with scratch counts.
Display THReshld	Command	<i>acs-id</i> , <i>lsm-id</i> , SUBpool, DETail	Yes	Yes*	No	Displays all scratch thresholds that match the MEDIA and/or RECTech. The scope of the display may be limited to MEDIA and/or RECTech scratch thresholds within a subpool, ACS, or LSM.  When DETail is supplied, all MEDIA and RECTech information is displayed along with scratch thresholds.
Display Volume	Command	DETail	No	No	No	Information on MEDIA and RECTech is provided when the DETail parameter is supplied.
EJect, EJECT	Command and Utility	SUBpool, SCRTCH	Yes	Yes	No	Ejects scratches that match the MEDIA and/or RECTech. If a subpool is supplied, those cartridges that match MEDIA and/or RECTech within the subpool are ejected.

**Table 24. MEDia, RECtech, and MODel Cross-reference (Continued)**

Name	Type	Related Parameters	MEDia	RECtech	MODel	Description
Mount	Command	SUBpool, SCRATCH, PRIVAT	Yes	No	No	Mounts scratches that match the MEDia. If a SUBpool is supplied, a cartridge that matches MEDia within the subpool is mounted.
TAPEREQ	Control Statement	Various Job Criteria	Yes*	Yes*	Yes*	<p>Processes which use this control statement correlate the MEDia, MODel, and RECtech parameters supplied by TAPEREQ to their definitions. The definition of MEDia is taken from either the VOLATTR control statement or the CDS. RECtech or MODel is taken from either UNITATTR control statements or eligible transports. For example, a volume has a known MEDia, so a transport must be found that matches the MEDia.</p> <p>RECtech or MODel aid transport selection when they match the MEDia. If MEDia is not supplied for a nonspecific request, then RECtech or MODel, when supplied, aid in defining which MEDia and subsequent volume is selected, provided that there are eligible transports with the RECtech or MODel attribute.</p> <p>Sometimes incompatibilities occur because of improper control statement definitions. When this happens, messages or unexpected results can occur.</p>
UNITATTR	Control Statement	N/A	No	No	Yes	The transport model, which implies transport capabilities, and network information is defined by this control statement. Lists are used to define a pool of transports from which to select.

**Table 24. MEDia, RECtech, and MODel Cross-reference (Continued)**

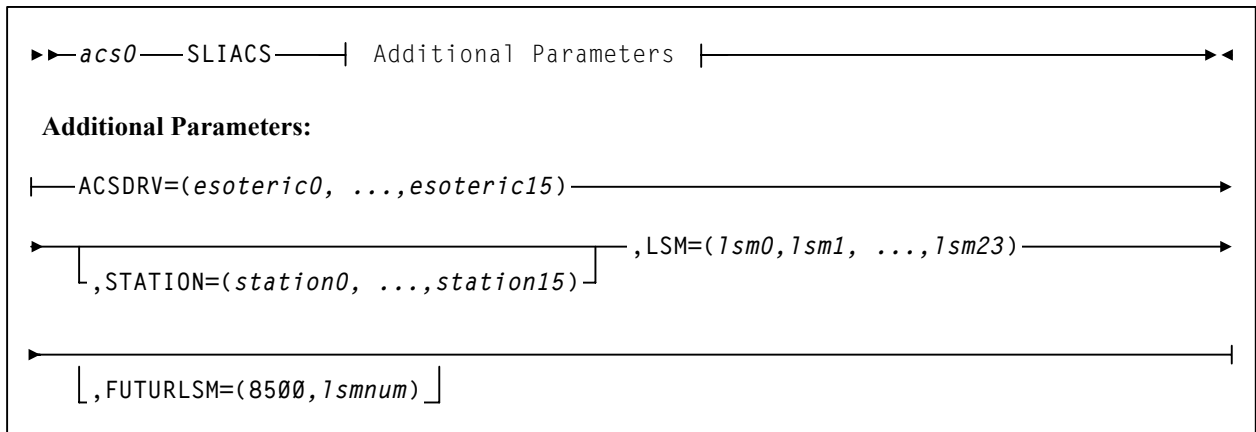
Name	Type	Related Parameters	MEDia	RECtech	MODel	Description
VOLATTR	Control Statement	N/A	Yes	Yes	No	<p>The MEDia of a given volume must be defined here and the desired RECtech to be used on this volume may also be expressed. Lists are used to define a pool of volumes from which to select.</p> <p>If VOLATTR is improperly defined, scratch counts may be incorrect or volume-to-transport incompatibilities may exist. These issues may result in various operator interactions and unexpected results.</p>
WARN	Command	<i>acs-id, lsm-id, SUBpool</i>	Yes	Yes*	No	<p>A scratch threshold warning value may be set or displayed for a given MEDia and RECtech. The scope of the change may optionally be limited to MEDia and RECtech scratch thresholds within a SUBpool, ACS, or LSM.</p>

\* Notes: Yes = Parameter exists. No = Parameter does not exist. \* = Parameter can be a list.

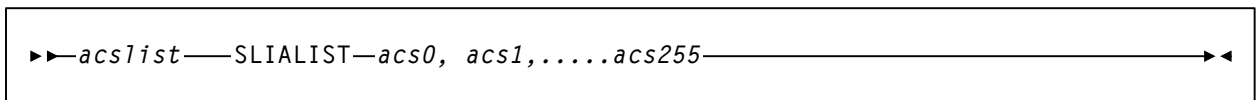
## LIBGEN Macros

The LIBGEN macros are shown below in alphabetical order. Refer to “Creating the Library Configuration File (LIBGEN)” in the *HSC Configuration Guide* for complete explanations of macro syntax and parameters, and the order in which they must be specified.

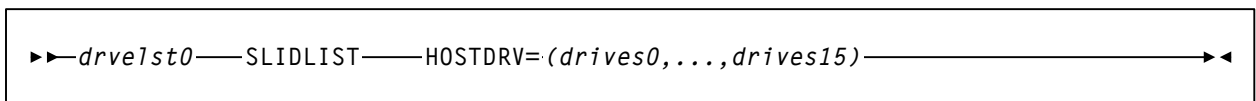
### SLIACS macro



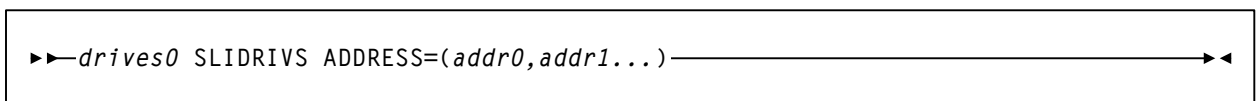
### SLIALIST macro



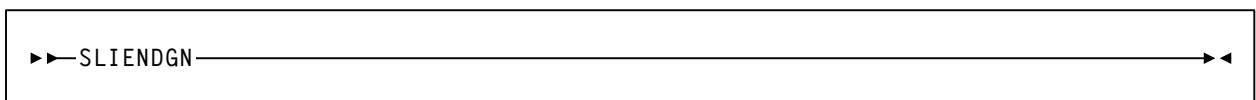
### SLIDLIST macro



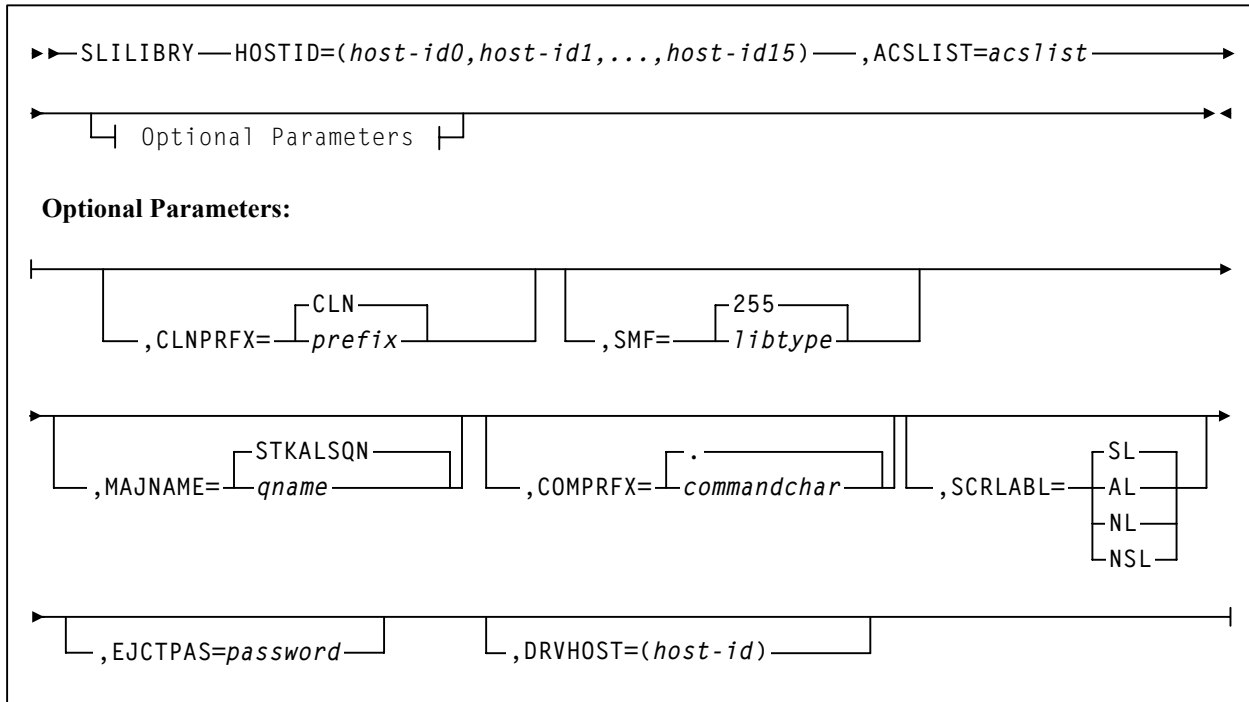
### SLIDRIVS macros



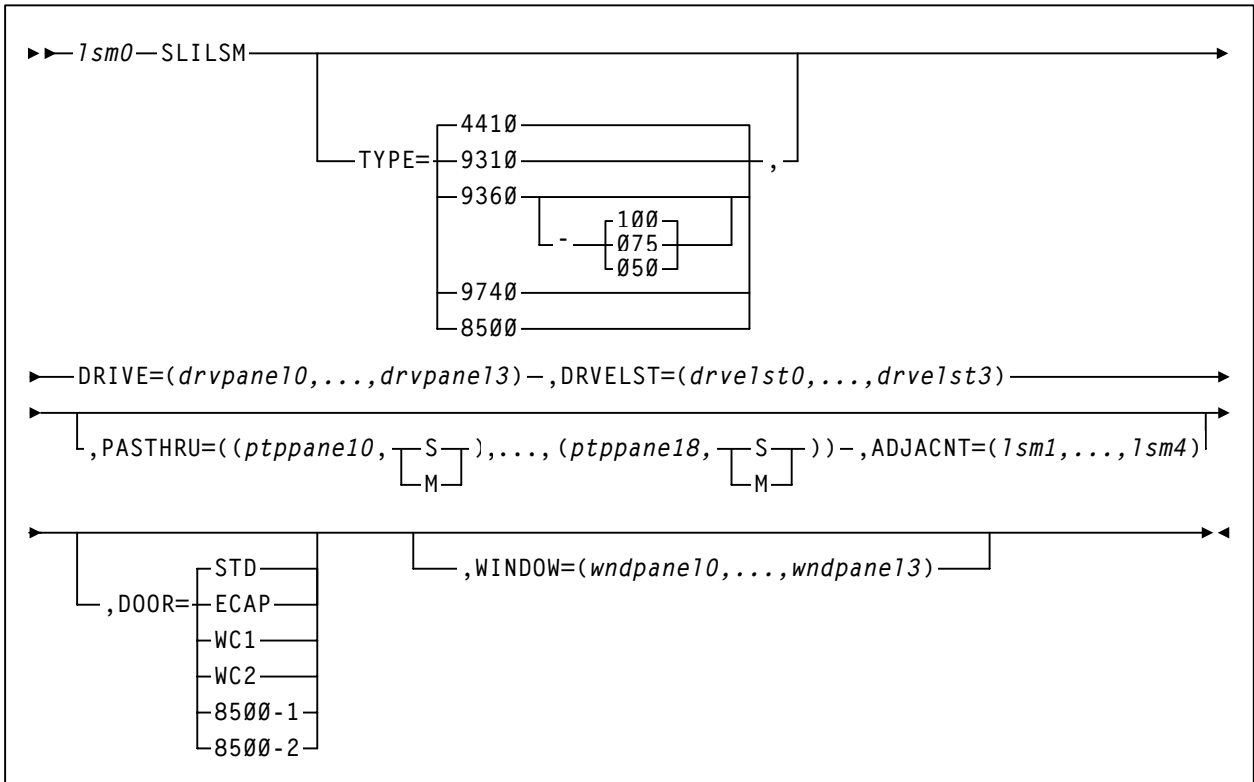
### SLIENDGN macro



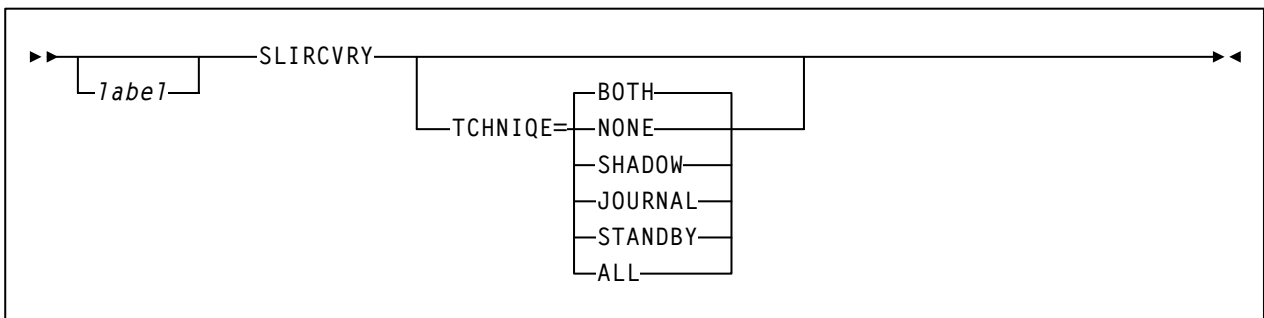
## SLILIBRY macro



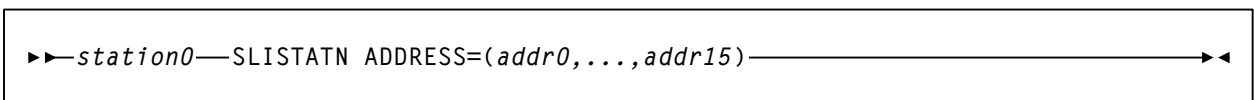
## SLILSM macro



## SLIRCVRY macro



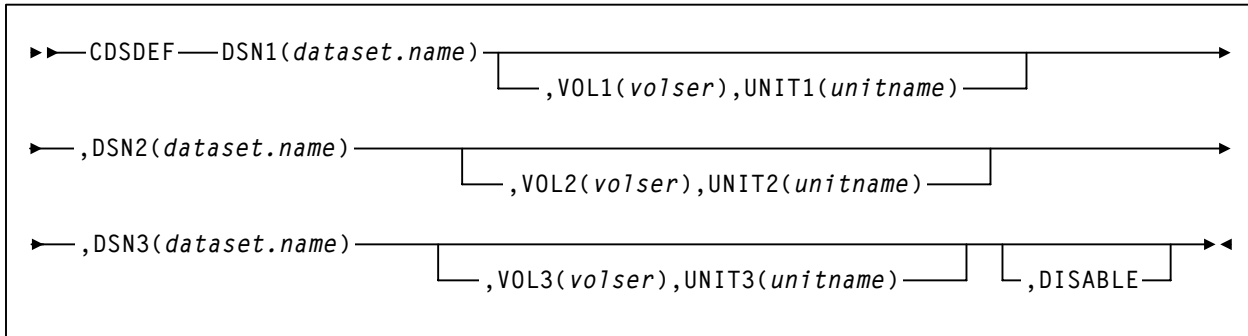
## SLISTATN macro



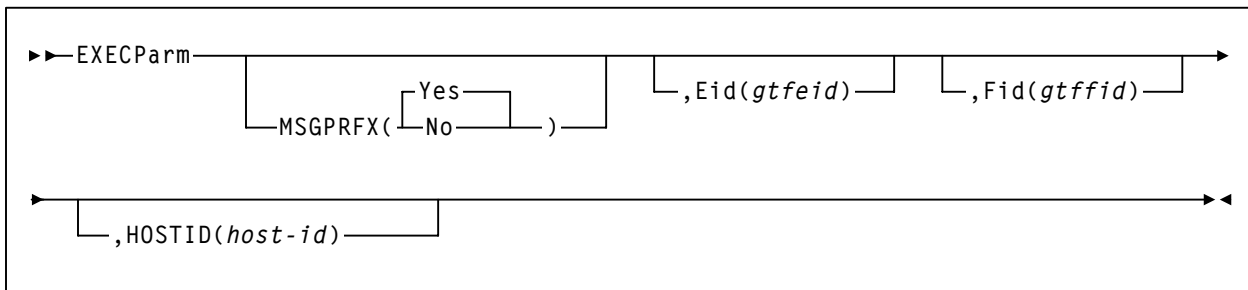
## HSC Control Statements

Refer to Chapter 3, “HSC Control Statements and HSC Start Procedure” for more information on control statement syntax and parameters.

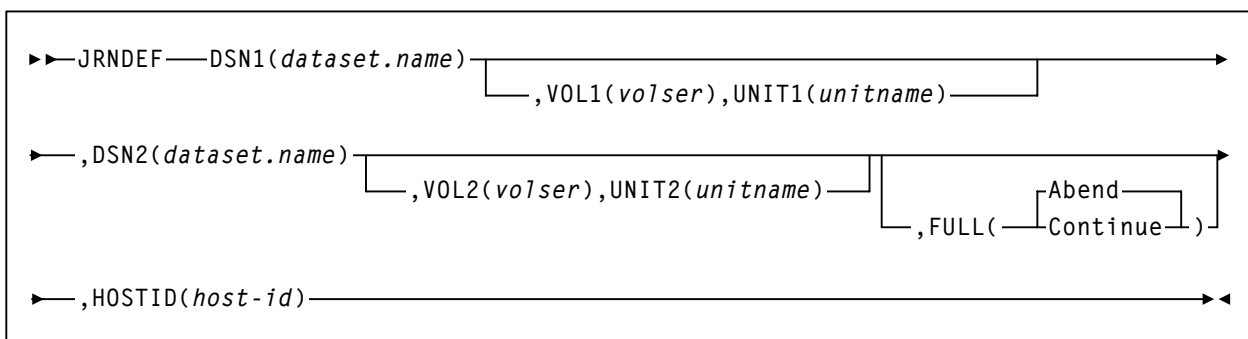
### Control Data Set Definition (CDSDEF) control statement



### EXECParm control statement

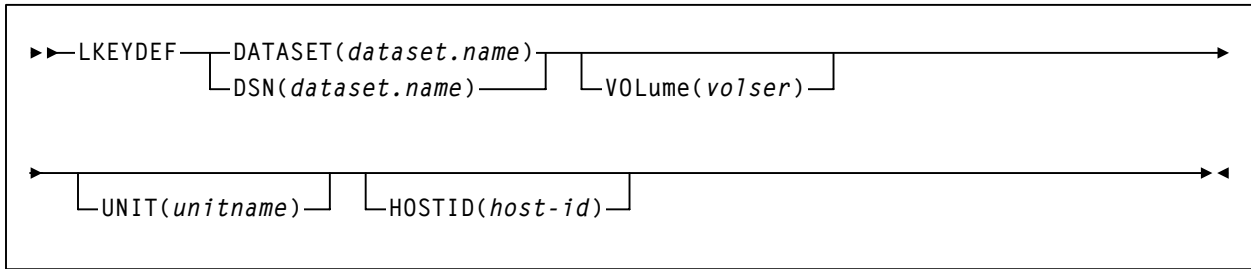


### Journal Definition (JRNDEF) control statement

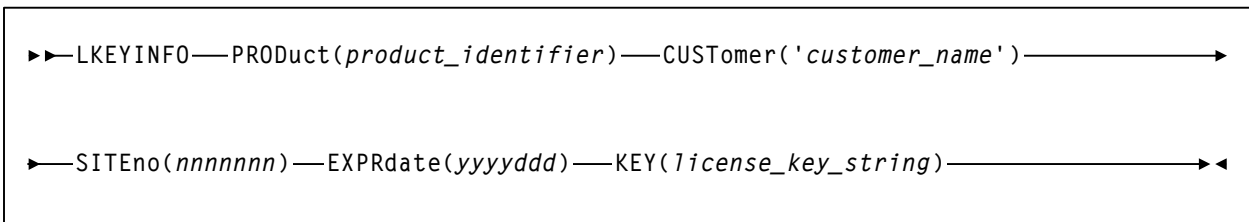




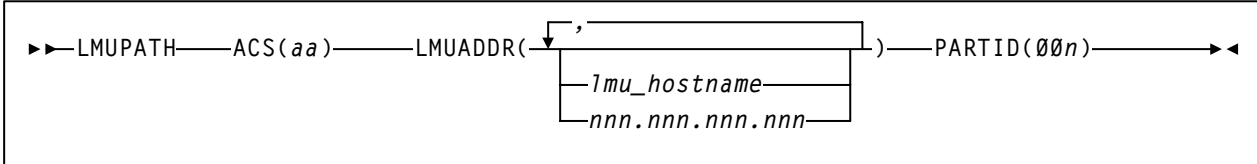
## License Key Definition (LKEYDEF) command and control statement



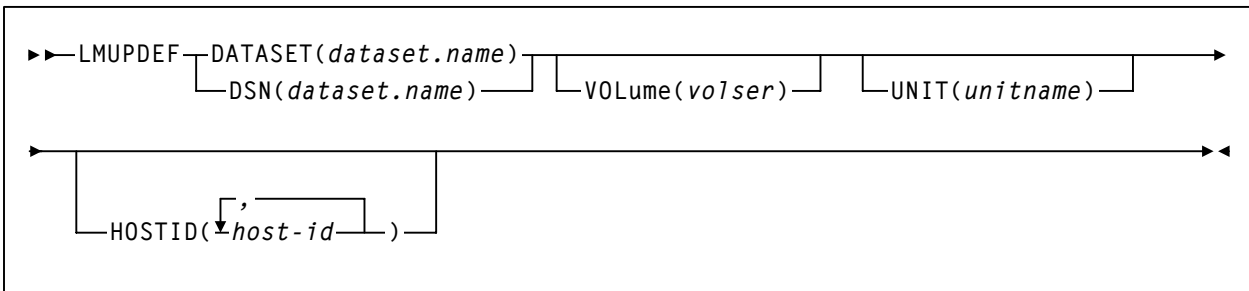
## License Key Information (LKEYinfo) control statement



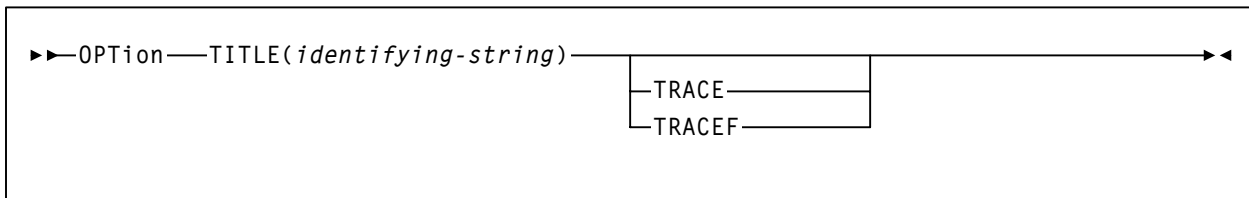
## LMUPATH control statement



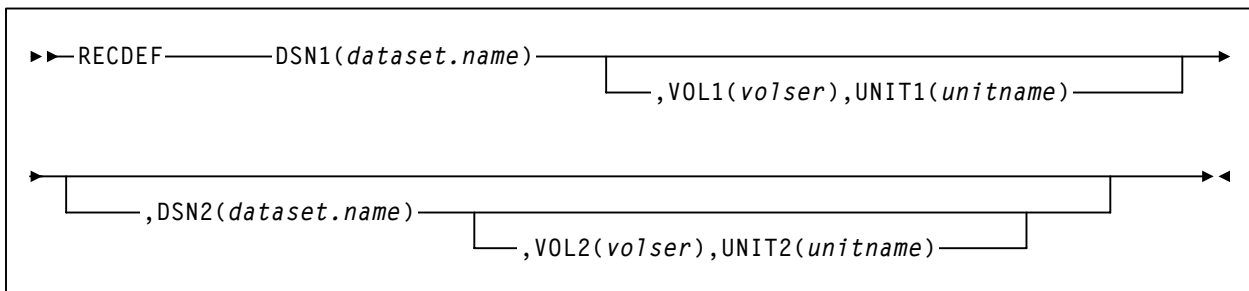
## LMU Path Definition (LMUPDEF) command and control statement



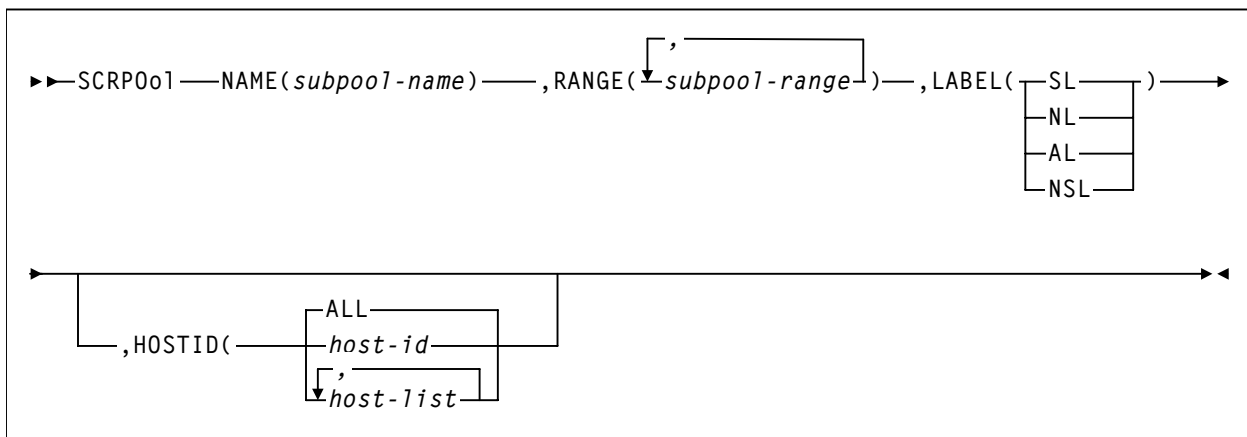
## OPTion control statement



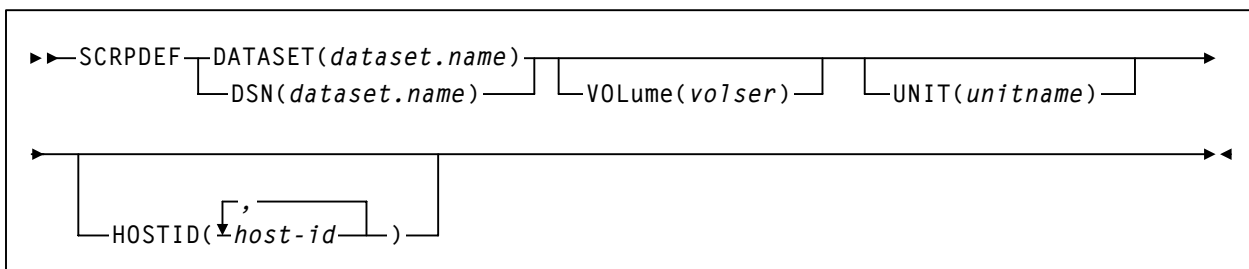
## Reconfiguration Definition (RECDEF) control statement



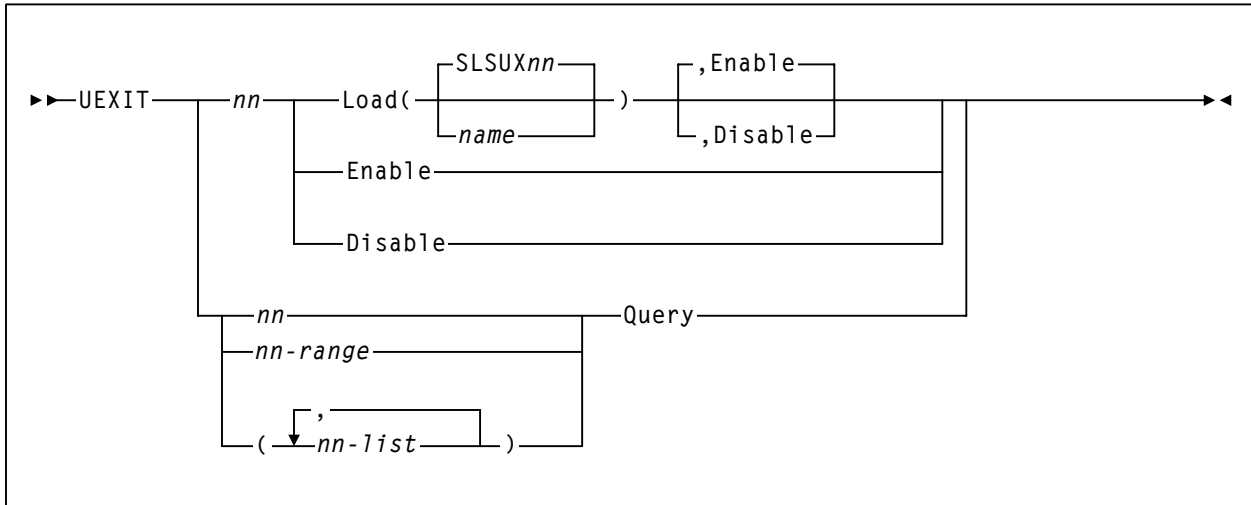
## Scratch Subpool (SCRPOol) control statement



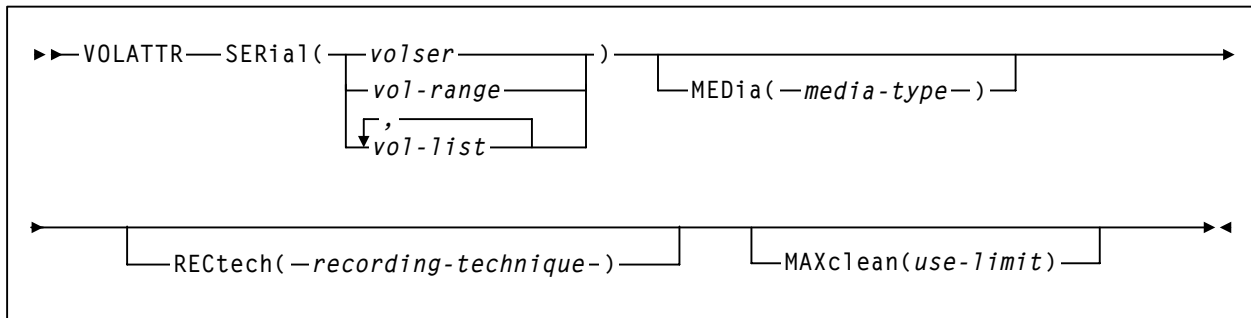
## Scratch Subpool Definition (SCRPDEF) command and control statement



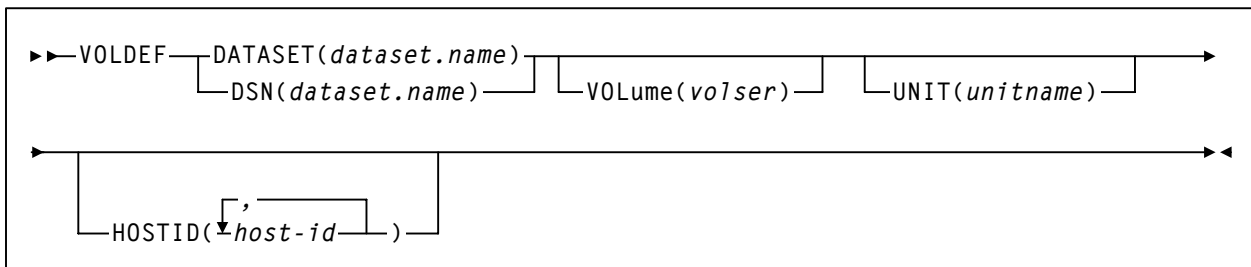
## User Exit (UEXIT) command and control statement



## Volume Attribute (VOLATTR) control statement



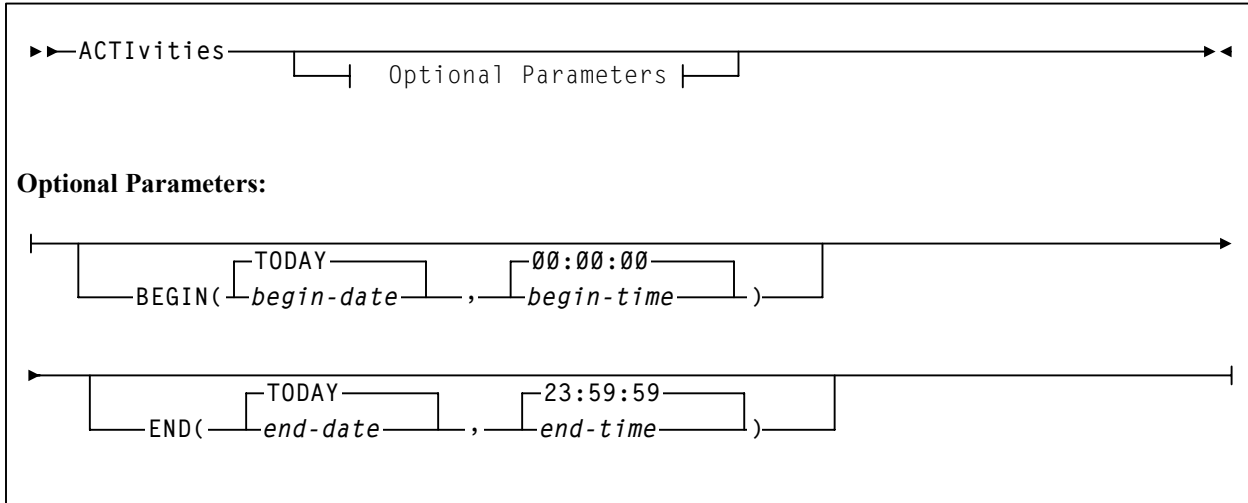
## Volume Attribute Definition (VOLDEF) command and control statement



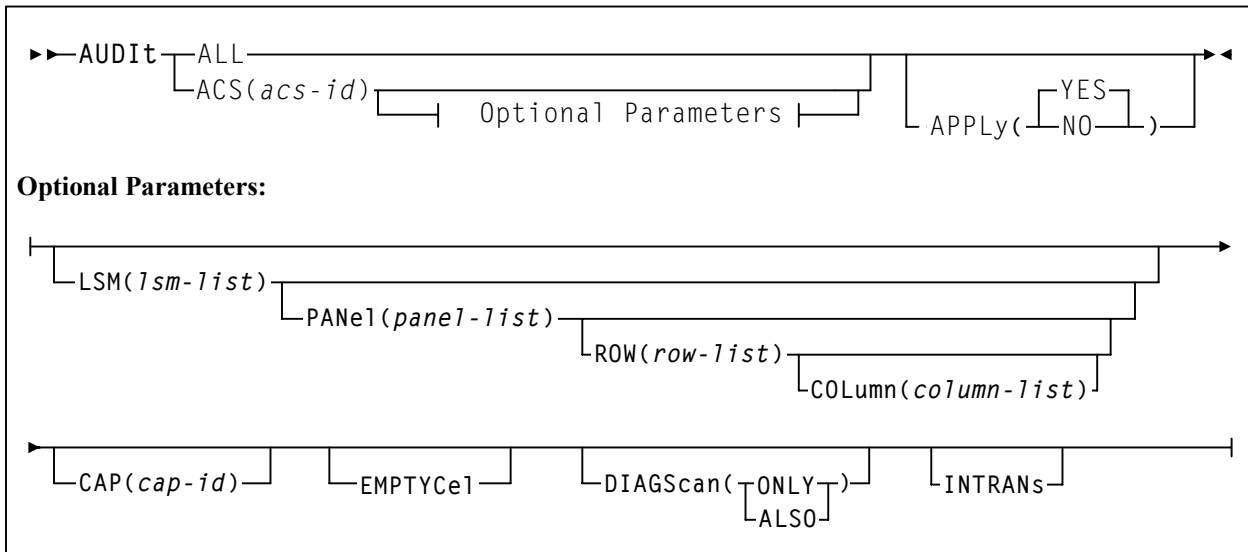
## Utilities

Refer to Chapter 4, “Utility Functions” for more information on utility syntax and parameters.

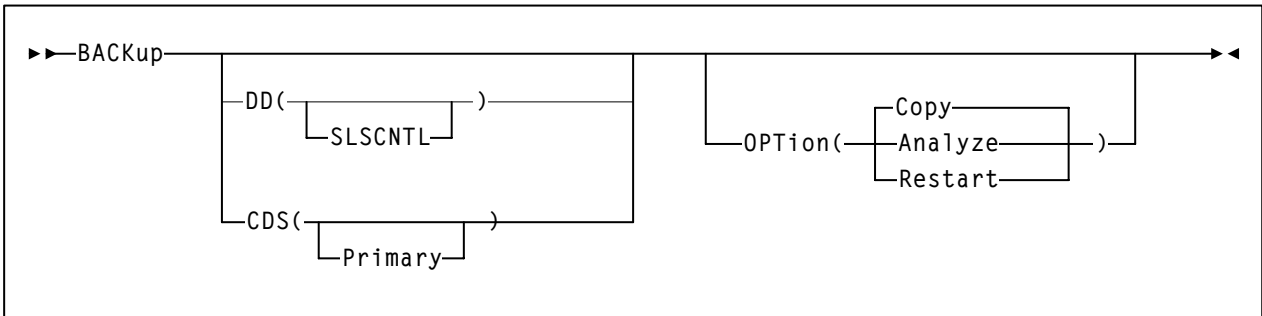
### ACTivities Report utility



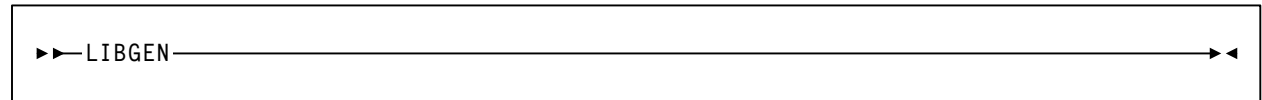
### AUDIt utility



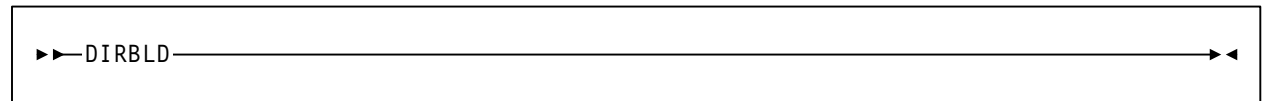
## BACKup utility



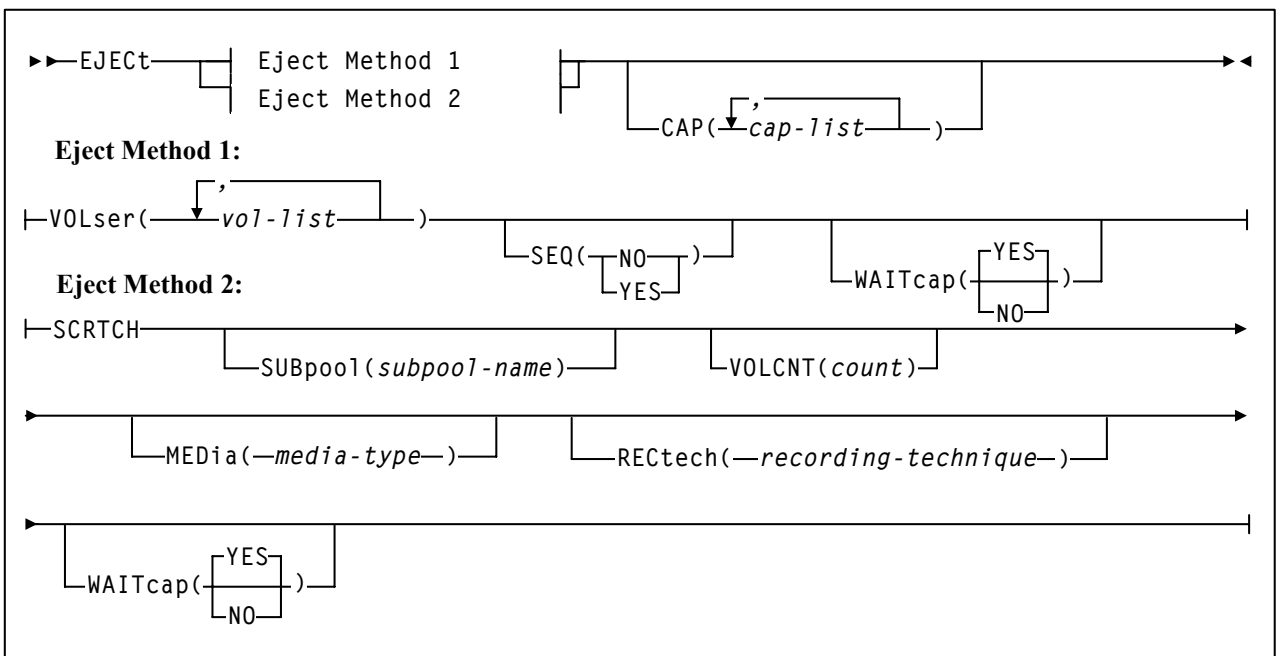
## Database Decompile (LIBGEN) utility



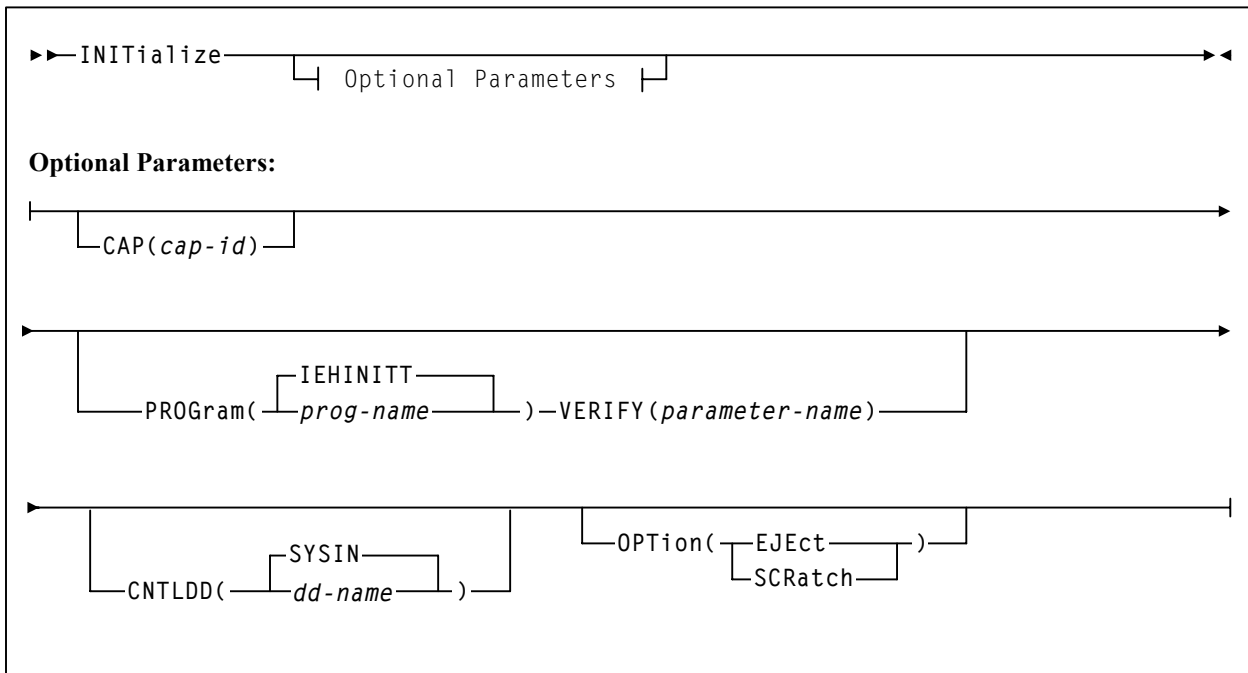
## Directory Rebuild (DIRBLD) utility



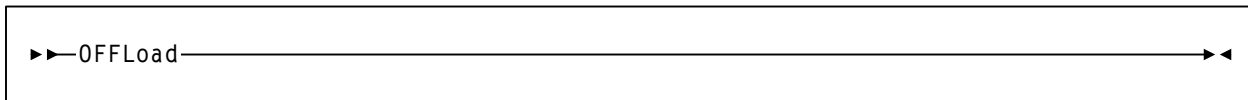
## EJECT Cartridge utility



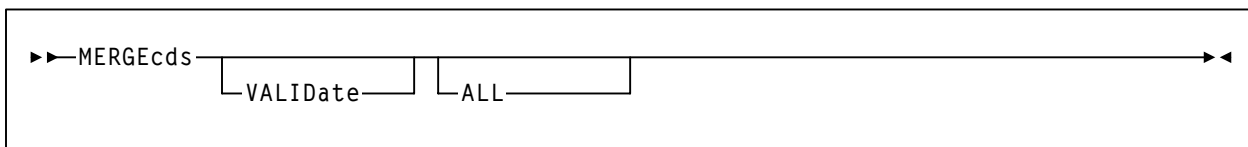
## INITialize Cartridge utility



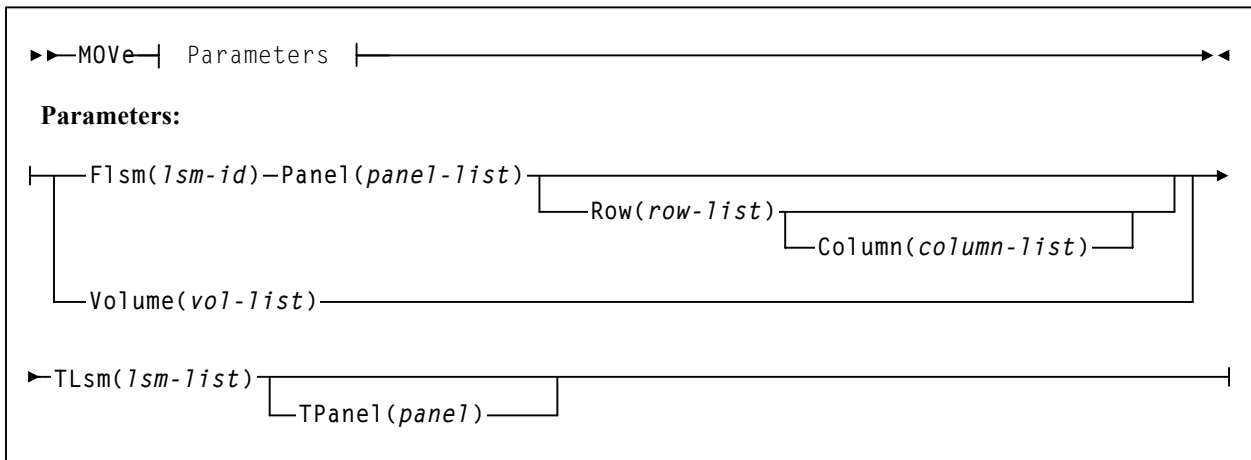
## Journal OFFLoad utility



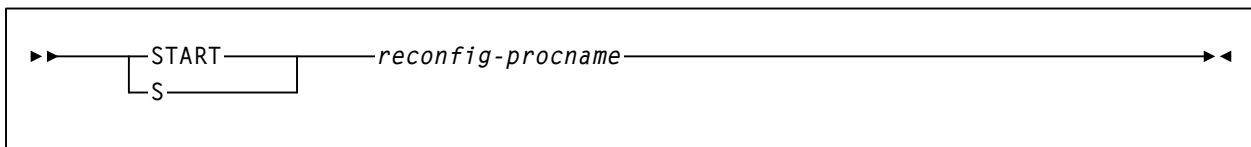
## MERGEcdfs utility



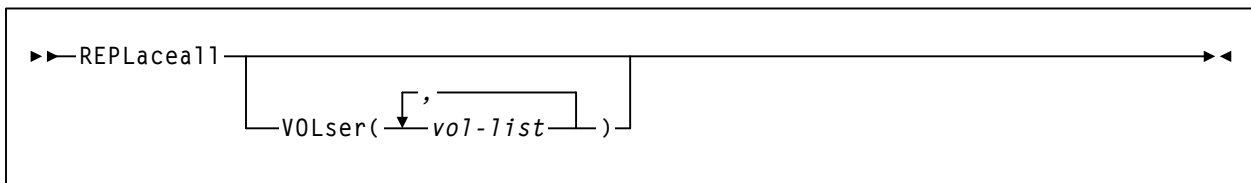
## MOVE utility



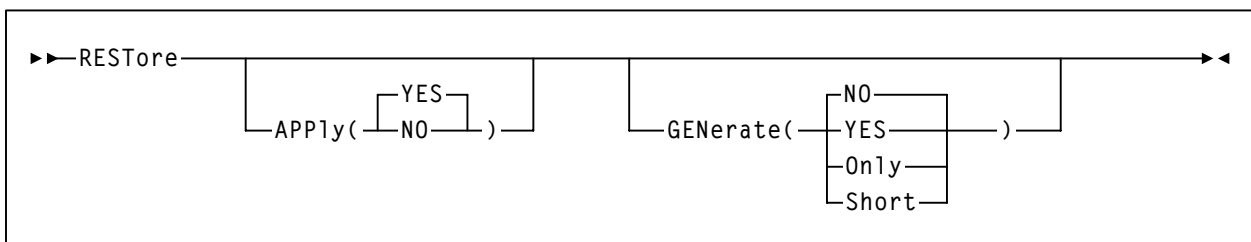
## Reconfiguration utility



## REPLace utility



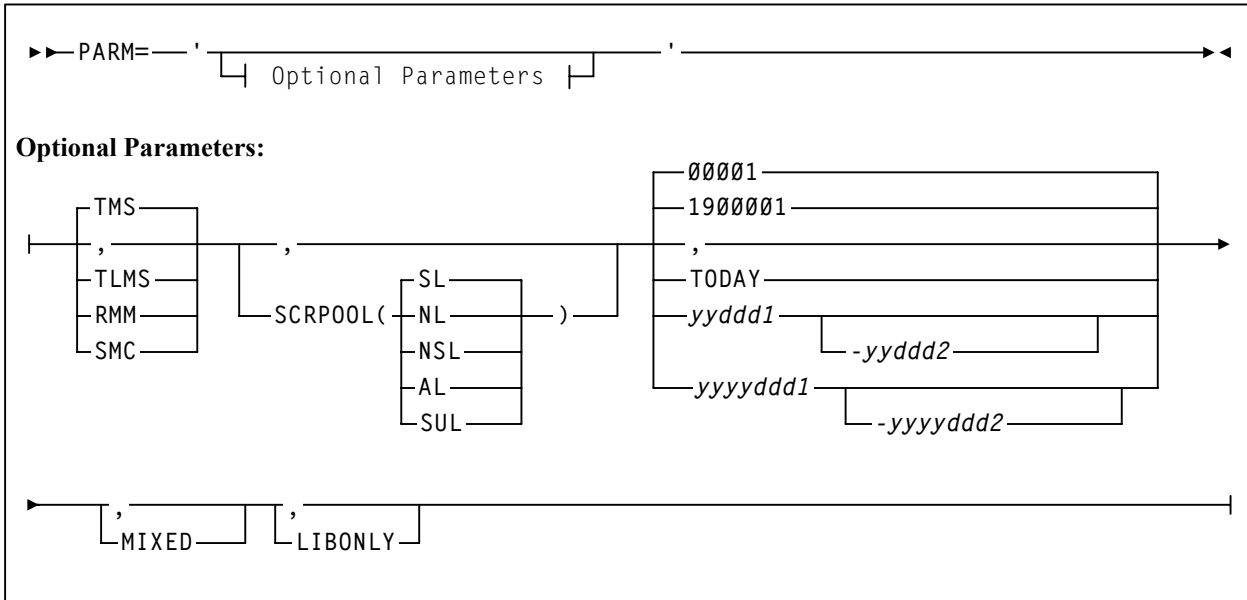
## RESTore utility



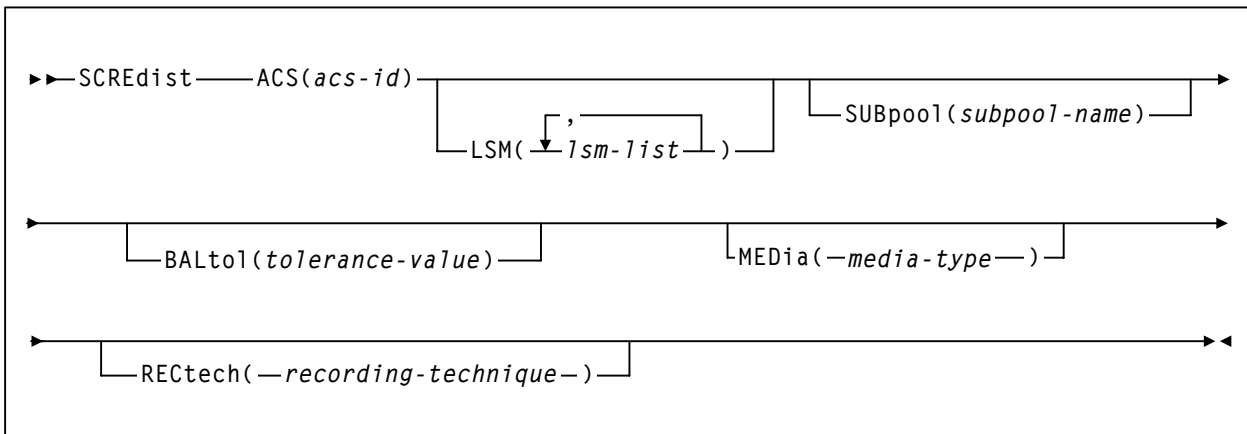
## SCRAtch utility



## Scratch Conversion utility



## Scratch Redistribution (SCREdist) utility





## SET utility

►► SET ◄◄ Options ◄◄

### Options:

├ ACSDRV(*esoteric*) ─, FORACS(*acs-id*) ─┘  
└ ─, FORHOST(*host-id*) ─┘

├ CLNPRFX(*prefix*) ─┘

├ COMPRFX(*cmdhex*) ─┘

├ DELDISP( ─ SCRTCH ─ ) ─┘  
└ ─ NOSCRTCH ─┘

├ DRVHOST( ─ OFF ─ ) ─┘  
└ ─ *host-id* ─┘

├ EJCTPAS( ─ ─ ) ─┘  
└ ─ *newpswd* ─ ─, OLDPASS(*oldpswd*) ─┘

├ FREEZE( ─ ON ─ ) ─, FORLSMID(*lsm-id*) ─┘  
└ ─ OFF ─ ─, FORPANEL(*panel*) ─┘

├ HOSTID(*newhost*), FORHOST(*oldhost*) ─┘

├ HSCLEVEL(OFF), FORHOST(*host-id*) ─┘

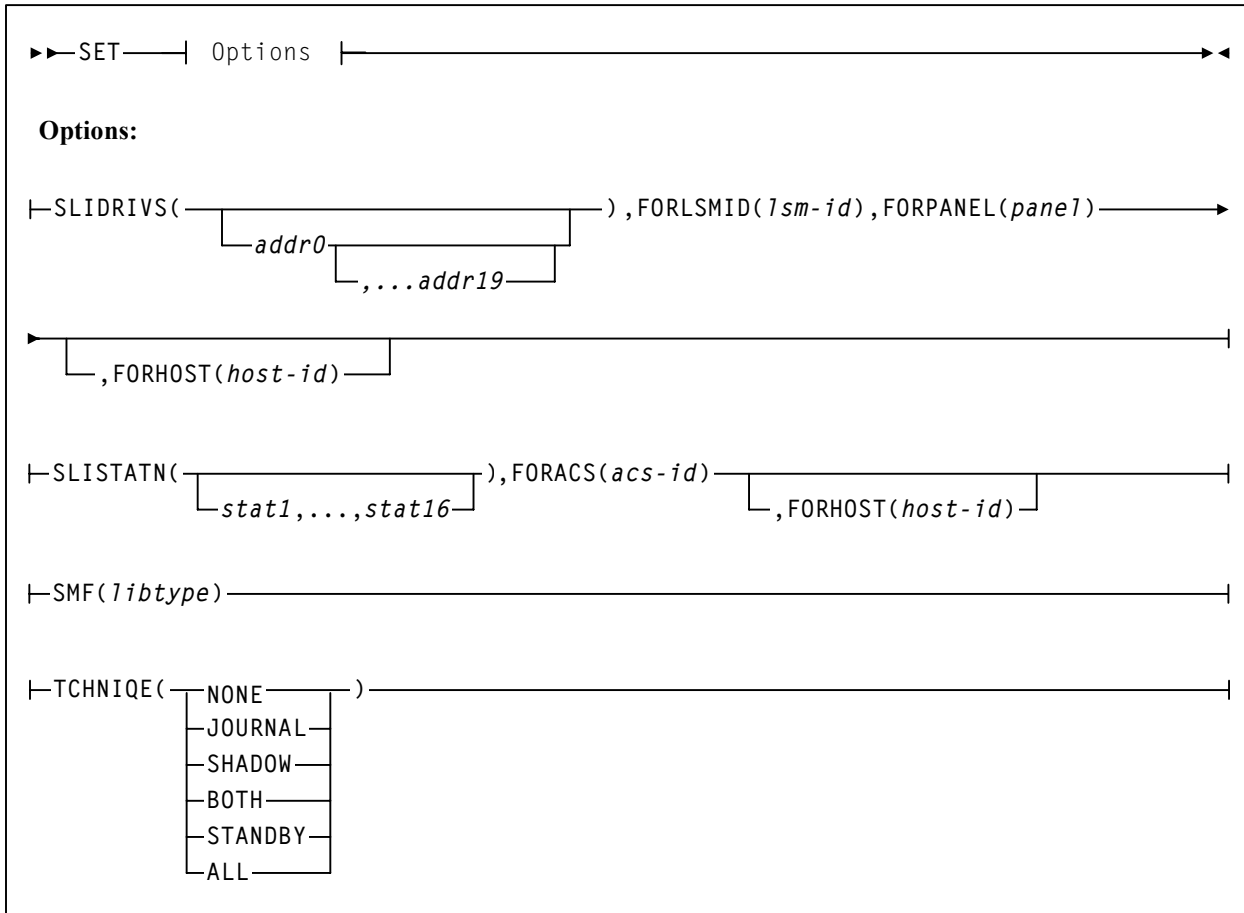
├ MAJNAME(*qname*) ─┘

├ NEWHOST(*newhost*), LIKEHOST(*model-host*) ─┘

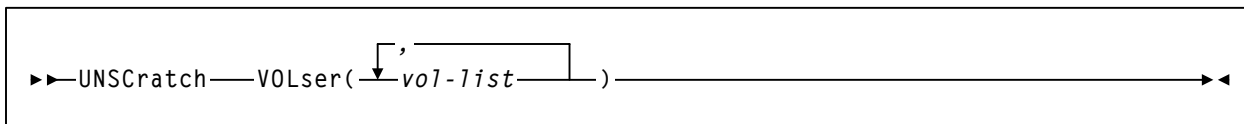
├>NNLBDRV( ─ ─ ) ─┘  
└ ─ *esoteric* ─ ─, FORHOST(*host-id*) ─┘

├ SCRLABL( ─ SL ─ ) ─┘  
└ ─ AL ─┘  
└ ─ NL ─┘  
└ ─ NSL ─┘

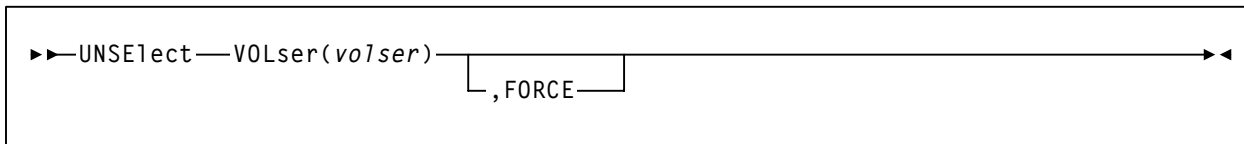
## SET Utility (continued)



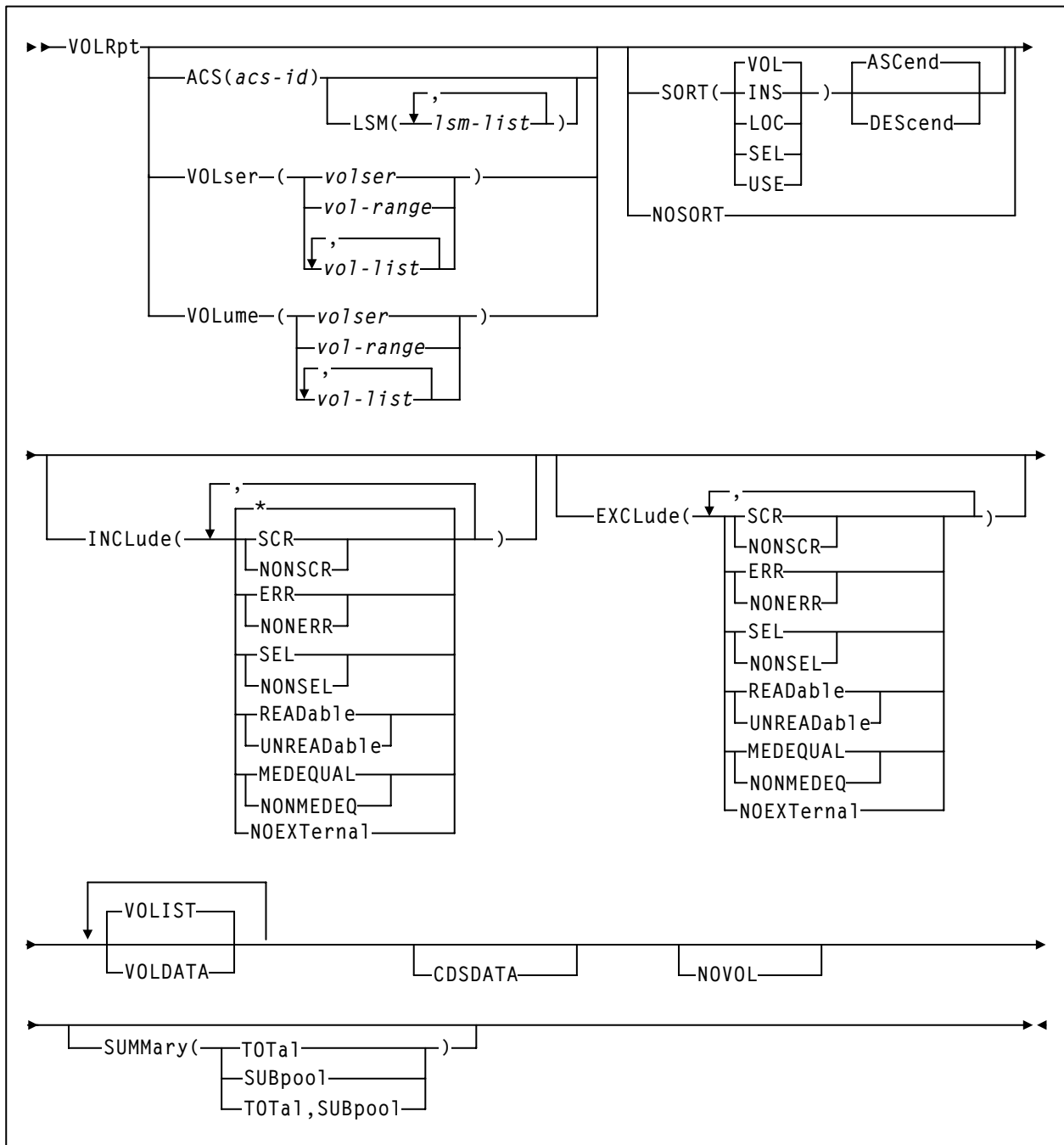
## UNSCratch utility



## Unselect utility



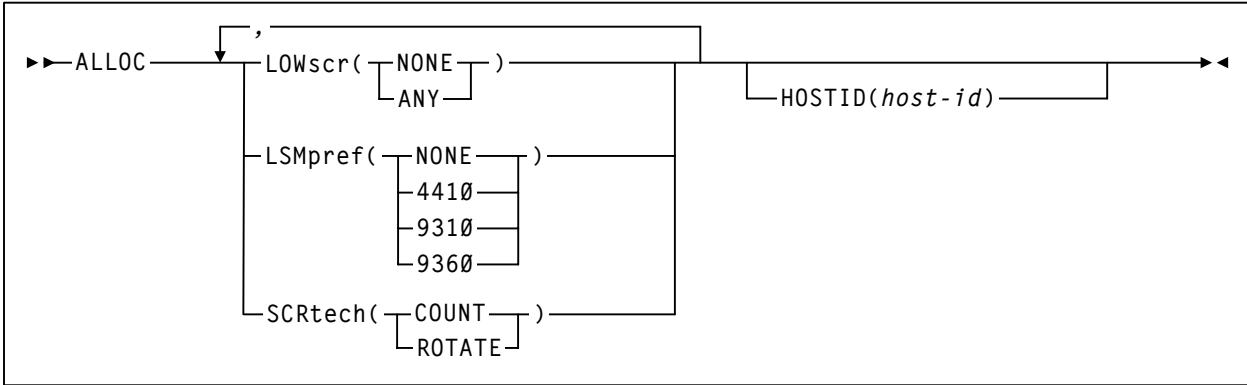
## Volume Report (VOLRpt) utility



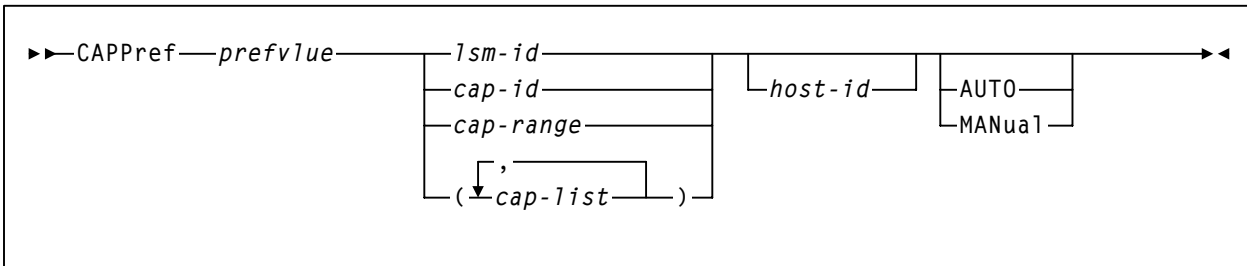
## Operator Commands

Refer to “Operator commands” in the *HSC/MSP Operator’s Guide* for complete explanations of command syntax and parameters.

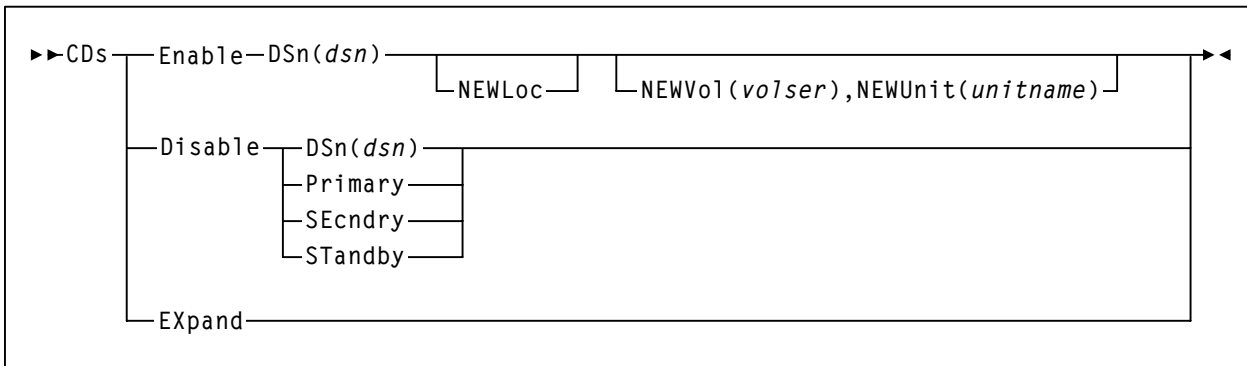
### Allocation (ALLOC) command and control statement



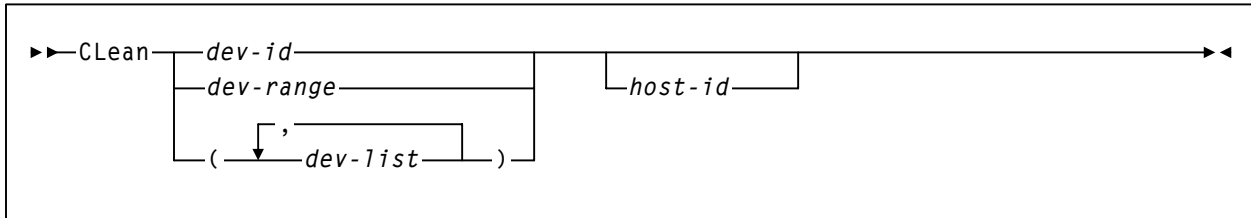
### CAP Preference (CAPPref) command and control statement



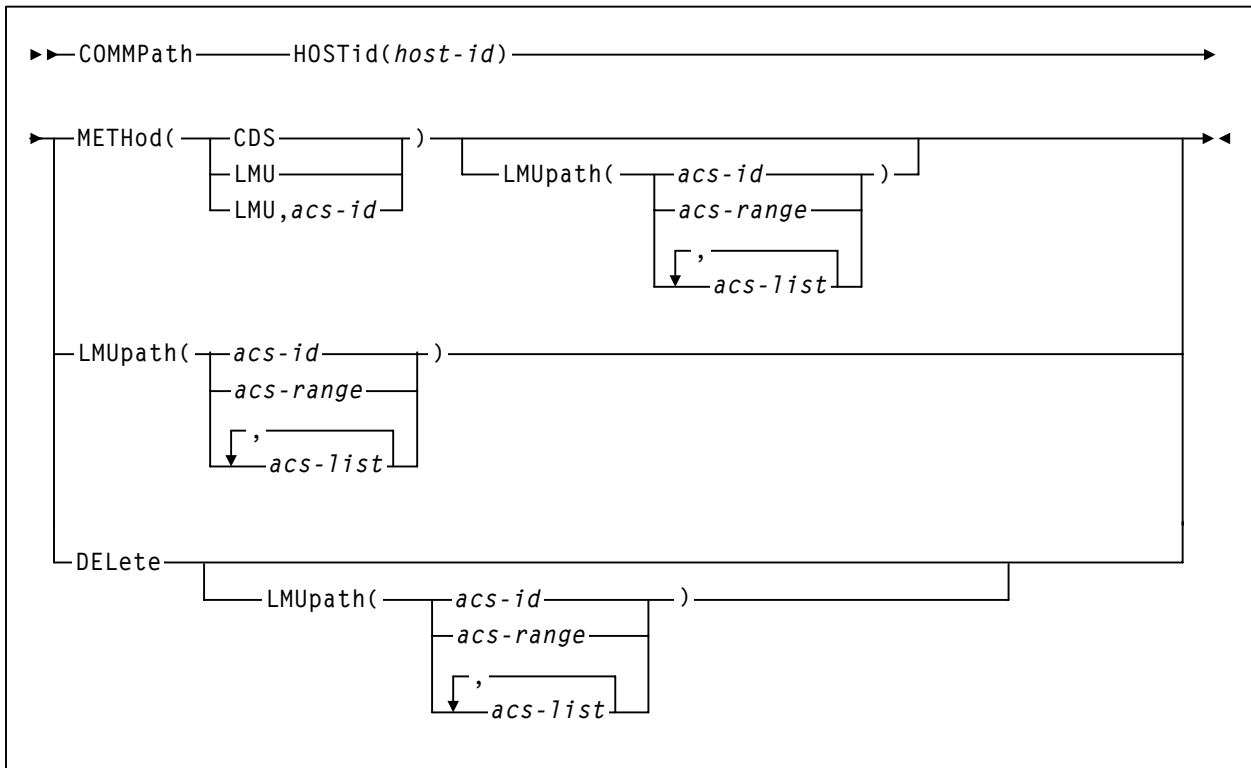
### CDs Enable/Disable command



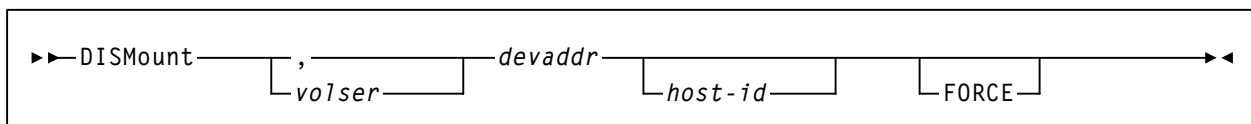
## CLean command



## Communications Path (COMMPath) command and control statement

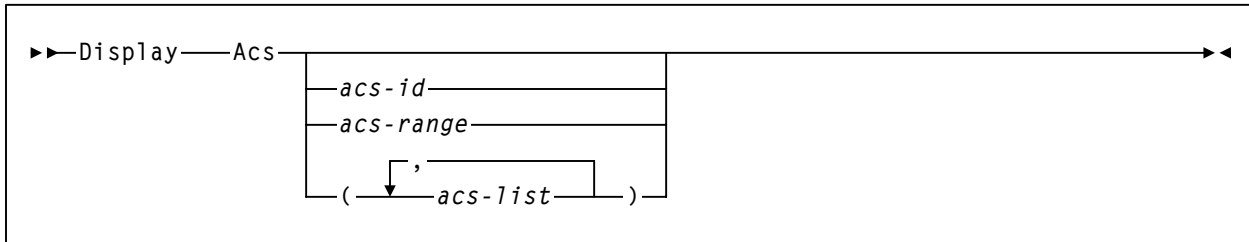


## DISMount command

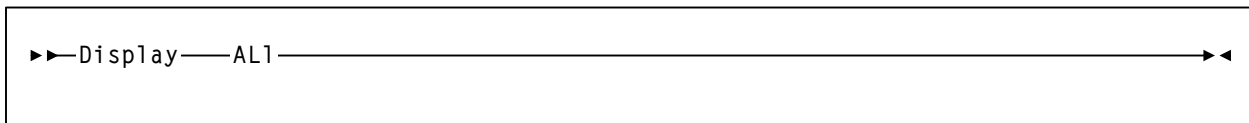


## Display command

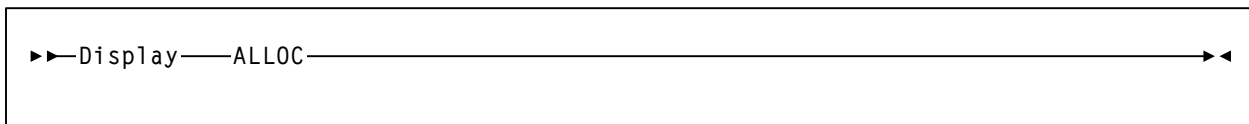
### Display Acs



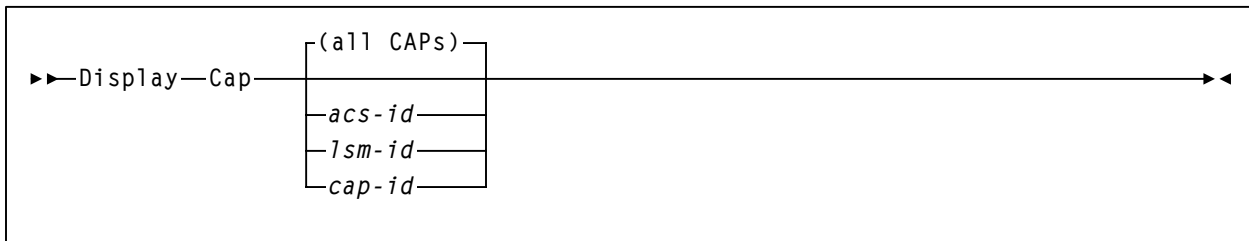
### Display ALI



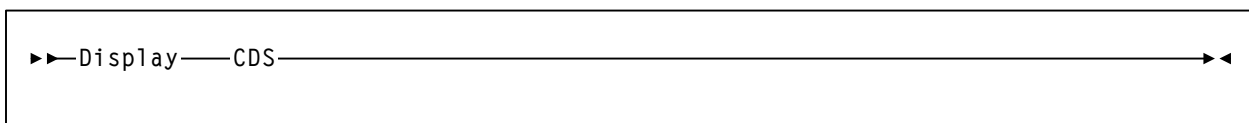
### Display ALLOC



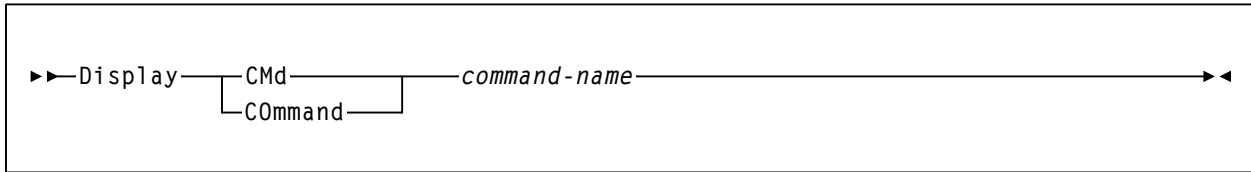
### Display CAP



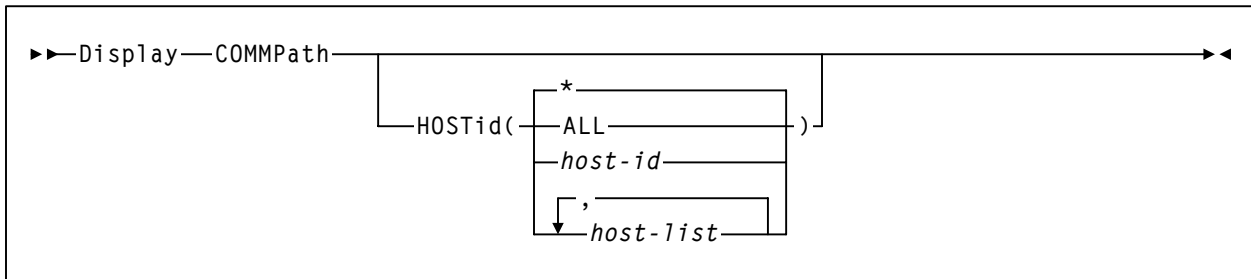
### Display CDS



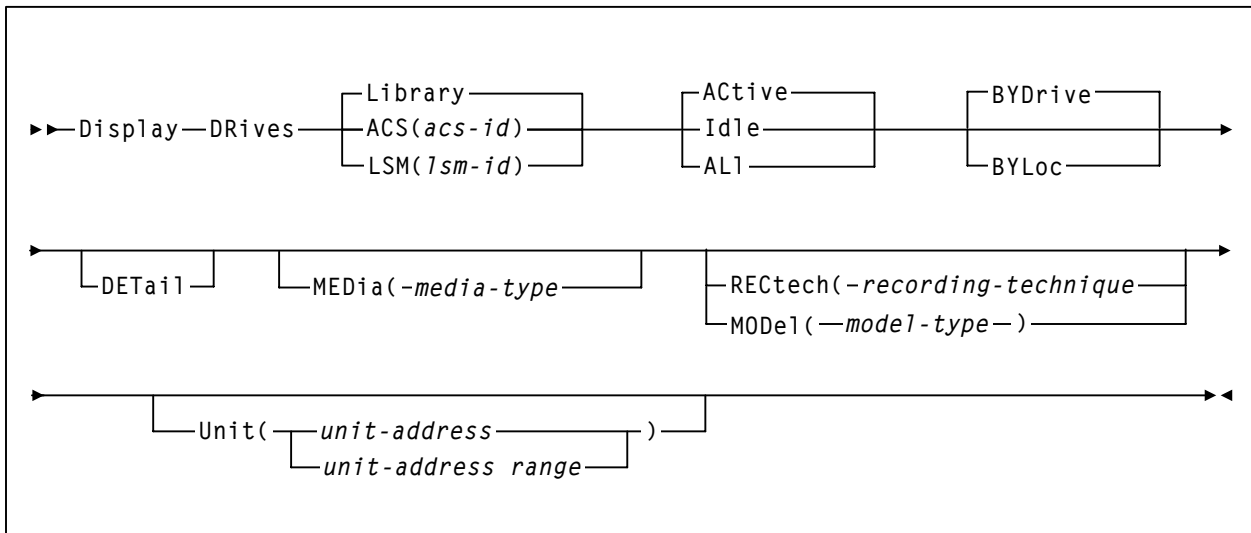
## Display Cmd



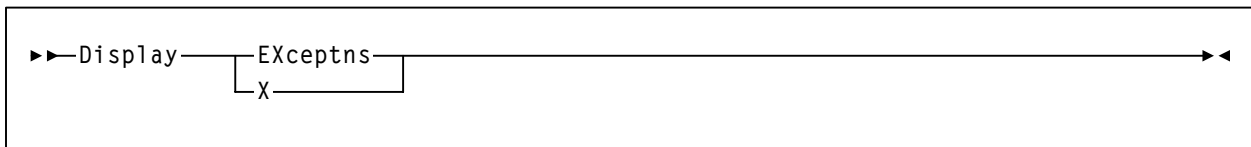
## Display COMMPath



## Display DRives



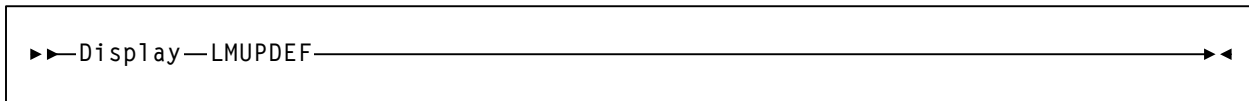
## Display Exceptions



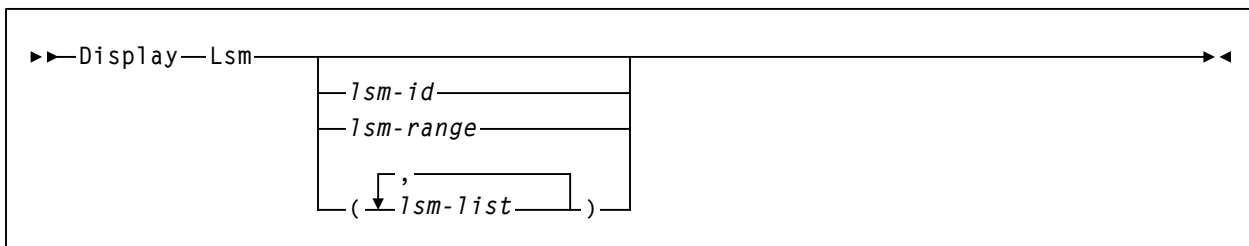
### Display LKEYDEF



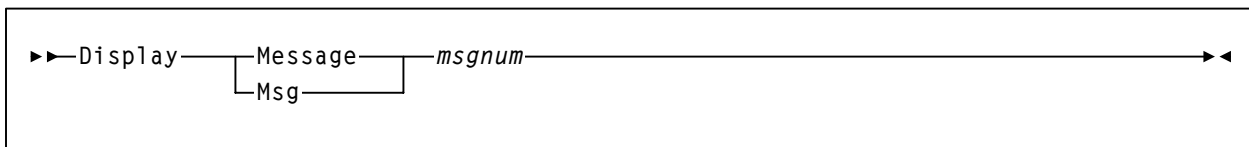
### Display LMUPDEF



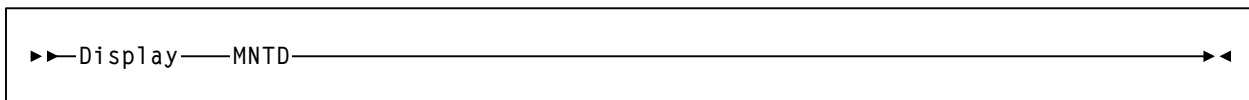
### Display LSM



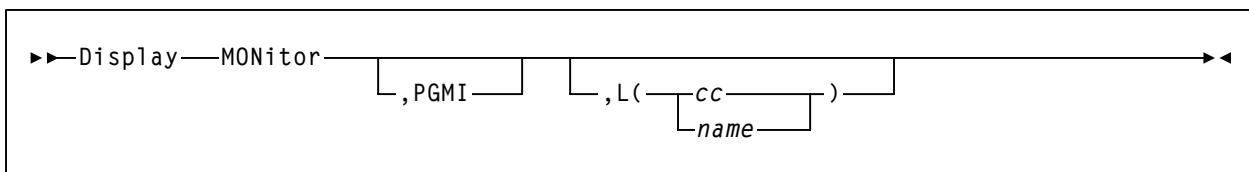
### Display Message



### Display MNTD



### Display MONitor





## Display OPTion

►► Display — OPTion ◀◀

## Display Requests

►► Display — Requests ◀◀

## Display SCRatch

►► Display — SCRatch ◀◀

┌ *acs-id* ─┐ ┌ ALL ─┐ ┌ SUBpool(*subpool-name*) ─┐ ┌ DETail ─┐

└ *lsm-id* ─┘

┌ MEDIA(*media-type*) ─┐ ┌ RECTech(*recording-technique*) ─┐

## Display SCRPFDEF

►► Display — SCRPFDEF ◀◀

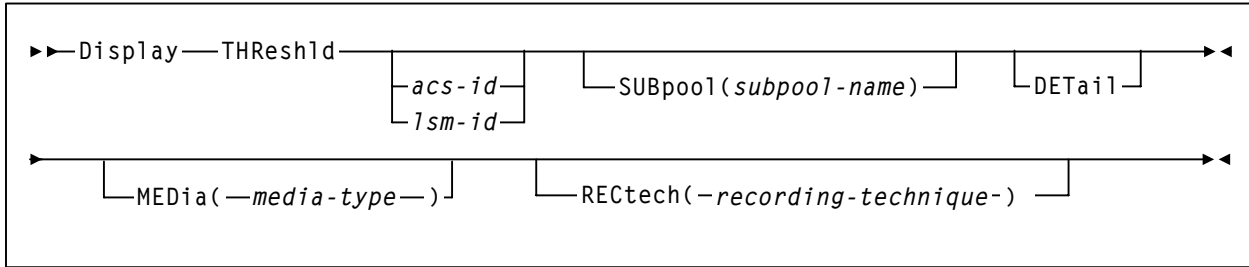
## Display SRVlev

►► Display — SRVlev ◀◀

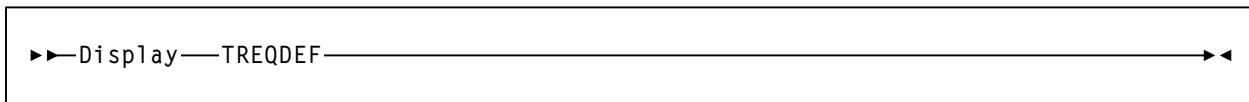
## Display Status

►► Display — Status ◀◀

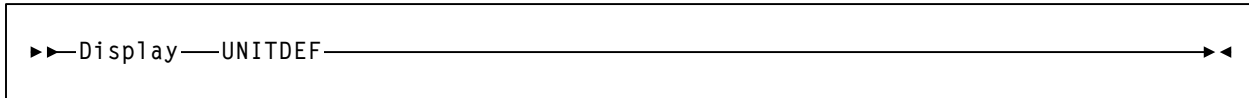
## Display THReshd



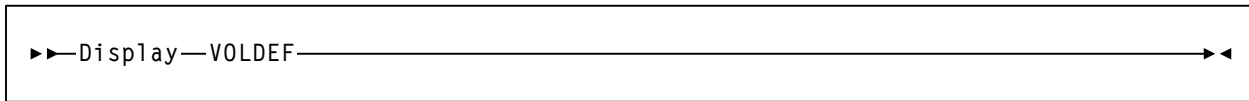
## Display TREQDEF



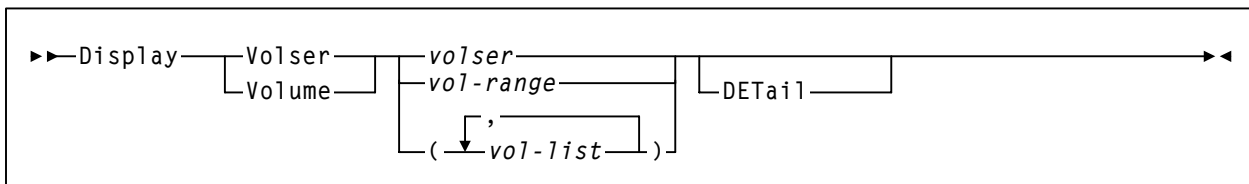
## Display UNITDEF



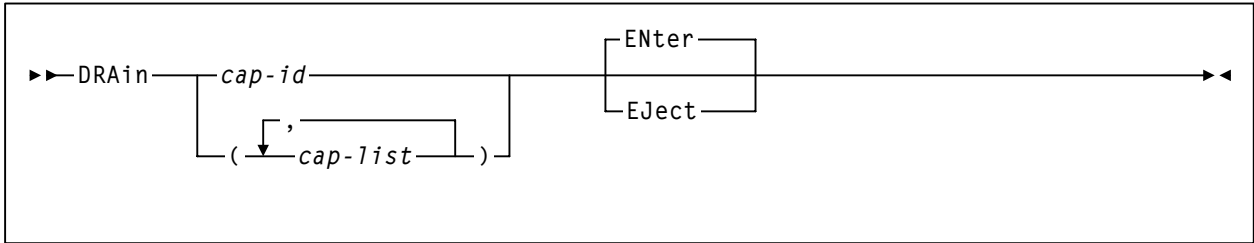
## Display VOLDEF



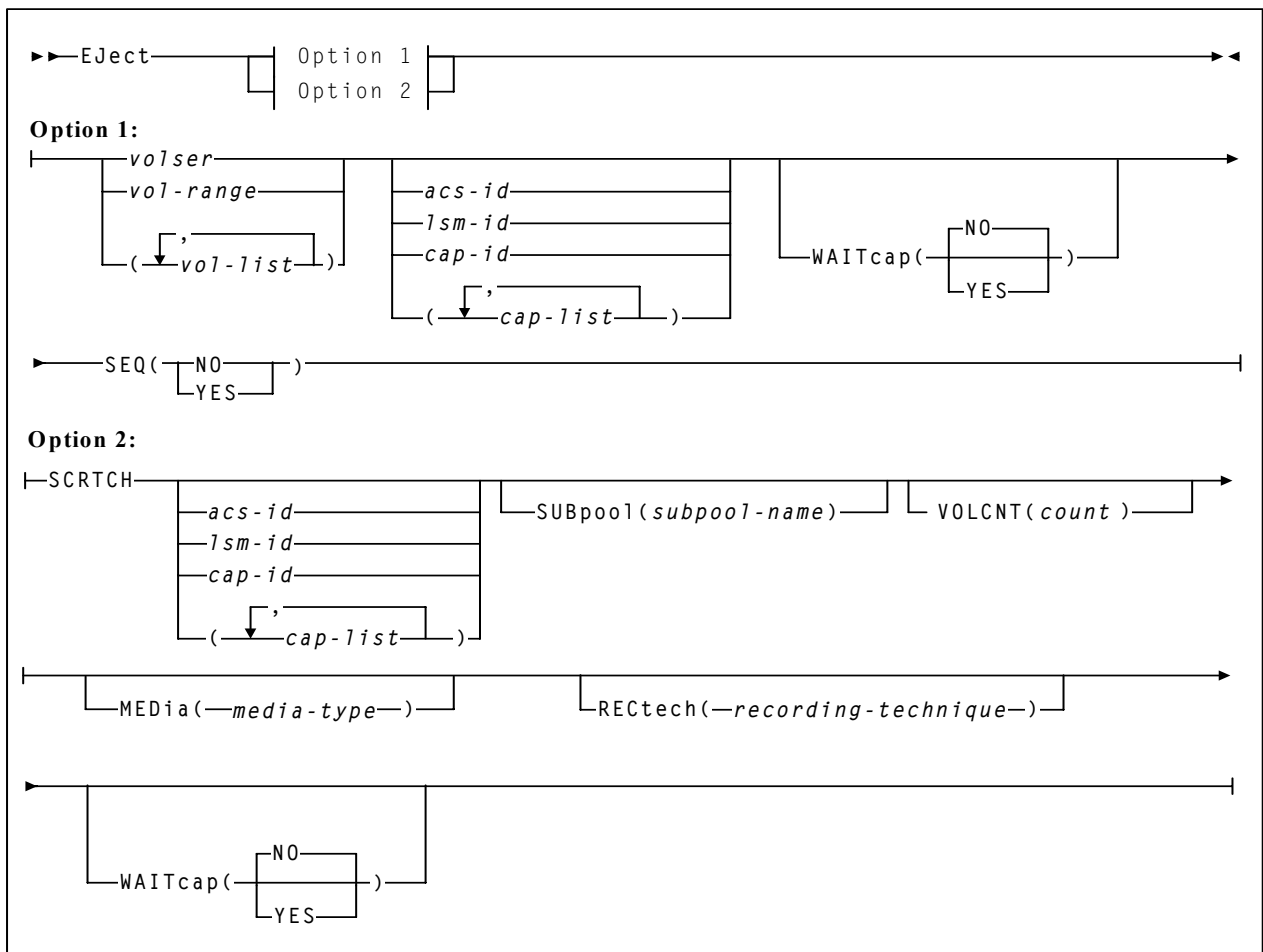
## Display Volume



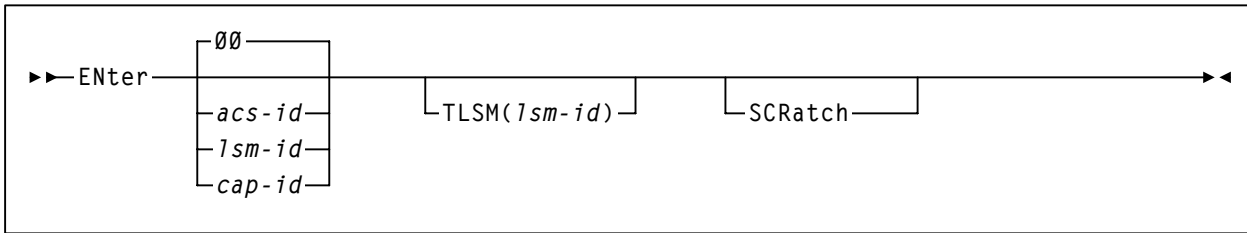
## DRAIn CAP command



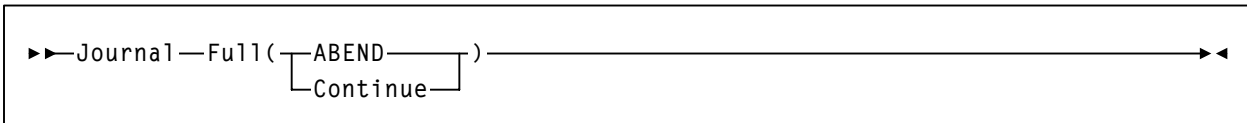
## EJect command



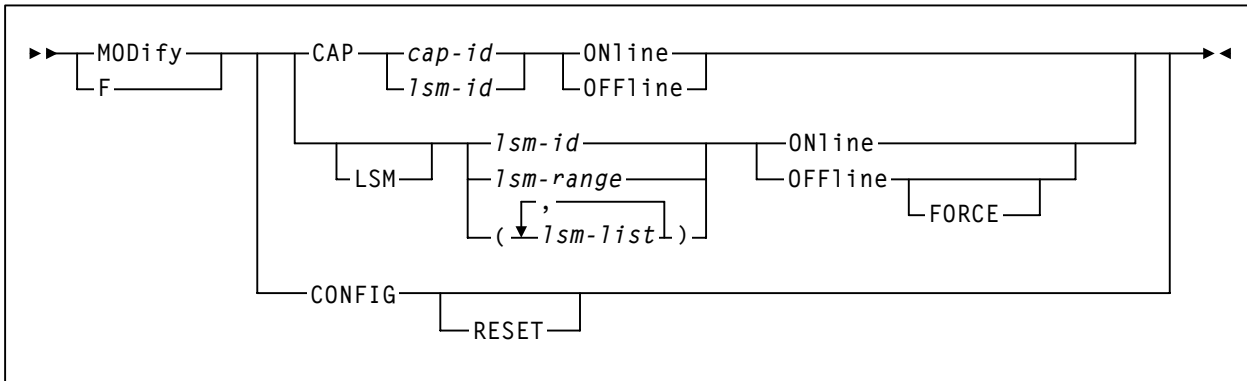
## ENter command



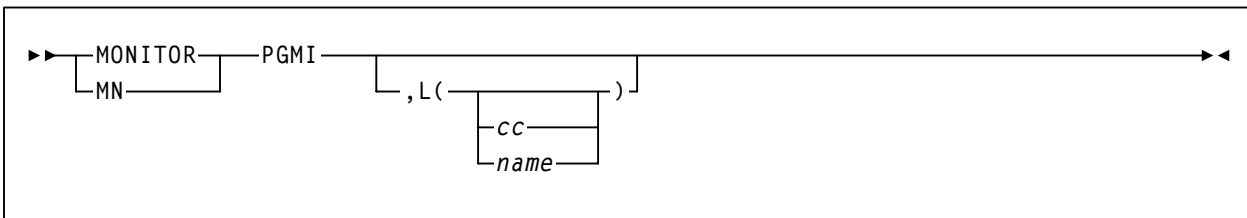
## Journal command



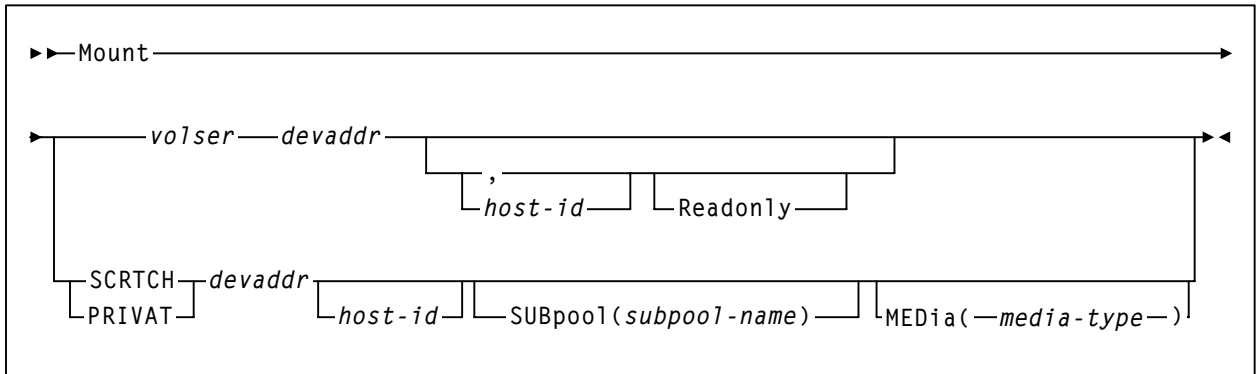
## MODify command



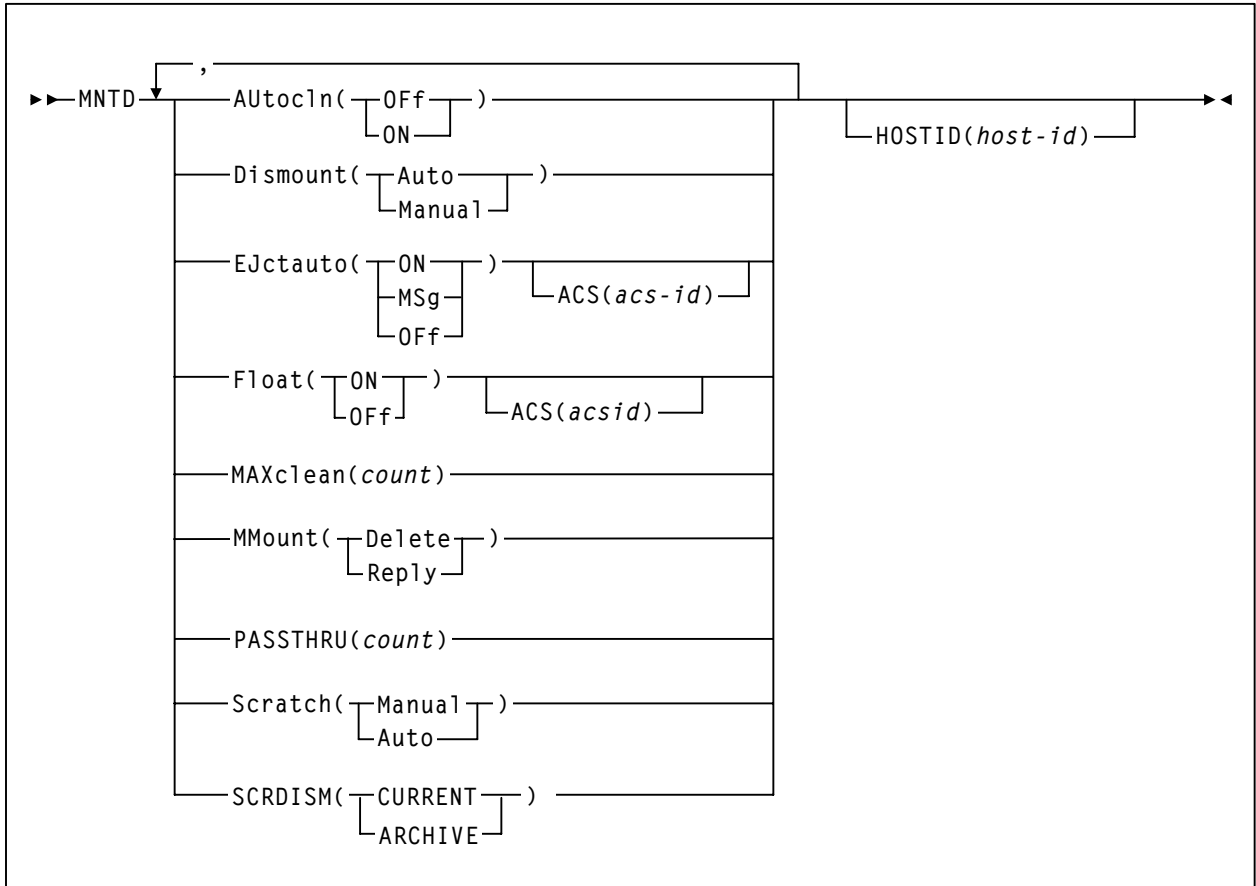
## MONITOR command



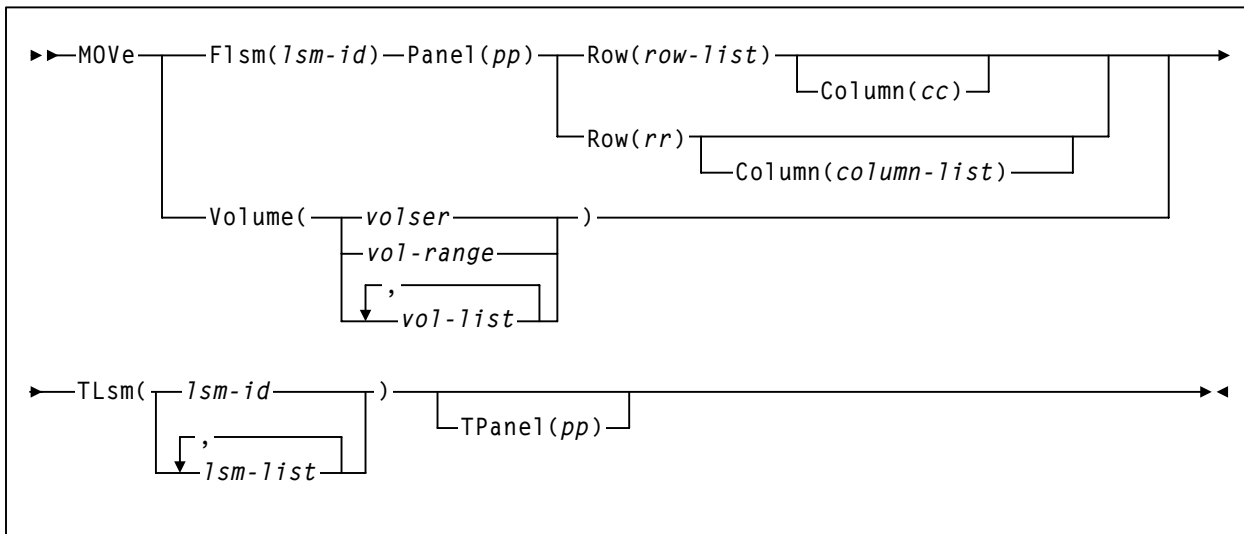
## Mount command



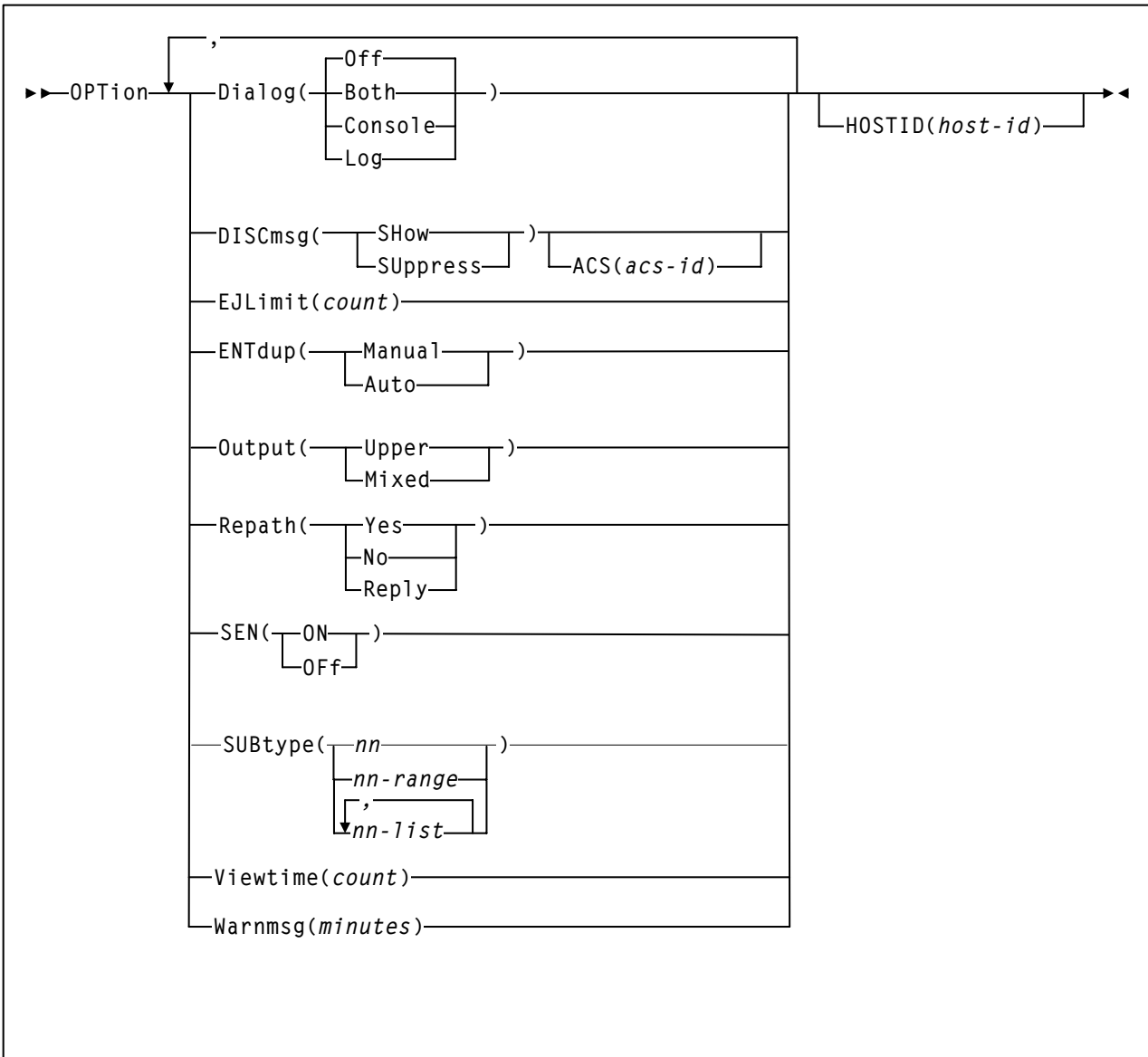
## Mount/Dismount Options (MNTD) command and control statement



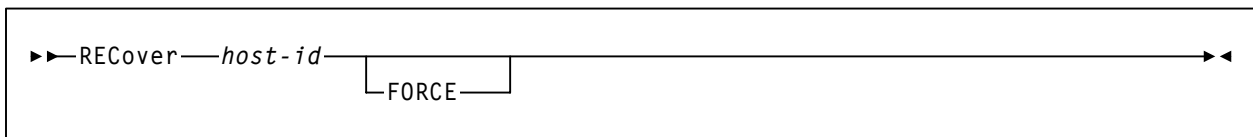
## MOVE command



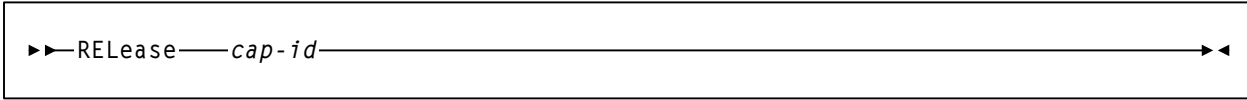
## OPTion command and control statement



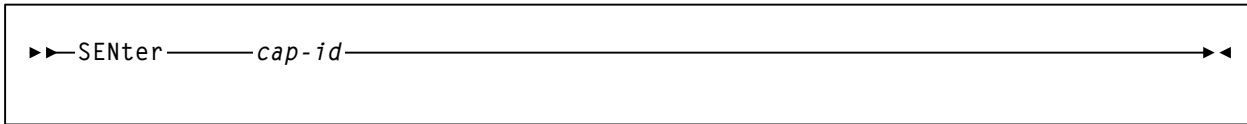
## RECover Host command



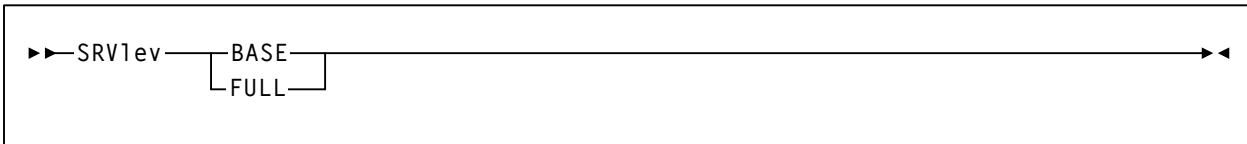
## RELease CAP command



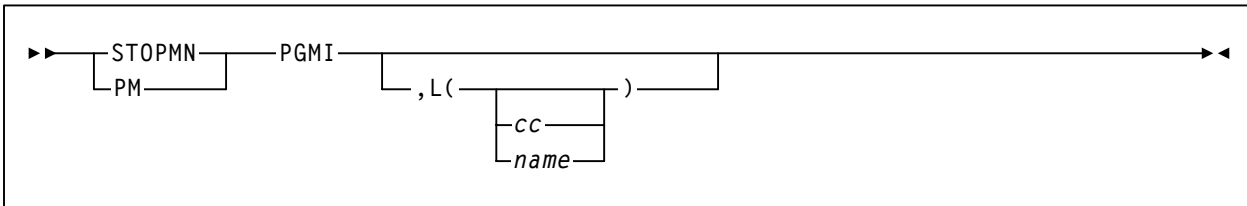
## SEnTer command



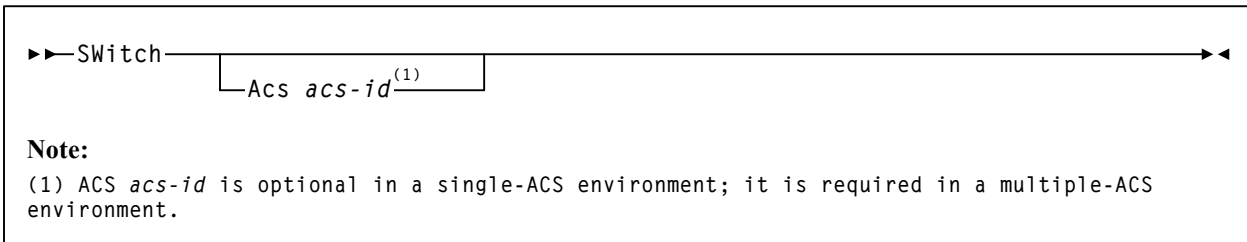
## SRVlev (Service Level) command



## Stop Monitoring (STOPMN) command

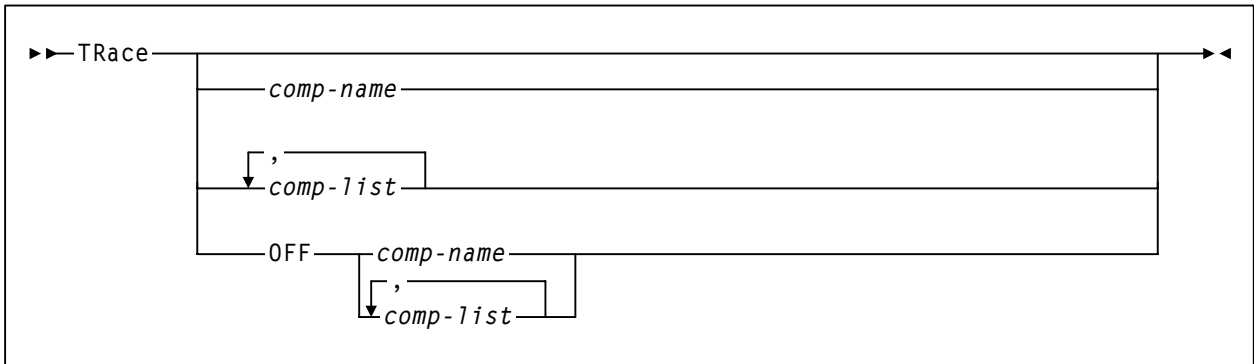


## SWitch command

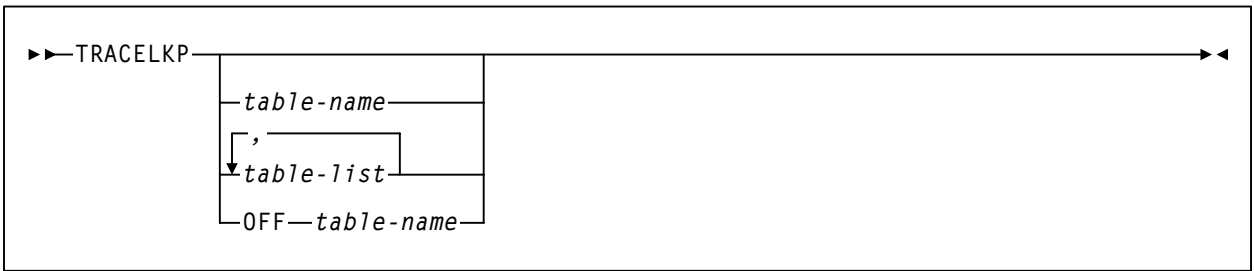




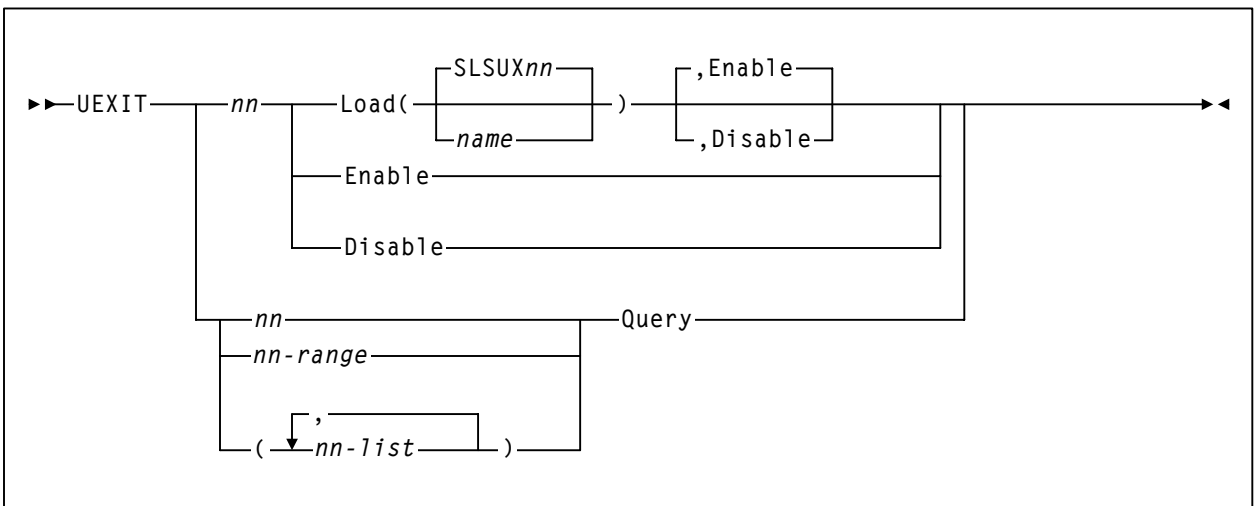
## TRace command



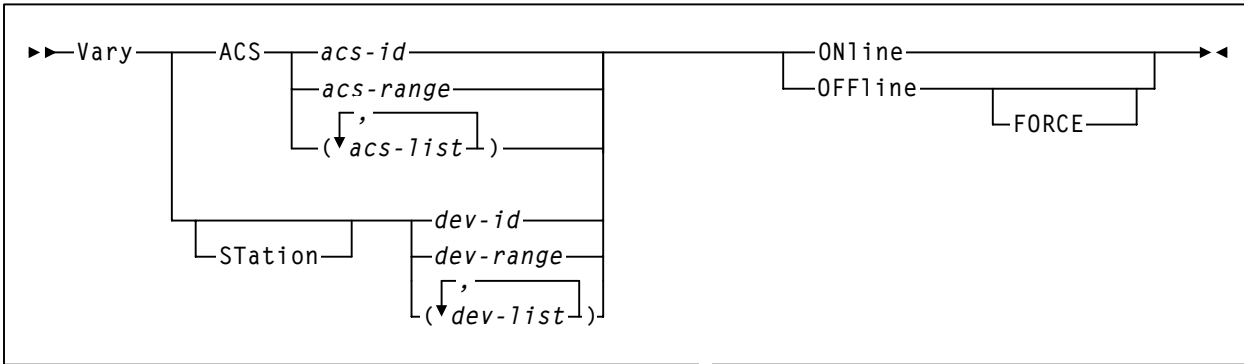
## TRACELKP command



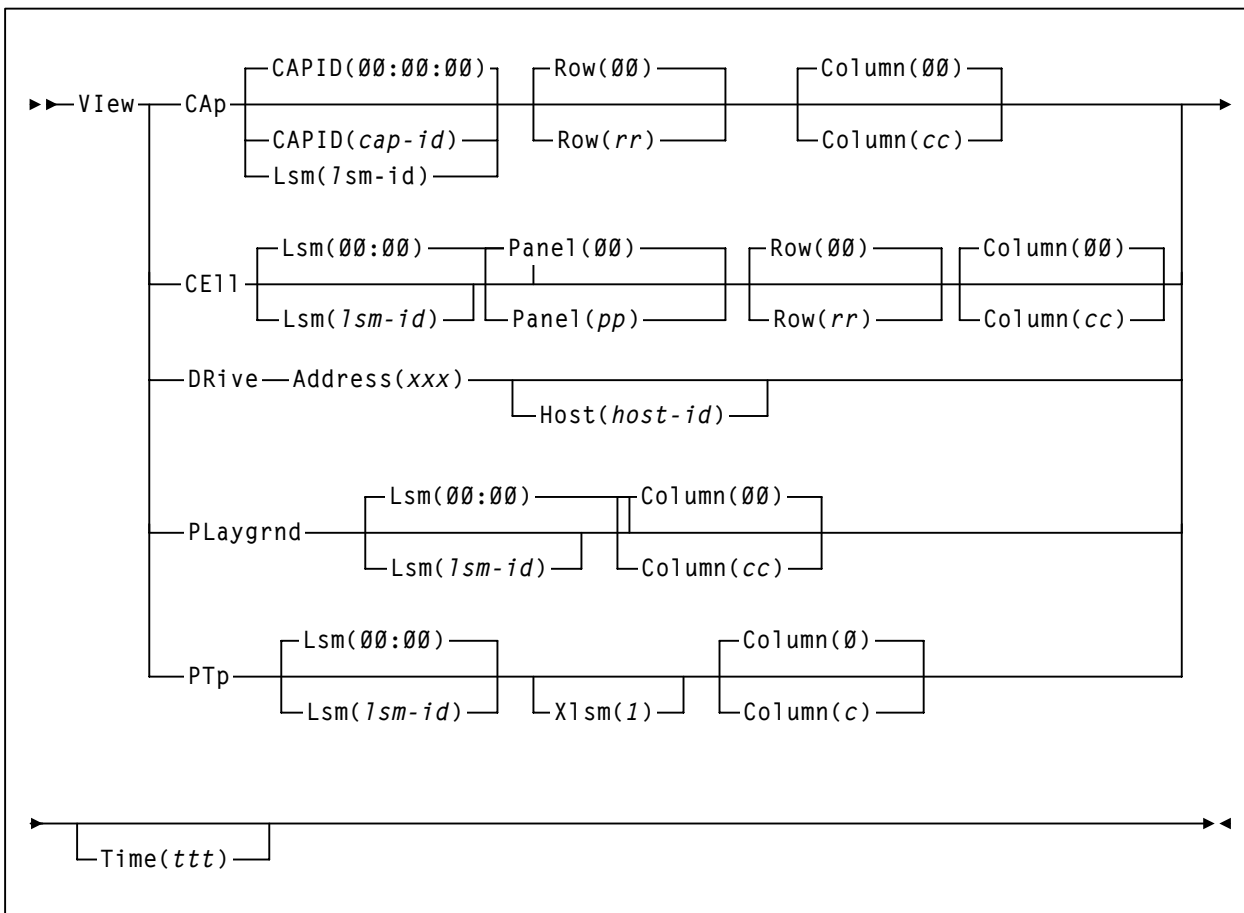
## User Exit (UEXIT) command and control statement



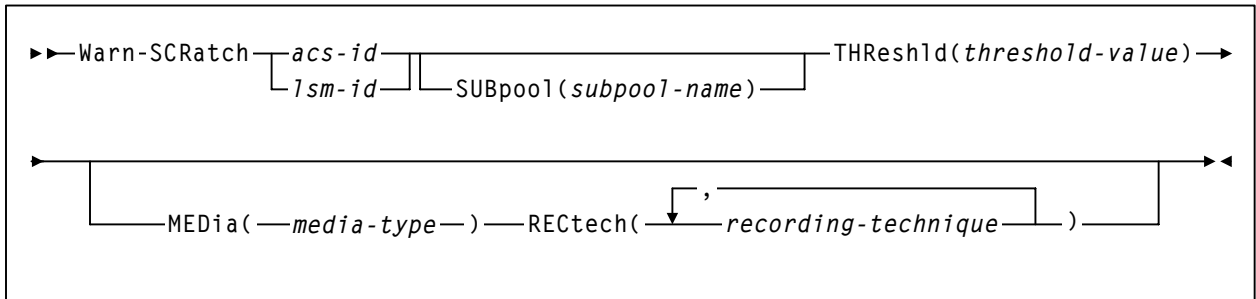
## Vary Station command



## View command

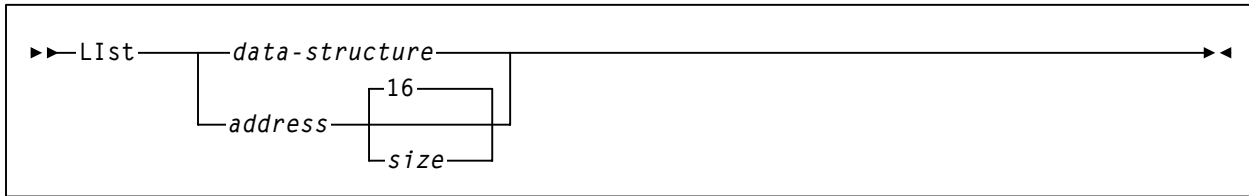


## Warn command

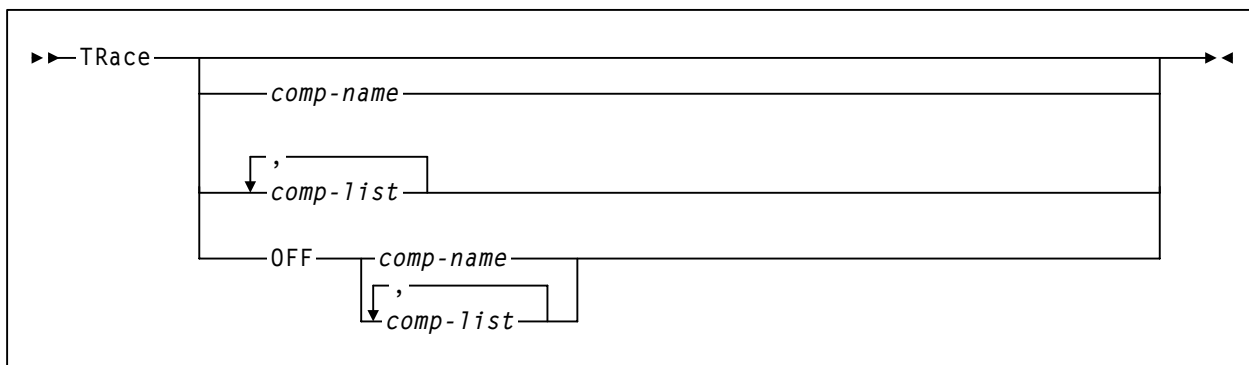


# HSC Diagnostic Commands

## List command



## TRace command



## Appendix D. Record Formats

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### Overview

This appendix provides the record formats for the HSC SMF, LOGREC, Volume Report, and Batch API records. These records are mapped by SMP/E-distributed macros.

Each record format contains the following information:

- decimal representation
- hexadecimal representation
- type
- length
- label information
- description.

Some important points to remember when referencing record formats are:

- Types “**Constant (CONST)**,” “**Character Constant (CHAR CONST)**,” “**BITMAP**,” and “**Length (LENGTH)**” contain values in the Decimal and Hexadecimal columns.
- Type “**AREA**” contains offsets in the Decimal and Hexadecimal columns. The Length is the length of an area. (An area defines an area of storage only.)
- Type “**STRUCTURE**” contains zeros in both the Decimal and Hexadecimal columns and the Label column contains a DSECT name. The Length is blank.
- With Label “**name (Rep count)**,” the Length is equal to the length of one element. The total length of the entire field is found by multiplying the Length times the Rep count.
- If the Label equals -RESERVED-, there is not a label for that particular field.
- Type “**Offset**” contains an offset in the Decimal and Hexadecimal columns and the Length is always blank.

Table 25 provides a key to the SMF record format tables.

**Table 25. Key to Record Format Tables**

Dec	Hex	Type	Length
values		CONSTANT CHAR CONST BITMAP LENGTH	
offset		AREA	length
0	(0)	STRUCTURE	blank
offset		CHARACTER HEXSTRING BITSTRING SIGNED-FWORD SIGNED-HWORD SHORT-FLOAT LONG-FLOAT A-ADDR Y-ADDR S-ADDR V-ADDR PACKED-DEC ZONED-DEC EXTENDED FLOAT	length (length of one element)
offset		OFFSET	blank

### Mapping Macros for SMF Records

Mapping macros for SMF records are listed in Table 26 on page 531.

### Mapping Macros for LOGREC Records

Mapping macros for LOGREC records are listed in Table 37 on page 557.

### Mapping Macros for Volume Report and Batch API Records

Mapping macros for Volume Report and Batch API records are listed in Table 52 on page 594.

### Mapping Macros for Batch API Records

Mapping macros for Batch API Records available only through the Batch API are listed in Table 59 on page 625.

## SMF Records

### SMF Mapping Macros

*Table 26. Mapping Macros for SMF Records*

Macro	Description
SLSDVAR	Volume Attribute Record Data Length (within other SMF records)
SLSSFHDR	SMF Record Header Information
SLSSBLOS	SMF LSM Operations Statistics
SLSSCAPJ	SMF CAP Eject Record
SLSSCAPN	SMF CAP Enter Record
SLSSVSTA	SMF Vary Station Record
SLSSMLSM	SMF Modify LSM Record
SLSSLB	SMF LMU ATHS Statistics Buffer
SLSSMF07	SMF Move Detail Record
SLSSMF08	SMF View Detail Record

## SMF Record Formats

### SLSDVAR

*Table 27. SLSDVAR Record Format*

Dec	Hex	Type	Length	Label	Description
SLSDVAR - Distributed Volume Attribute Record Length					
FUNCTION: Pass the HSC Volume Attribute Record Length(VARL) for other Distributed HSC Macros to use as needed.					
0	(0)	HEXSTRING	40	SLSDVAR	Volume Attribute Record
40	(28)	LENGTH		VARL	Length of SLSDVAR(VAR)

### Cross Reference

Name	Len	Offset Value
SLSDVAR	000040	00
VARL	-	28



# SLSSFHDR

**Table 28. SLSSFHDR Record Format**

Dec	Hex	Type	Length	Label	Description
SLSSFHDR - SMF RECORD HEADER MAP					
<p>FUNCTION:  MAPS THE STANDARD SMF RECORD HEADER AS DEFINED IN THE IBM SMF MANUAL (GC28-1153). IBM PROVIDES NO MAPPING MACRO. MAPS THE ACHS EXTENSIONS TO THE HEADER.</p> <p>SYMBOLICS:  &amp;TYPE - USED TO SELECT A VALID SMF RECORD TYPE  1 - BLOS STATISTICS  2 - VARY STATION COMMAND  3 - MODIFY LSM COMMAND  4 - LMU READ STATISTICS  5 - CARTRIDGE EJECT  6 - CARTRIDGE ENTER  7 - MOVE DETAIL  8 - VIEW STATISTICS  9 - (VTCS) SUBSYSTEM CONFIGURATION CHANGE</p> <p>-----  THE FOLLOWING VTCS SUBTYPES DO NOT SUPPORT DSECT GENERATION BY THIS SLSSFHDR.MACRO.  -----</p> 10 - (VTCS) SUBSYSTEM PERFORMANCE REQUEST 11 - (VTCS) CHANNEL INTERFACE PERFORMANCE REQUEST 12 - (VTCS) STATE SAVE 13 - (VTCS) VTV MOUNT REQUEST 14 - (VTCS) VTV DISMOUNT REQUEST 15 - (VTCS) VTV DELETE REQUEST 16 - (VTCS) RTD MOUNT REQUEST 17 - (VTCS) RTD DISMOUNT REQUEST 18 - (VTCS) VTV TO MVC REQUEST 19 - (VTCS) RECALL VTV FROM MVC REQUEST 20 - (VTCS) RTD PERFORMANCE REQUEST 21 - (VTCS) RTD VARY REQUEST 22 - (VTCS) HOST INITIATED MIM EVENT 23 - (VTCS) CHANGE OF SCRATCH DELETION POLICY 24 - (VTCS) MVC MEDIA DISCONTINUED USAGE EVENT 25 - (VTCS) MVC USAGE RECORDING 26 - (VTCS) VTV MOVEMENT 27 - (VTCS) VTV SCRATCH EVENT 28 - (VTCS) REPLICATE VTV TO CLUSTERED VTSS REQUEST					
0	(0)	STRUCTURE		SLSSFHDR	RECORD HEADER
0	(0)	SIGNED-HWORD	2	OSHDRECL	RECORD LENGTH
2	(2)	SIGNED-HWORD	2	OSHDDESC	SEGMENT DESCRIPTOR
4	(4)	BITSTRING	1	OSHDFLAG	SYSTEM INDICATOR FLAGS
		.1.. .... X'40'		OSHDSTV	Subtypes are valid
5	(5)	HEXSTRING	1	OSHDRCTY	SMF RECORD TYPE
6	(6)	HEXSTRING	4	OSHDTIME	TIME RECORD WAS WRITTEN. BINARY HUNDREDTHS OF SECONDS.
10	(A)	HEXSTRING	4	OSHDDATE	DATE RECORD WAS WRITTEN. FORMAT: X'0CYYDDDF'. THE DATE/TIME FIELDS ARE SET BY SLSSWSMF MODULE.
14	(E)	CHARACTER	4	OSHDSID	SYSTEM ID

**Table 28. SLSSFHDR Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
18	(12)	CHARACTER	4	OSHDSSID	SUBSYSTEM ID
22	(16)	SIGNED-HWORD	2	OSHDRSTY	RECORD SUBTYPE. If adding new record subtype(s), change field OSHDMAXS and add an entry in the HSSUBS table of SLUPERF. Then reassemble modules SLSOOSMF, SLSOWSMF, and SLUPERF.
1	(01)	CONST		OSHDBLOS	BLOS STATISTICS SUBTYPE
2	(02)	CONST		OSHDVSTA	VARY STATION COMMAND SUBTYPE
3	(03)	CONST		OSHDMLSM	MODIFY LSM COMMAND SUBTYPE
4	(04)	CONST		OSHDLRST	LMU READ STATISTICS SUBTYPE
5	(05)	CONST		OSHDEJCT	CARTRIDGE EJECT SUBTYPE
6	(06)	CONST		OSHDENTR	CARTRIDGE ENTER SUBTYPE
7	(07)	CONST		OSHDRC07	MOVE DETAIL SUBTYPE
8	(08)	CONST		OSHDVIEW	VIEW STATISTICS
9	(09)	CONST		OSHDLS09	(VTCS) Subsystem Configuration Change
SLSSFHDR.mac will NOT generate DSECTS for the following VTCS SMF SUBTYPEs.					
10	(0A)	CONST		OSHDVT10	(VTCS) Subsystem Performance Request
11	(0B)	CONST		OSHDVT11	(VTCS) Channel Interface Performance Rqst
12	(0C)	CONST		OSHDVT12	(VTCS) State Save
13	(0D)	CONST		OSHDVT13	(VTCS) VTV MOUNT Request
14	(0E)	CONST		OSHDVT14	(VTCS) VTV DISMOUNT Request
15	(0F)	CONST		OSHDVT15	(VTCS) VTV DELETE Request
16	(10)	CONST		OSHDVT16	(VTCS) RTD MOUNT Request
17	(11)	CONST		OSHDVT17	(VTCS) RTD DISMOUNT Request
18	(12)	CONST		OSHDVT18	(VTCS) VTV to MVC Request
19	(13)	CONST		OSHDVT19	(VTCS) RECALL VTV from MVC Request
20	(14)	CONST		OSHDVT20	(VTCS) RTD PERFORMANCE Request
21	(15)	CONST		OSHDVT21	(VTCS) RTD VARY Request
22	(16)	CONST		OSHDVT22	(VTCS) HOST Initiated MIM Event
23	(17)	CONST		OSHDVT23	(VTCS) CHANGE of SCRATCH DELETION Policy
24	(18)	CONST		OSHDVT24	(VTCS) MVC Media DISCONTINUED USAGE Event
25	(19)	CONST		OSHDVT25	(VTCS) MVC USAGE Recording
26	(1A)	CONST		OSHDVT26	(VTCS) VTV MOVEMENT

**Table 28. SLSSFHDR Record Format (Continued)**

<b>Dec</b>	<b>Hex</b>	<b>Type</b>	<b>Length</b>	<b>Label</b>	<b>Description</b>
27	(1B)	CONST		OSHDVT27	(VTCS) VTV SCRATCH Event
28	(1C)	CONST		OSHDVT28	(VTCS) REPLICATE VTV->CLUSTERED VTSS Rqst
28	(1C)	CONST		OSHDMAXS	MAXIMUM RECORD SUBTYPE VALUE
24	(18)	LENGTH		OSHDL	LENGTH OF FIXED PORTION OF OSHDR
24	(18)	OFFSET		SLSSTYPE	DEFINE EACH SMF SUBTYPE

## Cross Reference

Name	Len	Offset Value
OSHDBLOS	-	01
OSHDDATE	000004	0A
OSHDDESC	000002	02
OSHDEJCT	-	05
OSHDENTR	-	06
OSHDFLAG	000001	04
OSHDL	-	18
OSHDLRST	-	04
OSHDMAXS	-	1C
OSHDMLSM	-	03
OSHDRCTY	000001	05
OSHDRC07	-	07
OSHDRECL	000002	00
OSHDRSTY	000002	16
OSHDSID	000004	0E
OSHDSSID	000004	12
OSHDSTV	-	40
OSHDTIME	000004	06
OSHDVIEW	-	08
OSHDVSTA	-	02
OSHDVT09	-	09
OSHDVT10	-	0A
OSHDVT11	-	0B
OSHDVT12	-	0C
OSHDVT13	-	0D
OSHDVT14	-	0E
OSHDVT15	-	0F
OSHDVT16	-	10
OSHDVT17	-	11
OSHDVT18	-	12
OSHDVT19	-	13

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
OSHDVT20	-	14
OSHDVT21	-	15
OSHDVT22	-	16
OSHDVT23	-	17
OSHDVT24	-	18
OSHDVT25	-	19
OSHDVT26	-	1A
OSHDVT27	-	1B
OSHDVT28	-	1C
SLSSTYPE	-	18

# SLSSBLOS

**Table 29. SLSSBLOS Record Format**

Dec	Hex	Type	Length	Label	Description
SLSSBLOS - LSM OPERATIONS STATISTICS					
<p>FUNCTION: CONTAINS PERFORMANCE STATISTICS FOR THE LSM. THE SAME STRUCTURE IS USED TO CREATE THE SMF PERFORMANCE RECORD, HOWEVER THE CONTROL BLOCK HEADER IS ELIMINATED, AND ONLY THE FIXED AND MULTIPLE SECTIONS GENERATED. THE FIXED SECTION OF THE RECORD IS OSHDL OFF THE BEGINNING OF THE SMF RECORD. THE MULTIPLE SECTION IS BLOSLSSL OFF THE FIXED SECTION, AND THE FIELD BLOSKNT IN THE SMF RECORD DEFINES THE NUMBER OF MULTIPLE SECTIONS TO FOLLOW</p> <p>SYMBOLICS:            &amp;DSECT - DSECT OR CONTINUATION OF DATA AREA.            YES - PRODUCE A DSECT LISTING            NO - NO DSECT</p>					
0	(0)	AREA	2	SLSSBLOS	LSM OPERATIONS STATISTICS DATA AREA
START OF SMF FIXED PORTION					
0	(0)	SIGNED-HWORD	2	BLOSKNT	COUNT OF BLOS DATA AREAS TO FOLLOW
ZERO IN "IN MEMORY" VERSION.					
2	(02)	LENGTH		BLOSLSSL	LENGTH OF FIXED SMF PORTION.
START OF SMF MULTIPLE SECTION.					
2	(2)	A-ADDR	1	BLOSTYP0	TYPE OF STATISTIC FLAGS
		1... .... X'80'		BLOSMSS	MOUNT SCRATCH
		.1. .... X'40'		BLOSMNS	MOUNT NON-SCRATCH
		..1. .... X'20'		BLOSDSS	DISMOUNT SCRATCH
		...1 .... X'10'		BLOSDNS	DISMOUNT NON-SCRATCH
		.... 1... X'08'		BLOSSWS	SWAP
		.... .1.. X'04'		BLOSMOV	MOVE
		.... ..1. X'02'		BLOSNTNTR	ENTER
		.... ....1 X'01'		BLOSEJT	EJECT
3	(3)	A-ADDR	1	-RESERVED-	*** RESERVED
4	(4)	SIGNED-FWORD	4	BLOSSOPC	SAME LSM OPERATION COUNT
8	(8)	SIGNED-FWORD	4	BLOSSTIM	SAME LSM ELAPSED TIME. BINARY INTEGER COUNT, IN MILLISECONDS - THOUSANDTHS OF SECONDS.
12	(C)	SIGNED-FWORD	4	BLOSDOPC	DIFFERENT LSM OPERATION COUNT

**Table 29. SLSSBLOS Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
16	(10)	SIGNED-FWORD	4	BLOSDTIM	DIFFERENT LSM ELAPSED TIME
20	(14)	SIGNED-FWORD	4	BLOSPTRU	PASSTHRU COUNT
22	(16)	LENGTH		BLOSVL	LENGTH OF DATA SECTION
20	(14)	LENGTH		BLOSVL1	LENGTH OF COUNTER SECTION
24	(18)	LENGTH		BLOSL	BLOS LENGTH

**Cross Reference**

Name	Len	Offset Value
BLOSDNS	-	10
BLOSDOPC	000004	0C
BLOSDSS	-	20
BLOSDTIM	000004	10
BLOSEJT	-	01
BLOSKNT	000002	00
BLOSL	-	18
BLOSLSSL	-	02
BLOSMNS	-	40
BLOSMOV	-	04
BLOSMSS	-	80
BLOSNTNTR	-	02
BLOSPTRU	000004	14
BLOSSOPC	000004	04
BLOSSTIM	000004	08
BLOSSWS	-	08
BLOSTYP0	000001	02
BLOSVL	-	16
BLOSVL1	-	14
SLSSBLOS	000002	00

# SLSSCAPJ

**Table 30. SLSSCAPJ Record Format**

Dec	Hex	Type	Len	Label	Description
SLSSCAPJ - CAP EJECT SMF RECORD					
FUNCTION: USED TO HOLD INFORMATION PASSED TO THE ALS SMF WRITER SERVICE ROUTINE FOR THE CARTRIDGE EJECT EVENT.					
SYMBOLICS: &DSECT - DSECT OR CONTINUATION OF DATA AREA YES - PRODUCE A DSECT LISTING NO - NO DSECT					
6	(6)	AREA	2	SLSSCAPJ	CAP EJECT SMF RECORD SUBTYPE
6	(6)	HEXSTRING	6	CJSMFDES	DESTINATION CAP LOCATION
12	(C)	HEXSTRING	40	CJSMFVAR	VOL ATTRIBUTE RECORD FOR CARTRIDGE
46	(2E)	LENGTH		CJSMFL	LENGTH OF EJECT RECORD

## Cross Reference

Name	Len	Offset Value
CJSMFDES	000006	06
CJSMFL	-	2E
CJSMFVAR	000040	0C
SLSSCAPJ	000002	06



# SLSSCAPN

**Table 31. SLSSCAPN Record Format**

Dec	Hex	Type	Length	Label	Description
SLSSCAPN - CAP ENTER SMF RECORD					
FUNCTION: USED TO HOLD INFORMATION PASSED TO THE ALS SMF WRITER SERVICE ROUTINE FOR THE CARTRIDGE ENTER EVENT.					
SYMBOLICS: &DSECT - DSECT OR CONTINUATION OF DATA AREA. YES - PRODUCE A DSECT LISTING NO - NO DSECT					
6	(6)	AREA	2	SLSSCAPN	CAP ENTER SMF RECORD SUBTYPE
6	(6)	HEXSTRING	6	CNSMFSRC	SOURCE CAP LOCATION
12	(C)	HEXSTRING	40	CNSMFVAR	VOL ATTRIBUTE RECORD FOR CARTRIDGE
46	(2E)	LENGTH		CNSMFL	LENGTH OF EJECT RECORD

## Cross Reference

Name	Len	Offset Value
CNSMFL	-	2E
CNSMFSRC	000006	06
CNSMFVAR	000040	0C
SLSSCAPN	000002	06

# SLSSVSTA

**Table 32. SLSSVSTA Record Format**

Dec	Hex	Type	Length	Label	Description
SLSSVSTA - VARY STATION SMF RECORD SUBTYPE MAP					
FUNCTION: CONTAINS A RECORD OF SUCCESSFUL SUBSYSTEM VARY COMMANDS.					
SYMBOLICS: &DSECT - DSECT OR CONTINUATION OF DATA AREA. YES - PRODUCE A DSECT LISTING NO - NO DSECT					
0	(0)	AREA	2	SLSSVSTA	VARY STATION SMF RECORD SUBTYPE
0	(0)	SIGNED-FWORD	4	SVSTFLAG	FLAGS
0	(0)	A-ADDR	1	SVSTFLG0	TYPE OF STATISTIC FLAGS
		1... .. X'80'		SVSTVON	VARY ON
		.1... .. X'40'		SVSTVOF	VARY OFF
		..1... .. X'20'		SVSTFOR	VARY FORCE
		...1... .. X'10'		SVSTACS	SET ACS MODE
		.... 1... X'08'		SVSTSTBY	STATION ON STANDBY
		.... .1.. X'04'		SVSTVACS	ACS VARY REQUESTED
1	(1)	A-ADDR	3	-RESERVED-	*** RESERVED
FOR STATION VARY:					
4	(4)	HEXSTRING	2	SVSTATID	STATION ID
6	(6)	HEXSTRING	2	SVSTUNID	MVS UNIT NUMBER
FOR ACS VARY:					
4	(4)	HEXSTRING	1	SVSTACID	ACS ID
5	(5)	A-ADDR	3	-RESERVED-	*** UNUSED FOR VARY ACS
8	(08)	LENGTH		SVSTL	LENGTH OF DATA SECTION

## Cross Reference

Name	Len	Offset Value
SLSSVSTA	000002	00
SVSTACID	000001	04
SVSTACS	-	10
SVSTATID	000002	04
SVSTFLAG	000004	00
SVSTFLG0	000001	00
SVSTFOR	-	20
SVSTL	-	08
SVSTSTBY	-	08
SVSTUNID	000002	06
SVSTVACS	-	04
SVSTVOF	-	40
SVSTVON	-	80

# SLSSMLSM

**Table 33. SLSSMLSM Record Format**

Dec	Hex	Type	Length	Label	Description
SLSSMLSM - MODIFY LSM SMF RECORD SUBTYPE MAP					
FUNCTION: CONTAINS A RECORD OF SUCCESSFUL SUBSYSTEM MODIFY COMMANDS.					
SYMBOLICS: &DSECT - DSECT OR CONTINUATION OF DATA AREA. YES - PRODUCE A DSECT LISTING NO - NO DSECT					
0	(0)	AREA	2	SLSSMLSM	MODIFY LSM SMF RECORD SUBTYPE
0	(0)	SIGNED-FWORD	4	SMLSFLAG	FLAGS
0	(0)	A-ADDR	1	SMLSFLG0	TYPE OF STATISTIC FLAGS
		1... .... X'80'		SMLSVON	MODIFY ON
		.1.. .... X'40'		SMLSVOF	MODIFY OFF
		..1. .... X'20'		SMLSFOR	MODIFY FORCE
1	(1)	A-ADDR	3	-RESERVED-	RESERVED
4	(4)	HEXSTRING	2	SMLSATID	LSM ID
6	(06)	LENGTH		SMLSL	LENGTH OF DATA SECTION

## Cross Reference

Name	Len	Offset Value
SLSSMLSM	000002	00
SMLSATID	000002	04
SMLSFLAG	000004	00
SMLSFLG0	000001	00
SMLSFOR	-	20
SMLSL	-	06
SMLSVOF	-	40
SMLSVON	-	80

# SLSSLSB

**Table 34. SLSSLSB Record Format**

Dec	Hex	Type	Length	Label	Description
SLSSLSB - LMU STATISTICS BUFFER DATA BLOCK					
<p>FUNCTION:            THE CALLER OF THE SLSLRSTA FUNCTION SUPPLIES THE ADDRESS OF A DATA BUFFER TO BE FILLED IN WITH THE RESPONSE DATA FROM AN LMU READ STATISTICS REQUEST. THE DATA AREA CONTAINS 16 ENTRIES, ONE FOR EACH LSM CONFIGURED TO THE LMU. INFORMATION SUPPLIED ABOUT EACH LSM INCLUDES:</p> <p>1) LSM ARM UTILIZATION PERCENTAGE.            2) LSM NUMBER MASTER PASSTHRU PORT ONE IS CONNECTED TO.            3) LSM NUMBER MASTER PASSTHRU PORT TWO IS CONNECTED TO.</p> <p>SYMBOLICS:            &amp;DSECT - DSECT OR CONTINUATION OF DATA AREA.            YES - PRODUCE A DSECT LISTING            NO - NO DSECT</p>					
0	(0)	AREA	2	SLSSLSB	LMU ATHS STATISTICS BUFFER
0	(0)	HEXSTRING	2	LSBMON	MONTH
2	(2)	HEXSTRING	2	LSBDAY	DAY
4	(4)	HEXSTRING	2	LSBHR	HOUR
6	(6)	HEXSTRING	2	LSBMIN	MINUTE
8	(8)	HEXSTRING	2	LSBSEC	SECOND
10	(A)	HEXSTRING	1	LSBACS	ACS ID RANGE IS X'00' TO X'FF'
11	(B)	FWORD	3	-RESERVED-	***RESERVED
14	(E)	HWORD	2	-RESERVED-	BOUNDARY ALIGNMENT
16	(10)	FWORD	4	-RESERVED-	*** RESERVED
20	(14)	LENGTH	99	LSBCONTB	NEW FORMAT LSMs 0-99 CONFIGURATION F0 (0) = FUTURE LSM F1 (1) = A CONFIGURED LSM F2 (2) = AN UN-CONFIGURED LSM
119	(77)	HEXSTRING	32	LSBLSBE	ONE FOR EACH LSM FOR 99 LSMS
3287	(CD7)	LENGTH		LSBL	SIZE OF LSB
DSECT DESCRIBING EACH LSM STATISTICS BUFFER					
0	(0)	STRUCTURE		SLSSLSBE	LSM STATISTICS BUFFER.
0	(0)	SIGNED-FWORD	4	LSBEARMU	ARM UTILIZATION PERCENTAGE.
4	(4)	SIGNED-FWORD	4	LSBECNT1	PASSTHRU PORT 1 USAGE COUNT.
8	(8)	SIGNED-FWORD	4	LSBECNT2	PASSTHRU PORT 2 USAGE COUNT.

**Table 34. SLSSLSB Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
12	(C)	HEXSTRING	6	LSBECON1	PASSTHRU PORT 1 CONNECTIVITY.
18	(12)	HEXSTRING	6	LSBECON2	PASSTHRU PORT 2 CONNECTIVITY.
LSBECON1 AND LSBECON2 HAVE THE FOLLOWING MAPPING: BYTE 0 - RESERVED BYTE 1 - ACSID BYTE 2 - SLAVE LSMID BYTE 3 - RESERVED BYTE 4 - RESERVED BYTE 5 - RESERVED					
24	(18)	2-FWORDS	8	-RESERVED-	*** RESERVED
32	20	LENGTH		LSBEL	SIZE OF LSBE.

**Cross Reference**

Name	Len	Offset Value
LSBACS	000001	0A
LSBCONTB	000099	14
LSBDAY	000002	02
LSBEARMU	000004	00
LSBECNT1	000004	04
LSBECNT2	000004	08
LSBECON1	000006	0C
LSBECON2	000006	12
LSBEL	-	20
LSBHR	000002	04
LSBL	-	CD7
LSBLE	-	20
LSBLSBE	000032	77
LSBMIN	000002	06
LSBMON	000002	00
LSBSEC	000002	08
SLSSLSB	000002	00
SLSSLSBE	-	00

# SLSSMF07

**Table 35. SLSSMF07 Record Format**

Dec	Hex	Type	Length	Label	Description
<p>DSECT: SLSSMF07 - HSC RECORD TYPE 7 MAPPING MACRO</p> <p>FUNCTION:            MAPS THE SUBTYPE 7 SMF RECORD PRODUCED BY THE HSC. THIS IS PRODUCED FOR EACH SUCCESSFUL MOVE INITIATED BY THE HSC.</p> <p>THESE RECORDS WERE ORIGINALLY DESIGNED TO PROVIDE OUR FIELD AND MARKETING STAFFS WITH STATISTICAL CARTRIDGE MOVEMENT, LMU TIMING, AND ROBOTICS TIMING INFORMATION. THESE RECORDS REPORT MOVEMENT SOURCE, DESTINATION, LMU TIMES, AND ROBOTICS TIMES. THESE RECORDS ALSO CONTAIN VALUABLE SYSTEM ID AND JOB INFORMATION.</p> <p>USAGE TIPS:</p> <p>TO FIND ENTER ACTIVITY WITH THE SLSSMF07 RECORDS:</p> <ul style="list-style-type: none"> <li>• FIND ALL SLSSMF07 MOVE DETAIL RECORDS WITH A SOURCE IDENTIFIER (SMF07SRI) = "CAP"(SMF07SCP).</li> <li>• YOU CAN DETERMINE THE LIBRARY CARTRIDGE MOVEMENT TYPE THAT INITIATED THE ENTER BY CHECKING SMF07TYP.</li> </ul> <p>TO FIND EJECT ACTIVITY WITHIN THE SLSSMF07 RECORDS:</p> <ul style="list-style-type: none"> <li>• FIND ALL SLSSMF07 MOVE DETAIL RECORDS WITH A DESTINATION IDENTIFIER(SMF07DEI) = "CAP"(SMF07TCP).</li> <li>• YOU CAN DETERMINE THE LIBRARY CARTRIDGE MOVEMENT TYPE THAT INITIATED THE EJECT BY CHECKING SMF07TYP.</li> </ul>					
0	(0)	AREA	1	SLSSMF07	MOVE DETAIL SMF RECORD SUBTYPE
<p>THIS DSECT MAPS THE SUBTYPE 7 RECORD PRODUCED BY THE HSC FOR EACH SUCCESSFUL MOVE IF SUBTYPE 7 RECORDING IS ENABLED.</p>					
0	(0)	BITSTRING	1	SMF07TYP	TYPE OF RECORD
		1... .... X'80'		SMF07MSS	MOUNT SCRATCH
		.1... .... X'40'		SMF07MNS	MOUNT NON-SCRATCH
		..1... .... X'20'		SMF07DSS	DISMOUNT SCRATCH
		...1... .... X'10'		SMF07DNS	DISMOUNT NON-SCRATCH
		.... 1... X'08'		SMF07SWS	SWAP
		.... .1.. X'04'		SMF07MOV	MOVE
		.... ..1. X'02'		SMF07NTR	ENTER
		.... ...1 X'01'		SMF07EJT	EJECT
1	(1)	BITSTRING	1	SMF07RQS	REQUESTOR IDENTIFIER
		.... .... X'00'		SMF07UNK	UNKNOWN
		.... ...1 X'01'		SMF07HSC	HSC INITIATED (E.G. AUTOMATIC CLEANING OF A DRIVE)
		.... ..1. X'02'		SMF07JOB	JOB PROCESSING INITIATED
		.... ...11 X'03'		SMF07UTL	HSC UTILITY INITIATED
		.... .1.. X'04'		SMF07PRG	HSC PROGRAMMATIC INTERFACE

**Table 35. SLSSMF07 Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
2	(2)	.... .1.1 X'05'	1	SMF07OPR	HSC OPERATOR COMMAND INITIATED
		.... .11. X'06'		SMF07TMI	VM TMI INTERFACE
		BITSTRING		SMF07FLG	FLAG BYTE
		1... .... X'80'		SMF07DSV	SMF07DRS CONTAINS A DRIVE DEVICE NUM
		.1.. .... X'40'		SMF07DTV	SMF07DRT CONTAINS A DRIVE DEVICE NUM
		..1. .... X'20'		SMF07CNV	SMF07CON CONTAINS VALID DATA
		...1 .... X'10'		SMF07LMD	LMU DATA IS AVAILABLE
3	(3)	.... 1... X'08'	4	SMF07PRF	PERFORMANCE SIGNIFICANTLY IMPACTED BY LMU RETRY
		HEXSTRING		SMF07TTM	TIME IN HUNDREDTHS THE REQUEST WAS WAS RECEIVED BY THE HSC. ONLY
7	(7)	HEXSTRING	4	SMF07TDT	DATE THE REQUEST WAS RECEIVED BY THE HSC (0CYDDDF)
11	(B)	HEXSTRING	4	SMF07LTM	TIME IN HUNDREDTHS THE REQUEST WAS WAS RECEIVED BY THE LMU SERVER
15	(F)	HEXSTRING	4	SMF07LDT	DATE THE REQUEST WAS RECEIVED BY THE LMU SERVER
19	(13)	HEXSTRING	4	SMF07NRD	INTERVAL IN HUNDREDTHS THE REQUEST WAS QUEUED BECAUSE A LSM WAS NOT READY.
23	(17)	HEXSTRING	4	SMF07CPO	INTERVAL IN HUNDREDTHS OF A SECOND THE REQUEST WAS DELAYED DUE TO CAP OPERATIONS. THIS INCLUDES THE WAIT TIME FOR THE DOOR TO OPEN, CLOSE THE DOOR, DOOR, FILL OR EMPTY THE CAP, CLOSE THE DOOR, AND SCAN THE CAP. HEX 'FFFFFFF' INDICATES COUNTER OVERFLOW



**Table 35. SLSSMF07 Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
27	(1B)	CHARACTER	8	SMF07US1	THIS SHOULD ALWAYS ONLY CONTAIN DISPLAYABLE EBCDIC (INC BLANKS). JOBNAME IF REQ FROM JOB PROCESSING, HSC UTILITY, OR HSC PROGRAMATIC INTERFACE, OR HSC INITIATED. 'CONSOLE' IF INITIATED BY THE OPERATOR VIRTUAL MACHINE NAME THE IUCV RECEIVED FROM (VM TMS INTERFACE)
35	(23)	CHARACTER	8	SMF07US2	THIS SHOULD ALWAYS ONLY CONTAIN DISPLAYABLE EBCDIC (INC BLANKS). SMFID (JES2) IF REQ FROM JOB PROCESSING, HSC UTILITY, OR HSC MAIN PROCESSOR NAME (JES3). IF REQ FROM JOB PROCESSING, HSC UTILITY, OR HSC. THE CONSOLEID IN DISPLAYABLE FORMAT IF INITIATED BY THE OPERATOR NODE NAME (VM TMS INTERFACE)
43	(2B)	HEXSTRING	4	SMF07CON	CONSOLEID IF INITIATED BY THE OPERATOR
47	(2F)	CHARACTER	1	SMF07LBL	LABEL MODIFIER
'1'	(F1)	CHAR CONST		SMF07MVV	VERIFY LABEL VOLSER
'2'	(F2)	CHAR CONST		SMF07MVU	VERIFY UNLABELED CARTRIDGE
'3'	(F3)	CHAR CONST		SMF07MBV	BYPASS LABEL VERIFICATION
'4'	(F4)	CHAR CONST		SMF07MRC	RECOVERY CARTRIDGE
'5'	(F5)	CHAR CONST		SMF07VMT	VERIFY MEDIA AND BYPASS VOLSER
'6'	(F6)	CHAR CONST		SMF07VMV	VERIFY MEDIA AND VOLSER
'7'	(F7)	CHAR CONST		SMF07VMU	VERIFY MEDIA AND UNREADABLE LBL
48	(30)	CHARACTER	6	SMF07VOL	VOLSER BEING MOVED NOTE - ROW AND COLUMN COORDINATES HAVE DIFFERENT MEANINGS FOR CELLS, CAPS, AND DRIVES.
54	(36)	CHARACTER	1	SMF07SF1	SOURCE MODIFIER
'1'	(F1)	CHAR CONST		SMF07SFN	NORMAL
'2'	(F2)	CHAR CONST		SMF07SFI	ONLY SMF07SAC AND SMF07SLS VALID
55	(37)	CHARACTER	1	SMF07SRI	SOURCE IDENTIFIER

**Table 35. SLSSMF07 Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
'1'	(F1)	CHAR CONST		SMF07SCE	CELL
'2'	(F2)	CHAR CONST		SMF07SCP	CAP
'3'	(F3)	CHAR CONST		SMF07SDR	DRIVE
56	(38)	HEXSTRING	1	SMF07SAC	SOURCE ACS
57	(39)	HEXSTRING	1	SMF07SLS	SOURCE LSM
58	(3A)	HEXSTRING	1	SMF07SPN	SOURCE PANEL
59	(3B)	HEXSTRING	1	SMF07SRO	SOURCE ROW
60	(3C)	HEXSTRING	1	SMF07SCO	SOURCE COLUMN
61	(3D)	CHARACTER	1	SMF07DEI	DESTINATION IDENTIFIER
'1'	(F1)	CHAR CONST		SMF07TCE	CELL
'2'	(F2)	CHAR CONST		SMF07TCP	CAP
'3'	(F3)	CHAR CONST		SMF07TDR	DRIVE
'5'	(F5)	CHAR CONST		SMF07TDW	DRIVE (WRITE PROTECT)
62	(3E)	HEXSTRING	1	SMF07TAC	DESTINATION ACS
63	(3F)	HEXSTRING	1	SMF07TLS	DESTINATION LSM
64	(40)	HEXSTRING	1	SMF07TPN	DESTINATION PANEL
65	(41)	HEXSTRING	1	SMF07TRO	DESTINATION ROW
66	(42)	HEXSTRING	1	SMF07TCO	DESTINATION COLUMN
67	(43)	HEXSTRING	2	SMF07DRS	SOURCE DRIVE DEVICE NUMBER INVOLVED WITH THE REQUEST. VALID ONLY IF SMF07DSV IS ON.
69	(45)	HEXSTRING	2	SMF07DRT	DESTINATION DRIVE DEVICE NUMBER INVOLVED WITH THE REQUEST. VALID ONLY IF SMF07DTV IS ON.
71	(47)	HEXSTRING	4	SMF07STM	TIME IN HUNDREDTHS THE REQUEST WAS SENT TO THE LMU
75	(4B)	HEXSTRING	4	SMF07SDT	DATE THE REQUEST WAS SENT TO THE LMU IN THE FORM 0CYDDF.
79	(4F)	HEXSTRING	4	SMF07ETM	TIME IN HUNDREDTHS THE LMU INDICATED THE REQUEST WAS COMPLETE
83	(53)	HEXSTRING	4	SMF07EDT	DATE THE LMU INDICATED THE REQUEST WAS COMPLETE.
87	(57)	BITSTRING	1	SMF07TNM	NUMBER OF LSMS USED

**Table 35. SLSSMF07 Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
88	(58)	LENGTH		SMF07SL	LENGTH OF NON-LMU PORTION OF SUBRECORD
THIS MAPS THE DATA RETURNED BY THE LMU. IT IS ONLY AVAILABLE IF SMF07LMD IS ON. NOTE THAT THE LMU TIMES ARE ONLY VALID TO A TENTH OF A SECOND. THE HSC CONVERTS THE TIMES TO HUNDREDTHS TO BE CONSISTENT WITH OTHER TIMES.					
88	(58)	HEXSTRING	4	SMF07LTO	INTERVAL IN HUNDREDTHS OF A SECOND THE LMU HAD THE REQUEST. HEX 'FFFFFFFF' INDICATES LMU COUNTER OVERFLOW
92	(5C)	HEXSTRING	4	SMF07DWT	INTERVAL IN HUNDREDTHS OF A SECOND OF DRIVE WAIT TIME. HEX 'FFFFFFFF' INDICATES LMU COUNTER OVERFLOW
96	(60)	HEXSTRING	4	SMF07DRO	INTERVAL IN HUNDREDTHS OF DESTINATION LSM ROBOTICS TIME HEX 'FFFFFFFF' INDICATES LMU COUNTER OVERFLOW
100	(64)	HEXSTRING	4	SMF07DRQ	INTERVAL IN HUNDREDTHS OF DESTINATION LSM ROBOTICS QUEUE TIME. HEX 'FFFFFFFF' INDICATES LMU COUNTER OVERFLOW
104	(68)	HEXSTRING	4	SMF07ORO	INTERVAL IN HUNDREDTHS OF ALL OTHER LSM ROBOTICS TIME HEX 'FFFFFFFF' INDICATES LMU COUNTER OVERFLOW
108	(6C)	HEXSTRING	4	SMF07ORQ	INTERVAL IN HUNDREDTHS OF ALL OTHER LSM ROBOTICS QUEUE TIME. HEX 'FFFFFFFF' INDICATES LMU COUNTER OVERFLOW
112	(70)	HEXSTRING	4	SMF07PRO	INTERVAL IN HUNDREDTHS OF PASSTHRU ROBOTICS TIME HEX 'FFFFFFFF' INDICATES LMU COUNTER OVERFLOW
116	(74)	HEXSTRING	4	SMF07PRQ	INTERVAL IN HUNDREDTHS OF ALL PASSTHRU ROBOTICS QUEUE TIME. HEX 'FFFFFFFF' INDICATES LMU COUNTER OVERFLOW
120	(78)	LENGTH		SMF07L	LENGTH OF FIXED PORTION OF SUBRECORD

## Cross Reference

Name	Len	Offset Value
SLSSMF07	000001	00
SMF07CNV	-	20
SMF07CON	000004	2B
SMF07CPO	000004	17
SMF07DEI	000001	3D
SMF07DNS	-	10
SMF07DRO	000004	60
SMF07DRQ	000004	64
SMF07DRS	000002	43
SMF07DRT	000002	45
SMF07DSS	-	20
SMF07DSV	-	80
SMF07DTV	-	40
SMF07DWT	000004	5C
SMF07EDT	000004	53
SMF07EJT	-	01
SMF07ETM	000004	4F
SMF07FLG	000001	02
SMF07HSC	-	01
SMF07JOB	-	02
SMF07L	-	78
SMF07LBL	000001	2F
SMF07LDT	000004	0F
SMF07LMD	-	10
SMF07LTM	000004	0B
SMF07LTO	000004	58
SMF07MBV	-	'CVAL'
SMF07MNS	-	40
SMF07MOV	-	04
SMF07MRC	-	'CVAL'
SMF07MSS	-	80

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
SMF07MVU	-	'CVAL'
SMF07MVV	-	'CVAL'
SMF07NRD	000004	13
SMF07NTR	-	02
SMF07OPR	-	05
SMF07ORO	000004	68
SMF07ORQ	000004	6C
SMF07PRF	-	08
SMF07PRG	-	04
SMF07PRO	000004	70
SMF07PRQ	000004	74
SMF07RQS	000001	01
SMF07SAC	000001	38
SMF07SCE	-	'CVAL'
SMF07SCO	000001	3C
SMF07SCP	-	'CVAL'
SMF07SDR	-	'CVAL'
SMF07SDT	000004	4B
SMF07SFI	-	'CVAL'
SMF07SFN	-	'CVAL'
SMF07SF1	000001	36
SMF07SL	-	58
SMF07SLS	000001	39
SMF07SPN	000001	3A
SMF07SRI	000001	37
SMF07SRO	000001	3B
SMF07STM	000004	47
SMF07SWS	-	08
SMF07TAC	000001	3E
SMF07TCE	-	'CVAL'
SMF07TCO	000001	42
SMF07TCP	-	'CVAL'

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
SMF07TDR	-	'CVAL'
SMF07TDT	000004	07
SMF07TDW	-	'CVAL'
SMF07TLS	000001	3F
SMF07TMI	-	06
SMF07TNM	000001	57
SMF07TPN	000001	40
SMF07TRO	000001	41
SMF07TTM	000004	03
SMF07TYP	000001	00
SMF07UNK	-	00
SMF07US1	000008	1B
SMF07US2	000008	23
SMF07UTL	-	03
SMF07VMT	-	'CVAL'
SMF07VMU	-	'CVAL'
SMF07VMV	-	'CVAL'
SMF07VOL	000006	30

## SLSSMF08

**Table 36. SLSSMF08 Record Format**

Dec	Hex	Type	Length	Label	Description
SLSSMF08 - HSC RECORD TYPE 8 MAPPING MACRO					
<p>FUNCTION:            MAPS THE SUBTYPE 8 SMF RECORD PRODUCED BY THE HSC. THIS IS PRODUCED FOR EACH SUCCESSFUL VIEW COMMAND INITIATED BY THE HSC.</p> <p>SPECIAL CONSIDERATIONS: This data represents a record that is written out to the SMF data set.</p>					
0	(0)	AREA	1	SLSSMF08	VIEW DETAIL SMF RECORD SUBTYPE
THIS DSECT MAPS THE SUBTYPE 8 RECORD PRODUCED BY THE HSC FOR EACH SUCCESSFUL VIEW COMMAND WHEN SUBTYPE 8 RECORDING IS ENABLED.					
0	(0)	A-ADDR	1	SMF08ACS	ACS id.
1	(1)	A-ADDR	1	SMF08LSM	LSM number.
2	(2)	A-ADDR	1	SMF08CID	CAP id.
3	(3)	A-ADDR	1	SMF08MAG	MAG number.
4	(4)	A-ADDR	1	SMF08TYP	Type of VIEW completed.
		.... ..1 X'01'		SMF08CEL	Storage, diag., or playgrnd cell.
		.... ..1. X'02'		SMF08CAP	CAP cell.
		.... ..11 X'03'		SMF08DRV	Cartridge drive.
		.... ..1.. X'04'		SMF08PTP	pass-thru port cell.
5	(5)	AREA	1	SMF08PNL	Panel number (if SMF08TYP 1 or 3).
5	(5)	A-ADDR	1	SMF08LSM2	Connecting LSM (if SMF08TYP is 4).
6	(6)	AREA	1	SMF08ROW	Row number (if SMF08TYP 1 or 2).
6	(6)	AREA	1	SMF08XPT	Transport number (if SMF08TYP 3).
6	(6)	A-ADDR	1	SMF08SLT	PTP Slot number (if SMF08TYP 4).
7	(7)	A-ADDR	1	SMF08COL	Column number (if SMF08TYP 1 or 2)
8	(8)	A-ADDR	1	SMF08RTM	Requested VIEW time.
9	(9)	A-ADDR	1	SMF08VTM	Actual VIEW time.
10	(A)	CHARACTER	8	SMF08HST	Host name (if SMF08TYP 3).
18	(12)	HEXSTRING	2	SMF08CUA	Drive address (if SMF08TYP 3).
20	(14)	LENGTH		SMF08L	VIEW subtype 8 SMF record length.

## Cross Reference

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
SLSSMF08	000001	00
SMF08ACS	000001	00
SMF08CAP	-	02
SMF08CEL	-	01
SMF08CID	000001	02
SMF08COL	000001	07
SMF08CUA	000002	12
SMF08DRV	-	03
SMF08HST	000008	0A
SMF08L	-	14
SMF08LSM	000001	01
SMF08LSM2	000001	05
SMF08MAG	000001	03
SMF08PNL	000001	05
SMF08PTP	-	04
SMF08ROW	000001	06
SMF08RTM	000001	08
SMF08SLT	000001	06
SMF08TYP	000001	04
SMF08VTM	000001	09
SMF08XPT	000001	06



## LOGREC Records

### LOGREC Mapping Macros

*Table 37. Mapping Macros for LOGREC Records*

Macro	Description
SLSSLHDR	LOGREC Header Layout
SLSSVLG1	LOGREC Volume/Cell Force Unselect Record
SLSSBLOG	LOGREC Initialization/Termination Record
SLSSLLG1	LOGREC LMU Driver Format 1
SLSSLLG2	LOGREC LMU Driver Format 2
SLSSLLG3	LOGREC LMU Driver Format 3
SLSSLLG4	LOGREC LMU Driver Format 4
SLSSLLG5	LOGREC Dual LMU Status Change
SLSSLLG6	LOGREC Robotics Motion & Soft Fail Counts Record
SLSSDJLR	LOGREC Database/Journaling
SLSSPSWI	LOGREC Primary/Shadow Switch Record
SLSSRL00	LOGREC Recovery Record 1
SLSSRL01	LOGREC Recovery Record 2
SLSSHLG1	LOGREC Host Communications Format 1

# LOGREC Record Formats

## SLSSLHDR

**Table 38. SLSSLHDR Record Format**

Dec	Hex	Type	Length	Label	Description
SLSSLHDR - LOGREC RECORD HEADER MAP					
<p>FUNCTION:            MAPS THE STANDARD LOGREC RECORD HEADER AS DEFINED IN THE EREP MANUAL (GC28-1378). IBM PROVIDES NO MAPPING MACRO. MAPS THE ACHS EXTENSIONS TO THE HEADER.</p> <p>SYMBOLICS:            &amp;TYPE - USED TO SELECT A VALID LOGREC SUBTYPE            4001 - VOL/CELL FORCE UNSELECT RECORD            5000 - INIT/TERM LOGREC RECORD            6501 - LMU DRIVER LOGREC FORMAT 1            6502 - LMU DRIVER LOGREC FORMAT 2            6503 - LMU DRIVER LOGREC FORMAT 3            6504 - LMU DRIVER LOGREC FORMAT 4            6505 - DUAL LMU STATUS CHANGE RECORD            6506 - R+ Robotic Motion &amp; Softfail Counts            7000 - DATABASE JOURNALING LOGREC RECORD            7001 - DATABASE PRIMARY SHADOW SWITCH LOGREC RECORD            8500 - RECOVERY ERDS RECORD 0            8501 - RECOVERY ERDS RECORD 1            9201 - HOST COMMUNICATIONS LOGREC FORMAT 1</p>					
0	(0)	STRUCTURE		SLSSLHDR	RECORD HEADER MAP
0	(0)	BITSTRING	1	OLHDKEY1	CLASS/SOURCE
		.1.. .... X'40'		OLHDSOFT	SOFTWARE DETECTED ERROR
1	(1)	BITSTRING	1	OLHDKEY2	SYSTEM RELEASE LEVEL
		1... .... X'80'		OLHDVS2	VS2 OR LATER RELEASE LEVEL
2	(2)	BITSTRING	1	OLHDSMS	RECORD INDEPENDENT SWITCHES
		.... 1... X'08'		OLHDTFLG	TIME MACRO USED
3	(3)	BITSTRING	1	OLHDSW2	RECORD DEPENDANT SWITCHES
		..1. .... X'20'		OLHDERF	RECORD CONTAINS AN ERROR ID
4	(4)	HEXSTRING	2	-RESERVED-	*** RESERVED
6	(6)	HEXSTRING	1	OLHDCDCT	RECORD COUNT
7	(7)	HEXSTRING	1	-RESERVED-	*** RESERVED
8	(8)	HEXSTRING	4	OLHDDATE	SYSTEM DATE OF ERROR
12	(C)	HEXSTRING	4	OLHDTIME	SYSTEM TIME OF ERROR
16	(10)	HEXSTRING	8	OLHDCPID	CPU ID
24	(18)	CHARACTER	8	OLHDJBID	JOB ID
MAP FIELDS FROM REAL SDWA					

**Table 38. SLSSLHDR Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
32	(20)	OFFSET		OLHDERID	ERROR ID
32	(20)	HEXSTRING	400	OLHDRSDW	SDWA
32	(20)	CONST		SLSSTYPE	HSC software error subtype LOGREC data overlays SDWA area.
432	(1B0)	HEXSTRING	3	OLHDRARA	SDWARA
435	(1B3)	HEXSTRING	1	OLHRRAL	SDWAURAL (LENGTH OF VRA)
436	(1B4)	HEXSTRING	6	OLHDRVRA	VRA (ALIGN TO DOUBLE WORD+4)
442	(1BA)	HEXSTRING	152	OLHDRRC1	SDWARC1 (RECORABLE EXT 1)
594	(252)	HEXSTRING	16	OLHDRRC2	SDWARC2 (RECORABLE EXT 2)
610	(262)	HEXSTRING	32	OLHDRRC3	SDWARC3 (RECORABLE EXT 2)
642	(282)	HEXSTRING	2	OLHDRTP	RECORD TYPE or Subtype number
642	(282)	CONST		LTPAREA	HSC SOFTWARE ERROR RECORD TYPE
16385	(4001)	CONST		LTP4001	- VOL/CELL FORCE UNSELECT RECORD
20480	(5000)	CONST		LTP5000	- INIT/TERM LOGREC RECORD
25857	(6501)	CONST		LTP6501	- LMU DRIVER LOGREC FORMAT 1
25858	(6502)	CONST		LTP6502	- LMU DRIVER LOGREC FORMAT 2
25859	(6503)	CONST		LTP6503	- LMU DRIVER LOGREC FORMAT 3
25860	(6504)	CONST		LTP6504	- LMU DRIVER LOGREC FORMAT 4
25861	(6505)	CONST		LTP6505	- DUAL LMU STATUS CHANGE RECORD
25862	(6506)	CONST		LTP6506	- R+ Robotic Motion & Softfail Counts
28672	(7000)	CONST		LTP7000	- DATABASE JOURNALING LOGREC RECORD
28673	(7001)	CONST		LTP7001	- DATABASE PRIMARY SHADOW SWITCH RECORD
34048	(8500)	CONST		LTP8500	- RECOVERY ERDS RECORD 0
34049	(8501)	CONST		LTP8501	- RECOVERY ERDS RECORD 1
37377	(9201)	CONST		LTP9201	- HOST COMMUNICATIONS LOGREC FORMAT 1
644	(284)	HEXSTRING	4	OLHDSTC	STC RECORD X'FEEDFACE'
648	(288)	HEXSTRING	4	OLHDETIM	TIMESTAMP

**Table 38. SLSSLHDR Record Format (Continued)**

<b>Dec</b>	<b>Hex</b>	<b>Type</b>	<b>Length</b>	<b>Label</b>	<b>Description</b>
652	(28C)	LENGTH		OLHDL	LENGTH OF FIXED PORTION OF OLHD

## Cross Reference

Name	Len	Offset Value
LTYPAREA	-	282
LTYP4001	-	4001
LTYP5000	-	5000
LTYP6501	-	6501
LTYP6502	-	6502
LTYP6503	-	6503
LTYP6504	-	6504
LTYP6505	-	6505
LTYP6506	-	6506
LTYP7000	-	7000
LTYP7001	-	7001
LTYP8500	-	8500
LTYP8501	-	8501
LTYP9201	-	9201
OLHDCDCT	000001	06
OLHDCPID	000008	10
OLHDDATE	000004	08
OLHDERF	-	20
OLHDERID	-	20
OLHDETIM	000004	288
OLHDJBID	000008	18
OLHDKEY1	000001	00
OLHDKEY2	000001	01
OLHDL	-	28C
OLHDRARA	000003	1B0
OLHDRRAL	000001	1B3
OLHDRRC1	000152	1BA
OLHDRRC2	000016	252
OLHDRRC3	000032	262
OLHDRSDW	000400	20
OLHDRTYP	000002	282

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
OLHDRVRA	000006	1B4
OLHDSMS	000001	02
OLHDSOFT	-	40
OLHDSTC	000004	284
OLHDSW2	000001	03
OLHDTFLG	-	08
OLHDTIME	000004	0C
OLHDVS2	-	80
SLSSTYPE	-	20

# SLSSVLG1

**Table 39. SLSSVLG1 Record Format**

Dec	Hex	Type	Length	Label	Description
SLSSVLG1 - VOL/CELL LOGREC RECORD FORMAT 1					
FUNCTION: MAPS LOGREC RECORD CREATED WHEN A VOLUME IS FORCE UNSELECTED					
SYMBOLICS: &DSECT - DSECT OR CONTINUATION OF DATA AREA. YES - PRODUCE A DSECT LISTING NO - NO DSECT					
0	(0)	AREA	2	SLSSVLG1	VOL/CELL FORCE UNSELECT RECORD
16385	(4001)	CONST		VLG1SUBT	SUBTYPE X'4001'.
STANDARD SLS CONTROL BLOCK HEADER DEFINITION					
0	(0)	CHARACTER	4	VLG1HDR	IDENTIFIER 'VLG1 '
4	(4)	A-ADDR	4	VLG1LEN	LENGTH OF THE VLG1
8	(8)	A-ADDR	1	VLG1SP	SUBPOOL NUMBER
9	(9)	A-ADDR	1	VLG1KEY	PROTECTION KEY
10	(A)	SIGNED-HWORD	2	-RESERVED-	*** RESERVED
VLG1 BODY					
12	(C)	CHARACTER	8	VLG1HOST	HOSTID REQUESTING FORCE UNSELECT
20	(14)	CHARACTER	8	VLG1JOBN	JOBNAME PERFORMING FORCE UNSELECT
28	(1C)	CHARACTER	6	VLG1VOLS	VOLSER FORCE UNSELECTED
34	(22)	CHARACTER	8	VLG1OWNR	HOSTID THAT HAD THE VOL SELECTED
42	(2A)	HEXSTRING	12	-RESERVED-	*** RESERVED
54	(36)	LENGTH		VLG1L	

## Cross Reference

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
SLSSVLG1	000002	00
VLG1HDR	000004	00
VLG1HOST	000008	0C
VLG1JOBN	000008	14
VLG1KEY	000001	09
VLG1L	-	36
VLG1LEN	000004	04
VLG1OWNR	000008	22
VLG1SP	000001	08
VLG1SUBT	-	4001
VLG1VOLS	000006	1C



# SLSSBLOG

**Table 40. SLSSBLOG Record Format**

Dec	Hex	Type	Length	Label	Description
SLSSBLOG - INIT/TERM LOGREC RECORD					
FUNCTION: THIS MAPS THE LOGREC RECORD CREATED BY SLSBINIT WHENEVER THE SUBSYSTEM IS INITIALIZED OR TERMINATED, NORMALLY OR ABNORMALLY  SYMBOLICS: &DSECT - DSECT OR CONTINUATION OF DATA AREA. YES - PRODUCE A DSECT LISTING NO - NO DSECT					
0	(0)	AREA	2	SLSSBLOG	INIT/TERM LOGREC RECORD
20480	(5000)	CONST		BLOGID	RECORD TYPE 5000
0	(0)	AREA	4	BLOGFLAG	FLAGS
0	(0)	BITSTRING	1	BLOGFLG0	FLAG1 BYTE
		1... .. X'80'		BLOGSTRT	SUBSYSTEM START RECORD
		.1... .. X'40'		BLOGSHTD	SUBSYSTEM SHUTDOWN RECORD
		..1... .. X'20'		BLOGABND	SUBSYSTEM ABNORMAL SHUTDOWN
		...1 ... X'10'		BLOGCNCL	SUBSYSTEM WAS CANCELED
		.... 1... X'08'		BLOGRECO	RECONFIG STARTED
1	(1)	HEXSTRING	3	-RESERVED-	*** RESERVED
4	(4)	SIGNED-FWORD	4	-RESERVED-	*** RESERVED
8	(08)	LENGTH		BLOGL	LENGTH OF BLOG

## Cross Reference

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
BLOGABND	-	20
BLOGCNCL	-	10
BLOGFLAG	000004	00
BLOGFLG0	000001	00
BLOGID	-	5000
BLOGL	-	08
BLOGRECO	-	08
BLOGSHTD	-	40
BLOGSTRT	-	80
SLSSBLOG	000002	00

# SLSSLLG1

**Table 41. SLSSLLG1 Record Format**

Dec	Hex	Type	Length	Label	Description
SLSSLLG1 - LMU DRIVER LOGREC RECORD FORMAT ONE					
FUNCTION: MAPS LOGREC RECORD CREATED WHEN AN INVALID RESPONSE IS RECEIVED FROM THE LMU					
0	(0)	AREA	2	SLSSLLG1	LMU DRIVER LOGREC FORMAT ONE
25857	(6501)	CONST		LLG1SUBT	SUBTYPE X'6501'
STANDARD SLS CONTROL BLOCK HEADER DEFINITION					
0	(0)	CHARACTER	4	LLG1HDR	IDENTIFIER 'LLG1 '
4	(4)	A-ADDR	4	LLG1LEN	LENGTH OF THE LLG1
8	(8)	A-ADDR	1	LLG1SP	SUBPOOL NUMBER
9	(9)	A-ADDR	1	LLG1KEY	PROTECTION KEY
10	(A)	SIGNED-HWORD	2	-RESERVED-	*** RESERVED
LLG1 BODY					
12	(C)	HEXSTRING	1	LLG1ACS	ACSID OF REQUEST
13	(D)	HEXSTRING	2	LLG1STN	STATION RECEIVING RESPONSE
15	(F)	BITSTRING	1	LLG1ECD	ERROR CODE
		.... .1.. X'04'		LLG1INTCT	CAN'T HAVE INTERMEDIATE RESP
		.... 1... X'08'		LLG1INTNM	SEQUENCE NUMBER NOT NUMERIC
		.... 11.. X'0C'		LLG1NLRQ	NO LRQ WAS FOUND
		...1 .... X'10'		LLG1INVR	INVALID RESPONSE WAS FOUND
		...1 .1.. X'14'		LLG1RNTN	NON NUMERIC RESPONSE COUNT FOUND
		...1 1... X'18'		LLG1ERSP	ERROR RESPONSE RECEIVED
		...1 11.. X'1C'		LLG1DBKE	DEBLOCKING ERROR
		..1. .... X'20'		LLG1UNKB	UNKNOWN BROADCAST TYPE
		..1. .1.. X'24'		LLG1ACKE	ACK ERROR
		..1. 1... X'28'		LLG1INVB	INVALID BROADCAST WAS FOUND
NOTE THAT ERRORS 1-99 ARE SENT TO LMU AS A BLOCK ERROR ACK					
16	(10)	BITSTRING	1	LLG1RCDE	ERROR SUBCODE (SEE LRQRSCDE)

**Table 41. SLSSLLG1 Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
1	(01)	CONST		LLG1NUNR	UNRECOGNIZABLE TRANSMISSION
2	(02)	CONST		LLG1NSOB	NO START OF BLOCK CHARACTER
3	(03)	CONST		LLG1NEOB	NO END OF BLOCK CHARACTER
4	(04)	CONST		LLG1NSOT	NO START OF TRANSACTION CHARACTER
5	(05)	CONST		LLG1NEOT	NO END OF TRANSACTION CHARACTER
6	(06)	CONST		LLG1NING	INTERFACE NOT GROUPED TO A HOST
7	(07)	CONST		LLG1NHNL	HOST-ID NOT IN LEGAL RANGE
8	(08)	CONST		LLG1NSHP	ILLEGAL SET HOST PATH OPTION
9	(09)	CONST		LLG1NCJI	CAN'T JOIN INT; ANOTHER HOST HAS
10	(0A)	CONST		LLG1NWHI	WRONG HOST-ID
11	(0B)	CONST		LLG1NNUM	NON-NUMERIC BLOCK HEADER
12	(0C)	CONST		LLG1SNOB	STANDBY LMU CANNOT ACCEPT B BLOCK
13	(0D)	CONST		LLG1SWAT	SWITCHOVER ALREADY ACTIVE
50	(32)	CONST		LLG1NWSN	WRONG SEQUENCE NUMBER THIS STN
51	(33)	CONST		LLG1ILGL	SLAVE LMU ACKED B BLOCK
52	(34)	CONST		LLG1ERTP	NON-NUMERIC ACK ERROR TYPE
100	(64)	CONST		LLG1BBLK	BAD BLOCK
132	(84)	CONST		LLG1ITYP	TRANSACTION TYPE IS INVALID
17	(11)	HEXSTRING	44	LLG1RQST	REQUEST
61	(3D)	HEXSTRING	32	LLG1RSPN	RESPONSE
93	(5D)	HEXSTRING	1	LLG1HDFL	R PLUS (R+) HARDFAIL INDICATOR.
94	(5E)	HEXSTRING	5	-RESERVED-	RESERVED FOR FUTURE USE
99	(63)	CHARACTER	2	LLG1LMLV	LMU INTERFACE LEVEL
101	(65)	BITSTRING	1	LLG1STYP	STATION TYPE
		1... .... X'80'		LLG1STHN	STATION IS A NETWORK HOSTNAME

**Table 41. SLSSLLG1 Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
		.1.. .... X'40'		LLG1STTC	STATION IS A NETWORK IP ADDRESS
FOR TCP/IP HOSTNAME ADDRESS:					
102	(66)	CHARACTER	24	LLG1SHNM	STATION NETWORK HOST NAME
FOR TCP/IP NETWORK ADDRESS:					
126	(7E)	HEXSTRING	4	LLG1STCP	STATION NETWORK IP ADDRESS
130	(82)	HEXSTRING	22	-RESERVED-	RESERVED FOR FUTURE USE
152	(98)	LENGTH	LLG1L		

## Cross Reference

Name	Len	Offset Value
LLG1ACKE	-	24
LLG1ACS	000001	0C
LLG1BBLK	-	64
LLG1DBKE	-	1C
LLG1ECD	000001	0F
LLG1ERSP	-	18
LLG1ERTP	-	34
LLG1HDFL	000001	5D
LLG1HDR	000004	00
LLG1ILGL	-	33
LLG1INVB	-	28
LLG1INVR	-	10
LLG1ITYP	-	84
LLG1KEY	000001	09
LLG1L	-	98
LLG1LEN	000004	04
LLG1LMLV	000002	63
LLG1NCJI	-	09
LLG1NEOB	-	03
LLG1NEOT	-	05
LLG1NHNL	-	07
LLG1NING	-	06
LLG1NLRQ	-	0C
LLG1NNUM	-	0B
LLG1NSHP	-	08
LLG1NSOB	-	02
LLG1NSOT	-	04
LLG1NTCT	-	04
LLG1NTNM	-	08
LLG1NUNR	-	01
LLG1NWHI	-	0A

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
LLG1NWSN	-	32
LLG1RCDE	000001	10
LLG1RNTN	-	14
LLG1RQST	000044	11
LLG1RSPN	000032	3D
LLG1SHNM	000024	66
LLG1SNOB	-	0C
LLG1SP	000001	08
LLG1STCP	000004	7E
LLG1STHN	-	80
LLG1STN	000002	0D
LLG1STTC	-	40
LLG1STYP	000001	65
LLG1SUBT	-	6501
LLG1SWAT	-	0D
LLG1UNKB	-	20
SLSLLG1	000002	00

## SLSSLLG2

**Table 42. SLSSLLG2 Record Format**

Dec	Hex	Type	Length	Label	Description
SLSSLLG2 - LMU DRIVER LOGREC RECORD FORMAT TWO					
FUNCTION: MAPS LOGREC RECORD CREATED WHEN AN INVALID BLOCK IS RECEIVED FROM THE LMU					
SYMBOLICS: &DSECT - DSECT OR CONTINUATION OF DATA AREA. YES - PRODUCE A DSECT LISTING NO - NO DSECT					
0	(0)	AREA	2	SLSSLLG2	LMU DRIVER LOGREC FORMAT TWO
25858	(6502)	CONST		LLG2SUBT	SUBTYPE X'6502'
STANDARD SLS CONTROL BLOCK HEADER DEFINITION					
0	(0)	CHARACTER	4	LLG2HDR	IDENTIFIER 'LLG2 '
4	(4)	A-ADDR	4	LLG2LEN	LENGTH OF THE LLG2
8	(8)	A-ADDR	1	LLG2SP	SUBPOOL NUMBER
9	(9)	A-ADDR	1	LLG2KEY	PROTECTION KEY
10	(A)	SIGNED-HWORD	2	-RESERVED-	*** RESERVED
LLG2 BODY					
12	(C)	HEXSTRING	1	LLG2ACS	ACSID OF BLOCK
13	(D)	HEXSTRING	2	LLG2STN	STATION RECEIVING BLOCK
15	(F)	BITSTRING	1	LLG2ECD	ERROR CODE
		.... .1.. X'04'		LLG2DBKE	DEBLOCKING ERROR
16	(10)	BITSTRING	1	LLG2RCDE	ERROR SUBCODE
124	(7C)	CONST		LLG2BLNN	BLOCK LENGTH IS NOT NUMERIC
136	(88)	CONST		LLG2ISEQ	INVALID SEQUENCE NUM
17	(11)	HEXSTRING	64	LLG2IBLK	INPUT BLOCK
81	(51)	HEXSTRING	64	LLG2OBLK	OUTPUT BLOCK
145	(91)	BITSTRING	1	LLG2STYP	STATION TYPE
		1... .... X'80'		LLG2STHN	STATION IS A NETWORK HOSTNAME
		.1.. .... X'40'		LLG2STTC	STATION IS A NETWORK IP ADDRESS
FOR TCP/IP HOSTNAME ADDRESS:					
146	(92)	CHARACTER	24	LLG2SHNM	STATION NETWORK HOST NAME



**Table 42. SLSSLLG2 Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
FOR TCP/IP NETWORK ADDRESS:					
160	(AA)	HEXSTRING	4	LLG2STCP	STATION NETWORK IP ADDRESS
174	(AE)	HEXSTRING	26	-RESERVED-	RESERVED FOR FUTURE USE
200	(C8)	LENGTH		LLG2L	

**Cross Reference**

Name	Len	Offset Value
LLG2ACS	000001	0C
LLG2BLNN	-	7C
LLG2DBKE	-	04
LLG2ECD	000001	0F
LLG2HDR	000004	00
LLG2IBLK	000064	11
LLG2ISEQ	-	88
LLG2KEY	000001	09
LLG2L	-	C8
LLG2LEN	000004	04
LLG2OBLK	000064	51
LLG2RCDE	000001	10
LLG2SHNM	000024	92
LLG2SP	000001	08
LLG2STCP	000004	AA
LLG2STHN	-	80
LLG2STN	000002	0D
LLG2STTC	-	40
LLG2STYP	000001	91
LLG2SUBT	-	6502
SLSSLLG2	000002	00

## SLSSLLG3

**Table 43. SLSSLLG3 Record Format**

Dec	Hex	Type	Length	Label	Description
SLSSLLG3 - LMU DRIVER LOGREC RECORD FORMAT THREE					
FUNCTION: DEFINES FORMAT OF DOOR OPEN LOGREC RECORD					
SYMBOLICS: &DSECT - DSECT OR CONTINUATION OF DATA AREA. YES - PRODUCE A DSECT LISTING NO - NO DSECT					
0	(0)	AREA	2	SLSSLLG3	LMU DRIVER LOGREC FORMAT THREE
25859	(6503)	CONST		LLG3SUBT	SUBTYPE X'6503'
STANDARD SLS CONTROL BLOCK HEADER DEFINITION					
0	(0)	CHARACTER	4	LLG3HDR	IDENTIFIER 'LLG3 '
4	(4)	A-ADDR	4	LLG3LEN	LENGTH OF THE LLG3
8	(8)	A-ADDR	1	LLG3SP	SUBPOOL NUMBER
9	(9)	A-ADDR	1	LLG3KEY	PROTECTION KEY
10	(A)	SIGNED-HWORD	2	-RESERVED-	*** RESERVED
LLG3 BODY					
12	(C)	HEXSTRING	2	LLG3LSM	LSM ID
14	(0E)	LENGTH		LLG3L	

### Cross Reference

Name	Len	Offset Value
LLG3HDR	000004	00
LLG3KEY	000001	09
LLG3L	-	0E
LLG3LEN	000004	04
LLG3LSM	000002	0C
LLG3SP	000001	08
LLG3SUBT	-	6503
SLSSLLG3	000002	00

# SLSSLLG4

**Table 44. SLSSLLG4 Record Format**

Dec	Hex	Type	Length	Label	Description
SLSSLLG4 - LMU DRIVER LOGREC RECORD FORMAT FOUR					
FUNCTION: DEFINES FORMAT OF LMU DEGRADED RECORD					
SYMBOLICS: &DSECT - DSECT OR CONTINUATION OF DATA AREA. YES - PRODUCE A DSECT LISTING NO - NO DSECT					
0	(0)	AREA	2	SLSSLLG4	LMU DRIVER LOGREC FORMAT FOUR
25860	(6504)	CONST		LLG4SUBT	SUBTYPE X'6504'
STANDARD SLS CONTROL BLOCK HEADER DEFINITION					
0	(0)	CHARACTER	4	LLG4HDR	IDENTIFIER 'LLG4'
4	(4)	A-ADDR	4	LLG4LEN	LENGTH OF THE LLG4
8	(8)	A-ADDR	1	LLG4SP	SUBPOOL NUMBER
9	(9)	A-ADDR	1	LLG4KEY	PROTECTION KEY
10	(A)	SIGNED-HWORD	2	-RESERVED-	*** RESERVED
LLG4 BODY					
12	(C)	HEXSTRING	2	LLG4DEVC	LSM ID (FF FOR LMU)
14	(E)	HEXSTRING	1	LLG4COND	1 (PWR DWN) OR 2 (DEGRD)
16	(10)	SIGNED-FWORD	4	LLG4FSC	FSC
20	(14)	LENGTH		LLG4L	

## Cross Reference

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
LLG4COND	000001	0E
LLG4DEVC	000002	0C
LLG4FSC	000004	10
LLG4HDR	000004	00
LLG4KEY	000001	09
LLG4L	-	14
LLG4LEN	000004	04
LLG4SP	000001	08
LLG4SUBT	-	6504
SLSSLLG4	000002	00

# SLSSLLG5

**Table 45. SLSSLLG5 Record Format**

Dec	Hex	Type	Length	Label	Description
SLSSLLG5 - DUAL LMU STATUS CHANGE LOGREC RECORD					
FUNCTION: DEFINES FORMAT OF DUAL LMU STATUS CHANGE LOGREC RECORD					
SYMBOLICS: &DSECT - DSECT OR CONTINUATION OF DATA AREA. YES - PRODUCE A DSECT LISTING NO - NO DSECT					
0	(0)	AREA	2	SLSSLLG5	DUAL LMU STATUS CHANGE LOGREC RECORD
25861	(6505)	CONST		LLG5SUBT	SUBTYPE X'6505'
STANDARD SLS CONTROL BLOCK HEADER DEFINITION					
0	(0)	CHARACTER	4	LLG5HDR	IDENTIFIER 'LLG5'
4	(4)	A-ADDR	4	LLG5LEN	LENGTH OF THE LLG5
8	(8)	A-ADDR	1	LLG5SP	SUBPOOL NUMBER
9	(9)	A-ADDR	1	LLG5KEY	PROTECTION KEY
10	(A)	SIGNED-HWORD	2	-RESERVED-	*** RESERVED
LLG5 BODY					
12	(C)	HEXSTRING	1	LLG5ACS	ACS ID
13	(D)	HEXSTRING	2	LLG5STN	Station number
15	(F)	CHARACTER	1	LLG5OMST	Old Master LMU ID/Config Status
0 = Dual LMU Not Configured Before A = LMU A Was Master LMU Before B = LMU B Was Master LMU Before					
16	(10)	CHARACTER	1	LLG5OSLV	Old Standby LMU Status
0 = Dual LMU Not Configured Before 1 = Standby LMU Was prev ready 2 = Standby LMU Was prev not ready					
17	(11)	CHARACTER	1	LLG5NMST	New Master LMU ID/Config Status
0 = Dual LMU Is Not Configured Now A = LMU A Is Master LMU Now B = LMU B Is Master LMU Now					
18	(12)	CHARACTER	1	LLG5NSLV	New Standby LMU Status
0 = Dual LMU Is Not Configured Now 1 = Standby LMU Is ready 2 = Standby LMU Is not ready					
19	(13)	BITSTRING	1	LLG5STYP	STATION TYPE

**Table 45. SLSSLLG5 Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
		1... .. X'80'		LLG5STHN	STATION IS A NETWORK HOSTNAME
		.1... .. X'40'		LLG5STTC	STATION IS A NETWORK IP ADDRESS
FOR TCP/IP HOSTNAME ADDRESS:					
20	(14)	CHARACTER	24	LLG5SHNM	STATION NETWORK HOSTNAME
FOR TCP/IP NETWORK ADDRESS:					
44	(2C)	HEXSTRING	4	LLG5STCP	STATION NETWORK IP ADDRESS
48	(30)	HEXSTRING	24	-RESERVED-	RESERVED FOR FUTURE USE
72	(48)	LENGTH		LLG5L	

## Cross Reference

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
LLG5ACS	000001	0C
LLG5HDR	000004	00
LLG5KEY	000001	09
LLG5L	-	48
LLG5LEN	000004	04
LLG5NMST	000001	11
LLG5NSLV	000001	12
LLG5OMST	000001	0F
LLG5OSLV	000001	10
LLG5SHNM	000024	14
LLG5SP	000001	08
LLG5STCP	000004	2C
LLG5STHN	-	80
LLG5STN	000002	0D
LLG5STTC	-	40
LLG5STYP	000001	13
LLG5SUBT	-	6505
SLSSLLG5	000002	00

# SLSSLLG6

**Table 46. SLSSLLG6 Record Format**

Dec	Hex	Type	Length	Label	Description
SLSSLLG6 - Robotic Motion & Softfail Counts LOGREC Record					
FUNCTION: DEFINES FORMAT OF Robotic Motion & Softfail Counts Record					
SYMBOLICS: &DSECT - DSECT OR CONTINUATION OF DATA AREA. YES - PRODUCE A DSECT LISTING NO - NO DSECT					
0	(0)	AREA	2	SLSSLLG6	Robotic motion & softfail counts
25862	(6506)	CONST		LLG6SUBT	Subtype X'6506'
Standard SLS control block header definition					
0	(0)	CHARACTER	4	LLG6HDR	Eyeball characters
4	(4)	A-ADDR	4	LLG6LEN	Length of variable part of record
8	(8)	A-ADDR	1	LLG6SP	Subpool Number
9	(9)	A-ADDR	1	LLG6KEY	Protection Key
10	(A)	SIGNED-HWORD	2	-RESERVED-	Reserved for future use
LLG6 Body					
12	(C)	HEXSTRING	1	LLG6ACS	ACS ID (binary 0-255)
13	(D)	HEXSTRING	1	-RESERVED-	Reserved
14	(E)	BITSTRING	1	LLG6FLG1	1st byte of LSM configuration flags.
		1... .. X'80'		LLG6L0AV	LSM 0 Configured if flag is on.
		.1... .. X'40'		LLG6L1AV	LSM 1 Configured if flag is on.
		..1... .. X'20'		LLG6L2AV	LSM 2 Configured if flag is on.
		...1 ... X'10'		LLG6L3AV	LSM 3 Configured if flag is on.
		.... 1... X'08'		LLG6L4AV	LSM 4 Configured if flag is on.
		.... .1.. X'04'		LLG6L5AV	LSM 5 Configured if flag is on.
		.... ..1. X'02'		LLG6L6AV	LSM 6 Configured if flag is on.
		.... ...1 X'01'		LLG6L7AV	LSM 7 Configured if flag is on.
15	(F)	BITSTRING	1	LLG6FLG2	2nd byte of LSM configuration flags.
		1... .. X'80'		LLG6L8AV	LSM 8 Configured if flag is on.
		.1... .. X'40'		LLG6L9AV	LSM 9 Configured if flag is on.
		..1... .. X'20'		LLG6L10AV	LSM 10 Configured if flag is on.
		...1 ... X'10'		LLG6L11AV	LSM 11 Configured if flag is on.



**Table 46. SLSSLLG6 Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
		.... 1... X'08'		LLG6L12AV	LSM 12 Configured if flag is on.
		.... .1.. X'04'		LLG6L13AV	LSM 13 Configured if flag is on.
		.... ..1. X'02'		LLG6L14AV	LSM 14 Configured if flag is on.
		.... ...1 X'01'		LLG6L15AV	LSM 15 Configured if flag is on.
16	(10)	SIGNED-FWORD	4	LLG6L0RM	LSM 0 Robotic Motions Started
20	(14)	SIGNED-FWORD	4	LLG6L0SF	LSM 0 Softfails Recovered
24	(18)	SIGNED-FWORD	4	LLG6L1RM	LSM 1 Robotic Motions Started
28	(1C)	SIGNED-FWORD	4	LLG6L1SF	LSM 1 Softfails Recovered
32	(20)	SIGNED-FWORD	4	LLG6L2RM	LSM 2 Robotic Motions Started
36	(24)	SIGNED-FWORD	4	LLG6L2SF	LSM 2 Softfails Recovered
40	(28)	SIGNED-FWORD	4	LLG6L3RM	LSM 3 Robotic Motions Started
44	(2C)	SIGNED-FWORD	4	LLG6L3SF	LSM 3 Softfails Recovered
48	(30)	SIGNED-FWORD	4	LLG6L4RM	LSM 4 Robotic Motions Started
52	(34)	SIGNED-FWORD	4	LLG6L4SF	LSM 4 Softfails Recovered
56	(38)	SIGNED-FWORD	4	LLG6L5RM	LSM 5 Robotic Motions Started
60	(3C)	SIGNED-FWORD	4	LLG6L5SF	LSM 5 Softfails Recovered
64	(40)	SIGNED-FWORD	4	LLG6L6RM	LSM 6 Robotic Motions Started
68	(44)	SIGNED-FWORD	4	LLG6L6SF	LSM 6 Softfails Recovered
72	(48)	SIGNED-FWORD	4	LLG6L7RM	LSM 7 Robotic Motions Started
76	(4C)	SIGNED-FWORD	4	LLG6L7SF	LSM 7 Softfails Recovered
80	(50)	SIGNED-FWORD	4	LLG6L8RM	LSM 8 Robotic Motions Started
84	(54)	SIGNED-FWORD	4	LLG6L8SF	LSM 8 Softfails Recovered
88	(58)	SIGNED-FWORD	4	LLG6L9RM	LSM 9 Robotic Motions Started
92	(5C)	SIGNED-FWORD	4	LLG6L9SF	LSM 9 Softfails Recovered
96	(60)	SIGNED-FWORD	4	LLG6L10RM	LSM 10 Robotic Motions Started
100	(64)	SIGNED-FWORD	4	LLG6L10SF	LSM 10 Softfails Recovered
104	(68)	SIGNED-FWORD	4	LLG6L11RM	LSM 11 Robotic Motions Started
108	(6C)	SIGNED-FWORD	4	LLG6L11SF	LSM 11 Softfails Recovered
112	(70)	SIGNED-FWORD	4	LLG6L12RM	LSM 12 Robotic Motions Started
116	(74)	SIGNED-FWORD	4	LLG6L12SF	LSM 12 Softfails Recovered

**Table 46. SLSSLLG6 Record Format (Continued)**

<b>Dec</b>	<b>Hex</b>	<b>Type</b>	<b>Length</b>	<b>Label</b>	<b>Description</b>
120	(78)	SIGNED-FWORD	4	LLG6L13RM	LSM 13 Robotic Motions Started
124	(7C)	SIGNED-FWORD	4	LLG6L13SF	LSM 13 Softfails Recovered
128	(80)	SIGNED-FWORD	4	LLG6L14RM	LSM 14 Robotic Motions Started
132	(84)	SIGNED-FWORD	4	LLG6L14SF	LSM 14 Softfails Recovered
136	(88)	SIGNED-FWORD	4	LLG6L15RM	LSM 15 Robotic Motions Started
140	(8C)	SIGNED-FWORD	4	LLG6L15SF	LSM 15 Softfails Recovered
144	(90)	LENGTH		LLG6L	

## Cross Reference

Name	Len	Offset Value
LLG6ACS	000001	0C
LLG6FLG1	000001	0E
LLG6FLG2	000001	0F
LLG6HDR	000004	00
LLG6KEY	000001	09
LLG6L	-	90
LLG6LEN	000004	04
LLG6L0AV	-	80
LLG6L0RM	000004	10
LLG6L0SF	000004	14
LLG6L1AV	-	40
LLG6L1RM	000004	18
LLG6L1SF	000004	1C
LLG6L10AV	-	20
LLG6L10RM	000004	60
LLG6L10SF	000004	64
LLG6L11AV	-	10
LLG6L11RM	000004	68
LLG6L11SF	000004	6C
LLG6L12AV	-	08
LLG6L12RM	000004	70
LLG6L12SF	000004	74
LLG6L13AV	-	04
LLG6L13RM	000004	78
LLG6L13SF	000004	7C
LLG6L14AV	-	02
LLG6L14RM	000004	80
LLG6L14SF	000004	84
LLG6L15AV	-	01
LLG6L15RM	000004	88
LLG6L15SF	000004	8C

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
LLG6L2AV	-	20
LLG6L2RM	000004	20
LLG6L2SF	000004	24
LLG6L3AV	-	10
LLG6L3RM	000004	28
LLG6L3SF	000004	2C
LLG6L4AV	-	08
LLG6L4RM	000004	30
LLG6L4SF	000004	34
LLG6L5AV	-	04
LLG6L5RM	000004	38
LLG6L5SF	000004	3C
LLG6L6AV	-	02
LLG6L6RM	000004	40
LLG6L6SF	000004	44
LLG6L7AV	-	01
LLG6L7RM	000004	48
LLG6L7SF	000004	4C
LLG6L8AV	-	80
LLG6L8RM	000004	50
LLG6L8SF	000004	54
LLG6L9AV	-	40
LLG6L9RM	000004	58
LLG6L9SF	000004	5C
LLG6SP	000001	08
LLG6SUBT	-	6506
SLSSLLG6	000002	00

# SLSSDJLR

**Table 47. SLSSDJLR Record Format**

Dec	Hex	Type	Length	Label	Description
SLSSDJLR - DATABASE JOURNALING LOGREC MAP					
<p>FUNCTION:            TO MAP THE VARIABLE LENGTH AREA OF THE JOURNALING ERDS LOG RECORD WHICH BEGINS AT LABEL OLHDCRD OF OLHDR LOGREC MAPPING MACRO. SPECIFYING OLHDR TYPE=7000 WILL GENERATE THIS MAP VIA AN INNER MACRO CALL WITHIN OLHDR.</p> <p>SYMBOLICS:            &amp;DSECT - DSECT OR CONTINUATION OF DATA AREA.            YES - PRODUCE A DSECT LISTING            NO - NO DSECT</p>					
0	(0)	AREA	2	SLSSDJLR	DATABASE JOURNALING LOGREC MAP.
28672	(7000)	CONST		DJLRID	LOGREC SUBTYPE X'7000' IS PLACED INTO FIELD OLHDRTYP OF OLHDR LOGREC MAP. ID NUMBER MATCHES CORRESPOND- ING MESSAGES FROM WMSGTXTD MACRO.
0	(0)	BITSTRING	1	DJLRFLG1	FLAG BYTE.
		1... .... X'80'		DJLRIO	I/O ERROR IMMEDIATELY FOLLOWING JOURNAL SWITCH.
		.1.. .... X'40'		DJLRBIO	BOTH JOURNALS HAVE I/O ERRORS.
		..1. .... X'20'		DJLRIOFL	ONE JOURNAL HAS AN I/O ERROR, AND THE OTHER IS 100% FULL.
		...1 .... X'10'		DJLRNRST	NEWLY CURRENT JOURNAL ISN'T RESET.
		.... 1... X'08'		DJLR4BYT	USE 4 BYTE UNIT NAME FIELDS
1	(1)	CHARACTER	8	DJLRDDN1	INITIAL JOURNAL'S DDNAME.
9	(9)	CHARACTER	44	DJLRDSN1	INITIAL JOURNAL'S DSNAME.
53	(35)	CHARACTER	6	DJLRVOL1	INITIAL JOURNAL'S VOLUME SERIAL.
59	(3B)	CHARACTER	3	DJLRUNT1	INITIAL JOURNAL'S UNIT NAME.
62	(3E)	CHARACTER	8	DJLRDDN2	ALTERNATE JOURNAL'S DDNAME.
70	(46)	CHARACTER	44	DJLRDSN2	ALTERNATE JOURNAL'S DSNAME.
114	(72)	CHARACTER	6	DJLRVOL2	ALTERNATE JOURNAL'S VOLUME SERIAL.
120	(78)	CHARACTER	3	DJLRUNT2	ALTERNATE JOURNAL'S UNIT NAME.

**Table 47. SLSSDJLR Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
120	(78)	CHARACTER	4	DJLRUN42	ALTERNATE JOURNAL'S UNIT NAME
124	(7C)	CHARACTER	4	DJLRUN41	INITIAL JOURNAL'S UNIT NAME
128	(80)	AREA	8	-RESERVED-	FORCE THE LENGTH OF DJLR TO A
128	(80)	LENGTH		DJLRL	DOUBLE-WORD MULTIPLE FOR GETMAIN.

### Cross Reference

Name	Len	Offset Value
DJLRBIO	-	40
DJLRDDN1	000008	01
DJLRDDN2	000008	3E
DJLRDSN1	000044	09
DJLRDSN2	000044	46
DJLRFLG1	000001	00
DJLRID	-	7000
DJLRIO	-	80
DJLRIOFL	-	20
DJLRL	-	80
DJLRNRST	-	10
DJLRUNT1	000003	3B
DJLRUNT2	000003	78
DJLRUN41	000004	7C
DJLRUN42	000004	78
DJLRVOL1	000006	35
DJLRVOL2	000006	72
DJLR4BYT	-	08
SLSSDJLR	000002	00

# SLSSPSWI

**Table 48. SLSSPSWI Record Format**

Dec	Hex	Type	Length	Label	Description
SLSSPSWI - PRIMARY/SHADOW SWITCH LOGREC RECORD					
FUNCTION: THIS MAPS THE LOGREC RECORD CREATED BY SLSDRDSR WHENEVER THE SUBSYSTEM SWITCHES THE DATABASE FROM PRIMARY TO SHADOWING MODE					
SYMBOLICS: &DSECT - DSECT OR CONTINUATION OF DATA AREA. YES - PRODUCE A DSECT LISTING NO - NO DSECT					
0	(0)	AREA	2	SLSSPSWI	
28673	(7001)	CONST		PSWITID	RECORD TYPE 7001
0	(0)	AREA	4	PSWITFLG	FLAGS
0	(0)	HEXSTRING	1	PSWPRFLG	PRIMARY FLAG BYTE
1	(1)	HEXSTRING	1	PSWSCFLG	SECONDARY FLAG BYTE
2	(2)	HEXSTRING	2	-RESERVED-	*** RESERVED
4	(4)	SIGNED-FWORD	4	PSWITERR	ERROR CAUSING SWITCH TO SHADOW
8	(8)	SIGNED-FWORD	4	PSWPRDCB	DCB OF PRIMARY DATABASE
12	(C)	SIGNED-FWORD	4	PSWPRUCB	UCB OF PRIMARY DATABASE
16	(10)	CHARACTER	6	PSWPRVOL	VOLUME SERIAL OF PRIMARY DB
22	(16)	CHARACTER	44	PSWPRQNM	QNAME OF PRIMARY DATABASE
68	(44)	SIGNED-FWORD	4	PSWSCDCB	DCB OF SECONDARY DATABASE
72	(48)	SIGNED-FWORD	4	PSWSCUCB	UCB OF SECONDARY DATABASE
76	(4C)	CHARACTER	6	PSWSCVOL	VOLUME SERIAL OF SECONDARY DB
82	(52)	CHARACTER	44	PSWSCQNM	QNAME OF SECONDARY DATABASE
128	(80)	SIGNED-FWORD	4	-RESERVED-	*** RESERVED
132	(84)	LENGTH		PSWITL	LENGTH OF PSWIT

## Cross Reference

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
PSWITERR	000004	04
PSWITFLG	000004	00
PSWITID	-	7001
PSWITL	-	84
PSWPRDCB	000004	08
PSWPRFLG	000001	00
PSWPRQNM	000044	16
PSWPRUCB	000004	0C
PSWPRVOL	000006	10
PSWSCDCB	000004	44
PSWSCFLG	000001	01
PSWSCQNM	000044	52
PSWSCUCB	000004	48
PSWSCVOL	000006	4C
SLSSPSWI	000002	00



# SLSSRL00

**Table 49. SLSSRL00 Record Format**

Dec	Hex	Type	Length	Label	Description
SLSSRL00 - RECOVERY ERDS RECORD 00					
FUNCTION: THIS MAPS THE LOGREC RECORD CREATED BY SLSRAURE. IT CONTAINS THE LSM ID OF AN LSM REQUIRING AUDIT					
SYMBOLICS: &DSECT - DSECT OR CONTINUATION OF DATA AREA. YES - PRODUCE A DSECT LISTING NO - NO DSECT					
0	(0)	AREA	2	SLSSRL00	RECOVERY ERDS RECORD 0
34048	(8500)	CONST		RL00ID	EVENT = 8500
0	(0)	A-ADDR	2	RL00DEF	
2	(2)	CHARACTER	2	RL00LSMI	LSM REQUIRING AUDIT
8	(8)	LONG-FLOAT	8	-RESERVED-	*** RESERVED
16	(10)	LENGTH		RL00L	LENGTH OF RL00

## Cross Reference

Name	Len	Offset Value
RL00DEF	000002	00
RL00ID	-	8500
RL00L	-	10
RL00LSMI	000002	02
SLSSRL00	000002	00

# SLSSRL01

**Table 50. SLSSRL01 Record Format**

Dec	Hex	Type	Length	Label	Description
SLSSRL01 - RECOVERY ERDS RECORD 01					
FUNCTION: THIS MAPS THE LOGREC RECORD CREATED BY SLSRHRVC. IT CONTAINS THE HOST ID OF A HOST BEING RECOVERED.					
SYMBOLICS: &DSECT - DSECT OR CONTINUATION OF DATA AREA. YES - PRODUCE A DSECT LISTING NO - NO DSECT					
0	(0)	AREA	2	SLSSRL01	RECOVERY ERDS RECORD 1
34049	(8501)	CONST		RL01ID	EVENT = 8501
0	(0)	A-ADDR	2	RL01DEF	
2	(2)	CHARACTER	1	RL01TAGF	CROSS OR SAME HOST RECOVERY
3	(3)	CHARACTER	8	RL01HOST	HOST ID BEING RECOVERED
16	(10)	LONG-FLOAT	8	-RESERVED-	*** RESERVED
24	(18)	LENGTH		RL01L	LENGTH OF RL01

## Cross Reference

Name	Len	Offset Value
RL01DEF	000002	00
RL01HOST	000008	03
RL01ID	-	8501
RL01L	-	18
RL01TAGF	000001	02
SLSSRL01	000002	00

# SLSSHLG1

**Table 51. SLSSHLG1 Record Format**

Dec	Hex	Type	Length	Label	Description
SLSSHLG1 - Host Communications LOGREC format 1					
FUNCTION: Defines the LOGREC record formatted for method switches.					
0	(0)	STRUCTURE		SLSSHLG1	Communications LOGREC format 1
37377	(9201)	CONST		HLG1SUBT	Subtype X'9201'
Standard SLS Control Block Header					
0	(0)	A-ADDR	4	HLG1HDR	Identifier
'HLG1'	(C8D3C7F1)	CHAR CONST		HLG1ID	Identifier 'HLG1'
4	(4)	A-ADDR	4	HLG1LEN	Length of control block
8	(8)	A-ADDR	1	HLG1SP	Subpool number
9	(9)	A-ADDR	1	HLG1KEY	Protection key
10	(A)	SIGNED-HWORD	2	-RESERVED-	Reserved for future use
HLG1 body					
12	(C)	SIGNED-FWORD	4	HLG1RC	Return code causing method switch
16	(10)	CHARACTER	8	HLG1LCLH	Hostid of local (executing) host
24	(18)	CHARACTER	8	HLG1SWTH	Hostid of host being switched
32	(20)	CHARACTER	8	HLG1INTH	Hostid of host initiating the switch
40	(28)	A-ADDR	4	HLG1PMTH	Previous communications method
40	(28)	A-ADDR	4	HLG1PLP	Previous LMUPATH (if specified)
40	(28)	A-ADDR	4	HLG1NMTH	New communications method
40	(28)	A-ADDR	4	HLG1NLP	New LMUPATH (if specified)
40	(28)	SIGNED-FWORD	4	-RESERVED-(4)	Reserved
Host Communications Services LOGREC flags					
56	(38)	A-ADDR	1	HLG1FLG1	Flag byte 1
		1... .... X'80'		HLG1ICMD	Initiated by operator command
		.1.. .... X'40'		HLG1IOTH	Initiated by other host (via message)

**Table 51. SLSSHLG1 Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
		..1. .... X'20'		HLG1IWRT	Initiated by WRITE function error
		...1 .... X'10'		HLG1IICN	Initiated by internal condition (meaning internal to HSC processing, for example, operator switched method for local host so method is switched for all other possible hosts)
57	(39)	A-ADDR	1	HLG1FLG2	Flag byte 2
58	(3A)	A-ADDR	2	-RESERVED-	Reserved
This is the header information of the module creating the LOGREC rec					
60	(3C)	CHARACTER	1	HLG1SLSI	SLSID information area
60	(3C)	A-ADDR	2	-RESERVED-	Reserved
64	(40)	SIGNED-FWORD	4	-RESERVED-(16)	reserved space
128	(80)	LENGTH		HLG1L	Size of the SLSSHLG1 record

## Cross Reference

Name	Len	Offset Value
HLG1FLG1	000001	38
HLG1FLG2	000001	39
HLG1HDR	000004	00
HLG1ICMD	-	80
HLG1ID	-	'CVAL'
HLG1IICN	-	10
HLG1INTH	000008	20
HLG1IOTH	-	40
HLG1IWRT	-	20
HLG1KEY	000001	09
HLG1L	-	80
HLG1LCLH	000008	10
HLG1LEN	000004	04
HLG1NLP	000004	28
HLG1NMTH	000004	28
HLG1PLP	000004	28
HLG1PMTH	000004	28
HLG1RC	000004	0C
HLG1SLSI	000001	3C
HLG1SP	000001	08
HLG1SUBT	-	9201
HLG1SWTH	000008	18

## Volume Report and Batch API Records

### Volume Report and Batch API Mapping Macros

These SMP/E-distributed macros map both Volume Report and Batch API records.

Refer to “Batch API Records” on page 625 to see SLUVDDAT and SLUVPDAT, which are used only by the Batch API.

**Table 52. Mapping Macros for Volume Report and Batch API Records**

Macro	Description
SLUVADAT	Flat File ACS/LSM Information DSECT
SLUVCDAT	Flat File Static Configuration Data DSECT
SLUVHDAT	Flat File Host Information DSECT
SLUVIDAT	Flat File CDS Information DSECT
SLUVSDAT	Flat File ACS Station Address DSECT
SLUVVDAT	Flat File Volume Data DSECT

# Volume Report and Batch API Record Formats

## SLUVADAT

**Table 53. SLUVADAT Record Format**

Dec	Hex	Type	Length	Label	Description
SLUVADAT - FLAT FILE ACS/LSM INFORMATION DSECT					
FUNCTION: DESCRIBES THE ACS/LSM INFORMATION WHICH MAY BE GENERATED TO THE FLAT FILE BY THE VOLUME REPORT UTILITY					
0	(0)	STRUCTURE		SLUVADAT	
0	(0)	CHARACTER	1	-RESERVED-	RECORD TYPE (C'A')
1	(1)	HEXSTRING	1	ACSNUMBR	ACS NUMBER
2	(2)	BITSTRING	1	ACSSTAT	STATUS FLAG
		1... .... X'80'		ACSDUALL	1... .... - DUAL LMU
3	(3)	HEXSTRING	1	-RESERVED-	***** RESERVED *****
4	(4)	SIGNED-FWORD	4	ACSHCNMP	HOST CONNECT MAP (REPRESENTS EACH HOST CONNECTED FROM LEFT TO RIGHT IN HOST INDEX ORDER)
8	(8)	CHARACTER	2	ACSL1CLV	LMU 1 COMPATIBILITY LEVEL (FUTURE)W90
10	(A)	HEXSTRING	2	-RESERVED-	
12	(C)	CHARACTER	2	ACSL2CLV	LMU 2 COMPATIBILITY LEVEL (FUTURE)W90
14	(E)	HEXSTRING	2	-RESERVED-	
16	(10)	HEXSTRING	24	ACSLTYP5	LSM TYPES IN THIS ACS (1 BYTE FOR EACH TYPE - MAY BE MAPPED WITH EQUATES FOUND IN THE LSMMAP DSECT BELOW)
40	(28)	SIGNED-HWORD	2	ACSNMLSM	NUMBER OF LSMS IN THIS ACS
42	(2A)	LENGTH		ACSFLEN	LENGTH OF FIXED PORTION
42	(2A)	OFFSET		ACSL5MBG	BEGINNING OF LSM ENTRIES
ACSL5MS CONSISTS OF 1 ENTRY PER EACH LSM GENNED TO THIS ACS, EACH OF WHICH MAY BE MAPPED BY THE FOLLOWING DSECT:					
0	(0)	STRUCTURE		LSMMAP	
0	(0)	HEXSTRING	1	LSMNUMBR	LSM NUMBER
1	(1)	BITSTRING	1	LSMSTAT	LSM STATUS BYTE
		1... .... X'80'		LSMAUTO	1... .... - ON: AUTOMATIC MODE OFF: MANUAL MODE

**Table 53. SLUVADAT Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
		.1.. .... X'40'		LSMOFFPN	.1.. .... - OFFLINE PENDING
		.... 1... X'08'		LSMPTPRO	.... 1... - PTPS REORDERED
		1111 1111 X'FF'		LSMNONEX	1111 1111 - NON-EXISTENT LSM
2	(2)	BITSTRING	1	LSMVCAMF	FLAG BYTE
		1... .... X'80'		LSMAUDIP	1... .... - AUDIT IN PROCESS
		.1.. .... X'40'		LSMVCAMR	.1.. .... - VCAM REFORMATTED
3	(3)	CHARACTER	8	LSMHSTID	HOST ID IF LSM LOCKED
12	(C)	SIGNED-HWORD	2	LSMMAXCL	MAX CELL COUNT IN THIS LSM
14	(E)	BITSTRING	1	LSMHWTYP	LSM HARDWARE TYPE
		.... ....1 X'01'		LSMCIM	.... ....1 - CIMARRON (4400)
		.... ...11 X'03'		LSMWOLF	.... ...11 - WOLFCREEK (9360)
		.... .1.. X'04'		LSMPOWDR	.... .1.. - POWDERHORN (9310)
		.... .11. X'06'		LSMTWLF	.... .11. - 9740/TIMBERWOLF
		.... .111 X'07'		LSMELIB	.... .111 - E-LIB
15	(F)	HEXSTRING	1	LSMPNTOT	TOTAL NUMBER OF PANELS
16	(10)	HEXSTRING	1	LSMCAPNO	NUMBER OF CAPS
17	(11)	HEXSTRING	1	LSMPTPNO	MAX. # PTPS THIS LSM
18	(12)	HEXSTRING	1	LSMNPNGCS	NUMBER OF PLAYGROUND CELLS
19	(13)	HEXSTRING	1	LSMLIPNO	LAST INSIDE PANEL NUMBER
20	(14)	HEXSTRING	1	LSMLOPNO	LAST OUTSIDE PANEL NUMBER
21	(15)	HEXSTRING	1	LSMNDPPN	NUMBER OF DRIVES PER PANEL
22	(16)	HEXSTRING	1	LSMNXPRN	NUMBER OF TRANSPORTS IN THIS LSM
23	(17)	HEXSTRING	1	LSMIDPNO	INSIDE DOOR PANEL NUMBER
24	(18)	HEXSTRING	1	LSMODPNO	OUTSIDE DOOR PANEL NUMBER
25	(19)	HEXSTRING	1	LSMLCUPN	LCU PANEL NUMBER
26	(1A)	HEXSTRING	1	LSMNROPN	NUMBER OF ROWS PER OUTSIDE PANEL
27	(1B)	HEXSTRING	1	LSMNCOPN	NUMBER OF COLUMNS PER OUTSIDE PANEL
28	(1C)	HEXSTRING	1	LSMNRIPN	NUMBER OF ROWS PER INSIDE PANEL



**Table 53. SLUVADAT Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
29	(1D)	HEXSTRING	1	LSMNCIPN	NUMBER OF COLUMES PER INSIDE PANEL
30	(1E)	HEXSTRING	1	LSMDPNUM	NUMBER OF DRIVE PANELS
31	(1F)	HEXSTRING	1	LSMNADLS	NUMBER OF ADJACENT LSMS
32	(20)	HEXSTRING	4	LSMADLSM	ADJACENT LSM NUMBERS (1 BYTE/LSM)
36	(24)	SIGNED-HWORD	2	LSMFRECL	NUMBER OF FREE CELLS
38	(26)	SIGNED-HWORD	2	LSMCLNNM	NUMBER OF CLEANER CARTRIDGES
40	(28)	SIGNED-HWORD	2	LSMNCLSL	NUMBER OF CLEANER CARTRIDGES SELECTED
42	(2A)	CHARACTER	6	LSMLCLVL	LOW CLEANER VOLSER
48	(30)	CHARACTER	6	LSMHCLVL	HIGH CLEANER VOLSER
54	(36)	CHARACTER	6	LSMLCLSL	LAST CLEANER SELECTED
60	(3C)	SIGNED-HWORD	2	LSMSCRCT	NUMBER OF SCRATCHES IN THIS LSM
62	(3E)	HEXSTRING	6	LSMPANLS(44)	LSM PANEL ARRAY
326	(146)	LENGTH		LSMENTLN	LENGTH OF LSM ENTRY
LSMPANLS CONTAINS AN ENTRY FOR EACH PANEL IN AN LSM (MAXIMUM 20), AND MAY BE MAPPED WITH THE FOLLOWING DSECT:					
0	(0)	STRUCTURE		LSMPNLE	
0	(0)	BITSTRING	1	LSMPNLTY	PANEL TYPE
		.... ..1 X'01'		LSMCCPNL	.... ..1 - CIMARRON CELL PANEL
		.... ..1. X'02'		LSMCCL10	.... ..1. - CIMARRON PANEL 10
		.... ..11 X'03'		LSMCDPNL	.... ..11 - CIMARRON DOOR PANEL
		.... ..1.. X'04'		LSMCPTMP	.... ..1.. - CIM PTP RIGHT (USUALLY MSTR)
		.... ..1.1 X'05'		LSMCSTMP	.... ..1.1 - CIM PTP LEFT (SLAVE) PNL
		.... ..11. X'06'		LSMCDRVP	.... ..11. - CIMARRON DRIVE PANEL
		.... ..111 X'07'		LSMCDR10	.... ..111 - CIMARRON DRIVE PNL 10
		.... ..1... X'08'		LSMCLCUP	.... ..1... - CIMARRON LCU PANEL
		.... ..1..1 X'09'		LSMCNOCL	.... ..1..1 - CIM. NO CELLS ON PANEL
		.... ..1 .... X'10'		LSMCINPN	.... ..1 .... - CIMARRON INSIDE PANEL
		.... ..1 ...1 X'11'		LSMCIN19	.... ..1 ...1 - CIMARRON PANEL 19

**Table 53. SLUVADAT Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
		...1 ..1. X'12'		LSMCISDR	...1 ..1. - CIMARRON INSIDE DOOR
		...1 ..11 X'13'		LSMCWIDN	...1 ..11 - CIMARRON 20-DRIVE PANEL
		...1 .1.. X'14'		LSMCWIDD	...1 .1.. CIMARRON 20-DRIVE PANEL ADJACENT TO DOOR
		..1. .... X'20'		LSMWPNL0	..1. .... - WOLF PANEL 0
		..1. ...1 X'21'		LSMW2PSL	..1. ...1 - WC PANEL 2 WITH PTP (SLAVE)
		..1. ..1. X'22'		LSMW0PT	..1. ..1. - WOLF PANEL 0 W/PTP
		..1. ..11 X'23'		LSMW1NOD	..1. ..11 - WC PANEL WITHOUT DRIVE
		..1. .1.. X'24'		LSMW1DR	..1. .1.. - WOLF PANEL 1 W/DRIVE
		..1. .1.1 X'25'		LSMWPNL2	..1. .1.1 - WOLF PANEL 2
		..1. .11. X'26'		LSMW2PT	..1. .11. - WOLF PANEL 2 W/PTP
		..1. .111 X'27'		LSMWPNL3	..1. .111 - WOLF PANEL 3
		..1. 1... X'28'		LSMW3DR	..1. 1... - WOLF PANEL 3 W/DRIVE
		..1. 1..1 X'29'		LSMW41C	..1. 1..1 - WOLF PANEL 4 W/1 CAP
		..11 .... X'30'		LSMW42C	..11 .... - WOLF PANEL 4 W/2 CAPS
		..11 ...1 X'31'		LSMW3NOC	..11 ...1 - WC PANEL 3 WITHOUT CELLS
		..11 ..1. X'32'		LSMW3DNC	..11 ..1. - WC PANEL 3 WITH DRIVES, WITHOUT CELLS
		..11 ..11 X'33'		LSMW3WIN	..11 ..11 - WC PANEL 3 WITH WINDOW
		..11 .1.1 X'35'		LSMW4CNC	..11 .1.1 - WC PANEL 4, 1 CAP WITHOUT CELLS
		..11 .11. X'36'		LSMW4CCN	..11 .11. - WC PANEL 4, 2 CAPS WITHOUT CELLS
		..1. .... X'40'		LSMTPNLW	..1. .... - 9740 WINDOW
		..1. ...1 X'41'		LSMTPPNL	..1. ...1 - 9740 CELL PANEL
		..1. .1.1 X'45'		LSMTPCAP	..1. .1.1 - 9740 CAP
		..1. .11. X'46'		LSMTPDRV	..1. .11. - 9740 DRIVE PANEL
		..1. .111 X'47'		LSMTP0PT	..1. .111 - 9740 PANEL 0 PTP
		..1. 1... X'48'		LSMTP2PT	..1. 1... - 9740 PANEL 2 PTP 2 CAPS W/O CELLS

**Table 53. SLUVADAT Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
		1... .... X'80'		LSMELDRV	1... .... - ELIB DRIVE
		1... ...1 X'81'		LSMELCAP	1... ...1 - ELIB CAP
		1... ..1. X'82'		LSMELCEL	1... ..1. - ELIB STORAGE
		1... ...11 X'83'		LSMELCE3	1... ...11 - ELIB STORAGE
		1... ..1.. X'84'		LSMELCE4	1... ..1.. - ELIB STORAGE
1	(1)	HEXSTRING	2	LSMPCCNT	COUNT OF CELLS FOR THIS PANEL
3	(3)	BITSTRING	1	LSMPFLG	FLAG BYTE FOR PANEL STATUS
		1... .... X'80'		LSMPFRZ	PANEL IS FROZEN
4	(4)	HEXSTRING	2	-RESERVED-	***** RESERVED *****
3	(03)	LENGTH		LSMPFRZL	LENGTH OF FREEZE PANEL BYTES
6	(06)	LENGTH		LSMPNLEL	LENGTH OF PANEL ENTRY

**Cross Reference**

Name	Len	Offset Value
ACSDUALL	-	80
ACSFLEN	-	2A
ACSHCNMP	000004	04
ACSLMBG	-	2A
ACSLTYP	000024	10
ACSL1CLV	000002	08
ACSL2CLV	000002	0C
ACSNMLSM	000002	28
ACSNUMBR	000001	01
ACSSTAT	000001	02
LSMADLSM	000004	20
LSMAUDIP	-	80
LSMAUTO	-	80
LSMCAPNO	000001	10
LSMCCL10	-	02
LSMCCPNL	-	01
LSMCDPNL	-	03

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
LSMCDRVP	-	06
LSMCDR10	-	07
LSMCIM	-	01
LSMCINPN	-	10
LSMCIN19	-	11
LSMCISDR	-	12
LSMCLCUP	-	08
LSMCLNNM	000002	26
LSMCNOCL	-	09
LSMCPTMP	-	04
LSMCSTMP	-	05
LSMCWIDD	-	14
LSMCWIDN	-	13
LSMDPNUM	000001	1E
LSMELCAP	-	81
LSMELCEL	-	82
LSMELCE3	-	83
LSMELCE4	-	84
LSMELDRV	-	80
LSMELIB	-	07
LSMENTLN	-	B8
LSMFRECL	000002	24
LSMHCLVL	000006	30
LSMHSTID	000008	03
LSMHWTYP	000001	0E
LSMIDPNO	000001	17
LSMLCLSL	000006	36
LSMLCLVL	000006	2A
LSMLCUPN	000001	19
LSMLIPNO	000001	13
LSMLOPNO	000001	14
LSMMAXCL	000002	0C

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
LSMNADLS	000001	1F
LSMNCIPN	000001	1D
LSMNCLSL	000002	28
LSMNCOPN	000001	1B
LSMNDPPN	000001	15
LSMNONEX	-	FF
LSMNPGCS	000001	12
LSMNRIPN	000001	1C
LSMNROPN	000001	1A
LSMNUMBR	000001	00
LSMNXprt	000001	16
LSMODPNO	000001	18
LSMOFFPN	-	40
LSMPANLS	000006	3E
LSMPCCNT	000002	01
LSMPFLG	000001	03
LSMPFRZ	-	80
LSMPFRZL	-	03
LSMPNLEL	-	06
LSMPNLTY	000001	00
LSMPNTOT	000001	0F
LSMPOWDR	-	04
LSMPTPNO	000001	11
LSMPTPRO	-	08
LSMSCRCT	000002	3C
LSMSTAT	000001	01
LSMTPCAP	-	45
LSMTPDRV	-	46
LSMTPNLW	-	40
LSMTPPNL		41
LSMTP0PT	-	47
LSMTP2PT	-	48

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
LSMTWLF	-	06
LSMVCAMF	000001	02
LSMVCAMR	-	40
LSMWOLF	-	03
LSMWPNL0	-	20
LSMWPNL2	-	25
LSMWPNL3	-	27
LSMWP0PT	-	22
LSMWP1DR	-	24
LSMWP2PT	-	26
LSMWP3DR	-	28
LSMWP41C	-	29
LSMWP42C	-	30
LSMW3NOC	-	31
LSMW1NOD	-	23
LSMW2PSL	-	21
LSMW3DNC	-	32
LSMW3WIN	-	33
LSMW4CCN	-	36
LSMW4CNC	-	35

# SLUVCDAT

Table 54. SLUVCDAT Record Format

Dec	Hex	Type	Length	Label	Description
SLUVCDAT - FLAT FILE STATIC CONFIGURATION DATA DSECT					
FUNCTION: DESCRIBES THE STATIC CONFIGURATION INFORMATION WHICH MAY BE GENERATED TO THE FLAT FILE BY THE VOLUME REPORT UTILITY					
0	(0)	STRUCTURE		SLUVCDAT	
0	(0)	CHARACTER	1	-RESERVED-	RECORD TYPE (C'C')
1	(1)	CHARACTER	3	CFGCCPFX	CLEANING CARTRIDGE PREFIX
4	(4)	SIGNED-FWORD	4	CFGTOTXP	TOTAL TRANSPORTS ALL LSMS (FUTURE)
8	(8)	CHARACTER	2	-RESERVED-	***RESERVED***
10	(A)	CHARACTER	2	-RESERVED-	***RESERVED***
12	(C)	SIGNED-HWORD	2	CFGNMACS	TOTAL DEFINED ACSS
14	(E)	SIGNED-HWORD	2	CFGTOTLS	TOTAL DEFINED LSMS
16	(10)	SIGNED-HWORD	2	CFGTOTCA	TOTAL CAPS FOR ALL LSMS
18	(12)	SIGNED-HWORD	2	CFGTOTDR	TOTAL DRIVES IN ALL LSMS
20	(14)	HEXSTRING	1	CFGSMFTY	SMF RECORD TYPE
21	(15)	CHARACTER	1	CFGCMDPF	COMMAND PREFIX CHARACTER
22	(16)	BITSTRING	1	CFGDDISP	DELETE DISPOSITION
		1... .... X'80'		CFGDDSCR	1... .... - SCRATCH
		.1.. .... X'40'		CFGDDNSC	.1.. .... - NON-SCRATCH
23	(17)	BITSTRING	1	CFGFLAG1	FLAGS
		1... .... X'80'		CFGLIBFX	1... .... - LIB. IS FIXED LOC.
		.1.. .... X'40'		CFGDISVF	.1.. .... - DISMOUNT VOL. FLOAT
		..1. .... X'20'		CFGCHKPE	..1. .... - CHECK EJECT PASSWORD
24	(18)	BITSTRING	1	CFGLANG	LANGUAGE TYPE
		1... .... X'80'		CFGENGLS	1... .... - ENGLISH
		.1.. .... X'40'		CFGITALN	.1.. .... - ITALIAN
		..1. .... X'20'		CFGGERMN	..1. .... - GERMAN
		...1 .... X'10'		CFGFRNCH	...1 .... - FRENCH
25	(19)	BITSTRING	1	CFGSCRLB	SCRATCH LABEL TYPE
		.... .... X'00'		CFGSCRSL	.... .... - SL (STANDARD)

**Table 54. SLUVCDAT Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
		.... ..1 X'01'		CFGSCRAL	.... ..1 - AL (ANSI)
		.... ..1. X'02'		CFGSCRNL	.... ..1. - NL (NONLABELLED)
		.... ..11 X'03'		CFGSCRNS	.... ..11 - NSL (NON-STANDARD)
		.... ..1. X'04'		CFGSCRBL	.... ..1. - BLP (BYPASS LBL PROC)
		.... ..1.1 X'05'		CFGSCRNA	.... ..1.1 - LBL TYPE NOT AVAIL.
26	(1A)	LENGTH		CFGLNGTH	LENGTH OF RECORD
256	(100)	CONST		CFGMXLSM	MAXIMUM NUMBER OF ACSS



## Cross Reference

Name	Len	Offset Value
CFGCCPFX	000003	01
CFGCHKEP	-	20
CFGCMDFP	000001	15
CFGDDISP	000001	16
CFGDDNSC	-	40
CFGDDSCR	-	80
CFGDISVF	-	40
CFGENGLS	-	80
CFGFLAG1	000001	17
CFGFRNCH	-	10
CFGGERMN	-	20
CFGITALN	-	40
CFGLANG	000001	18
CFGLIBFX	-	80
CFGNGTH	-	1A
CFGMXLSM	-	100
CFGNMACS	000002	0C
CFGSCRAL	-	01
CFGSCRBL	-	04
CFGSCRBL	000001	19
CFGSCRNA	-	05
CFGSCRNL	-	02
CFGSCRNS	-	03
CFGSCRSL	-	00
CFGSMFTY	000001	14
CGTOTCA	000002	10
CGTOTDR	000002	12
CGTOTLS	000002	0E
CGTOTXP	000004	04

# SLUVHDAT



Note: Field HSTLIBEN contains only the first 16 ACS esoterics.

**Table 55. SLUVHDAT Record Format**

Dec	Hex	Type	Length	Label	Description
SLUVHDAT - FLAT FILE HOST INFORMATION DSECT					
FUNCTION: DESCRIBES THE HOST INFORMATION WHICH MAY BE WRITTEN TO THE FLAT FILE BY THE VOLUME REPORT UTILITY					
0	(0)	STRUCTURE		SLUVHDAT	
0	(0)	CHARACTER	1	-RESERVED-	RECORD TYPE (C'H')
1	(1)	HEXSTRING	2	HSTNHOST	NUMBER OF HOSTS GENNED
3	(03)	LENGTH		HSTFXLEN	FIXED PORTION LENGTH
3	(03)	OFFSET		HSTHOSTS	BEGINNING OF HOST DESCRIPTORS SECTION
HSTHOSTS CONSISTS OF 1 ENTRY PER GENNED HOST, EACH OF WHICH MAY BE MAPPED BY THE FOLLOWING DSECT:					
0	(0)	STRUCTURE		HSTHDMAP	
0	(0)	CHARACTER	8	HSTHNAME	HOST NAME
8	(8)	HEXSTRING	1	HSTINDEX	HOST INDEX NUMBER
9	(9)	BITSTRING	1	HSTFLAG1	HOST FLAG 1 - CDS OPERATING FLGS
		1... .. X'80'		HSTPRIAC	1... .. - PRIMARY ACTIVE
		.1... .. X'40'		HSTSHDAC	.1... .. - SHADOW ACTIVE
		..1... .. X'20'		HSTHSTAC	..1... .. - HOST ACTIVE
		...1... .. X'10'		HSTSBYAC	...1... .. - STANDBY ACTIVE
10	(A)	BITSTRING	1	HSTFLAG2	HOST FLAG 2 - OTHER OPER. FLGS
		1... .. X'80'		HSTRCVRR	1... .. - 'RECOVER' Q RESPONSE TO SLS0739
		.1... .. X'40'		HSTRCVRH	.1... .. - RECOVER ISSUED FOR THIS HOST
		..1... .. X'20'		HSTDELAY	..1... .. - DELAY ISSUED FOR THIS HOST
		...1... .. X'10'		HSTDEAD	...1... .. - THIS HOST ASSUMED DEAD
11	(B)	BITSTRING	1	HSTFLAG3	HOST FLAG 3 - HSC SOFTWARE RLSE
		..1... .. X'20'		HSTR110	..1... .. - HSC 1.1.0
		1... .. X'80'		HSTR120	1... .. - HSC 1.2.0

**Table 55. SLUVHDAT Record Format (Continued)**

<b>Dec</b>	<b>Hex</b>	<b>Type</b>	<b>Length</b>	<b>Label</b>	<b>Description</b>
		.1.. .... X'40'		HSTR200	.1.. .... - HSC 2.0.0
		...1 .... X'10'		HSTR201	...1 .... - HSC 2.0.1
		.... 1... X'08'		HSTR210	.... 1... - HSC 2.1.0
		.... .1.. X'04'		HSTR400	.... .1.. - HSC 4.0.0
		.... ..1. X'02'		HSTR410	.... ..1. - HSC 4.1.0
12	(C)	CHARACTER	8	HSTNONEN	NON-LIBRARY ESOTERIC NAMES
20	(14)	CHARACTER	8	HSTLIBEN(16)	LIBRARY ESOTERIC NAMES (BY ACS)
148	(94)	LENGTH		HSTHOSLN	LENGTH OF HOST ENTRY

## Cross Reference

Name	Len	Offset Value
HSTDEAD	-	10
HSTDELAY	-	20
HSTFLAG1	000001	09
HSTFLAG2	000001	0A
HSTFLAG3	000001	0B
HSTFXLEN	-	03
HSTHNAME	000008	00
HSTHOSLN	-	94
HSTHOSTS	-	03
HSTHSTAC	-	20
HSTINDEX	000001	08
HSTLIBEN	000008	14
HSTNHOST	000002	01
HSTNONEN	000008	0C
HSTPRIAC	-	80
HSTRCVRH	-	40
HSTRCVRR	-	80
HSTR110	-	20
HSTR120	-	80
HSTR200	-	40
HSTR201	-	10
HSTR210	-	08
HSTR400	-	04
HSTR410	-	02
HSTSBYAC	-	10
HSTSHDAC	-	40

# SLUVIDAT

**Table 56. SLUVIDAT Record Format**

Dec	Hex	Type	Length	Label	Description
SLUVIDAT - FLAT FILE CDS INFORMATION DSECT					
FUNCTION: DESCRIBES THE CDS INFORMATION WHICH MAY BE GENERATED TO THE FLAT FILE BY THE VOLUME REPORT UTILITY.					
0	(0)	STRUCTURE		SLUVIDAT	
0	(0)	CHARACTER	1	-RESERVED-	RECORD TYPE (C'I')
1	(1)	BITSTRING	1	CDSRCVRY	CDS RECOVERY OPTIONS
		1... .. X'80'		CDSSECND	1... .. - SECONDARY
		.1... .. X'40'		CDSSTDBY	.1... .. - STANDBY
		..1... .. X'20'		CDSJOURN	..1... .. - JOURNAL
		111... .. X'E0'		CDSALL	111... .. - ALL
		1.1... .. X'A0'		CDSBOTH	1.1... .. - JOURNAL & SECONDARY
		.... .. X'00'		CDSNONE	.... .. - NONE
4	(4)	SIGNED-FWORD	4	CDSRSVD1	*** RESERVED ***
8	(8)	CHARACTER	8	CDSENQNM	CDS MAJOR ENQUEUE NAME
16	(10)	CHARACTER	8	CDSLEVEL	CDS LEVEL - VERSION/RELEASE/MOD LEVEL (‘VV.RR.MM’)
24	(18)	CHARACTER	8	CDCDATE	DATE CDS CREATED (MM/DD/YY) NOTE: SINGLE DIGIT MONTH WILL HAVE A BLANK AS THE FIRST CHARACTER, E.G. ‘ 3/16/92’
32	(20)	CHARACTER	8	CDSCTIME	TIME CDS CREATED (HH:MM:SS)
40	(28)	CHARACTER	8	CDSBTIME	TIME LAST BACKED UP (HH:MM:SS)
48	(30)	CHARACTER	8	CDSBDATE	DATE LAST BACKED UP (MM/DD/YY)
56	(38)	CHARACTER	8	CDSRTIME	TIME WHEN RESTORED (HH:MM:SS)
64	(40)	CHARACTER	8	CDSRDATE	DATE WHEN RESTORED (MM/DD/YY)
72	(48)	CHARACTER	240	CDSNAMES	CDS DATASET INFORMATION
312	(138)	LENGTH		CDSLNGTH	LENGTH OF RECORD
CDSNAMES CONTAINS ONE ENTRY PER PRIMARY, SHADOW, AND STANDBY CDSS. EACH ENTRY MAY BE MAPPED BY THE FOLLOWING DSECT:					
0	(0)	STRUCTURE		CDSINFO	FOR CDSNAMES ENTRIES

**Table 56. SLUVIDAT Record Format (Continued)**

<b>Dec</b>	<b>Hex</b>	<b>Type</b>	<b>Length</b>	<b>Label</b>	<b>Description</b>
0	(0)	CHARACTER	44	CSDSDSN	CDS DATASET NAME
44	(2C)	CHARACTER	6	CDSVOL	CDS VOLSER
50	(32)	HEXSTRING	2	-RESERVED-	*** RESERVED ***
52	(34)	CHARACTER	8	CDSUNIT	CDS UNIT NAME
60	(3C)	HEXSTRING	2	CDSSWCNT	CDS SWITCH COUNT
62	(3E)	HEXSTRING	2	-RESERVED-	*** RESERVED ***
64	(40)	HEXSTRING	4	-RESERVED-(4)	*** RESERVED ***
80	(50)	LENGTH		CDSINFOL	LENGTH OF CDS ENTRY

## Cross Reference

Name	Len	Offset Value
CDSALL	-	E0
CDSBDATE	000008	30
CDSBOTH	-	A0
CDSBTIME	000008	28
CDSCDATE	000008	18
CDSCTIME	000008	20
CDSDSN	000044	00
CDSENQNM	000008	08
CDSINFOL	-	50
CDSJOURN	-	20
CDSLEVEL	000008	10
CDSLNGTH	-	138
CDSNAMES	000240	48
CDSNONE	-	00
CDSRCVRY	000001	01
CDSRDATE	000008	40
CDSRSVD1	000004	04
CDSRTIME	000008	38
CDSSECND	-	80
CDSSTDBY	-	40
CDSSWCNT	000002	3C
CDSUNIT	000008	34
CDSVOL	000006	2C

# SLUVSDAT

**Table 57. SLUVSDAT Record Format**

Dec	Hex	Type	Length	Label	Description
SLUVSDAT - FLAT FILE ACS STATION ADDRESS DSECT					
FUNCTION: MAP THE STATION ADDRESS INFORMATION BY HOST WITHIN ACS WHICH MAY BE WRITTEN TO THE FLAT FILE BY THE VOLUME REPORT UTILITY.					
0	(0)	STRUCTURE		SLUVSDAT	
0	(0)	CHARACTER	1	-RESERVED-	RECORD TYPE (C'S')
1	(1)	BITSTRING	1	STNACS	ACS NUMBER
2	(02)	LENGTH		STNFXLEN	LENGTH OF FIXED SECTION
2	(02)	OFFSET		STNSTNS	START OF ACS HOST/STATION ARRAY STNSTNS CONSISTS OF 1 ENTRY PER GENNED HOST, EACH OF WHICH MAY BE MAPPD BY THE FOLLOWING DSECT:
0	(0)	STRUCTURE		STNENTRY	
0	(0)	HEXSTRING	1	STNHINDX	HOST INDEX NUMBER
1	(1)	HEXSTRING	3	STNADDRS(16)	STATION ADDRESS ARRAY
49	(31)	LENGTH		STNENTLN	LENGTH OF HOST/STATION ENTRY STNADDRS CONSISTS OF 1 ENTRY FOR EACH OF 16 POSSIBLE STATION AD- DRESSES WHICH COULD BE ASSIGNED TO A GIVEN ACS:
0	(0)	STRUCTURE		STNADENT	
0	(0)	BITSTRING	1	STNFLAG	STATION FLAGS
		1... .. X'80'		STNONLIN	1... .. - STATION ONLINE
1	(1)	HEXSTRING	2	STNCUA	STATION CUA
3	(03)	LENGTH		STNADENL	LENGTH OF STATION ADDR ENTRY



## Cross Reference

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
STNACS	000001	01
STNADDRS	000003	01
STNADENL	-	03
STNCUA	000002	01
STNENTLN	-	31
STNFLAG	000001	00
STNFXLEN	-	02
STNHINDX	000001	00
STNONLIN	-	80
STNSTNS	-	02

## SLUVVDAT

To determine the HSC release that produced a volume report flat file, use the CDSDATA parameter to create flat file records with non-volume information.

Interrogate the CDSLEVEL field in the SLUVIDAT (CDS Information) record. A CDS at level 02.00.00 is reported by an HSC VOLRpt at release level 2.0.1 and earlier. CDS level 02.01.00 is reported by an HSC 6.0, 6.1, or 6.2 VOLRpt.

The CDSDATA records are appended to the VOLDATA records. To interrogate the CDS level before processing the volume records, extract the CDSDATA and VOLDATA in different steps to create separate files.



### Notes:

1. The Batch API request formats the date fields VOLDTINS, VOLDTSEL, and VOLTMNT as “yyyymmdd.”
2. The Batch API request does not report volume subpool labels or IDs. Fields VOLSPLBL and VOLSPID are blank-filled.
3. When a volume has been mounted, the VOLERMNT and VOLERACT bit values are **both** set in VOLFLAG2. If the volume is errant, the VOLERMNT bit value is **not** set in VOLFLAG2, but the VOLERACT bit value is set.

**Table 58. SLUVVDAT Record Format**

Dec	Hex	Type	Length	Label	Description
SLUVVDAT - FLAT FILE VOLUME DATA DSECT					
FUNCTION: DESCRIBES THE VOLUME DATA WHICH MAY BE GENERATED TO THE FLAT FILE BY THE VOLUME REPORT UTILITY					
0	(0)	STRUCTURE		SLUVVDAT	
0	(0)	CHARACTER	1	-RESERVED-	RECORD TYPE (C'V')
1	(1)	BITSTRING	1	VOLMEDIA	VOLUME MEDIA TYPE
'1'	(F1)	CHAR CONST		VOLMEDST	STANDARD MEDIA
'1'	(F1)	CHAR CONST		VOLMEDT1	(X'F1') STANDARD MEDIA
'A'	(C1)	CHAR CONST		VOLMEDTA	(X'C1') HELICAL MEDIA "A"
'B'	(C2)	CHAR CONST		VOLMEDTB	(X'C2') HELICAL MEDIA "B"
'C'	(C3)	CHAR CONST		VOLMEDTC	(X'C3') HELICAL MEDIA "C"
'D'	(C4)	CHAR CONST		VOLMEDTD	(X'C4') HELICAL CLEANING CARTRIDGE
'E'	(C5)	CHAR CONST		VOLMEDTE	(X'C5') ECART MEDIA
'J'	(D1)	CHAR CONST		VOLMEDTJ	(X'D1') JCART MEDIA
'P'	(D7)	CHAR CONST		VOLMEDTP	(X'D7') STK2P MEDIA

**Table 58. SLUVVDAT Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
'R'	(D9)	CHAR CONST		VOLMEDTR	(X'D9') STK1R MEDIA
'U'	(E4)	CHAR CONST		VOLMEDTU	(X'E4') STK1U CLEANING CARTRIDGE "U"
'W'	(E7)	CHAR CONST		VOLMEDTW	(X'E7') STK2W CLEANING CARTRIDGE "W"
'Z'	(E9)	CHAR CONST		VOLMEDTZ	(X'E9') ZCART MEDIA
2	(2)	BITSTRING	1	VOLFLAG1	VOLUME FLAG BYTE 1
		1... .... X'80'		VOLSCR	1... .... - VOLUME IS SCRATCH
		.1.. .... X'40'		VOLSEL	.1.. .... - VOLUME IS SELECTED
		..1. .... X'20'		VOLEXLBL	..1. .... - VOLUME HAS EXTERNAL LABEL
		...1 .... X'10'		VOLEXRD	...1 .... - EXTERNAL LABEL IS OCR READABLE
		.... 1... X'08'		VOLINUSE	.... 1... - THIS RECORD IS IN USE
		.... ...1 X'01'		VOLNILIB	.... ...1 - VOLUME NOT IN LIB.
3	(3)	HEXSTRING	1	VOLOHID	OWNING HOST ID
4	(4)	SIGNED-FWORD	4	VOLSELCT	VOLUME SELECTION COUNT
8	(8)	CHARACTER	6	VOLSER	VOLUME SERIAL NUMBER, LEFT JUSTIFIED AND BLANK FILLED.
14	(E)	CHARACTER	14	VOLHMLOC	HOME LOCATION
14	(E)	CHARACTER	2	VOLHMACS	READABLE HEXADECIMAL ACS NUMBER WHERE THE VOLUME RESIDES.
16	(10)	CHARACTER	1	-RESERVED-	':'
17	(11)	CHARACTER	2	VOLHMLSM	READABLE HEXADECIMAL LSM # IN VOLHMACS WHERE THE VOLUME RESIDES
19	(13)	CHARACTER	1	-RESERVED-	':'
20	(14)	CHARACTER	2	VOLHMPNL	DECIMAL NUMBER OF THE PANEL WITHIN VOLHMLSM WHERE THE VOLUME RESIDES.
22	(16)	CHARACTER	1	-RESERVED-	':'
23	(17)	CHARACTER	2	VOLHMROW	DECIMAL NUMBER OF THE ROW WITHIN VOLHMPNL WHERE THE VOLUME RESIDES.
25	(19)	CHARACTER	1	-RESERVED-	':'

**Table 58. SLUVVDAT Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
26	(1A)	CHARACTER	2	VOLHMCEL	DECIMAL NUMBER OF THE COLUMN WITHIN VOLHMROW WHERE THE VOLUME RESIDES.
28	(1C)	CHARACTER	3	VOLSPLBL	VOLUME SUBPOOL LABEL TYPE
'SL'	(E2D3)	CHAR CONST		VOLSPSL	STANDARD LABEL
'NL'	(D5D3)	CHAR CONST		VOLSPNL	NON-LABELLED
'AL'	(C1D3)	CHAR CONST		VOLSPAL	ANSI LABEL
'NSL'	(D5E2D3)	CHAR CONST		VOLSPNSL	NON-STANDARD LABEL
' '	(404040)	CHAR CONST		VOLSPNON	' SUBPOOL INFO NOT REQUESTED OR NOT AVAILABLE
31	(1F)	CHARACTER	13	VOLSPID	VOLUME SUBPOOL ID (13-BYTE NAME OF POOL IF USING SCRPOOL STATEMENTS; 3-BYTE SUBPOOL INDEX NUMBER IF USING SLSUX03)
44	(2C)	SIGNED-HWORD	2	VOLMXCLN	VOLUME MAXCLEAN VALUE
46	(2E)	SIGNED-HWORD	2	-RESERVED-	* RESERVED *
48	(30)	SIGNED-FWORD	4	-RESERVED-(2)	* RESERVED *
<p>THE FOLLOWING FIELDS:  VOLDTINS, VOLDTSEL, VOLDTMNT  CONTAIN THE HIGH-ORDER FULLWORD OF THE CPU TOD CLOCK VALUE WHEN THE VOLUME WAS (RESPECTIVELY) ENTERED INTO THE LIBRARY, LAST SELECTED, AND LAST MOUNTED.</p> <p>FOR EACH OF THESE FIELDS, THE LOW-ORDER BIT (BIT 31) HAS A VALUE EQUAL TO 2-TO-THE-20TH-POWER MICROSECONDS, OR 1.048576 SECONDS SINCE MIDNIGHT, JANUARY 1, 1900. THIS TIME IS UNCORRECTED FOR ANY LOCAL TIME ZONE OFFSET FROM GMT. THIS IS THE SAME FORMAT WHICH IS USED BY THE HSC TO SAVE THIS INFORMATION.</p> <p>THE VALUES IN FIELDS: VOLDTINS, VOLTMINS, VOLDTSEL, VOLTMSEL, VOLDTMNT, VOLTMNT HAVE BEEN CORRECTED FOR LOCAL TIME OFFSET FROM GMT. THESE TIMES (AND POSSIBLY THE DATES) MAY THEREFORE BE DIFFERENT FROM VALUES CALCULATED USING THE TOD CONTENTS IN VOLDTINS, VOLDTSEL, AND VOLDTMNT.</p>					
56	(38)	SIGNED-FWORD	4	VOLDTINS	TOD CLOCK VALUE WHEN VOLUME WAS INSERTED INTO THE LIBRARY
60	(3C)	SIGNED-FWORD	4	VOLDTSEL	TOD CLOCK VALUE WHEN VOLUME WAS LAST SELECTED
64	(40)	SIGNED-FWORD	4	VOLDTMNT	TOD CLOCK VALUE WHEN VOLUME WAS LAST MOUNTED

**Table 58. SLUVVDAT Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
68	(44)	CHARACTER	8	VOLDTINS	DATE VOLUME INSERTED INTO THE LIBRARY FORMAT DETERMINED BY VOLD4YR
76	(4C)	CHARACTER	8	VOLTMINS	TIME VOLUME INSERTED INTO THE LIBRARY (HH:MM:SS)
84	(54)	CHARACTER	8	VOLDTSEL	DATE VOLUME LAST SELECTED FORMAT DETERMINED BY VOLD4YR
92	(5C)	CHARACTER	8	VOLTMSEL	TIME VOLUME LAST SELECTED (HH:MM:SS)
100	(64)	CHARACTER	8	VOLDTMNT	DATE VOLUME LAST MOUNTED FORMAT DETERMINED BY VOLD4YR
108	(6C)	CHARACTER	8	VOLTMMNT	TIME VOLUME LAST MOUNTED (HH:MM:SS)
116	(74)	BITSTRING	1	VOLFLAG3	VOLUME FLAG BYTE 3
		1... .... X'80'		VOLD4YR	INDICATES DATE FORMAT ON - YYYYMMDD FORMAT OFF - MM/DD/YY FORMAT
		.1. .... X'20'		VOLMNDSM	AFFECTS VOLDTMNT/VOLTMNT FLDS ON - TIME/DATE LAST MOUNTED@02 OFF - TIME/DATE DISMOUNTED
		.... .1. X'02'		VOLNOUSE	VOLUME NOT USABLE
117	(75)	HEXSTRING	3	-RESERVED-	RESERVED
120	(78)	LENGTH		VOLLNGTH	
THE FOLLOWING SECTION IS FILLED IN ONLY IF THE VOLUME WAS FOUND TO BE EITHER IN TRANSIT OR ERRANT.					
120	(78)	BITSTRING	1	VOLFLAG2	VOLUME FLAG BYTE 2
***** FOR IN-TRANSIT VOLUMES: *****					
		1... .... X'80'		VOLITUSE	1... .... - RECORD IN USE
		.1. .... X'40'		VOLITACQ	.1. .... - RECORD HAS BEEN ACQUIRED
***** FOR ERRANT VOLUMES: *****					
		1... .... X'80'		VOLERACT	1... .... - RECORD IS ACTIVE
		.1. .... X'40'		VOLERLIL	.1. .... - LOST IN LSM POSSIBLE

**Table 58. SLUVVDAT Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
121	(79)	..1. .... X'20'	1	VOLERSSC	..1. .... - SOURCE LOC. SCANNED
		...1 .... X'10'		VOLERDSC	...1 .... - DEST. LOC. SCANNED
		.... 1... X'08'		VOLERLSC	.... 1... - LOST IN LSM SCANNED
		.... .1.. X'04'		VOLERHSC	.... .1.. - HOME LSM SCANNED
		.... ..1.X'02'		VOLERMNT	.... ..1.- VOLUME IS MOUNTED
		BITSTRING		VOLITTAG	IN-TRANSIT TAG TYPE
		.... .... X'00'		VOLITOTH	.... .... - OTHER (OR NOT IN TRAN)
		.... ....1 X'01'		VOLITCAP	.... ....1 - CAP
		.... ..1. X'02'		VOLITCEL	.... ..1. - CELL
		.... .1.. X'04'		VOLITLSM	.... .1.. - LSM ID
		.... 1... X'08'		VOLITVOL	.... 1... - VOLUME
.... 1.1. X'0A'	VOLITLOC	.... 1.1. - LIBRARY LOCATION (VOLITVOL+VOLITCEL)			
122	(7A)	BITSTRING	1	VOLITRTN	RECOVERY ROUTINE FLAG (IN TRAN. ON)
		.... .1.. X'04'		VOLRRAUS	.... .1.. - AUDIT START
		.... 1... X'08'		VOLRRALD	.... 1... - AUDIT LOGICAL DELETE
		...1 .... X'10'		VOLRRMNT	...1 .... - MOUNT
		...1 .1.. X'14'		VOLRRDEJ	...1 .1.. - DISMOUNT EJECT
		...1 1... X'18'		VOLRRCLU	...1 1... - CLEANER UPDATE
		...1 11.. X'1C'		VOLRRCLS	...1 11.. - CLEANER SELECT
		..1. .... X'20'		VOLRRSCA	..1. .... - SCRATCH ADD
		..1. .1.. X'24'		VOLRRSCD	..1. .1.. - SCRATCH DELETE
		..1. 1... X'28'		VOLRRVDL	..1. 1... - VOLUME DELETE
		..1. 11.. X'2C'		VOLRRERR	..1. 11.. - ERRANT PROCESSING
		..11 .... X'30'		VOLRRCAP	..11 .... - CAP
		..11 .1.. X'34'		VOLRRCNL	..11 .1.. - CONFIG LSM
		..11 1... X'38'		VOLRRSUA	..11 1... - SCRATCH UPDATE ADD
		..11 11.. X'3C'		VOLRRSLV	..11 11.. - SELECTED VOLUME
		..1. .... X'40'		VOLRRSRE	..1. .... - SCRATCH REDISTRIBUTION
		..1. .1.. X'44'		VOLRRMCT	..1. .1.. - MOVE CARTRIDGE

**Table 58. SLUVVDAT Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
123	(7B)	HEXSTRING	3	-RESERVED-	* RESERVED
126	(7E)	HEXSTRING	6	VOLSRCE	SOURCE LOCATION
132	(84)	HEXSTRING	6	VOLDEST	DESTINATION LOCATION
138	(8A)	CHARACTER	2	VOLLILSM	“LOST IN” LSM
140	(8C)	CHARACTER	8	VOLRECC	RECTECH CHAR FORM
148	(94)	CHARACTER	8	VOLMEDC	MEDIA CHAR FORM
156	(9C)	LENGTH		VOLIELEN	LENGTH OF MAIN VOLUME SECTION PLUS IN-TRANSIT/ERRANT INFORMATION
THE VOLSRCE AND VOLDEST FIELDS MAY BE MAPPED BY THE FOLLOWING DSECT.					
0	(0)	STRUCTURE		VOLLOC	
0	(0)	CHARACTER	1	VOLSTYPE	SOURCE TYPE
'1'	(F1)	CHAR CONST		VOLSCCELL	CELL
'2'	(F2)	CHAR CONST		VOLSCAP	CAP
'3'	(F3)	CHAR CONST		VOLSDRIV	DRIVE
'4'	(F4)	CHAR CONST		VOLSOTHR	OTHER
1	(1)	HEXSTRING	1	VOLSACSN	ACS NUMBER
2	(2)	HEXSTRING	1	VOLSLSMN	LSM NUMBER
***** FOR “CELL” TYPES *****					
3	(3)	HEXSTRING	1	VOLSPNLN	PANEL NUMBER
4	(4)	HEXSTRING	1	VOLSROWN	ROW NUMBER
5	(5)	HEXSTRING	1	VOLSCOLN	COLUMN (CELL) NUMBER
***** FOR “CAP” TYPES *****					
3	(3)	HEXSTRING	2	VOLSCLOC	CAP LOCATION
5	(5)	HEXSTRING	1	-RESERVED-	RESERVED
***** FOR “DRIVE” TYPES *****					
3	(3)	HEXSTRING	1	VOLSDPNL	DRIVE PANEL NUMBER
4	(4)	HEXSTRING	1	VOLSDNUM	DRIVE NUMBER

**Table 58. SLUVVDAT Record Format (Continued)**

<b>Dec</b>	<b>Hex</b>	<b>Type</b>	<b>Length</b>	<b>Label</b>	<b>Description</b>
5	(5)	HEXSTRING	1	-RESERVED-	RESERVED
3	(3)	HEXSTRING	1	VOLSDIDX	DRIVE INDEX NUMBER
4	(4)	HEXSTRING	1	-RESERVED-	RESERVED
5	(5)	BITSTRING	1	VOLSDFLG	DRIVE FORMAT FLAG
		1111 1111 X'FF'		VOLSDFIX	DRIVE IS DRIVE INDEX FORMAT
6	(6)	HEXSTRING	2	-RESERVED-	RESERVED

FOR "OTHER" TYPES, THIS RECORD IS TREATED AS IF THE VOLUME WERE ERRANT.



## Cross Reference

Name	Len	Offset Value
VOLDEST	000006	84
VOLDTINS	000008	44
VOLDTMNT	000008	64
VOLDTSEL	000008	54
VOLD4YR	-	80
VOLERACT	-	80
VOLERDSC	-	10
VOLERHSC	-	04
VOLERLIL	-	40
VOLERLSC	-	08
VOLERMNT	-	02
VOLERSSC	-	20
VOLEXLBL	-	20
VOLEXRD	-	10
VOLFLAG1	000001	02
VOLFLAG2	000001	78
VOLFLAG3	000001	74
VOLHMACS	000002	0E
VOLHMCEL	000002	1A
VOLHMLOC	000014	0E
VOLHMLSM	000002	11
VOLHMPNL	000002	14
VOLHMROW	000002	17
VOLIELEN	-	9C
VOLINUSE	-	08
VOLITACQ	-	40
VOLITCAP	-	01
VOLITCEL	-	02
VOLITLOC	-	0A
VOLITLSM	-	04
VOLITOTH	-	00

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
VOLITRTN	000001	7A
VOLITTAG	000001	79
VOLITUSE	-	80
VOLITVOL	-	08
VOLLILSM	000002	8A
VOLLNGTH	-	78
VOLMEDC	000008	94
VOLMEDIA	000001	01
VOLMEDST	-	'CVAL'
VOLMEDTA	-	'CVAL'
VOLMEDTB	-	'CVAL'
VOLMEDTC	-	'CVAL'
VOLMEDTD	-	'CVAL'
VOLMEDTE	-	'CVAL'
VOLMEDTJ	-	'CVAL'
VOLMEDTP	-	'CVAL'
VOLMEDTR	-	'CVAL'
VOLMEDTU	-	'CVAL'
VOLMEDTW	-	'CVAL'
VOLMEDTZ	-	'CVAL'
VOLMEDT1	-	'CVAL'
VOLMNDSM	-	20
VOLMXCLN	000002	2C
VOLNILIB	-	01
VOLNOUSE	-	02
VOLOHID	000001	03
VOLRECC	000008	8C
VOLRRALD	-	08
VOLRRAUS	-	04
VOLRRCAP	-	30
VOLRRCLS	-	1C
VOLRRCLU	-	18

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
VOLRRCNL	-	34
VOLRRDEJ	-	14
VOLRRERR	-	2C
VOLRRMCT	-	44
VOLRRMNT	-	10
VOLRRSCA	-	20
VOLRRSCD	-	24
VOLRRSLV	-	3C
VOLRRSRE	-	40
VOLRRSUA	-	38
VOLRRVDL	-	28
VOLSACSN	000001	01
VOLSCAP	-	'CVAL'
VOLSCCELL	-	'CVAL'
VOLSCLOC	000002	03
VOLSCOLN	000001	05
VOLSCR	-	80
VOLSDFIX	-	FF
VOLSDFLG	000001	05
VOLSDIDS	000001	03
VOLSDNUM	000001	04
VOLSDPNL	000001	03
VOLSDRIV	-	'CVAL'
VOLSEL	-	40
VOLSELCT	000004	04
VOLSER	000006	08
VOLSLSMN	000001	02
VOLSOTHR	-	'CVAL'
VOLSPAL	-	'CVAL'
VOLSPID	000013	1F
VOLSPLBL	000003	1C
VOLSPNL	-	'CVAL'

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
VOLSPNLN	000001	03
VOLSPNON	-	'CVAL'
VOLSPNSL	-	'CVAL'
VOLSPSL	-	'CVAL'
VOLSRCE	000006	7E
VOLSROWN	000001	04
VOLSTYPE	000001	00
VOLTDINS	000004	38
VOLTDMNT	000004	40
VOLTDSSEL	000004	3C
VOLTMINS	000008	4C
VOLTMMNT	000008	6C
VOLTMSSEL	000008	5C

## Batch API Records

### Batch API Mapping Macros

These SMP/E-distributed macros map only Batch API records. Refer to “Volume Report and Batch API Records” on page 594 to see the records that map both Volume Report and Batch API.

**Table 59. Mapping macros for Batch API Records**

Macro	Description
SLUVDDAT	Batch API Drive Information DSECT
SLUVPDAT	Batch API CAP Information DSECT

## Batch API Record Formats

### SLUVDDAT

This record is produced only by the Batch API QCDS request. Refer to Appendix H, “Batch Application Program Interface (API)” for more information.

**Table 60. SLUVDDAT Record Format**

Dec	Hex	Type	Length	Label	Description
SLUVDDAT - QCDS DRIVE INFORMATION DSECT					
FUNCTION: MAPS THE DRIVE DATA PRODUCED BY THE QCDS READ REQUEST FOR THE CDS DRV RECORD AREA.					
0	(0)	STRUCTURE		SLUVDDAT	
0	(0)	CHARACTER	1	UVDRT	RECORD TYPE
1	(1)	BITSTRING	1	UVDFLAG1	STATUS FLAG:
		1... .. X'80'		UVDDCLN	DRIVE NEEDS CLEANING
2	(2)	BITSTRING	1	UVDFLAG2	MOUNT ERROR FLAG:
		1... .. X'80'		UVDBMNT	MOUNT ERROR
		.1... .. X'40'		UVDOPRQ	OPER INTERV REQD BY UX01
		..1... .. X'20'		UVDV5310	IAT5310 ERROR MESSAGE ISSUED
3	(3)	BITSTRING	1	UVDFLAG3	SCRATCH MOUNT FLAG:
		1... .. X'80'		UVDSCR	SCRATCH MOUNT
		.1... .. X'40'		UVDNSCR	NON-SCRATCH MOUNT
		..1... .. X'20'		UVD501E	IEC501E MSG PREVIOUSLY PROCESSED
		...1... .. X'10'		UVDRACF	RACF READ OPTION WAS SET
		.... 1... X'08'		UVDTMS7	MESSAGE IECTMS7 BEING PROCESSED
4	(4)	CHARACTER	2	UVDTYPE	DRIVE TYPE FROM LMU:
'64'	(F6F4)	CHAR CONST		UVD4480	4480 DRIVE
'32'	(F3F2)	CHAR CONST		UVDTIMB	TIMBERLINE DRIVE
'33'	(F3F3)	CHAR CONST		UVD9491	9490EE DRIVE
'16'	(F1F6)	CHAR CONST		UVDREDW	REDWOOD
'08'	(F0F8)	CHAR CONST		UVDSILV	SILVERTON
'06'	(F0F6)	CHAR CONST		UVD3590	T9940A ACTING AS A 3590
'05'	(F0F5)	CHAR CONST		UVD3490E	T9940A ACTING AS A 3490E

**Table 60. SLUVDDAT Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
'01'	(F0F1)	CHAR CONST		UVD984B4	T9840B ACTING AS A 3490E
'07'	(F0F7)	CHAR CONST		UVD984B5	T9840B ACTING AS A 3590
'09'	(F0F9)	CHAR CONST		UVD994B4	T9940B ACTING AS A 3490E
'10'	(F1F0)	CHAR CONST		UVD994B5	T9940B ACTING AS A 3590
'02'	(F0F2)	CHAR CONST		UVD9840	9840 DRIVE
'03'	(F0F3)	CHAR CONST		UVD98405	9840 DRIVE ACTING AS A 3590
65535	(FFFF)	CONST		UVDNOLMU	LMU DRIVE TYPE NOT YET SET
6	(6)	AREA	4	UVDDRVID	DRIVEID:
6	(6)	HEXSTRING	1	UVDIDACS	DRIVEID ACS
7	(7)	HEXSTRING	1	UVDIDLSM	DRIVEID LSM
8	(8)	HEXSTRING	1	UVDIDPNL	DRIVEID PANEL
9	(9)	HEXSTRING	1	UVDIDNUM	DRIVEID NUMBER WITHIN PANEL
12	(C)	SIGNED-FWORD	4	UVDDEFIN	DRIVE IS DEFINED TO A HOST - BIT-MAP REPRESENTING EACH HOST THAT HAS THIS DRIVE DEFINED, READING FROM LEFT TO RIGHT IN HOST INDEX ORDER
16	(10)	SIGNED-HWORD	2	UVDNUNIT	NUMBER OF DRIVE UNITS (FOR UVDUNITN)
18	(12)	SIGNED-HWORD	2	UVDLUNIT	LENGTH OF DRIVE UNITS (FOR UVDUNITN)
20	(14)	SIGNED-HWORD	2	UVDUNITN(16)	MVS UNIT NUMBERS INDEXED BY HOST.
52	(34)	LENGTH		UVDLEN	RECORD LENGTH

**Cross Reference**

Name	Len	Offset Value
UVDBMNT	-	80
UVDDCLN	-	80
UVDDEFIN	000004	0C
UVDDRVID	000004	06
UVDFLAG1	000001	01

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
UVDFLAG2	000001	02
UVDFLAG3	000001	03
UVDIDACS	000001	06
UVDIDLSM	000001	07
UVDIDNUM	000001	09
UVDIDPNL	000001	08
UVDLEN	-	34
UVDLUNIT	000002	12
UVDNOLMU	-	FFFF
UVDNSCR	-	40
UVDNUNIT	000002	10
UVDOPRQ	-	40
UVDRACTF	-	10
UVDREDW	-	'CVAL'
UVDRT	000001	00
UVDSCR	-	80
UVDSILV	-	'CVAL'
UVDTIMB	-	'CVAL'
UVDTMS7	-	08
UVDTYPE	000002	04
UVDUNITN	000002	14
UVDV5310	-	20
UVD3490E	-	'CVAL'
UVD3590	-	'CVAL'
UVD4480	-	'CVAL'
UVD501E	-	20
UVD9491	-	'CVAL'
UVD984B4	-	'CVAL'
UVD984B5	-	'CVAL'
UVD9840	-	'CVAL'
UVD98405	-	'CVAL'
UVD994B4	-	'CVAL'



<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
UVD994B5	-	'CVAL'

## SLUVPDAT

This record is produced only by the Batch API QCDS request. Refer to Appendix H, “Batch Application Program Interface (API)” for more information.

**Table 61. SLUVPDAT Record Format**

Dec	Hex	Type	Length	Label	Description
SLUVPDAT - QCDS CAP INFORMATION DSECT					
FUNCTION: MAPS THE CAP DATA PRODUCED BY THE QCDS READ REQUEST FOR THE CDS CAP RECORD AREA.					
0	(0)	STRUCTURE		SLUVPDAT	
0	(0)	CHARACTER	1	UVPRT	RECORD TYPE
1	(1)	BITSTRING	1	UVPFLAG1	CAP STATUS:
		1... .. X'80'		UVPF1ACT	CAP IS ACTIVE
		.1.. .. X'40'		UVPF1REC	CAP NEEDS RECOVERY
		..1. .... X'20'		UVPF1AUT	CAP IS IN AUTOMATIC MODE
		...1 .... X'10'		UVPF1LNK	CAP IS LINKED
		.... 1... X'08'		UVPF1ONL	CAP IS ONLINE
2	(2)	BITSTRING	1	UVPFLAG2	CAP MODE:
		1... .. X'80'		UVPF2ENT	CAP IS ENTERING
		.1.. .. X'40'		UVPF2DRA	CAP IS DRAINING
		..1. .... X'20'		UVPF2EJT	CAP IS EJECTING
		...1 .... X'10'		UVPF2CLN	CAP IS CLEANING
		.... 1... X'08'		UVPF2IDL	CAP IS IDLE
3	(3)	HEXSTRING	3	UVPID	CAP ID
6	(6)	CHARACTER	8	UVPJOBN	JOBNAME OF OWNER
14	(E)	CHARACTER	8	UVPHOST	HOSTID IF CAP IS ACTIVE
22	(16)	HEXSTRING	1	UVPHOSTI	HOST INDEX FOR CAHOST
24	(18)	SIGNED-HWORD	2	UVPNCELL	NUMBER OF CELLS IN CAP
26	(1A)	HEXSTRING	1	UVPNROWS	NUMBER OF ROWS IN THIS CAP
27	(1B)	HEXSTRING	1	UVPNCOLS	NUMBER OF COLUMNS IN THIS CAP
28	(1C)	HEXSTRING	1	UVPNMAGS	NUMBER OF MAGAZINES IN THIS CAP
29	(1D)	HEXSTRING	1	UVPNMAGC	NUMBER OF CELLS PER MAGAZINE
30	(1E)	SIGNED-HWORD	2	UVPNPRI	NUMBER OF CAP PRIORITY ELEMENTS

**Table 61. SLUVPDAT Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
32	(20)	SIGNED-HWORD	2	UVPLPRIO	LENGTH OF CAP PRIORITY ELEMENTS
34	(22)	HEXSTRING	1	UVPPRITY(16)	CAP PRIORITY ELEMENTS, BY HOST INDEX
50	(32)	HEXSTRING	1	UVPPANEL	PANEL NUMBER OF CAP
51	(33)	BITSTRING	1	UVPTYPE	TYPE OF CAP:
		1... .. X'80'		UVPPCAP	PRIORITY CAP
		.... ..1 X'01'		UVPCIM	CIMARRON
		.... ..1. X'02'		UVPClip	CLIPPER
		.... ..11 X'03'		UVPTWSTD	STANDARD WOLF CLIPPER
		.... ..1.. X'04'		UVPTWOPT	OPTIONAL WOLF CLIPPER
		.... ..1.1 X'05'		UVP9740	9740 CAP (CELLS SET AT VARY LSM)
52	(34)	LENGTH		UVPLEN	RECORD LENGTH

## Cross Reference

Name	Len	Offset Value
UVPCIM	-	01
UVPCLIP	-	02
UVPFLAG1	000001	01
UVPFLAG2	000001	02
UVPF1ACT	-	80
UVPF1AUT	-	20
UVPF1LNK	-	10
UVPF1ONL	-	08
UVPF1REC	-	40
UVPF2CLN	-	10
UVPF2DRA	-	40
UVPF2EJT	-	20
UVPF2ENT	-	80
UVPF2IDL	-	08
UVPHOST	000008	0E
UVPHOSTI	000001	16
UVPID	000003	03
UVPJOBN	000008	06
UVPLEN	-	34
UVPLPRIO	000002	20
UVPNCELL	000002	18
UVPNCOLS	000001	1B
UVPNMAGC	000001	1D
UVPNMAGS	000001	1C
UVPNPRI0	000002	1E
UVPNROWS	000001	1A
UVPPANEL	000001	32
UVPPCAP	-	80
UVPPRITY	000001	22
UVPRT	000001	00
UVPTWOPT	-	04

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
UVPTWSTD	-	03
UVPTYPE	000001	33
UVP9740	-	05



# Appendix E. Logging ACS Robotics Motion

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## Overview

StorageTek provides a way to monitor the reliability of ACS robotics motion. This appendix describes what information is logged and how that information is logged.

## Information Being Logged

StorageTek logs robotic motion statistics in three categories:

- robotic Motion Start Counts
- temporary Motion Error Counts
- permanent Motion Errors.

Each category is described in the following paragraphs.

### Robotics Motion Start Counts

Each time an LSM robotics motion request is accepted by the LMU, the count of Robotics Motion Starts is incremented by one. This count represents the number of times the robot attempts to pick up a cartridge at one location, move it, and place it at another location. When the Catalog or View commands are used, the count is the number of times the robot hand is moved to a target location. The Robotics Motion Start Count is incremented at the start of each robotics motion. The motion itself may be successful, have a temporary error or have a permanent failure.

With the exception of LMU busy retries, motions retried by the HSC are counted as additional subsequent motions, since each attempted motion request could result in a hardware failure (hard fail) or temporary error.

### Temporary Motion Error Counts

For each motion which is successful, but which had a temporary error, the count of Temporary Motion Errors is incremented by one. A temporary error is counted against any motion that contains a retry at some level which either impacts performance or may indicate that hardware is degraded. Temporary errors are currently counted at the LSM level against any motion requiring a panel ID recalibration to complete. Temporary errors are counted at the LMU level if a motion must be retried.

## **Permanent Motion Errors**

Each time a permanent motion failure occurs, complete information concerning the failure is logged. A permanent error is counted against any motion which causes a Mount, DISMount, Swap, MOVE, Catalog, or Vlew command to fail in such a way that user intervention is required to correct the situation.



## How Information is Logged

The HSC periodically retrieves the statistics for robotics motions begun and temporary errors from the LMU. This information is logged to SYS1.LOGREC as software errors as shown in the Table 62. This record is a valid “Initiated and Temporary Error Motion Software Error Record” only under the following circumstances:

- if the Record Type Field (bytes 642-643) has value X'6506' and
- the StorageTek identifier (X'FEEDFACE' at bytes 644-647) is present.

Such a record is called an LLG6 record. Refer to Appendix D, “Record Formats” to see the record layout for LLG6.

**Table 62. Format for Total Motions and Temporary Error Counts**

Initiated and Temporary Error Motion Software Error Record	
BYTE #	Description of Field
00-31	Standard HSC LOGREC header
00-00	X'40' indicates software detected error
01-01	X'80' indicates VS2 or later release level
02-02	X'08' indicates TIME macro was used
03-03	X'20' indicates record contains an error ID
04-05	Reserved
06-06	Record count
07-07	Reserved
08-11	System date of error
12-15	System time of error
16-23	CPU ID
24-31	Subsystem name
32-35	Eyeball characters 'LLG6'
36-41	Proprietary data
42-43	Reserved
44-44	ACSid (binary)
45-45	Reserved

**Table 62. Format for Total Motions and Temporary Error Counts (Continued)**

<b>Initiated and Temporary Error Motion Software Error Record</b>	
<b>BYTE #</b>	<b>Description of Field</b>
46-46	LSM Configuration Flag 1st Byte X'80' - LSM 0 exists if flag is on X'40' - LSM 1 exists if flag is on X'20' - LSM 2 exists if flag is on X'10' - LSM 3 exists if flag is on X'08' - LSM 4 exists if flag is on X'04' - LSM 5 exists if flag is on X'02' - LSM 6 exists if flag is on X'01' - LSM 7 exists if flag is on
47-47	LSM Configuration Flag 2nd Byte X'80' - LSM 8 exists if flag is on X'40' - LSM 9 exists if flag is on X'20' - LSM 10 exists if flag is on X'10' - LSM 11 exists if flag is on X'08' - LSM 12 exists if flag is on X'04' - LSM 13 exists if flag is on X'02' - LSM 14 exists if flag is on X'01' - LSM 15 exists if flag is on
48-51	LSM 0 Robotic motions started (binary)
52-55	LSM 0 Temporary motion error counts (binary)
56-59	LSM 1 Robotic motions started (binary)
60-63	LSM 1 Temporary motion error counts (binary)
64-67	LSM 2 Robotic motions started (binary)
68-71	LSM 2 Temporary motion error counts (binary)
72-75	LSM 3 Robotic motions started (binary)
76-79	LSM 3 Temporary motion error counts (binary)
80-83	LSM 4 Robotic motions started (binary)
84-87	LSM 4 Temporary motion error counts (binary)
88-91	LSM 5 Robotic motions started (binary)
92-95	LSM 5 Temporary motion error counts (binary)
96-99	LSM 6 Robotic motions started (binary)
100-103	LSM 6 Temporary motion error counts (binary)
104-107	LSM 7 Robotic motions started (binary)
108-111	LSM 7 Temporary motion error counts (binary)
112-115	LSM 8 Robotic motions started (binary)
116-119	LSM 8 Temporary motion error counts (binary)
120-123	LSM 9 Robotic motions started (binary)

**Table 62. Format for Total Motions and Temporary Error Counts (Continued)**

<b>Initiated and Temporary Error Motion Software Error Record</b>	
<b>BYTE #</b>	<b>Description of Field</b>
124-127	LSM 9 Temporary motion error counts (binary)
128-131	LSM 10 Robotic motions started (binary)
132-135	LSM 10 Temporary motion error counts (binary)
136-139	LSM 11 Robotic motions started (binary)
140-143	LSM 11 Temporary motion error counts (binary)
144-147	LSM 12 Robotic motions started (binary)
148-151	LSM 12 Temporary motion error counts (binary)
152-155	LSM 13 Robotic motions started (binary)
156-159	LSM 13 Temporary motion error counts (binary)
160-163	LSM 14 Robotic motions started (binary)
164-167	LSM 14 Temporary motion error counts (binary)
168-171	LSM 15 Robotic motions started (binary)
172-175	LSM 15 Temporary motion error counts (binary)
176-641	Reserved
642-643	Record type X'6506'
644-647	StorageTek identifier X'FEEDFACE'
648-651	Timestamp Table

The HSC also makes a log entry for each permanent error, codes and indicates whether or not the errors are considered permanent errors.

The record format used to log a hard fail to SYS1.LOGREC is shown in Table 63. This record is a valid “Motion Hard Fail Software Error Record” only under the following conditions:

- if the Record Type Field (bytes 642-643) has a value of X'6501',
- the StorageTek identifier (X'FEEDFACE' at bytes 644-647) is present, and
- the character 'H' appears at the byte 113 location.

These records, regardless of whether the hard fail indicator is turned on, are LLG1 records.

**Table 63. Record Format for a Hard Failure**

<b>Motion Hard Fail Software Error Record</b>	
<b>BYTE #</b>	<b>Description of Field</b>
00-31	Standard HSC LOGREC header
00-00	X'40' indicates software detected error
01-01	X'80' indicates VS2 or later release level
02-02	X'08' indicates TIME macro was used
03-03	X'20' indicates record contains an error ID
04-05	Reserved
06-06	Record count
07-07	Reserved
08-11	System date of error
12-15	System time of error
16-23	CPU ID
24-31	Subsystem name
32-35	Eyeball characters 'LLG1'
36-41	Proprietary data D-4
42-43	Reserved
44-44	ACSid (binary)
45-48	Proprietary data
49-85	Request data
49-58	Transaction header
49-52	Proprietary data
53-54	Host ID
55-57	Sequence number
58-58	Transaction Type, a '1' indicates a request
59-59	Request type, 'B' = Mount request 'C' = Dismount request 'D' = Swap request 'E' = Move request 'K' = Catalog request 'X' = View request
60-61	Proprietary data

**Table 63. Record Format for a Hard Failure (Continued)**

<b>Motion Hard Fail Software Error Record</b>	
<b>BYTE #</b>	<b>Description of Field</b>
62-67	VOLSER of cartridge (this field is only valid if Request type, byte 59, is 'B', 'C', 'D' or 'E' and byte 60 has value character '1')
68-89	Proprietary data
90-91	Host ID
92-94	Sequence number
95-95	Character '7' indicates an error response
96-96	Response type, 'B' = Mount response 'C' = Dismount response 'D' = Swap response 'E' = Move response 'K' = Catalog response 'X' = View response
97-100	LMU Response Code (see Appendix A for definitions)
101-102	LSMid in error
103-112	Proprietary data
113-113	Character 'H' indicates a hard failure
114-641	Reserved
642-643	Record type X'6501'
644-647	StorageTek identifier X'FEEDFACE'
648-651	Timestamp

## Logging Interval

When LMU 3.0 or 9315/9330 1.0  $\mu$ -software is properly installed in the ACS, the HSC identifies hard fails in LLG1 records and records robotic motion and temporary error counts in LLG6 records written to SYS1.LOGREC.

An LLG6 record is written to SYS1.LOGREC for each qualified ACS at the same interval that is defined for writing ACS-specific SMF records. A record is written not less than once in 24 hours, and always when the HSC is shutting down normally (assuming it has not been canceled).

An LLG1 record, which may or may not represent a hard fail, is written to SYS1.LOGREC for most operations requested by the HSC for which the LMU is unable to complete the HSC request. Operations that are automatically retried by the HSC are usually not errors, and some other states may be defined that are not logged as errors. See "LMU Response Codes" on page 643 for information on error and response codes. For

operations that do result in an error, only those that requested robotic motions are logged as hard fails with the appropriate indicator set in the record. Errors that do not represent failed robotic motions are software errors. These should be analyzed and reported to StorageTek.

## Single-Host Environment

In a single-host environment, there is only one SYS1.LOGREC data set and only one copy of the HSC. In such an environment, everything is straightforward and easy to manage.

Recommended procedures in this environment are:

- Offload SYS1.LOGREC to a history data set, and
- Follow Computer Associates' CA-9/R+ Installation Instructions.

The extracted data for the reporting period may then be sent to the reliability measuring service for inclusion in their industry-wide report.

## Multi-Host Environment

Data are interpreted differently in a multi-host environment than in a single-host environment. For this reason more explanation is necessary.

Since the LMU counts robotic motions started and temporary errors by LSM and not by host, when any host requests ACS statistics from an LMU, the data that is written to SYS1.LOGREC in an LLG6 record represents the total robotic motions started and temporary errors that occurred on each LSM since the last time that any R+ host requested ACS statistics from the LMU. The robotic motions started by all hosts are consolidated into one LLG6 record.

However, the robotic motions that end in a hard fail that are reported in LLG1 records are only logged to the SYS1.LOGREC of the R+ host that experienced the hard fail. Software failures are similarly logged only by the host that experienced the failure (an LLG1 record without the "hard fail" indicator).

Follow Computer Associates' published procedures for extracting data from all R+ hosts from the LOGREC history tapes and send the extracted data for the reporting period to the reliability measuring service for inclusion in their industry-wide report.

## LMU Response Codes

The following tables contain a list of permanent error LMU response codes with associated

- descriptions
- indications of whether a console message is generated
- indications of whether a LOGREC record is cut
- indications of whether this response code is included as an R+ hard fail or if it is excluded.

Symbols used in the tables are as follows:

<b>Code</b>	<b>Description</b>
M	Console message posted
L	Record logged to SYS1.LOGREC
L+	Record sometimes logged to SYS1.LOGREC
H	Hard Fail logged to R+ Statistics
r	Retried by the Host.

## Invalid Parameter Error Codes: 0101 - 0127

**Table 64. LMU Response Codes 0101 thru 0127**

LMU Resp	Response Description	Con Msg	LOG rec	Mnt B	Dmt C	Swp D	Mov E	Cat J/K	Vw X
0101	Bad primary LSM	M	L	H	H	H	H	H	H
0102	Bad secondary LSM	M	L	H	H	H	H	H	H
0105	Undefined option or modifier	M	L	H	H	H	H	H	H
0106	Invalid LSM	M	L	H	H	H	H	H	H
0107	Invalid panel	M	L	H	H	H	H	H	H
0108	Invalid row	M	L	H	H	H	H	H	H
0109	Invalid column	M	L	H	H	H	H	H	H
0110	Invalid drive	M	L	H	H	H	H	H	H
0111	Invalid CAP row	M	L	H	H	H	H	H	H
0112	Invalid CAP column	M	L	H	H	H	H	H	H
0113	No cell at the specified address	M	L	H	H	H	H	H	H
0114	Label modifier option not legal	M	L	H	H	H	H	H	H
0115	Source modifier option not legal	M	L	H	H	H	H	H	H
0116	Source type illegal	M	L	H	H	H	H	H	H
0117	Destination type illegal	M	L	H	H	H	H	H	H
0118	Beginning address greater than end on catalog	M	L	H	H	H	H	H	H
0119	Invalid characters in VOLSER label	M	L	H	H	H	H	H	H
0120	Invalid request ID received	M	L	H	H	H	H	H	H
0121	Invalid transaction length	M	L	H	H	H	H	H	H
0122	Invalid host ID	M	L	H	H	H	H	H	H
0123	illegal characters in request	M	L	H	H	H	H	H	H
0124	Host ID doesn't match current	M	L	H	H	H	H	H	H
0125	Duplicate sequence number active	M	L	-	-	-	-	-	-
0126	Transaction type not request or message ACK	M	L	H	H	H	H	H	H
0127	Invalid request code to cancel	M	L	H	H	H	H	H	H



## Configuration Error Codes: 0201 - 0203

**Table 65. LMU Response Codes 0201 thru 0203**

LMU Resp	Response Description	Con Msg	LOG rec	Mnt B	Dmt C	Swp D	Mov E	Cat J/K	Vw X
0201	LSM is not in static configuration	M	L	H	H	H	H	H	H
0202	Drive does not exist	M	L	H	H	H	H	H	H
0203	CAP does not exist	M	L	H	H	H	H	H	H

## CAP Procedural Error Codes: 0301 - 0310

**Table 66. LMU Response Codes 0301 thru 0310**

LMU Resp	Response Description	Con Msg	LOG rec	Mnt B	Dmt C	Swp D	Mov E	Cat J/K	Vw X
0301	CAP not reserved	M	L	H	H	H	H	H	H
0302	CAP already reserved	M	L	H	H	H	H	H	H
0303	CAP in Enter mode	M	L	H	H	H	H	H	H
0304	CAP in Eject mode	M	L	H	H	H	H	H	H
0305	CAP move active	M	L	H	H	H	H	H	H
0306	CAP door is open	M	L	H	H	H	H	H	H
0307	CAP catalog is in progress	M	L+	H	H	H	H	H	H
0309	Cannot unlock CAP, CAP door is not fully latched	M	L	H	H	H	H	H	H
0310	Cannot cancel enter on release request	M	L+	H	H	H	H	H	H

## General Procedural Error Codes: 0401 - 0427

Table 67. LMU Response Codes 0401 thru 0427

LMU Resp	Response Description	Con Msg	LOG rec	Mnt B	Dmt C	Swp D	Mov E	Cat J/K	Vw X
0401	LSM not ready	-	-	r	r	r	r	r	r
	if unlabeled or bypass label	M	-	r	r	r	r	r	r
	if not VARY and LSM offline	M	-	r	r	r	r	r	r
	else add to Temp Outage Queue	-	-	r	r	r	r	r	r
0402	LSM in maintenance mode	M	L	-	-	-	-	-	-
0403	LSM offline pending	M	-	-	-	-	-	-	-
0404	LSM offline	M	-	-	-	-	-	-	-
0405	Drive is full	M	L	-	H	-	H	H	H
0407	Multiple LSM requests in maintenance	M	L	H	H	H	H	H	H
0408	Path rejected due to full PTP deadlock	M	L	H	H	H	H	H	H
0410	Bad recovery on cartridge VOLSER	M	L	H	H	H	H	H	H
0411	Maximum requests allowed exceeded	-	-	r	r	r	r	r	r
0412	Quiesce host is already in progress	M	L	H	H	H	H	H	H
0413	Prior quiesce host override	M	L	H	H	H	H	H	H
0414	Maximum read VOLSER requests active	-	-	H	H	H	H	H	H
0416	Request canceled	M	-	-	-	-	-	-	-
0415	Cancel already pending against request	M	L	H	H	H	H	H	H
0419	VOLSER unexpectedly was readable	M	L	r	r	r	r	H	H
0420	Bad read of VOLSER	M	L+	r	r	r	r	H	H
0422	Cell full	M	L+	-	-	-	-	H	H
0423	Cell empty	M	L+	-	-	-	-	H	H
0424	Drive empty	M	L+	-	-	-	H	H	H
0425	Drive is active	M	L+	r	-	-	H	H	H

**Table 67. LMU Response Codes 0401 thru 0427 (Continued)**

LMU Resp	Response Description	Con Msg	LOG rec	Mnt B	Dmt C	Swp D	Mov E	Cat J/K	Vw X
0426	Drive not rewound	M	L+	r	-	-	H	H	H
0427	Cartridge not mounted	M	L	H	-	-	H	H	H

**LMU LAN Interface Error Codes: 0501 - 0512**

**Table 68. LMU Response Codes 0501 thru 0512**

LMU Resp	Response Description	Con Msg	LOG rec	Mnt B	Dmt C	Swp D	Mov E	Cat J/K	Vw X
0501	Transmission rejection: No LSM at node	M	L	H	H	H	H	H	H
0502	Transmission rejection: Bad LSMid	M	L	H	H	H	H	H	H
0503	Transmission rejection: LSM not communicating	M	-	r	r	r	r	r	r
0504	Transmission rejection: Transmission error	M	-	r	r	r	r	r	r
0505	Transmission rejection: No ACK	M	-	r	r	r	r	r	r
0506	Transmission rejection: No operational LAN	M	-	r	r	r	r	r	r
0507	Transmission rejection: No memory available	M	-	r	r	r	r	r	r
0508	Transmission rejection: Buffer overflow	M	-	r	r	r	r	r	r
0509	Transmission rejection: No response for command	M	L	H	H	H	H	H	H
0510	Transmission rejection: LSM forced offline	M	-	-	-	-	-	-	-
0511	Transmission rejection: Already active CAP Unlock	M	L	H	H	H	H	H	H
0512	Transmission rejection: This is a standby	M	L	H	H	H	H	H	H

## LMU Logical Error Codes: 0601 - 0620

Table 69. LMU Response Codes 0601 thru 0620

LMU Resp	Response Description	Con Msg	LOG rec	Mnt B	Dmt C	Swp D	Mov E	Cat J/K	Vw X
0601	Unknown allocation request	M	L	H	H	H	H	H	H
0602	Bad qualifier byte 0	M	L	H	H	H	H	H	H
0603	Bad qualifier byte 1	M	L	H	H	H	H	H	H
0604	Bad qualifier byte 2	M	L	H	H	H	H	H	H
0605	LSM online	M	L	H	H	H	H	H	H
0606	Offline pend overridden	M	L	H	H	H	H	H	H
0610	Unknown panel type from static configuration	M	L	H	H	H	H	H	H
0611	Internal logical problem detected	M	L	H	H	H	H	H	H
0612	Pass-thru port cell full	M	L	H	H	H	H	H	H
0613	Pass-thru port cell empty	M	L	H	H	H	H	H	H
0615	Dynamic task create found full mailbox	M	L	H	H	H	H	H	H
0616	Allocate pend timed out	M	L	H	H	H	H	H	H
0617	LSM command pend timed out	M	L	H	H	H	H	H	H
0620	Connecting LSM path is unavailable for unknown reason	M	L	H	H	H	H	H	H

## LSM Robotics Error Codes: 0701 - 0718

Table 70. LMU Response Codes 0701 thru 0718

LMU Resp	Response Description	Con Msg	LOG rec	Mnt B	Dmt C	Swp D	Mov E	Cat J/K	Vw X
0701	Arm not operational	M	L	H	H	H	H	H	H
0702	Hand not operational	M	L	H	H	H	H	H	H
0703	PTP not operational	M	L	H	H	H	H	H	H
0704	PTP does not exist	M	L	H	H	H	H	H	H
0705	CAP is not operational	M	L	H	H	H	H	H	H
0707	Necessary elements inoperational	M	L	H	H	H	H	H	H
0708	Failed robotics portion of move	M	L	H	H	H	H	H	H
0709	Bad PUT	M	L	H	H	H	H	H	H
0710	Bad GET	M	L	H	H	H	H	H	H
0711	Bad reach retraction	M	L	H	H	H	H	H	H
0712	Bad reach extension	M	L	H	H	H	H	H	H
0713	Error positioning PTP	M	L	H	H	H	H	H	H
0714	No hands are operative	M	L	H	H	H	H	H	H
0715	Drive didn't detect cartridge on PUT	M	L	-	H	-	H	H	H
0716	Failed targeting portion of move	M	L	H	H	H	H	H	H
0717	Reach is in an unsafe position	M	L	H	H	H	H	H	H
0718	Failed during recalibration on cell	M	L	H	H	H	H	H	H

## LSM Hardware Error Codes: 0801 - 0809

**Table 71. LMU Response Codes 0801 thru 0809**

LMU Resp	Response Description	Con Msg	LOG rec	Mnt B	Dmt C	Swp D	Mov E	Cat J/K	Vw X
0801	LSM didn't respond to request	M	L	H	H	H	H	H	H
0804	CAP unlock solenoid has over-currented	M	L	H	H	H	H	H	H
0805	Unlock CAP failed	M	L	H	H	H	H	H	H
0806	Lock CAP failed	M	L	H	H	H	H	H	H
0807	Drive not communicating	M	L	-	-	-	H	H	H
0808	Tape unit interface failure	M	L	-	-	-	H	H	H
0809	Failed to transfer image into memory	M	L	H	H	H	H	H	H

## LSM Logical Error Codes: 0901 - 0977

**Table 72. LMU Response Codes 0901 thru 0977**

LMU Resp	Response Description	Con Msg	LOG rec	Mnt B	Dmt C	Swp D	Mov E	Cat J/K	Vw X
0901	Wrong LSM on GET response	M	L	H	H	H	H	H	H
0902	Packet type of response not received	M	L	H	H	H	H	H	H
0903	Wrong task ID on response	M	L	H	H	H	H	H	H
0904	Wrong function ID on response	M	L	H	H	H	H	H	H
0905	Wrong cell address on response	M	L	H	H	H	H	H	H
0906	LSM is offline (from LSM)	M	L	H	H	H	H	H	H
0907	Bad cell location (from LSM)	M	L	H	H	H	H	H	H
0908	Unknown ending status from LSM	M	L	H	H	H	H	H	H
0909	LSM returned invalid response	M	L	H	H	H	H	H	H
0910	Unexpected or out-of-sequence CAP message	M	L	H	H	H	H	H	H
0916	Failure ending status	M	L	H	H	H	H	H	H
0917	Busy ending status	M	L	H	H	H	H	H	H
0918	Bad command	M	L	H	H	H	H	H	H
0919	Bad parameters on command	M	L	H	H	H	H	H	H
0920	Bad address type	M	L	H	H	H	H	H	H

**Table 72. LMU Response Codes 0901 thru 0977 (Continued)**

<b>LMU Resp</b>	<b>Response Description</b>	<b>Con Msg</b>	<b>LOG rec</b>	<b>Mnt B</b>	<b>Dmt C</b>	<b>Swp D</b>	<b>Mov E</b>	<b>Cat J/K</b>	<b>Vw X</b>
0921	Bad panel, row, or column	M	L	H	H	H	H	H	H
0922	Arm currently reserved	M	L	H	H	H	H		
0923	CAP currently reserved	M	L	H	H	H	H	H	H
0924	First Master Pass-Thru-Port reserved	M	L	H	H	H	H	H	H
0925	Second Master Pass-Thru-Port reserved	M	L	H	H	H	H	H	H
0926	Playground currently reserved	M	L	H	H	H	H	H	H
0943	LSM is online	M	L	H	H	H	H	H	H
0944	LSM is in maintenance mode	M	L	H	H	H	H	H	H
0945	LSM is offline	M	L	H	H	H	H	H	H
0946	LSM access door is open	M	-	r	r	r	r	r	r
0947	LSM is not initialized	M	L	H	H	H	H	H	H
0950	Cell location nonexistent	M	L	H	H	H	H	H	H
0951	Hand full	M	L	H	H	H	H	H	H
0952	Hand empty	M	L	H	H	H	H	H	H
0953	Drive full	M	L+	-	H	-	H	H	H
0955	CAP is currently unlocked	M	L	H	H	H	H	H	H
0956	Can't unlock CAP in idle	M	L	H	H	H	H	H	H
0957	CAP is open	M	L	H	H	H	H	H	H
0958	CAP is currently locked	M	L	H	H	H	H	H	H
0960	CAP already in Idle mode	M	L	H	H	H	H	H	H
0961	CAP already in Eject mode	M	L	H	H	H	H	H	H
0962	CAP already in Enter mode	M	L	H	H	H	H	H	H
0963	CAP in Enter mode, can't eject	M	L	H	H	H	H	H	H
0964	CAP in Eject mode, can't enter	M	L	H	H	H	H	H	H
0965	CAP not locked for Idle mode	M	L	H	H	H	H	H	H
0970	Not a drive panel	M	L	H	H	H	H	H	H
0971	No drive installed at address	M	L	H	H	H	H	H	H
0972	Invalid drive command specifier	M	L	H	H	H	H	H	H
0975	Actively passing data	M	L	H	-	-	H	H	H

**Table 72. LMU Response Codes 0901 thru 0977 (Continued)**

LMU Resp	Response Description	Con Msg	LOG rec	Mnt B	Dmt C	Swp D	Mov E	Cat J/K	Vw X
0976	Can't rewind	M	L	H	-	-	H	H	H
0977	Can't unload	M	L	-	-	-	H	H	H
0978	Drive cannot honor write protected	M	L	H	H	H	H	H	H
0979	Drive currently reserved	M	L	H	H	H	H	H	H

**Drive Error Codes: 1001 - 1011**

**Table 73. LMU Response Codes 1001 thru 1011**

LMU Resp	Response Description	Con Msg	LOG rec	Mnt B	Dmt C	Swp D	Mov E	Cat J/K	Vw X
1001	Drive not communicating	M	L	-	-	-	H	H	H
1002	Drive is not operational	M	L	-	-	-	H	H	H
1003	Outstanding request for drive	M	L	-	H	-	H	H	H
1004	Drive is allocated	M	L+	-	H	-	H	H	H
1005	Drive already has cartridge in it - unload timeout	M	L	-	H	-	H	H	H
1006	Drive found online for diagnostic request	M	L	H	H	H	H	H	H
1010	Drive can't load cartridge	M	L	-	H	-	H	H	H
1011	Load or Unload already in progress	M	L	H	H	H	H	H	H
1012	Load Failure on Special Use Cartridge	M	L	H	-	H	-	-	-

**Undefined Response Code**

**Table 74. LMU Response Code xxxx**

LMU Resp	Response Description	Con Msg	LOG rec	Mnt B	Dmt C	Swp D	Mov E	Cat J/K	Vw X
xxxx	Undefined Ending Status	M	L	H	H	H	H	H	H



# **Appendix F. Significant Event Notification Facility (SEN)**

## **Overview**

The HSC provides a Significant Event Notification facility (SEN). The SEN includes a macro interface that allows an application to request notification of specific HSC and VTCS events. The application can then process the data passed by the SEN. SEN notification requests are maintained across HSC warm starts and are purged on HSC cold starts. When HSC is cold started, therefore, all previously established notification requests must be reestablished.

This appendix discusses the following topics:

- using the HSC SEN
- VTCS and HSC Events XML tags.

## **Using the HSC SEN**

The SEN macro interface is supported at HSC base service level. There is no operator interface for the SEN itself, but the Display SEN command for HSC 5.0 and later lists SEN notification requests.

For information on the XML format output of the supported SEN events, see “VTCS and HSC Events XML Tags” on page 676.

## **Enabling the SEN**

When the HSC initializes, the SEN facility is disabled, so you must enable it by specifying the OPTION SEN operator command, which is described in the *HSC Operator's Guide*. To enable the SEN, enter the following:

```
OPTION SEN(ON)
```

## The SEN Macro Interface

You invoke the SLSXSEN macro to make SEN requests. The SLSXSEN macro has two forms:

- A **list form** that generates a parameter list. The parameter list is mapped by macro SLSXSENM and must be included in routines invoking SLSXSEN.
- The **execute form** that populates the parameter list and calls the SEN request module SLSXSENR. Modules using the SLSXSEN macro must have an authorization code of 1 and reside in an APF authorized library.

The SLSXSEN macro supports the following four requests:

### **LISTEN**

Request notification for SEN defined events, which requires providing a routine to be invoked when the event occurs.

### **DELETE**

Remove a specific event notification request.

### **DISABLE**

Disable the LISTEN routine for event notification request.

### **ENABLE**

Enable the LISTEN routine for event notification request.

Programs invoking SLSXSEN LISTEN requests must supply the entry points of two routines:

- The SEN request module SLSXSENR.
- The listener routine to get control when an event occurs.

SLSXSENR must be loaded from an APF-authorized library. The listener routine must reside in common storage. The invoking program is responsible for managing this storage.

The listener routine is validated during LISTEN request processing by invoking the routine with general purpose register 1 set to zeros. Therefore, the listener routine must be sensitive to this condition and process it accordingly. The listener routine can simply return back to the caller on this condition or perform any type of initialization required. If LISTEN request processing detects an abend during validation, the request is rejected. A successful LISTEN request returns a token. Programs invoking SLSXSEN with DELETE, DISABLE, or ENABLE requests must provide this token to target a specific LISTEN request. The HSC SAMPLIB contains a sample program showing the use of SLSXSEN.

When events occur for which there is a listener routine, it is invoked and receives data that describes the event. The data passed is in XML format, which is provided on the StorageTek Customer Resource Center (CRC). For more information on the supported events, see “Supported HSC and VTCS SEN Events” on page 672.

When SEN request processing completes and control is returned to the requesting program, the parameter list and Register 15 contain the return code. Return codes are described in “Execute Form - Syntax and Parameters” on page 658.

If the HSC detects an abend while the listener routine is in control, the associated request is disabled and must be programmatically reenabled or deleted. When a notification request is disabled, the listener routine is not invoked.



**Note:** The HSC OPTion command and control statement lets you set the SEN facility ON or OFF.

```
OPTion SEN(ON)  
OPTion SEN(OFF)
```

**Note that** even if the SEN is disabled, SLSXSEN requests for event notification can still be processed.

## SEN Macro Interface Authorization Requirements and Module Attributes

Modules invoking the SEN macro interface must:

- have an authorization code of 1 and reside in an APF authorized library, **or**
- be running in key 0 - 7 or supervisor state and be running in AMODE 31.

The listener routine must be running in TCB mode (not in SRB mode) and must be re-entrant.

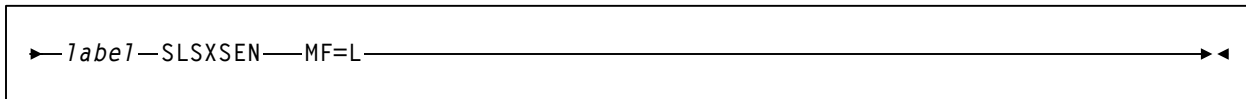
## The SLSXSEN Macro

The SLSXSEN macro has two forms:

- A **list form** that generates a parameter list. The parameter list is mapped by macro SLSXSENM (see “SLSXSENM Macro Format” on page 656) and must be included in routines invoking SLSXSEN. On completion of SEN request processing, the SEN parameter list contains the return code and token response areas.
- The **execute form** that populates the parameter list and calls the SEN request module SLSXSENR.

### List Form - Syntax and Parameters

#### Syntax



#### Parameters

##### MF=L

Specifies that a remote parameter list is generated. All other options are ignored.

### SLSXSENM Macro Format

Table 75 shows the format of macro SLSXSENM, which generates a DSECT that maps the SEN parameter list generated by the list form of macro SLSXSEN.

**Table 75. SLSXSENM Macro Format**

Dec	Hex	Type	Length	Label	Description
0	0			SLSXSENM	Start of DSECT
0	0	hexstring	2	SLSXSLEN	Length of parameter list
2	3	bitstring	1	SLSXSFC	SEN request code
		X'01'		SLSXLIS	LISTEN
		X'02'		SLSXSDEL	DELETE
		X'03'		SLSXSDIS	DISABLE
		X'04'		SLSXSENA	ENABLE
3	3	bitstring	1	SLSXSFLG	Processing flag
		X'80'		SLSXSEOT	EOT = YES
		X'40'		SLSXSEOM	EOM = YES
4	4	hexstring	8	SLSXSEM	Event mask

**Table 75. SLSXSENM Macro Format**

<b>Dec</b>	<b>Hex</b>	<b>Type</b>	<b>Length</b>	<b>Label</b>	<b>Description</b>
12	C	hexstring	4	SLSXSLA	Listener routine address
16	10	hexstring	4	SLSXSRT	Current TCB of requestor
20	14	hexstring	4	SLSXSRA	ASCB of requestor
22	16	hexstring	2	SLSXSTOK	Listen request token
30	1E	character	8	SLSXSREQ	Requestor name
38	26	character	8	SLSXSLNR	Listener routine name
40	28	hexstring	2	SLSXSQA	SEN queue entry address
42	2A	hexstring	2	SLSXSRC	SEN return code
			36	SLXRDI	Duplicate request encountered, request ignored
			32	SLXRNHSC	HSC not active or at proper level
			28	SLXRBADA	Authorization requirements not met
			24	SLXRBILR	Listener failed validation
			20	SLSXRSAB	Abend in HSC SEN processing
			16	SLSXRIR	Invalid request
			12	SLSXRNSQ	No LISTEN request found for DELETE, DISABLE, or ENABLE
			08	SLSXRDR	Duplicate listener encountered
			04	SLSXRDOK	SEN request successful, however the SEN facility is disabled
44	2C			SLSXSMLN	Length

## Execute Form - Syntax and Parameters

### Syntax

```
▶ label - SLSXSEN - function - parameters ▶
```

### Parameters

*function* is one of the following:

- LISTEN; see “LISTEN” on page 658.
- DELETE; see “DELETE” on page 661.
- DISABLE; see “DISABLE” on page 662.
- ENABLE; see “ENABLE” on page 664.

### LISTEN

LISTEN requests notification for the events described in “Supported HSC and VTCS SEN Events” on page 672. Also see “The SEN Listener Exit Routine” on page 666.



**Note:** A sample program of a LISTEN request (SENREQST) is provided in file SLSSAMP during SMP/E installation.

### Syntax

```
label SLSXSEN LISTEN,  
      EVENT=(event_1,event_2,...),  
      RTOKEN=token,  
      LNRADR=listener_address,  
      SENRADR=SLSXSENR_address,  
      EOT=YES/NO,  
      EOM=YES/NO,  
      REQNAME=requestor_name,  
      LNRNAME=listener_name,  
      MF=(E,parm_list)
```

### Parameters

#### EVENT=

Specifies the event(s) requiring notification. For more information, see “Supported HSC and VTCS SEN Events” on page 672. You can specify the event name or the numeric equate. Event names are case sensitive. You can specify a single event or EVENT=ALL. This parameter is required and there is no default.



**Note:** To specify multiple events on a single LISTEN request, StorageTek recommends that you use the numeric equates to ensure that the parameter value specified will not exceed IBM’s 256 byte size limitation for macro variables.

**RTOKEN=**

Specifies the address of a fullword token associated with a successful LISTEN request. Valid values are any RX-type address or registers 2 through 12. This parameter is required and there is no default.

**LNRADR=**

Specifies the entry point address of the listener routine that is invoked when the events specified occur. This program must reside in persistent common storage (that is, subpool 241) if EOT = YES or EOM=YES. It is your responsibility to delete the listener routine and free the storage associated with it. Valid values are any RX-type address or registers 2 through 12. This parameter is required and there is no default.

**SENADR=**

Specifies the entry point address of the SEN request module (SLSXSENR) that is provided with HSC. SLSXSENR must be loaded before invoking macro SLSXSEN. Valid values are any RX-type address or registers 2 through 12. This parameter is required and there is no default.

**EOT=**

Specifies whether the listener routine associated with this request is invoked if the task that issued the LISTEN request ends.

**YES**

Invoke the listener routine if the associated task ends.

**NO**

Do not invoke the listener routine if the task associated with this request ends.

This parameter is optional and NO is the default.

**EOM=**

Specifies whether the listener routine associated with this request is invoked if the address space that issued the LISTEN request ends.

**YES**

Invoke the listener routine if the associated address space ends.

**NO**

Do not invoke the listener routine if the address space associated with this request ends.

This parameter is optional and NO is the default.



**Caution:** EOT and EOM control execution of the listener routine, so make sure you set them to specify how you want the listener routine to operate.

**REQNAME=**

Specifies the name of the requestor and is used to uniquely identify a specify request for display purposes. The name must be an eight byte field containing a combination of uppercase alphanumeric values (A-Z,0-9), national characters (\$,@,#) with no embedded blanks. Valid values are any RX-type address or registers 2 through 12. This parameter is optional if LNRNAME is not specified and has no default.

**LNRNAME=**

Specifies the name of the listener routine. The name must be an eight byte field containing a combination of uppercase alphanumeric values (A-Z,0-9), national characters (\$,@,#) with no embedded blanks. Valid values are any RX-type address or registers 2 through 12. If LNRNAME is specified, REQNAME must also be specified. Otherwise, this parameter is optional and has no default.



**Hint:** Although not required, REQNAME and LNRNAME are very useful when displaying active SEN requests. For more information, see “The listener routine must be running in TCB mode (not in SRB mode) and must be re-entrant.” on page 655.

**MF=(E,*parm\_list*)**

Specifies the execute form of the macro using the specified parameter list generated by the list form. The parameter list, *parm\_list*, can be specified as any RX-type address or registers 2 through 12.

**Responses**

The return code is set in register 15 and the SEN parameter list. If the return code is zero, the address specified by RTOKEN contains the token representing this LISTEN request. This token is used when deleting, disabling or enabling a request. Table 76 on page 660 describes the SLSXSEN LISTEN return codes.

**Table 76. SLSXSEN LISTEN Return Codes**

Return Code	Meaning
00	SEN LISTEN request successful
04	SEN LISTEN request successful however the SEN facility is disabled.
08	Listen request with conflicting event lists. For more information, see “Detecting Duplicate Listen Requests” on page 670.
12	N/A
16	Invalid parameter list received.
20	Indicates that an abend occurred in HSC SEN processing, request rejected.
24	Indicates that listener routine validation failed, request rejected



**Table 76. SLSXSEN LISTEN Return Codes**

Return Code	Meaning
28	The HSC determined that the SLSXSEN macro is being invoked by a program that does not meet the authorization requirements specified in “SEN Macro Interface Authorization Requirements and Module Attributes” on page 655.
32	The HSC is not active or at the proper initialization level for SEN services.
36	An identical LISTEN request already exists, request ignored. For more information, see “Detecting Duplicate Listen Requests” on page 670.
40	Indicates that the REQNAM or LNRNAME syntax is invalid. Valid syntax is uppercase A-Z, 0-9, valid national characters (\$,#,@), with no embedded blanks.

## **DELETE**

### **Syntax**

```
label SLSXSEN DELETE,
      RTOKEN=token,
      MF=(E,param_list)
```

### **Parameters**

#### **RTOKEN=**

Specifies the address of a fullword token representing the request to be removed. This token was returned from a successful LISTEN request. This parameter is required and there is no default.

#### **MF=(E,param\_list)**

Specifies the execute form of the macro using the specified parameter list generated by the list form. The parameter list, *param\_list*, can be specified as any RX-type address or registers 2 through 12.



**Note:** All other parameters are ignored if entered on the DELETE request.

## Responses

The return code is set in register 15 and the SEN parameter list. Table 77 on page 662 describes the SLSXSEN DELETE return codes.

**Table 77. SLSXSEN DELETE Return Codes**

Return Code	Meaning
00	SEN DELETE request successful.
04	N/A
08	N/A
12	No existing LISTEN request was found using the TOKEN specified on the DELETE request.
16	Invalid request received (not LISTEN, DELETE, DISABLE, or ENABLE).
20	An abend occurred in HSC SEN processing, request rejected.
24	N/A
28	The HSC determined that the SLSXSEN macro is being invoked by a program that does not meet the authorization requirements specified in “SEN Macro Interface Authorization Requirements and Module Attributes” on page 655.
32	HSC is not active or at the proper initialization level for SEN services.
36	N/A

## DISABLE

Disable notification for a specific LISTEN request. The targeted request remains but the associated listener routine is not invoked when the specified events occur.

### Syntax

```
label SLSXSEN DISABLE,  
      RTOKEN=token,  
      MF=(E,parm_list)
```

### Parameters

#### RTOKEN=

Specifies the address of a fullword token representing the request to be disabled. This token was returned from a successful LISTEN request. This parameter is required and there is no default.

**MF=(E,*parm\_list*)**

Specifies the execute form of the macro using the specified parameter list generated by the list form. The parameter list, *parm\_list*, can be specified as any RX-type address or registers 2 through 12.



**Note:** All other parameters are ignored if entered on the DISABLE request.

**Responses**

The return code is set in register 15 and the SEN parameter list. Table 78 on page 663 describes the SLSXSEN DISABLE return codes.

**Table 78. SLSXSEN DISABLE Return Codes**

<b>Return Code</b>	<b>Meaning</b>
00	SEN DISABLE request successful.
04	SEN DISABLE request successful however the SEN facility is disabled.
08	N/A
12	No existing LISTEN request was found using the TOKEN specified on the DISABLE request.
16	Invalid request received (not LISTEN, DELETE, DISABLE, or ENABLE).
20	An abend occurred in HSC SEN processing, request rejected.
24	N/A
28	The HSC determined that the SLSXSEN macro is being invoked by a program that does not meet the authorization requirements specified in “SEN Macro Interface Authorization Requirements and Module Attributes” on page 655.
32	HSC is not active or at the proper initialization level for SEN services.
36	N/A

## ENABLE

Enable notification for a specific LISTEN request. The targeted request's listener routine is now invoked when the specified events occur.

### Syntax

```
label SLSXSEN ENABLE,  
      RTOKEN=token,  
      MF=(E,parm_list)
```

### Parameters

#### RTOKEN=

Specifies the address of a fullword token representing the request to be enabled. This token was returned from a successful LISTEN request. This parameter is required and there is no default.

#### MF=(E,*parm\_list*)

Specifies the execute form of the macro using the specified parameter list generated by the list form. The parameter list, *parm\_list*, can be specified as any RX-type address or registers 2 through 12.



**Note:** All other parameters are ignored if entered on the ENABLE request.

### Responses

The return code is set in register 15 and the SEN parameter list. Table 79 on page 664 describes the SLSXSEN ENABLE return codes.

**Table 79. SLSXSEN ENABLE Return Codes**

Return Code	Meaning
00	SEN ENABLE request successful.
04	SEN ENABLE request successful however the SEN facility is disabled.
08	N/A
12	No existing LISTEN request was found using the TOKEN specified on the ENABLE request.
16	Invalid request received (not LISTEN, DELETE, DISABLE, or ENABLE).
20	An abend occurred in HSC SEN processing, request rejected.
24	N/A

**Table 79. SLSXSEN ENABLE Return Codes**

<b>Return Code</b>	<b>Meaning</b>
28	The HSC determined that the SLSXSEN macro is being invoked by a program that does not meet the authorization requirements specified in “SEN Macro Interface Authorization Requirements and Module Attributes” on page 655.
32	HSC is not active or at the proper initialization level for SEN services.
36	N/A

## The SEN Listener Exit Routine

To use the SEN, you must write a listener exit routine that is invoked when the requested event(s) occur. The following sections describe the requirements and implementation of this exit.

### Input Registers

Registers on entry to the SEN listener routine are as follows:

- R1 points to the address of input parameter list (mapped by macro SWSPGMIA) or zero.
- R13 points to the address of register save area.
- R15 points to the listener routine entry point address.
- All other registers are undefined.

On entry, Register 1 always contains the address of the SWSPGMIA data area except during SEN event registration. When requesting an event, you must provide the address of a listener exit routine that is invoked whenever the specified event(s) occur (for more information, see “LNRADR=” on page 659). As part of this process, HSC invokes the listener exit routine to ensure the address provided is valid. When this validation call is made, Register 1 contains zeros, indicating validation is being performed. During validation, the listener routine can simply return control or perform any routine specific initialization. If the validation call is not successful, the SEN request fails.

### Output Registers

Registers on exit from the SEN listener exit routine must be as follows:

- R13 points to the address of original register save area.
- All other registers are undefined (however R15 can be set to 4 upon return to instruct SEN to stop passing any further XML data. For more information, see “How to Tell SEN to Stop Calling Your Listener Routine During Event Processing” on page 670).

### Entry Environment

On entry, the SEN listener exit receives control as follows:

- STATE - supervisor
- KEY - key 0
- AMODE: 24 or 31 bit
- LOCKS - none

## Listener Exit Routine Programming Considerations

During the SEN registration process each successful request is queued in FIFO order. When a SEN defined event occurs all registered listener exits are invoked serially, in the order in which registration requests were received. A potential performance degradation can occur if a listener exit performs long running units of work. This is particularly critical because each SEN event causes listener exits to be invoked multiple times.



**Warning:** StorageTek **strongly recommends** that you design “short running” listener exit routines. In addition, the use of facilities that can result in “wait conditions”, such as WAIT/POST, STIMER/STIMERM and file I/O, should be used with caution or avoided all together.

## The SWSPGMIA Data Area

On entry to the SEN listener exit during event processing, Register 1 contains the address of a data area mapped by macro SWSPGMIA. This storage area contains pointers to the XML defined elements describing each SEN defined event. For more information on the XML structures and tags, see “VTCS and HSC Events XML Tags” on page 676.

The listener exit XML interface basically consists of three types of tag definitions:

- Structure start tags
- Structure end tags
- Data tags and associated data

Structure start tags are passed to the listener exit, without any other data, and are used to indicate a set of logically grouped tags will follow.

Data tags (both start and end) along with the associated data are self defining XML elements.

Structure end tags are passed to the listener exit, without any other data, and are used to indicate the set of logically grouped tags has ended.

The following fields of SWSPGMIA support these XML tag structures:

### **PGMIRSVA**

Address of complete XML element being passed.

### **PGMIRSVL**

Length of the start tag plus, optionally, data length plus end tag length.

### **PGMIRSTA**

Address of XML start or end tag.

### **PGMIRSTL**

Length of the XML tag.

### **PGMIRSDA**

Address of associated data, or zero.

## PGMIRSDL

Length of associated data, or zero.

Fields PGMIRSVL, PGMIRSTA, and PGMIRSTL always contain values. PGMIRSVL contains the address of either a structure start tag, a structure end tag or a data start tag. If PGMIRSVL points to a structure start or end tag, PGMIRSVL contains the length of the tag (including both the leading and trailing '<','>'). If PGMIRSVL points to a data tag, PGMIRSVL contains the length of the tag (including both the leading and trailing '<','>'), plus the length of the data, plus the length of the data end tag.

Fields PGMIRSTA and PGMIRSTL always contain values. PGMIRSTA contains the address of either a structure start tag or a structure end tag. PGMIRSTL contains the length of the tag (including both the leading and trailing '<','>'),

Fields PGMIRSDA and PGMIRSDL optionally contain values. If PGMIRSVL points to either a structure start or structure end tag, PGMIRSDA and PGMIRSDL will contain zero since there is no data associated with these tags. But if PGMIRSVL points to a data start tag, then PGMIRSDA will contain the address of the associated data, and PGMIRSDL will contain the data's length. The following sections show examples of how the listener exit routine processes XML structures and tags.

### Example 1

XML tag `<libvol_insert_event>` is passed to the listener exit, which produces the following:

- PGMIRSVL points to: `<libvol_insert_event>`.
- PGMIRSVL contains: `x'00000015'`.
- PGMIRSTA points to: `<libvol_insert_event>`.
- PGMIRSTL contains: `x'00000015'`.

Because `<libvol_insert_event>` is a structure tag and has no related data:

- PGMIRSDA contains: 0.
- PGMIRSDL contains: 0.

### Example 2

XML tag `<hsc_version>5.0.0</hsc_version>` is passed to the listener exit, which produces the following:

- PGMIRSVL points to: `<hsc_version>`.
- PGMIRSVL contains: `x'00000020'`.
- PGMIRSTA points to: `<hsc_version>`.
- PGMIRSTL contains: `x'0000000D'`.

Since `<hsc_version>` is a data start tag, it does have related data. As a result:



- PGMIRSDA points to: 5.0.0.
- PGMIRSDL contains: 00000005.

As described in “Listener Exit Routine Programming Considerations” on page 667, each SEN defined event causes multiple invocations of registered listener exit routines. For example, when an HSC insert volume event occurs the following XML structure is built. The listener routine will be invoked for each of the tag sets:

- <libvol\_insert\_event> (passed on the 1st call to listener exit)
- <header> (passed on 2nd call to the listener exit)
- <hsc\_version>5.0.0</hsc\_version> (passed on 3rd call to the listener exit)
- <date>2002Mar19</date> (passed on 4th call to the listener exit)
- <time>17:53:17</time> (passed on 5th call to the listener exit)
- <host\_name>HOSTA</host\_name> (passed on 6th call to the listener exit)
- </header> (passed on 7th call to listener exit)
- <libvol\_data> (passed on 8th call to listener exit)
- <vol\_status>xx</vol\_status> (passed on 9th call to listener exit, xx is a 1 byte flag field documented in member SLSUX06P of the SLSMAC installation file, field UX06FLGS)
- <volser>V0L001</volser> (passed on 10th call to listener exit)
- <volume\_location> (passed on 11th call to listener exit)
- <acs>00</acs> (passed on 12th call to listener exit)
- <lsm>000</lsm> (passed on 13th call to listener exit)
- <panel>07</panel> (passed on 14th call to listener exit)
- <row>02</row> (passed on 15th call to listener exit)
- <column>10</column> (passed on 16th call to listener exit)
- </volume\_location> (passed on 17th call to listener exit)
- <select\_count>0</select\_count> (passed on 18th call to listener exit)
- </libvol\_data> (passed on 19th call to listener exit)
- </libvol\_insert\_event> (passed on 20th and final call to listener exit)

## How to Tell SEN to Stop Calling Your Listener Routine During Event Processing

Because listener routines are invoked to process each XML tag for the event, the data required by the listener may be satisfied before the last tag for the event is passed. For example, your listener routine only requires ACS and LSM number when a cartridge is entered into an LSM. Using “Example 2” on page 668, the listener routines requirements are satisfied on the 13th call. In this situation, a listener routine can set general purpose register 15 to 4 prior to returning control. This instructs SEN not to call it any more for this event. The remaining XML tags are bypassed.

## Detecting Duplicate Listen Requests

When an application attempts to register a Listen request with the SEN facility, HSC first validates the request. As part of this validation, HSC insures duplicate registration requests are not accepted to prevent the same user exit routine from being called multiple times for a single event. The following list differentiates between a unique and a duplicate registration request:

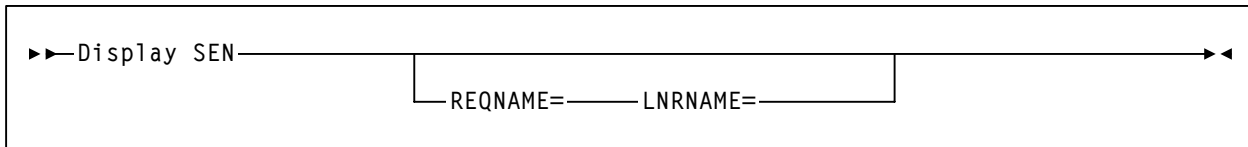
- If a new Listen request specifies an exit routine entry point address that is different than all other previously registered entry point addresses, the Listen request is accepted.
- If a new Listen request specifies an exit routine entry point address that matches a previously registered entry point address but their respective event lists contain no common events (that is, each Listen request specified a unique event list), the Listen request is accepted.
- If a new Listen request specifies an exit routine entry point address that matches a previously registered entry point address and their respective event lists contain all common events (that is, each Listen request specified identical event lists), the Listen request is rejected as an identical duplicate and terminates with a return code of 36.
- If a new Listen request specifies an exit routine entry point address that matches a previously registered entry point address and their respective event lists contain some common events but not all (that is, each Listen request specified partially matching event lists), the Listen request is rejected as a duplicate with conflicting event lists and terminates with a return code of 8.

## Display SEN Command

You can use the Display SEN command to display the SEN LISTEN requests and their statuses. The display can either show a specific request, using the requestor and listener names, a list of related requests using only the requestor name, or all SEN requests. The information displayed includes:

- Requestor name and listener name if any.
- EOT/EOM settings.
- Disable/enable status.
- The token associated with the request.
- The event list of the request.

### Syntax



### Parameters

**REQNAME=**

Specifies the name of the requestor identified on the SEN request (see “Execute Form - Syntax and Parameters” on page 658).

**LNRNAME=**

Specifies the name of the listener routine identified on the SEN request (see “Execute Form - Syntax and Parameters” on page 658).



**Note:** REQNAME= and LNRNAME= are optional. If you specify one, however, you must specify the other.

## Supported HSC and VTCS SEN Events

### HSC Events

Table 80 on page 672 describes the supported HSC SEN events.

**Table 80. HSC SEN Events**

Event Name	Numeric Equate
libvol_insert_event	18
libvol_delete_event	19
hsc_termination_event	20
ismrail_added_event	25
ismrail_removed_event	26
libdrive_added_event	27
libdrive_removed_event	28

### VTCS SEN Events

Table 81 on page 672 describes the supported VTCS SEN events.

**Table 81. VTCS SEN Events**

Event Name	Numeric Equate
vtss_performance_event	01
vtss_chanif_performace_event	02
vtv_mount_event	03
vtv_dismount_event	04
vtv_delete_event	05
mvc_mount_event	06
mvc_dismount_event	07
vtv_migrate_event	08
vtv_recall_event	09
rtd_performance_event	10
rtd_vary_event	11
mvc_usage_event	12
vtv_movement_event	13
vtv_scratch_event	14
vtv_replicate_event	15

**Table 81. VTCS SEN Events**

<b>Event Name</b>	<b>Numeric Equate</b>
vtv_unlink_from_mvc_event	16
clink_vary_event	17

## SEN Messages

**SLS4970I** SEN QUEUE DISPLAY STATUS  
CURRENT REQUESTORS 99999999  
REQNAME RRRRRRRR LNRNAME LLLLLLLL TOKEN TTTTTTTT  
FLAGS FFFFFFFF  
EVENT EEEEEEEE

**Explanation:** This is the output from the Display SEN Queue command. The output produced varies depending on the parameters specified. If no parameters are specified all entries in the SEN QUEUE are displayed. If REQname is specified then only Requestors matching REQname will be displayed. If LNRname is specified REQname must be specified. If LNRname is specified then only Requestors and Listeners matching REQname and LNRname will be displayed.

99999999	Number of Requestors on the SEN QUEUE
RRRRRRRR	Requestor name
LLLLLLLL	Listener name
TTTTTTTT	Hex display of the Requestor Token
FFFFFFF	Description of the processing flags for the SEN QUEUE ENTRY
EEEEEEEE	Description of the Event to be Listened for

**System Action:** None.

**User Response:** None.

**SLS4971I** Significant Event Notification facility not active

**Explanation:** An attempt was made to display SEN Queue entries. However, Significant Event Notification facility is not active.

**System Action:** The DISPLAY SEN command is rejected.

**User Response:** Make certain you are running the correct version of HSC. If you are certain you are running the correct version contact StorageTek HSC support.

**SLS4972I** SEN QUEUE IS EMPTY

**Explanation:** An attempt was made to display SEN Queue entries. However, the SEN QUEUE contained no entries.

**System Action:** Processing continues.

**User Response:** Make certain you have run the task to add entries to the SEN QUEUE. If the task has run correctly contact StorageTek HSC support.

**SLS4973I** REQNAME *nnnnnnnn* NOT FOUND

**Explanation:** An attempt was made to display a specific Requestor on the SEN QUEUE. However, the specified Requestor was not found.

**System Action:** Processing continues.

**User Response:** Make certain you have spelled the Requestor name correctly.

**SLS4974I** LNRNAME *nnnnnnnn* NOT FOUND

**Explanation:** An attempt was made to display a specific Listener on the SEN QUEUE. However, the specified Listener was not found.

**System Action:** Processing continues.

**User Response:** Make certain you have spelled the Listener name correctly.

## **VTCS and HSC Events XML Tags**

This section describes the XML output of the VTCS and HSC events processed by the HSC Significant Event Notification (SEN) facility as follows:

- Listing of the data tags.
- Tag definitions.
- Cross reference of data tags to structure or event tags.

For more information, see the following sections:

- “VTCS Events XML Tags” on page 677
- “HSC Events XML Tags” on page 681



## VTCS Events XML Tags

**Table 82. VTCS Events XML Tags**

XML Tag	Definition	Where Used
<addresses_trapped>	From SMF11NAT in turn from NOADRTRP parm returned from Channel Interface Performance ECAM-T request. Contains the number of unit addresses trapped by a channel interface.	<chanif_data>
<async_end_tod>	Structure that contains date and time that the asynchronous event completed. Date is supplied as: <date>yyyymmdd</date> Time is supplied as: <time>hh:mm:ss.thm</time>	<vtv_mount_event>
		<vtv_dismount_event>
		<mvc_mount_event>
		<vtv_migrate_event>
		<vtv_recall_event>
		<vtv_replicate_event>
<async_start_tod>	Structure that contains date and time that the asynchronous event started. Contains <date> and <time> as in <async_end_tod>.	<vtv_mount_event>
		<vtv_dismount_event>
		<mvc_mount_event>
		<vtv_migrate_event>
		<vtv_recall_event>
		<vtv_replicate_event>
<base_cache_size>	Cache size in MB of VTSS	<vtss_performance_event>
<bytes_read_freespace_collection>	Bytes read for free space collection within a partition.	<part_data>
<bytes_xfered_read>	Bytes transferred for read	<rt_d_performance_event>
<bytes_xfered_write>	Bytes transferred for write	<rt_d_performance_event>
<chanif_data>	Structure that contains all the information for a single channel IF. Contains:	<vtss_chanif_performance_event>

**Table 82. VTCS Events XML Tags**

XML Tag	Definition	Where Used
	<name>	
	<installed>	
	<enabled>	
	<link_type>	
	<addresses_trapped>	
	<speed>	
	<io_count>	
	<cu_busy_count>	
<collected_free_backend_capacity>	Bytes read for free space collection with the VTSS partition.	<part_data>
<cu_busy_count>	Count of control unit busy events on a chan IF	<chanif_data>
<customer_cache_size>	Customer cache size in MB	<vtss_performance_event>
<dev_activity>	RTD activity (initial selects)	<rtd_preformance_event>
<dev_available_time>	RTD mounted time	<rtd_preformance_event>
<dev_connect_time>	RTD connected time	<rtd_preformance_event>
<dev_util_time>	RTD utilized time	<rtd_preformance_event>
<dsname>	Data set name of the VTV being mounted/dismounted	<vtv_mount_event>
		<vtv_dismount_event>
<ecam_bypassed_bufferspace_count>	Count of ECAM-T requests bypassed – no buffer space	<vtss_performance_event>
<ecam_bypassed_configbusy_count>	Count of ECAM-T requests bypassed – configuration busy	<vtss_performance_event>
<ecam_processed_count>	Count of ECAM-T requests processed	<vtss_performance_event>
<enabled>	Indicates if a channel if is enabled - contains YES/NO	<chanif_data>
<installed>	Indicates if a channel if installed - contains YES/NO	<chanif_data>
<io_count>	Number of I/Os on this channel interface since last report.	<chanif_data>
<jobname>	MSP jobname requesting the mount/dismount	<vtv_mount_event>
		<vtv_dismount_event>

**Table 82. VTCS Events XML Tags**

XML Tag	Definition	Where Used
<link_type>	Identifies the link type contains HOST/RTD	<chanif_data>
<mount_type>	Indicates the type of mount performed. Contains:	<vtv_mount_event>
	EXISTING-SPECIFIC	
	CREATE-SL	
	CREATE-AL	
	EXISTING-SCRATCH	
<name>	The configured name of the channel IF.	<chanif_data>
<new_mvc>	Structure that describes the target MVC on a VTV move. Contains <mvc_data>	<vtv_movement_event>
<nvs_size>	NVS Size (MB)	<vtss_performance_event>
<offline_cache_size>	Offline cache size	<vtss_performance_event>
<old_mvc>	Structure that describes the source MVC on a VTV move. Contains <mvc_data>	<vtv_movement_event>
<part_data>	Structure containing all the information from a VTSS partition. Contains:	<vtss_performance_event>
	<total_backend_capacity>	
	<total_free_backend_capacity>	
	<collected_free_backend_capacity>	
	<bytes_read_freespace_collection>	
	<standard_capacity_defined>	
< name>	Name of a VTSS partition	<part_data>
<pinned_cache_size>	Pinned Cache Size	<vtss_performance_event>
<read_buffered_log>	64-byte rbl data represented as 128 characters	<mvc_dismount_event>
<read_only>	Indicates whether or not the VTV was mounted READONLY – contains YES/NO	<vtv_mount_event>

**Table 82. VTCS Events XML Tags**

XML Tag	Definition	Where Used
<reason>	The reason for the VTV delete, MVC mount, VTV migrate, VTV recall or the VTV/MVC unlink.	<vtv_delete_event>
		<mvc_mount_event>
		<vtv_migrate_event>
		<vtv_recall_event>
		<vtv_unlink_from_mvc_event>
<recall_required>	Indicates whether or not a recall was required in order to mount the VTV – contains YES/NO	<vtv_mount_event>
<recall_with_error>	Indicates if the recall was performed with error – contains YES/NO	<vtv_recall_event>
<sense_data>	32-byte sense data represented as 64 characters	<mvc_mount_event>
		<mvc_dismount_event>
		<vtv_recall_event>
		<vtv_replicate_event>
<speed>	The speed of a channel IF.	<chanif_data>
<standard_capacity_defined>	Standard capacity defined for the partition	<part_data>
<stepname>	MSP stepname of the job requesting the mount/dismount of the VTV	<vtv_mount_event>
		<vtv_dismount_event>
<total_backend_capacity>	Total backend capacity for a partition	<part_data>
<total_free_backend_capacity>	Total free backend capacity for a partition.	<part_data>

## HSC Events XML Tags

Table 83. HSC Events XML Tags

Head Tag	Structure/Data Tags		Definition
<header>			header structure, occurs in: <libvol_insert_event> <libvol_delete_event> <hsc_termination_event> <b>Note:</b> Any x22 abends resulting from the cancellation of HSC will not generate the HSC termination event. <libdrive_added_event> <libdrive_removed_event> <ismrail_added_event> <ismrail_removed_event>
	<hsc_version>		HSC Version
	<date>		date
	<time>		time
	<host_name>		host name

**Table 83. HSC Events XML Tags**

Head Tag	Structure/Data Tags			Definition
<libdrive_added_event>				dynamically added drive event
	<libdrive_data>			drive data
		<location_data>		drive location
			<acs>	ACS
			<lsm>	LSM
			<panel>	panel
			<libdrive_number>	drive number
		<libdrive_model>		drive model (for example, 9840C)
		<libdrive_unit_address>		MSP unit address
<libdrive_removed_event>				dynamically removed drive event
	<libdrive_data>			drive data
		<location_data>		drive location
			<acs>	ACS
			<lsm>	LSM
			<panel>	panel
			<libdrive_number>	drive number
		<libdrive_model>		drive model (for example, 9840C)
		<libdrive_unit_address>		MSP unit address
<libvol_insert_event>				library volume insert event
	<libvol_data>			library volume data
		<vol_status>		volume status (e.g., scratch)

**Table 83. HSC Events XML Tags**

Head Tag	Structure/Data Tags		Definition
		<volser>	VOLSER
		<volume_location>	volume location data
			<location_type> Location type (e.g. cell)
			<acs> acs id
			<lsm> Lsm id
			<panel> panel number
			<row> Row number
			<column> Column no.
		<select count>	Number of times volume selected
<libvol_delete_event>			library volume delete event
	<libvol_data>		library volume data
		<vol_status>	volume status (e.g. scratch)
		<volser>	VOLSER
		<volume_location>	volume location data
			<location_type> Location type (e.g., cell)
			<acs> acs id
			<lsm> Lsm id
			<panel> panel number
			<row> Row number
			<column> Column no.
		<select_count>	Number of times volume selected

**Table 83. HSC Events XML Tags**

Head Tag	Structure/Data Tags		Definition
<hsc_termination_event>			HSC termination event
<ismrail_added_event>			dynamically added LSM rail event (SL8500 only)
	<ismrail_data>		LSM rail data
		<location_data>	rail location
			<acs>
			<ism>
<ismrail_removed_event>			dynamically removed LSM rail event (SL8500 only)
	<ismrail_data>		LSM rail data
		<location_data>	rail location
			<acs>
			<ism>



# Appendix G. Programmatic Interface (PGMI)

---

## Overview

The Host Software Component (HSC) provides a programmatic interface for users and software developers to request services from the HSC. This interface is functional at the HSC FULL service level.

Those services are:

- query information
- volume movement
- scratch volume control.

The interfaces defined in this document are provided to allow programs that do not use certain MSP services (e.g., unique tape management systems) to request certain services from the HSC.

## Query Information

A user can query the HSC for information about configuration, data sets, drive selection, scratch pools, volume location and status. This includes some information available from the HSC Display command. The information is returned in structured control blocks.

A program can query the HSC to determine if a volume is resident in the ACS, and if it is, what drives are the closest. This permits programs doing their own dynamic allocation to make an appropriate choice.

## Volume Movement

Interfaces are provided for issuing requests to the HSC to mount, dismount, and eject volumes. If the interface is not used, a program must go through allocation, OPEN/CLOSE/EOV, and the appropriate mount and dismount messages must be issued. The HSC intercepts the messages and instructs the ACS to perform the necessary operations. For further information on intercepted messages, refer to the *SMC Configuration and Administration Guide*.

## Scratch Volume Control

The HSC supports the following scratch processing options:

- request a scratch volume to use; request the HSC to select a VOLSER the HSC thinks is scratch
- return a volume to scratch status
- mark a volume as nonscratch
- provide scratch subpool support.

This permits an installation more control over scratch processing.

## Virtual Storage Manager (VSM) Support

VSM support has been added for certain HSC programmatic interface requests. See the VSM software documentation for more information.

## Using the Interface

Requests for HSC services are made via the SLSXREQ macro. The request parameter list and response areas are mapped by the SLSXREQM macro. An assembler program that uses SLSXREQ is also required to have SLSXREQM generate the DSECTs used by the SLSXREQ macro.

SLSXREQ calls module SLSXCAL to actually get the request over to the HSC. The primary purpose of this routine is to locate the HSC program call (PC) number for cross address space communication. The user is required to have previously loaded SLSXCAL. The address of the routine is passed to the SLSXREQ macro. SLSXCAL is reentrant, so the LOAD need only be done once.

The normal return code (in R15) from the SLSXREQ macro is zero. This indicates the function was successfully initiated. When the HSC is unavailable, a SLSXREQ request receives a return code of SLXRNHSC (X'20') in register 15. The QHSC request can be used to periodically poll the HSC status to determine when it becomes available.

When request processing completes, the HSC returns the address of the response area and its length. R1 contains the address of the response area and R0 contains the length of the response. The response area is in non-fetch protected, HSC key storage. The user should not attempt to freemain or alter the response area. This response area is valid until the next SLSXREQ call, after which it no longer contains the response.

Both synchronous and asynchronous interfaces are provided. Synchronous requests cause the requestor to wait until the request is complete. Asynchronous mode allows the user to have multiple requests active at once, and returns control to the requestor immediately.



**Note:** Asynchronous requests are not supported for the QHSC and READ functions.

Upon returning from an asynchronous request, R0 will contain a token and R1 will contain the address of an ECB. When the request is complete, the ECB will be posted. After the post, the user must issue a SLSXREQ READ function specifying the returned token. This causes a single response to be made available to the requestor. The ECB and token are no longer valid after the response has been read.

If the PGMI application terminates before all asynchronous requests have completed, any pending requests are canceled. To ensure all requests have completed, the PGMI application must wait for all ECBs to be posted.



**Note:** If an asynchronous request specifies selected CAPs or volumes, and the PGMI does not wait until all ECBs are posted before terminating, CAPs may need to be released by entering the RELEase CAP command (refer to “RELEase CAP Command” in the *HSC/MSP Operator's Guide*) and VOLSERs may need to be “unselected” using the UNSElect utility (refer to “UNSElect Utility” on page 309).

The responses are mapped by the SLSXREQM macro. The response block always contains a Reply Header, mapped by the SLX DSECT. The contents of the elements that follow the SLX header depend on the type of request made. Elements of a similar type are always contiguous (e.g., all drive elements are together). The Reply Header contains the number of each type of element, the offset from the start of Reply Header to the start of the

elements of a specified type, and the length of each element type. In order to ensure compatibility with future enhancements, the length in the Reply Header should be used at run time; not an assembled constant.

In the event that the HSC is made unavailable in the middle of a request, the ECB will be posted and the response area will indicate that the HSC is unavailable.

A request can only be issued in task mode with no locks held. A task can have multiple requests active at once. If the requesting task terminates, no responses will be sent and any returned response areas will no longer be valid.

## SLSXREQ Functions

The sections below describe the SLSXREQ functions.

### Query Requests

Query requests can be issued to obtain information from the HSC. These requests include

- QCAP – Requests a CAP query to determine the number of CAPs available and the capacity and status of each CAP.
- QCONFIG – Requests certain configuration data from the HSC. It returns the number of ACSs and LSMs in the library.
- QDRIVES – Requests drive configuration data from the HSC.
- QDRLIST – Requests a list of drives sorted by proximity to a specified volume. An empty list is returned if the volume is not in the library. For scratch requests, drives are sorted by LSM. Drives attached to the LSM containing the most scratch volumes for a specified subpool are listed first.
- QDSN – Requests information about the current data sets in use by the HSC.
- QHSC – Requests the status (up or down) of the HSC.
- QEJECT – Determine the status of all vol-ids within a given eject request.
- QSCRATCH – Requests the scratch counts for each LSM in the library.
- QVOLUME – Requests information about a specified volume.

### Motion Requests

Motion requests can be issued to have the HSC move a cartridge. The motions that can be requested are

- DISMOUNT – Dismount a cartridge and place it in a cell.
- EJECT – Move a cartridge from a cell, place the cartridge in a CAP, and have the operator remove the cartridge.
- MOUNT – Move a cartridge to a drive and mount it.
- MOVE – Move a volume(s) within an LSM or to another LSM.
- RESET – Attempt to dismount all cartridges mounted on behalf of a specified host.

### Scratch Requests

The following requests can be issued to alter the scratch status of a volume:

- SCRATCH – Mark a volume as being in scratch status.
- SELSCR – Pick a volume in a specified scratch subpool and mark it as nonscratch.
- UNSCRATCH – Mark a volume as not being in scratch status.

## Control Requests

The following requests can be issued to control processing of requests:

- READQ – Read a response associated with a specific token.
- STOP – Terminate a specific PGMI request.

## Authorization

The HSC provides a user exit (SLSUX05) to perform authorization checking. If the user exit disables itself (setting return code UX05NOPR) or ABENDs, the HSC allows all users to issue the query and READ requests. The remaining requests can only be issued by APF-authorized, key 0-7, or supervisor state requestors.

If desired, an installation can use the user exit (SLSUX05) to perform different authorization (e.g., use RACF or similar product).

## Functional Description

The user exit is invoked for all requests received from the user interface. This does not include HSC internal requests (e.g., job processing, utilities). The user exit should evaluate the request, and set a return code to indicate if the HSC should permit the request to be executed.

The installation written exit routine, which replaces the StorageTek default routine, must be named SLSUX05, and is link-edited into an HSC library. Standard Fujitsu OS linkage conventions must be observed.

For more information on User Exit SLSUX05, see the *NCS User Exit Guide*.

## Macros

The HSC programmatic interface uses the SLSXREQ invocation macro to format a parameter list and call SLSXCAL to continue processing. It is assumed that the caller has previously loaded SLSXCAL.

The SLSXREQM macro must be specified to generate a mapping of the parameter list and reply areas

R13 must point to a 72-byte register save area.

### Addresses and Registers

- RS-type address: specifies an address that would be valid in an RS-type instruction
- RX-type address: specifies an address that would be valid in an RX-type instruction.
- Register (2) - (12): indicates that one of the general registers, 2 through 12, should be specified, enclosed in parentheses. The register must have been previously loaded with the value required by the parameter. Unused bits must be zeroed.
- Register (0): specifies general register 0, previously loaded as indicated above for register (2) - (12).



## Macro SLSXREQ Syntax

Only list and execute forms of the SLSXREQ macro are available.

### List Form

The list form defines a remote parameter list that is referenced by the execute form of the macro

The syntax for the list form is:

```
▶ label—SLSXREQ—MF=L—————▶
```

### Parameters

**MF=L** specifies that a remote parameter list is generated. All other options are ignored.

### Execute Form

The execute form stores parameters in the area defined by the list form and calls SLSXCAL.

The syntax for the execute form is:

```
▶ label—SLSXREQ—function—parameter—————▶
```

where *function* is:

<b>DISMOUNT</b>	Dismount volume
<b>EJECT</b>	Eject volume(s) from an ACS
<b>MOUNT</b>	Mount volume
<b>MOVE</b>	Move volume(s) within library
<b>QCAP</b>	Get the number, capacity, and status of each CAP in an ACS
<b>QCONFIG</b>	Get configuration data
<b>QDRIVES</b>	Get drive information
<b>QDRLIST</b>	Get list of drives for mount
<b>QDSN</b>	Get data set information

<b>QEJECT</b>	Determine the status of individual vol-ids within a specific eject request
<b>QHSC</b>	Determine HSC status
<b>QSCRATCH</b>	Get LSM scratch counts
<b>QVOLUME</b>	Get volume status
<b>READ</b>	Read a response
<b>RESET</b>	Dismount all volumes mounted for a specified host
<b>SCRATCH</b>	Return a volume to scratch status
<b>SELSCR</b>	Select a scratch volume
<b>STOP</b>	Terminate a specific PGMI unit-of-work (or list of units-of-work)
<b>UNSCRATCH</b>	Remove a volume from scratch status

and *parameter* is:

,ACSID=*acsidaddr*  
 ,CAP=*capidaddr*  
 ,COL=*columnaddr*  
 ,COUNT=*countaddr*  
 ,DRIVE=*driveaddr*  
 ,DSN=*datasetname*  
 ,EXPDT=*expirationdate*  
 ,HOSTID=*hostaddr* or *hostidaddr*  
 ,JOB=*jobname* ,  
 ,LIST=*itemlistaddr*  
 ,LSM=*lsmidaddr* or *lsmaddr*  
 ,LTYPE={LDT|SL|NL|AL|NSL|(*r*)}  
 ,MEDIA=*medaddr*  
 ,MF=(*E,parmaddr*)  
 ,OPTION={SYNCH|ASYNCH}  
 ,PAN=*paneladdr*  
 ,PGM=*pgmname*  
 ,PROTECT={YES|(*r*)}  
 ,RECTECH=*recaddr*

,RETPD=*retentionperiod*  
 ,ROW=*rowaddr*  
 ,SCRATCH={YES|(*r*)}  
 ,SCRPOOL=*value*  
 ,STEP=*stepname*  
 ,SUBPOOL=*subpoolname* or *value*  
 ,TEXT=*textaddr*  
 ,TOKEN=*tokenaddr*  
 ,TOLSM=*lsmaddr*  
 ,TOPAN=*paneladdr*  
 ,VOLSER=*voladdr* or *volumeaddr*  
 ,VOLTYPE={Specific|Nonspecific}  
 ,XCALADR=*rtnaddr* or *subrtnaddr*

The following parameters from the list above are selection criteria (input) parameters taken from the TAPEREQ control statement:

- DSN
- EXPDT
- JOB
- PGM
- RETPD
- STEP
- VOLTYPE.

**Note:** EXPDT and RETPD are mutually exclusive.

MEDIA and RECTECH are media and format requirements (output) parameters also associated with TAPEREQ.

The PGMI determines media and recording technique values for a request either by using MEDIA and RECTECH parameters directly or by searching the TAPEREQ selection criteria (input) parameters in the following order:

1. If both MEDIA and RECTECH are specified, all TAPEREQ parameters are ignored.

**Note:** PGMI TAPEREQ values (i.e., DSN, EXPDT, JOB, PGM, RETPD, STEP, and VOLTYPE) are ignored as well.

2. If either MEDIA or RECTECH is specified, the implied default is used for the parameter not entered (e.g., if MEDIA is supplied, the RECTECH default is taken).
3. If neither MEDIA nor RECTECH is specified, the PGMI TAPEREQ values (i.e., DSN, EXPDT, JOB, PGM, RETPD, STEP, or VOLTYPE) are searched to determine a media type and recording technique from the TAPEREQ statement(s).

4. If none of the PGMI TAPEREQ values is specified, the HSC tries to find a TAPEREQ that matches all the TAPEREQ default values. If that fails, the default values for MEDia and RECtech are used.

## Return Specifications

### Return Codes

Upon return, R15 contains a decimal return code as follows:

Return Field Name	Decimal Value and Description
SLXR0K	0 - Wait can be issued (OPTION=ASYNCH) or check response area for status (OPTION=SYNCH).
SLXRNHSC	20 - HSC not available. No SLX response is returned.

After the ECB associated with the request (for OPTION=ASYNCH) has been posted, or upon return for OPTION=SYNCH, the field SLXCMDRC (Return Code) will indicate the status (decimal) of the request.

Return Field Name	Decimal Value and Description
SLXR0K	0 - Request completed successfully.
SLXRWARN	4 - The request completed successfully. However, an anomalous condition occurred (e.g., a QVOLUME request specified a volume not in the library).
SLXRBADP	8 - Bad parameter list (e.g., incompatible options). SLXPEOFF will provide an offset to the bad parameter.
SLXRIERR	12 - Unrecoverable error occurred while processing request.
SLXRFAIL	16 - Request unsuccessful. SLXSRC contains the function specific reason code or a message. HSC messages and non-PGMI reason codes are described in the <i>HSC/MSP Messages and Codes Manual</i> . PGMI reason codes are described in "Reason Codes" on page 697.
SLXRNHSC	20 - HSC not available.
SLXRNAUT	24 - User not authorized. The request was failed by SLSUX05, or the HSC default authorization.
SLXNTCB	28 - Request unsuccessful. The caller was not in task mode.
SLXLOCKD	32 - Request unsuccessful. The caller held at least one lock.
SLXTPROT	36 - Request unsuccessful. The caller did not have fetch/store authority to the SLSXREQM parameter list.
SLXNORSP	40 - Request unsuccessful. No response element with the specified token existed.

## Reason Codes

Reason Code Field Name	Decimal Value and Description
SLXANOALS	32772 - HSC is not active.
SLXQNOA	32788 - ASCOMM is not active.
SLXINVOP	32792 - Invalid QUAB option. Internal error; contact StorageTek.
SLXINVFC	32780 - Invalid function code. Internal error; contact StorageTek.
SLXNOLVT	32784 - No LVT. Internal error; contact StorageTek.
SLXTABND	32804 - ASCOMM server task abended.
SLXTINTR	32818 - Current task interrupted.
SLXSANF	32822 - Search argument not found.
SLXMSTT	32826 - Mismatch token types.
SLXTRNF	32832 - Token request area not found.
SLXSFUL	32848 - Reply area space is full.

# DISMOUNT

## DISMOUNT

The DISMOUNT request directs the HSC to dismount a volume from a specified transport.

### DISMOUNT Considerations

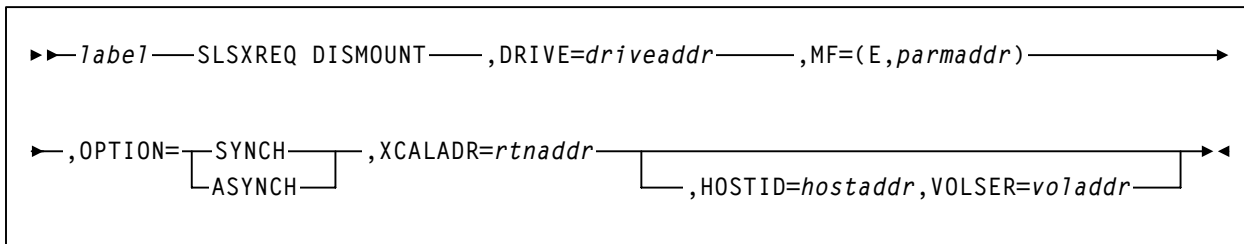
If the operation fails, normal messages to the operator are still sent.

If the volume was temp-entered (see the MOUNT request), it will be ejected to the highest preference available CAP. Otherwise, it is moved to a cell chosen by the HSC.

The requestor is responsible for ensuring that the cartridge on the drive has been rewound. If it has not, the operator is asked for permission to rewind the drive. If the operator grants permission, the drive is unloaded, regardless of whether the drive is in use.

A DISMOUNT request may cancel a MOUNT request provided it is issued before the cartridge is removed from its cell. This is called suppression. If this happens, both requests fail, and the response reason codes indicate “suppression” has occurred.

### Syntax



### Parameters

#### DRIVE

*driveaddr* specifies the address of the 2-byte drive specification (0cua) from which a volume needs dismounting. Specify either an RX-type address of the data or the register (2) - (12) containing the address of the data.

**This parameter is required.**

#### MF=(E,*parmaddr*)

specifies the execute form of the SLSXREQ macro using a remote parameter list. The parameter list address *parmaddr* may be specified as an RX-type address or in the register form. Valid register values are (1) - (12).

**This parameter is required.**

**OPTION**

specifies whether the requestor is to wait until the request is complete or continue processing while the request is active.

**This parameter is required.**

**SYNCH**

specifies that the requestor wait until the request is complete.

**ASYNCH**

specifies that the requestor continue processing while the request is active. After return from the original request, R1 contains the address of an ECB POSTed when the response completed. R0 contains the token used by SLSXREQ READ to read the response.

**XCALADR**

specifies a location containing the address of the SLSXCAL routine.

*rtnaddr* specifies either an RX-type address of the routine, register (15), or register (2) - (12) containing the routine's address.

**This parameter is required.**

**HOSTID**

specifies the address of an eight character host ID, left justified and padded with blanks.

*hostaddr* specifies either an RX-type address of the host ID or the register (2) - (12) containing the address of the host ID.

**This parameter is optional.** If the parameter is not specified, the host ID executing the request is used.

**VOLSER**

*voladdr* specifies the address of a six-character volume label. Acceptable characters for a VOLSER are A-Z, 0-9, #, \$, ¥, and trailing blanks.

Specify either an RX-type address of the VOLSER or the register (2) - (12) containing the address of the VOLSER.

**This parameter is required if HOSTID is specified.**

# DISMOUNT

## Response to DISMOUNT Request

A return code (SLXCMDRC in the SLSXREQM macro) indicates the success of the operation. If the drive is now empty, a return code of SLXROK is placed in SLXCMDRC. If the dismount failed, a return code of SLXRFAIL is placed there.

If the return code is SLXROK or SLXRFAIL, a reason code or message is placed in SLXSRC, and a message text element (mapped by SLXSMSG) is returned. The reason code is the binary message number of the message that the HSC issued when the request completed. HSC messages and non-PGMI reason codes are described in the *HSC/MSP Messages and Codes Guide*. PGMI reason codes are described in “Reason Codes” on page 697.

The response is returned at the completion of the request.



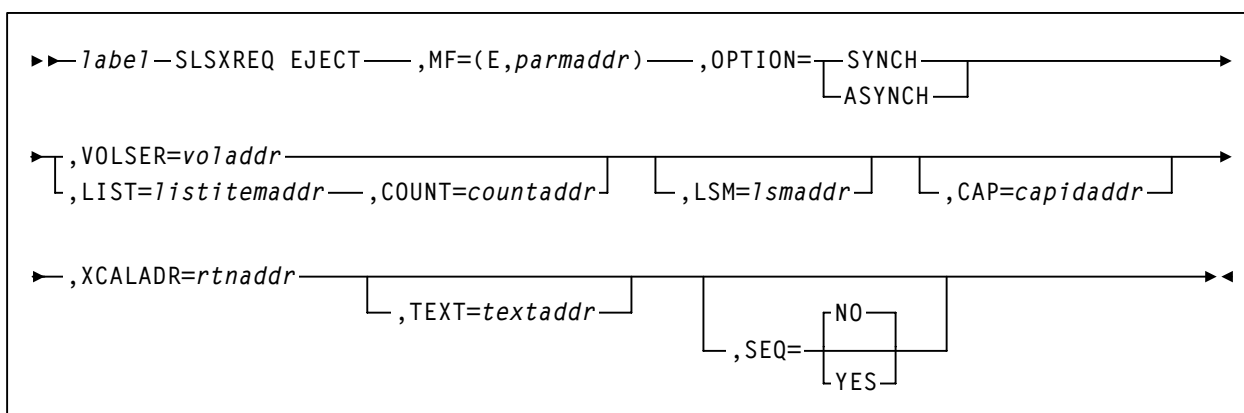
## EJECT

The EJECT request causes the HSC to eject a specific volume from the library using the parameter VOLSER, or a list of volumes using the parameters LIST and COUNT. The volume is ejected to the available CAP with the highest preference. The volume may also be ejected at a designated LSM by issuing the LSM parameter.

### EJECT Considerations

This request duplicates the operator Eject command with the exception that there is no limit of 100 VOLSERs specified with the COUNT parameter.

### Syntax



### Parameters

#### MF=(E,*parmaddr*)

specifies the execute form of the SLSXREQ macro using a remote parameter list. The parameter list address *parmaddr* may be specified as an RX-type address or in the register form. Valid register values are (1) - (12).

**This parameter is required.**

#### OPTION

specifies whether the requestor is to wait until the request is complete or continue processing while the request is active.

**This parameter is required.**

#### SYNCH

specifies that the requestor wait until the request is complete.

#### ASYNCH

specifies that the requestor continue processing while the request is active. After return from the original request, R1 contains the address of an ECB

# EJECT

POSTed when the response completed. R0 contains the token used by SLSXREQ READ to read the response.

## **VOLSER**

*voladdr* specifies the address of a six-character volume label. Acceptable characters for a VOLSER are A-Z, 0-9, #, \$, ¥, and trailing blanks.

Specify either an RX-type address of the VOLSER or the register (2) - (12) containing the address of the VOLSER.

**This parameter is required if LIST and COUNT are not specified.** Either VOLSER or LIST and COUNT must be specified.

## **LIST**

*listitemaddr* specifies the address of a list of elements.

For EJECT, LIST designates a list of 6-byte VOLSERs.

**This parameter is required if VOLSER is not specified.**

## **COUNT**

*countaddr* specifies the address of a two-byte count value.

**This parameter is required when LIST is specified.**

For EJECT, COUNT specifies the number of VOLSERs in the list designated by the co-requisite LIST parameter. Either COUNT and LIST or VOLSER must be specified.

## **LSM**

specifies the address of an LSMid. The format of an LSMid is *AALL*, where *AA* is the ACS number (00-FF hexadecimal) and *LL* is the LSM number (*LL* is 00-17 hexadecimal). For example, 0102 is ACS 01, LSM 02.

Specify either an RX-type address of the LSMid or the register (2) - (12) containing the address of the LSMid.

**This parameter is optional.**

## **CAP**

specifies the address of the CAP used to satisfy the request. *capidaddr* specifies either the RX-type address of the data or the number of the register containing the address of the data.

The format of *capidaddr* is *AALLCC00*, where *AA* is the ACS number, *LL* is the LSM number, and *CC* is the CAP number. These identifiers are always followed by 00. The values specified are hexadecimal values.

**This parameter is optional.**

**XCALADR**

specifies a location containing the address of the SLSXCAL routine.

*rnaddr* specifies either an RX-type address of the routine, register (15), or register (2) - (12) containing the routine's address.

**This parameter is required.**

**TEXT**

specifies the address of a 32-byte text string issued whenever the operator is requested to open the CAP for an EJECT request.

**This parameter is optional.**

**SEQ**

specifies whether or not CAP eject processing fills the CAP cells sequentially or by home location distance.



**Note:** The SEQ parameter is effective for all LSM types but is used primarily for the SL8500 environment. If sequential order is desired for other LSM types, you must code SEQ=YES.

**This parameter is optional.**

**NO**

specifies that the EJECT process order the requested volumes by home location. EJECT fills the CAP or magazine (for the SL8500) according to the volume home location distance to the CAP; that is, volumes closest to the CAP are ejected first.

This is the default.

**YES**

specifies that the EJECT process place cartridges in the CAP beginning with the topmost available CAP cell and continuing sequentially.

**Response to EJECT Request**

A return code (SLXCMDRC in SLSXREQM macro) indicates the success of the operation. If the volume was ejected, a return code of SLXR0K is placed in SLXCMDRC. If the eject failed, a return code of SLXRFAIL is placed there. If the code is SLXRFAIL, a reason code or message is placed in SLXSRC. HSC messages and non-PGMI reason codes are described in the *HSC/MSP Messages and Codes Guide*. PGMI reason codes are described in "Reason Codes" on page 697.

The response is returned at the completion of the request.

# MOUNT

# MOUNT

The MOUNT request directs the HSC to mount a volume.

## MOUNT Considerations

When a cartridge is removed from its home cell, it becomes “selected” and remains in that state until it is returned. A cartridge in the selected state cannot be used by the following requests:

- EJECT
- MOUNT
- MOVE
- SCRATCH
- UNSCRATCH.

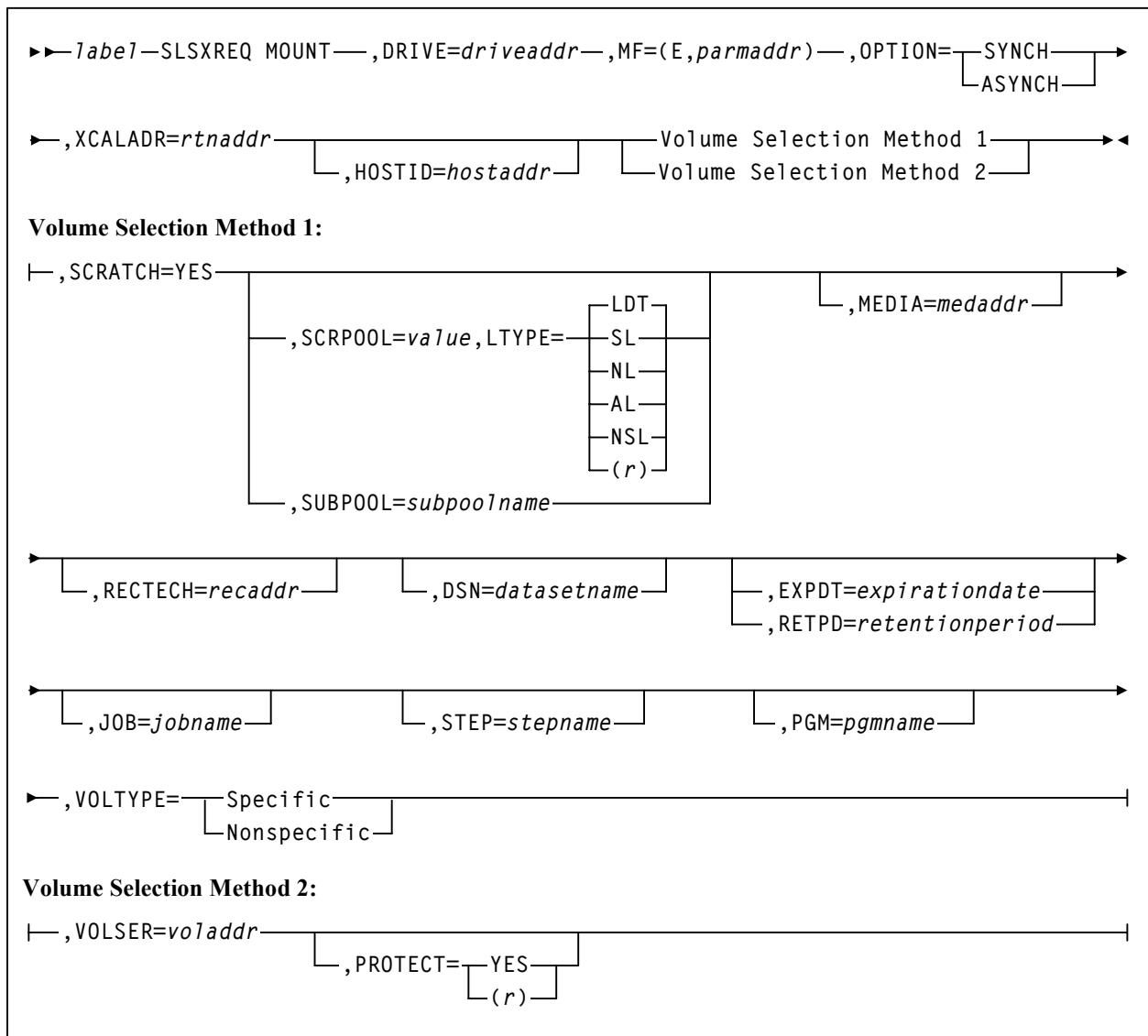
If the target transport for the mount has a volume mounted but unloaded, that volume will be dismounted automatically when the next mount for that transport is requested.

If the volume to be mounted is not in the library, the operator will be given a chance to enter the volume in the library, either permanently or temporarily (temp-enter). If the volume is temp-entered, it will be automatically ejected when dismounted.



**Note:** To enter a volume in the library, there must be an empty cell in the ACS for the volume, even if it is being temp-entered.

**Syntax**



**Parameters**

**DRIVE**

*driveaddr* specifies the address of the 2-byte drive specification (0cua) on which a volume needs to be mounted.

Specify either an RX-type address of the data or the register (2) - (12) containing the address of the data.

**This parameter is required.**

# MOUNT

## **MF=(E,*parmaddr*)**

specifies the execute form of the SLSXREQ macro using a remote parameter list. The parameter list address *parmaddr* may be specified as an RX-type address or in the register form. Valid register values are (1) - (12).

**This parameter is required.**

## **OPTION**

specifies whether the requestor is to wait until the request is complete or continue processing while the request is active.

**This parameter is required.**

## **SYNCH**

specifies that the requestor wait until the request is complete.

## **ASYNCH**

specifies that the requestor continue processing while the request is active. After return from the original request, R1 contains the address of an ECB POSTed when the response completed. R0 contains the token used by SLSXREQ READ to read the response.

## **XCALADR**

specifies a location containing the address of the SLSXCAL routine.

*rtmaddr* specifies either an RX-type address of the routine, register (15), or register (2) - (12) containing the routine's address.

**This parameter is required.**

## **HOSTID**

specifies the address of an eight character host ID, left justified and padded with blanks.

*hostaddr* specifies either an RX-type address of the host ID or the register (2) - (12) containing the address of the host ID.

**This parameter is optional.** If the parameter is not specified, the host ID executing the request is used.

## **SCRATCH**

specifies that the request is for a nonspecific (scratch) volume.

A VOLSER is selected at this time and mounted on the specified transport.

**This parameter is required if VOLSER is not specified.** Either SCRATCH or VOLSER must be specified.

**SCRPOOL**

specifies the scratch subpool index for each request. The index ranges from 0 to 255. A value of zero indicates no special subpool request and any available scratch volume is usable. These subpools are defined by the user in the PARMLIB data set.

*value* specifies either an RX-type address of the one-byte subpool or the register (2) - (12) containing the subpool in byte 3 (rightmost).

**This parameter is optional** and defaults to 0 (any scratch volume).

When SCRPOOL is specified, an LTYPE value is also required. SCRPOOL only has meaning for a scratch request and is disregarded when a SUBPOOL value is issued.

**LTYPE**

specifies the label type for scratch processing. This parameter causes scratch processing to be restricted to the set of scratch volumes associated with the label type specified. These label types are defined in a user defined PARMLIB data set.

**LDT**

specifies the library default label type.

**SL**

specifies the standard-labeled pool.

**NL**

specifies the nonlabeled pool.

**AL**

specifies the ANSI-labeled pool.

**NSL**

specifies the nonstandard-labeled pool.

**(r)**

specifies a register (2) - (12) containing the label type in byte 0 of the register. That value is either SLSXLLDT (library default), SLSXLSL (standard label), SLSXLAL (ANSI label), SLSXLNL (nonlabeled) or SLSXLNS (nonstandard label).

This parameter defaults to library default type (LDT). If the default value is accepted for LTYPE, then SCRPOOL defaults to zero (0). If the label type is not the library default type, a nonzero subpool (SCRPOOL) must be specified.

**When SCRPOOL is specified, an LTYPE parameter must also be specified.**

LTYPE has meaning for a SCRATCH=YES request only. When SUBPOOL is specified, SCRPOOL and LTYPE have no meaning.

# MOUNT

## SUBPOOL

specifies the address of a 13-character field containing the scratch subpool name for the scratch subpool.

If *subpoolname* is not provided, the subpool index is converted into three EBCDIC decimal digits and placed in the leftmost three positions of the subpool name.

Specify either an RX-type address of the data or the number of the register containing the address of the data. When SUBPOOL is specified, SCRPOOL and LTYPE have no meaning.

**This parameter is optional.**

## MEDia

specifies the address of an 8-byte character field containing the media type of the cartridge to be mounted. **This parameter is optional.**



### Notes:

- If **MEDia** is not specified, the next scratch cartridge is mounted without regard to media type.
- **The SL8500 library supports only the T9840A, T9840B, T9840C, T9940B, and T10000 media types and recording techniques.**

### *medaddr*

specifies either an RX-type address of the data or the register (2) - (12) containing the address of the data. Valid media types are:

### **LONGItud**

indicates any Standard or ECART cartridge.

### **Standard**

indicates a standard length, 3480 cartridge. It can be read on any longitudinal drives (4480, 4490, 9490, or 9490EE). Data can be written in 36-track mode on a 4490, 9490, or 9490EE transport but cannot be read on an 18-track (4480) drive. Synonyms for this type of cartridge include:

- CST
- MEDIA1
- STD
- 1
- 3480



**ECART**

indicates a 3490E, extended capacity cartridge. It can be used only on a 36-track drive (4490, 9490, or 9490EE). Synonyms include:

- E
- ECCST
- ETAPE
- Long
- MEDIA2
- 3490E

**ZCART**

indicates a 3490E, extended capacity cartridge that provides greater storage capacity than an ECART. It can be used only on a 9490EE drive.

ZCART can be abbreviated as Z.

**DD3**

indicates any DD3A, DD3B, or DD3C (HELical) cartridge. HELical is a synonym for DD3.

**DD3A, DD3B, DD3C**

indicates a helical cartridge. The media indicator in the external label is encoded with the cartridge type (A, B, or C). DD3A, DD3B, or DD3C can be abbreviated to A, B, or C, respectively.

Types of helical cartridges, along with their associated media capacities, are:

- A — 10GB
- B — 25GB
- C — 50GB.

Data capacity differences between DD3A, DD3B, and DD3C cartridges are related to the length of the tape in the cartridge, not to the recording density of the data.

**STK1**

indicates any T9840 cartridge.

**STK1R**

indicates a T9840 cartridge. The media indicator in the external label is encoded with the cartridge type (R). STK1R can be abbreviated to R.

T9840 cartridge media capacities are 20GB (T9840A and T9840B) or 40GB (T9840C).

**STK2**

indicates any T9940 cartridge.

# MOUNT

## STK2P

indicates a T9940 data cartridge. The media indicator in the external label is encoded with the cartridge type (P). STK2P can be abbreviated to P.

T9940 cartridge media capacities are 60GB (T9940A) or 200GB (T9940B).

## T1000T1 or T1

indicates a full-capacity 500GB T10000 cartridge. **T1000T1** can be abbreviated as **T1**.

## T1000TS or TS

indicates a smaller-capacity 120GB T10000 cartridge. **T1000TS** can be abbreviated as **TS**.

## RECtech

specifies the address of an 8-byte field containing the recording technique used to record data tracks on the tape surface. **This parameter is optional.**



### Notes:

- If RECtech is not specified, the next scratch cartridge is mounted depending on the MEDIA type that has been specified.
- **The SL8500 library supports only the T9840A, T9840B, T9840C, T9940B, and T10000 media types and recording techniques.**

## *recaddr*

specifies either an RX-type address of the data or the register (2) - (12) containing the address of the data. Valid recording techniques are:

### LONGItud

indicates any device that uses longitudinal recording.

### 18track

indicates a 4480 transport.

### 36track

indicates a 4490, 9490, or 9490EE transport (any device that records in 36-track mode).

### 36Atrack

indicates a 4490 (Silverton) transport.

### 36Btrack

indicates a 9490 (Timberline) transport.

### 36Ctrack

indicates a 9490EE transport.

### HELical

indicates a device using helical recording.

**DD3**

indicates a device using helical recording.

**STK1R**

indicates any 9840 transport.

**STK1R34**

indicates any 3490E-image 9840 transport.

**STK1R35**

indicates any 3590-image 9840 transport.

**STK1RA**

indicates a 3490E or 3590-image T9840A transport.

**STK1RA34**

indicates a 3490E-image T9840A transport.

**STK1RA35**

indicates a 3590-image T9840A transport.

**STK1RB**

indicates a 3490E or 3590-image T9840B transport.

**STK1RB34**

indicates a 3490E-image T9840B transport.

**STK1RB35**

indicates a 3590-image T9840B transport.

**STK1RAB**

indicates a 3490E or 3590-image T9840A or T9840B transport.

**STK1RAB4**

indicates a 3490E-image T9840A or T9840B transport.

**STK1RAB5**

indicates a 3590E-image T9840A or T9840B transport.

**STK1RC**

indicates a 3490E or 3590-image T9840C transport.

**STK1RC34**

indicates a 3490-image T9840C transport.

**STK1RC35**

indicates a 3590-image T9840C transport.

**STK2P**

indicates any 9940 transport.

# MOUNT

**STK2P34**

indicates any 3490E-image 9940 transport.

**STK2P35**

indicates any 3590-image 9940 transport.

**STK2PA**

indicates a T9940A transport.

**STK2PA34**

indicates a 3490E-image T9940A transport.

**STK2PA35**

indicates a 3590-image T9940A transport.

**STK2PB**

indicates a T9940B transport.

**STK2PB34**

indicates a 3490E-image T9940B transport.

**STK2PB35**

indicates a 3590-image T9940B transport.

**T1A**

indicates any T10000 transport.

**T1AN**

indicates a non-encryption enabled 3490E- or 3590-image T10000 transport.

**T1A34**

indicates a non-encryption enabled 3490E-image T10000 transport.

**T1A35**

indicates a non-encryption enabled 3590-image T10000 transport.

**T1AE**

indicates an encryption-enabled 3490E- or 3590-image T10000 transport.

**T1AE34**

indicates an encryption-enabled 3490E-image T10000 transport.

**T1AE35**

indicates an encryption-enabled 3590-image T10000 transport.

**Note:** The following parameters are ignored if Media, RECtech, or both are specified.

**DSN**

*datasetname* specifies the data set name.

**This parameter is optional.**

**EXPDT**

*expirationdate* specifies the expiration date of the data set in *yyddd* or *yyy/ddd* format.

**This parameter is optional.**

**RETPD**

*retentionperiod* specifies the retention period for the data set in days. Specify the number of days as a one- to four-digit decimal number.

**This parameter is optional.**

**JOB**

*jobname* specifies the job name.

**This parameter is optional.**

**STEP**

*stepname* specifies the step name.

**This parameter is optional.**

**PGM**

*pgmname* specifies the step name.

**This parameter is optional.**

**VOLTYPE**

indicates whether or not a nonspecific volume was requested.

**Specific**

requests a specific volume to be mounted.

**Nonspecific**

requests a nonspecific volume to be mounted

**This parameter is optional.**

# MOUNT

## **VOLSER**

*voladdr* specifies the address of a six-character volume label. Acceptable characters for a VOLSER are A-Z, 0-9, #, \$, ¥, and trailing blanks.

Specify either an RX-type address of the VOLSER or the register (2) - (12) containing the address of the VOLSER.

**This parameter is required if SCRATCH is not specified.** Either VOLSER or SCRATCH must be specified.

## **PROTECT**

PROTECT=YES - Specifies the volume is disabled for writing. It causes a volume enabled by the physical thumbwheel to be write disabled for this mount. There is no way to write-enable a cartridge whose thumbwheel indicates the volume is write disabled.

PROTECT=(*r*) - Specifies a register (2) - (12) that contains the write disablement in byte 2 of the register. If bit SLSXPROT is on, writing is disabled. If not on, the thumbwheel determines the write enablement.

**This parameter is optional.** If omitted, the write enablement is determined by the thumbwheel on the cartridge.

## **Response to MOUNT Request**

A return code (SLXCMDRC in SLSXREQM macro) indicates the success of the operation. If the code is SLXROK or SLXRFAIL, a reason code or message is placed in SLXSRC, and a message text element (mapped by SLXSMSG) is returned. The reason code corresponds to the message in the message text. HSC messages and non-PGMI reason codes are described in the *HSC/MSP Messages and Codes Guide*. PGMI reason codes are described in "Reason Codes" on page 697.

If the volume was mounted, a return code of SLXROK is placed in SLXCMDRC. A volume information element (mapped by SLXSVOL) is returned for the mounted volume.

The response is returned at the completion of the request.

## MOVE

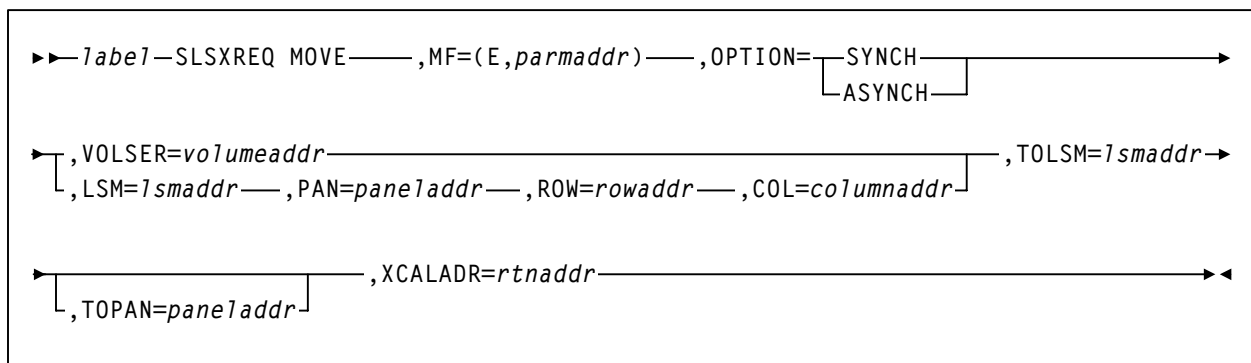
The MOVE request permits you to request the HSC to move a single volume to another location within a library complex.

### MOVE Considerations

The following apply before using the MOVE request:

- Movement of volumes to the same panel in the same LSM, or to a frozen panel, is not allowed. The following volume move functions are permitted:
  - Move a single volume from a panel within an LSM to another panel of the same LSM.
  - Move a single volume from a panel within an LSM to any panel of a different LSM within the library complex.
- Movement of volumes to LSMs is done on a first-come first-serve basis. As volumes are moved, if an LSM is filled before the move request is finished for that LSM, the move request continues with the movement of volumes designated for the next LSM specified in the request. An LSM is full if all available cells contain tape cartridges. This process continues until the entire move request is completed.

### Syntax



### Parameters

#### MF=(E, parmaddr)

specifies the execute form of the SLSXREQ macro using a remote parameter list. The parameter list address parmaddr may be specified as an RX-type address or in the register form. Valid register values are (1) - (12).

**This parameter is required.**

#### OPTION

specifies whether the requestor is to wait until the request is complete or continue processing while the request is active.

**This parameter is required.**

# MOVE

## SYNCH

specifies that the requestor wait until the request is complete.

## ASYNCH

specifies that the requestor continue processing while the request is active. After return from the original request, R1 contains the address of an ECB POSTed when the response completed. R0 contains the token used by SLSXREQ READ to read the response.

## VOLSER

specifies the address of a volume.

*volumeaddr* specifies either an RX-type address of the VOLSER or the register (2) - (12) containing the address of the volume. The format of VOLSER is six characters (*vvvvvv*). Valid characters are A-Z, 0-9, #, \$, ¥, and trailing blanks.

**This parameter is required if LSM is not specified.**

## LSM

specifies the address of an LSMid. The format of an LSMid is *AALL*, where *AA* is the ACS number (00-FF hexadecimal) and *LL* is the LSM number (*LL* is 00-17 hexadecimal). For example, 010A is ACS 01, LSM 10.

Specify either an RX-type address of the LSMid or the register (2) - (12) containing the address of the LSMid.

The COL, PAN, and ROW parameters must accompany the LSM parameter. **This parameter is required if VOL is not specified.**

## PAN

specifies the address of a panel number. The format of the panel number is *nn*, where '*nn*' is a one-byte hexadecimal number.

Specify either an RX-type address of the panel or the register (2) - (12) containing the address of the panel.

The COL, ROW, and LSM parameters must accompany the PAN parameter. **These four parameters or the VOL parameter must be issued.**

## ROW

specifies the address of a row number. The format of the row number is *nn*, where '*nn*' is a one-byte hexadecimal number.

Specify either an RX-type address of the Row or the register (2) - (12) containing the address of the Row.

The COL, PAN, and LSM parameters must accompany the ROW parameter. **These four parameters or the VOL parameter must be issued.**



**COL**

specifies the address of a column number. The format of the column number is *nn*, where '*nn*' is a one-byte hexadecimal number.

Specify either an RX-type address of the COL or the register (2) - (12) containing the address of the COL.

The LSM, PAN, and ROW parameters must accompany the COL parameter. **These four parameters or the VOL parameter must be issued.**

**TOLSM**

specifies the address of the LSMid where the volume is moved. The LSMid is two hexadecimal bytes in the format *AALL*, where *AA* is the ACS number and *LL* is the LSM number.

*lsmaddr* specifies either an RX-type address of the LSMid or the register (2) - (12) containing the address of the LSMid.

**This parameter is required.**

**TOPAN**

specifies the address of a panel number. The format of the panel number is *nn*, where '*nn*' is a one-byte hexadecimal number.

Specify either an RX-type address of the panel or the register (2) - (12) containing the address of the panel.

**This parameter is optional.**

**XCALADR**

specifies a location containing the address of the SLSXCAL routine.

*rtnaddr* specifies either an RX-type address of the routine, register (15), or register (2) - (12) containing the routine's address.

**This parameter is required.**

**Response to Move Request**

A return code (SLXCMDRC in SLSXREQM macro) indicates the success of the operation. If the code is SLXROK or SLXRFAIL, a reason code is placed in SLXSRC, and a message text element (mapped by SLXSMSG) is returned. The reason code corresponds to the message in the message text.

If the volume was moved, a return code of SLXROK is placed in SLXCMDRC. A volume information element (mapped by SLXSVOL) is returned for the moved volume and the new location is returned in SLXVLOC field.

The response is returned at the completion of the request.

## QCAP

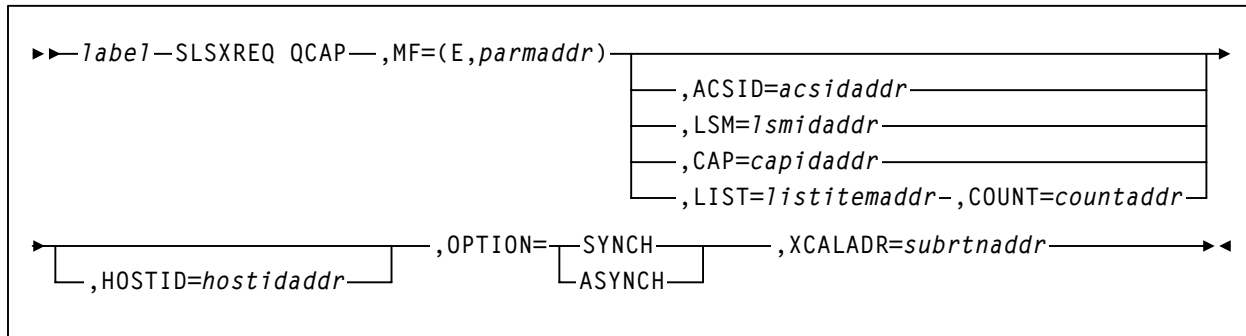
## QCAP

This request is used to query the capacity and status of a CAP.

### QCAP Considerations

There are no considerations for this PGMI function.

### Syntax



### Parameters

#### MF=(E,*parmaddr*)

specifies the execute form of the SLSXREQ macro using a remote parameter list. The parameter list address *parmaddr* may be specified as an RX-type address or in the register form. Valid register values are (1) - (12).

**This parameter is required.**

#### ACSID

*acsidaddr* specifies the address of the ACS used to satisfy the request. The format of *acsidaddr* is *AA*, where *AA* is the ACS number (00-FF hexadecimal). For example, 01, designates ACS 01. Specify either an RX-type address of the data or the number of the register containing the address of the data.

**This parameter is optional.** If specified, the returned data is for the specific ACS.

If ACSID, LSM, CAP, or LIST and COUNT, are not specified, the data returned is for all CAPs.

#### LSM

specifies the address of an LSMid. The format of an LSMid is *AALL*, where *AA* is the ACS number (00-FF hexadecimal) and *LL* is the LSM number (*LL* is 00-17

hexadecimal). For example, 0102 is ACS 01, LSM 02. All values are in hexadecimal format.

Specify either an RX-type address of the LSMid or the register (2) - (12) containing the address of the LSMid. **This parameter is optional.**

If specified, the returned data is for the specific LSM.

If ACSID, LSM, CAP, or LIST and COUNT, are not specified, the data returned is for all CAPs.

### CAP

specifies the address of the CAP used to satisfy the request. *capidaddr* specifies either the RX-type address of the data or the number of the register containing the address of the data.

The format of *capidaddr* is *AALLCC00*, where *AA* is the ACS number, *LL* is the LSM number, and *CC* is the CAP number. These identifiers are always followed by 00. The values specified are hexadecimal values. **This parameter is optional.**

If specified, the returned data is for the specific CAP.

If ACSID, LSM, CAP, or LIST and COUNT, are not specified, the data returned is for all CAPs.

### LIST

*listitemaddr* specifies the address of the CAPIDs used to satisfy the request. Specify either an RX-type address of the data or the number of the register containing the address of the data. **This parameter is optional.**

If specified, the returned data is for the specific CAPIDs.

If ACSID, LSM, CAP, or LIST and COUNT, are not specified, the data returned is for all CAPs.

### COUNT

*countaddr* specifies the address of a two-byte count value.

**This parameter is required when LIST is specified.**

For QCAP, COUNT specifies the number of CAPIDs in the list designated by the co-requisite LIST parameter.

If ACSID, LSM, CAP, or LIST and COUNT, are not specified, the data returned is for all CAPs.

# QCAP

## HOSTID

specifies the address of an eight character host ID, left justified and padded with blanks.

*hostidaddr* specifies either an RX-type address of the host ID or the register (2) - (12) containing the address of the host ID.

**This parameter is optional.** If the parameter is not specified, the host ID executing the request is used.

## OPTION

specifies whether the requestor is to wait until the request is complete or continue processing while the request is active.

**This parameter is required.**

## SYNCH

specifies that the requestor wait until the request is complete.

## ASYNCH

specifies that the requestor continue processing while the request is active. After return from the original request, R1 contains the address of an ECB POSTed when the response completed. R0 contains the token used by SLSXREQ READ to read the response.

## XCALADR

*subrtnaddr* specifies a location containing the address of the SLSXCAL routine.

Specify either an RX-type address of the routine, register (15), or register (2) - (12) containing the routine's address.

**This parameter is required.**

## Response to QCAP Request

A return code (SLSXQCAP in SLSXREQM macro) indicates the success of the operation. A value of 1A in R15 indicates that a QCAP has been requested. A value of zero indicates that the request has processed.

## QCONFIG

This request is provided to enable the requestor to get information about the library configuration.

### QCONFIG Considerations

There are no special considerations associated with the QCONFIG request.

### Syntax

```
►► label—SLSXREQ QCONFIG—,MF=(E,parmaddr)—,OPTION=  SYNCH  ASYNCH ,XCALADR=rtnaddr►◄
```

### Parameters

#### MF=(E,*parmaddr*)

specifies the execute form of the SLSXREQ macro using a remote parameter list. The parameter list address *parmaddr* may be specified as an RX-type address or in the register form. Valid register values are (1) - (12).

**This parameter is required.**

#### OPTION

specifies whether the requestor is to wait until the request is complete or continue processing while the request is active.

**This parameter is required.**

#### SYNCH

specifies that the requestor wait until the request is complete.

#### ASYNCH

specifies that the requestor continue processing while the request is active. After return from the original request, R1 contains the address of an ECB POSTed when the response completed. R0 contains the token used by SLSXREQ READ to read the response.

#### XCALADR

specifies a location containing the address of the SLSXCAL routine.

*rtnaddr* specifies either an RX-type address of the routine, register (15), or register (2) - (12) containing the routine's address.

**This parameter is required.**

# QCONFIG

## Response to QCONFIG Request

A return code (SLXCMDRC in SLSXREQM macro) indicates the success of the operation. If the code is SLXRFAIL, a reason code or message is placed in SLXSRC. HSC messages and non-PGMI reason codes are described in the *HSC/MSP Messages and Codes Guide*. PGMI reason codes are described in “Reason Codes” on page 697.

In addition to the Reply Header, the Configuration Summary Section, mapped by SLXSCFG is returned.

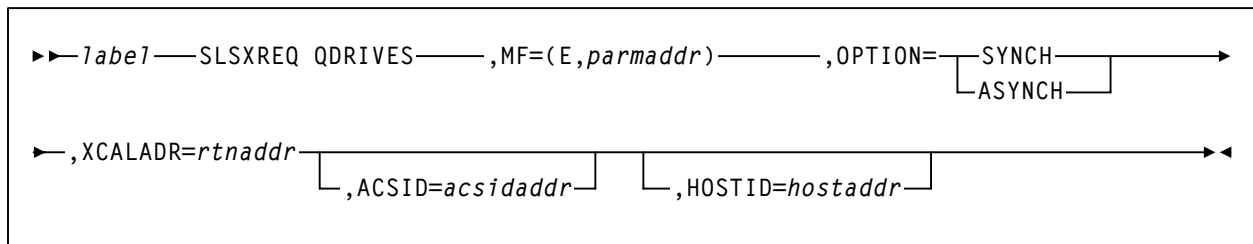
## QDRIVES

This request retrieves drive related configuration data. The response includes the ACS and LSM address of the transports, whether or not an enhanced CAP is present, and LSM pass-thru connections.

### QDRIVES Considerations

There are no special considerations associated with the QDRIVES request.

### Syntax



### Parameters

#### **MF=(E,parmaddr)**

specifies the execute form of the SLSXREQ macro using a remote parameter list. The parameter list address *parmaddr* may be specified as an RX-type address or in the register form. Valid register values are (1) - (12).

**This parameter is required.**

#### **OPTION**

specifies whether the requestor is to wait until the request is complete or continue processing while the request is active.

**This parameter is required.**

#### **SYNCH**

specifies that the requestor wait until the request is complete.

#### **ASYNCH**

specifies that the requestor continue processing while the request is active. After return from the original request, R1 contains the address of an ECB POSTed when the response completed. R0 contains the token used by SLSXREQ READ to read the response.

# QDRIVES

## XCALADR

specifies a location containing the address of the SLSXCAL routine.

*rtncaddr* specifies either an RX-type address of the routine, register (15), or register (2) - (12) containing the routine's address.

**This parameter is required.**

## ACSID

*acsidaddr* specifies the address of the ACS used to satisfy the request. The format of *acsidaddr* is *AA*, where *AA* is the ACS number (00-FF hexadecimal). For example, 01, designates ACS 01. Specify either an RX-type address of the data or the number of the register containing the address of the data.

**This parameter is optional.**

## HOSTID

specifies the address of an eight character host ID, left justified and padded with blanks.

*hostaddr* specifies either an RX-type address of the host ID or the register (2) - (12) containing the address of the host ID.

**This parameter is optional.** If the parameter is not specified, the host ID executing the request is used.

## Response to QDRIVES Request

A return code (SLXCMDRC in SLSXREQM macro) indicates the success of the operation. If the code is SLXRFAIL, a reason code or message is placed in SLXSRC. HSC messages and non-PGMI reason codes are described in the *HSC/MSP Messages and Codes Guide*. PGMI reason codes are described in "Reason Codes" on page 697.

In addition to the Reply Header, the Drive Information Section (mapped by SLXSDRV) and LSM Information Section (mapped by SLXSLSM) are returned.



## QDRLIST

The QDRLIST request is used to obtain the HSC recommendation for a library transport for use on a subsequent MOUNT request.

### QDRLIST Considerations

The HSC makes its recommendation by returning a list of drive information elements ordered so that the first element describes the best drive to use, the second element describes the second best drive to use, etc..

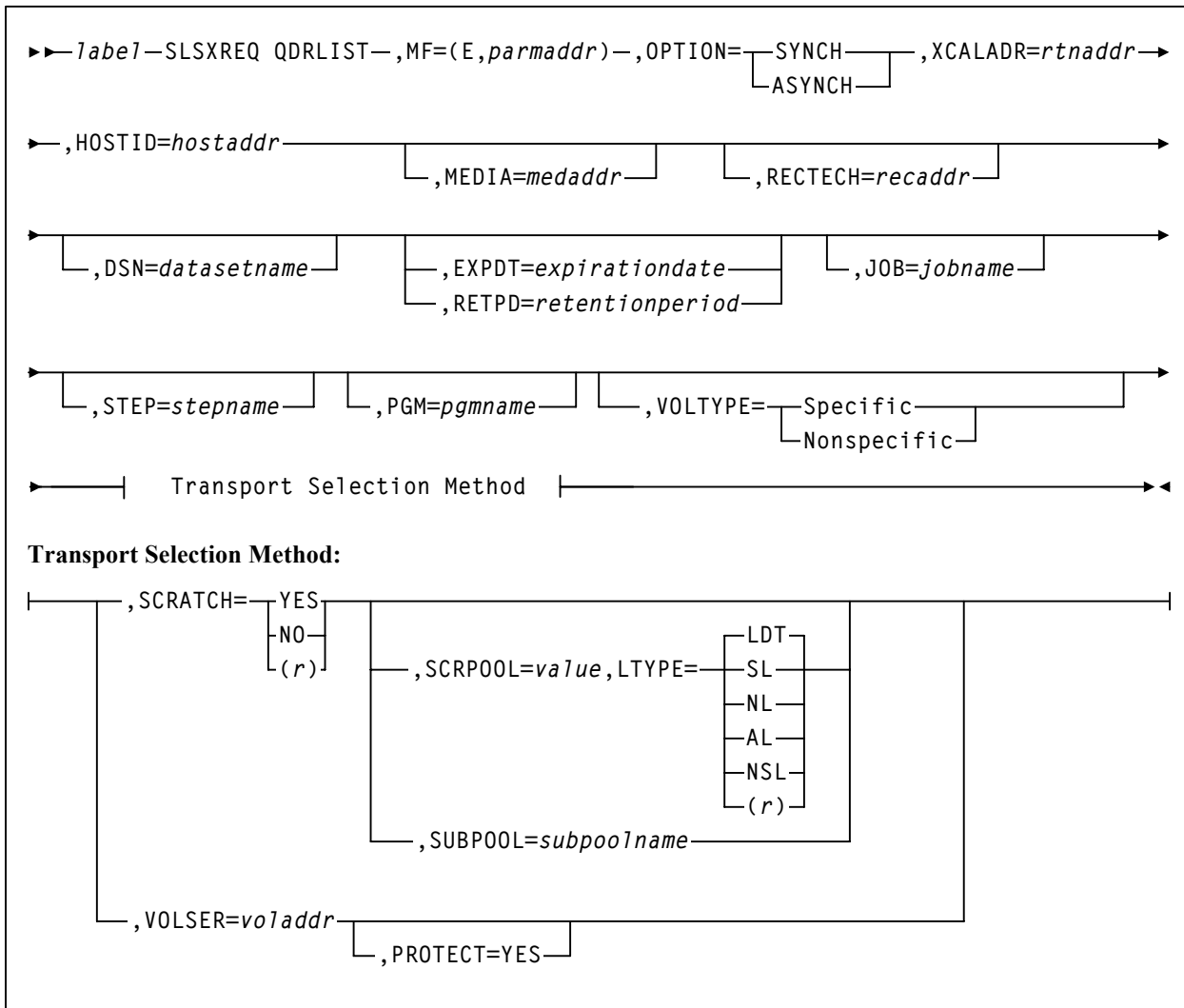
If the request is for a specific volume (i.e., SCRATCH=NO), the drive information elements are arranged so that the first drive is in the LSM that is closest to (or in the same LSM as) the LSM that the cartridge is in, and the last drive is in the LSM that is farthest from the cartridge. Only the drives in the same ACS as the volume are returned. In addition, volume information for the specified volume is returned.

If the request is for a nonspecific volume (i.e., SCRATCH=YES), the drive information elements are arranged so that the first drive is in the LSM with the most scratch volumes of the specified subpool and label type, and the last drive is in the LSM that has the least scratch volumes. Drives from all ACSs are returned. A list of drives is still returned even if there are no scratch volumes, in which case, the scratch counts in the LSM elements are zeros.

The HSC ignores whether a transport already has a volume mounted, is in an offline LSM, or a disconnected ACS.

# QDRLIST

## Syntax



## Parameters

### MF=(E,*parmaddr*)

specifies the execute form of the SLSXREQ macro using a remote parameter list. The parameter list address *parmaddr* may be specified as an RX-type address or in the register form. Valid register values are (1) - (12).

**This parameter is required.**

### OPTION

specifies whether the requestor is to wait until the request is complete or continue processing while the request is active.

**This parameter is required.**

**SYNCH**

specifies that the requestor wait until the request is complete.

**ASYNCH**

specifies that the requestor continue processing while the request is active. After return from the original request, R1 contains the address of an ECB POSTed when the response completed. R0 contains the token used by SLSXREQ READ to read the response.

**XCALADR**

specifies a location containing the address of the SLSXCAL routine.

*rtncadr* specifies either an RX-type address of the routine, register (15), or register (2) - (12) containing the routine's address.

**This parameter is required.**

**HOSTID**

specifies the address of an eight character host ID, left justified and padded with blanks.

*hostaddr* specifies either an RX-type address of the host ID or the register (2) - (12) containing the address of the host ID.

**This parameter is optional.**

If the parameter is not specified, the host ID executing the request is used.

**MEDia**

specifies the address of an 8-byte character field containing the media type of the selected transport. **This parameter is optional.**

**Notes:**

- If MEDia is not specified, transports are selected without regard to media type.
- **The SL8500 library supports only the T9840A, T9840B, T9840C, T9940B, and T10000 media types and recording techniques.**

***medaddr***

specifies either an RX-type address of the data or the register (2) - (12) containing the address of the data. Valid media types are:

**LONGitud**

indicates any Standard or ECART cartridge.

# QDRLIST

## **Standard**

indicates a standard length, 3480 cartridge. It can be read on any longitudinal drives (4480, 4490, 9490, or 9490EE). Data can be written in 36-track mode on a 4490, 9490, or 9490EE transport but cannot be read on an 18-track (4480) drive. Synonyms for this type of cartridge include:

- CST
- MEDIA1
- STD
- 1
- 3480

## **ECART**

indicates a 3490E, extended capacity cartridge. It can be used only on a 36-track drive (4490, 9490, or 9490EE). Synonyms include:

- E
- ECCST
- ETAPE
- Long
- MEDIA2
- 3490E

## **ZCART**

indicates a 3490E, extended capacity cartridge that provides greater storage capacity than an ECART. It can be used only on a 9490EE drive.

ZCART can be abbreviated as Z.

## **DD3**

indicates any DD3A, DD3B, or DD3C (HELical) cartridge. HELical is a synonym for DD3.

## **DD3A, DD3B, DD3C**

indicates a helical cartridge. The media indicator in the external label is encoded with the cartridge type (A, B, or C). DD3A, DD3B, or DD3C can be abbreviated to A, B, or C, respectively.

Types of helical cartridges, along with their associated media capacities, are:

- A — 10GB
- B — 25GB
- C — 50GB.

Data capacity differences between DD3A, DD3B, and DD3C cartridges are related to the length of the tape in the cartridge, not to the recording density of the data.

## **STK1**

indicates any T9840 cartridge.

**STK1R**

indicates a T9840 cartridge. The media indicator in the external label is encoded with the cartridge type (R). STK1R can be abbreviated to R.

T9840 cartridge media capacities are 20GB (T9840A and T9840B) or 40GB (T9840C).

**STK2**

indicates any T9940 cartridge.

**STK2P**

indicates a T9940 data cartridge. The media indicator in the external label is encoded with the cartridge type (P). STK2P can be abbreviated to P.

T9940 cartridge media capacities are 60GB (T9940A) or 200GB (T9940B).

**T1000T1 or T1**

indicates a full-capacity 500GB T10000 cartridge. **T1000T1** can be abbreviated as **T1**.

**T1000TS or TS**

indicates a smaller-capacity 120GB T10000 cartridge. **T1000TS** can be abbreviated as **TS**.

**RECtech**

specifies the address of an 8-byte field containing the recording technique used to record data tracks on the tape surface. **This parameter is optional.**

**Notes:**

- If **RECtech** is not specified, transports are selected depending on the MEDIA type that has been specified.
- **The SL8500 library supports only the T9840A, T9840B, T9840C, T9940B, and T10000 media types and recording techniques.**

**recaddr**

specifies either an RX-type address of the data or the register (2) - (12) containing the address of the data. Valid recording techniques are:

**LONGItud**

indicates any device that uses longitudinal recording.

**18track**

indicates a 4480 transport.

# QDRLIST

**36track**

indicates a 4490, 9490, or 9490EE transport (any device that records in 36-track mode).

**36Atrack**

indicates a 4490 (Silverton) transport.

**36Btrack**

indicates a 9490 (Timberline) transport.

**36Ctrack**

indicates a 9490EE transport.

**HELical**

indicates a device using helical recording.

**DD3**

indicates a device using helical recording.

**STK1R**

indicates any 9840 transport.

**STK1R34**

indicates any 3490E-image 9840 transport.

**STK1R35**

indicates any 3590-image 9840 transport.

**STK1RA**

indicates a 3490E or 3590-image T9840A transport.

**STK1RA34**

indicates a 3490E-image T9840A transport.

**STK1RA35**

indicates a 3590-image T9840A transport.

**STK1RB**

indicates a 3490E or 3590-image T9840B transport.

**STK1RB34**

indicates a 3490E-image T9840B transport.

**STK1RB35**

indicates a 3590-image T9840B transport.

**STK1RAB**

indicates a 3490E or 3590-image T9840A or T9840B transport.

**STK1RAB4**

indicates a 3490E-image T9840A or T9840B transport.

**STK1RAB5**

indicates a 3590E-image T9840A or T9840B transport.

**STK1RC**

indicates a 3490E or 3590-image T9840C transport.

**STK1RC34**

indicates a 3490-image T9840C transport.

**STK1RC35**

indicates a 3590-image T9840C transport.

**STK2P**

indicates any 9940 transport.

**STK2P34**

indicates any 3490E-image 9940 transport.

**STK2P35**

indicates any 3590-image 9940 transport.

**STK2PA**

indicates a T9940A transport.

**STK2PA34**

indicates a 3490E-image T9940A transport.

**STK2PA35**

indicates a 3590-image T9940A transport.

**STK2PB**

indicates a T9940B transport.

**STK2PB34**

indicates a 3490E-image T9940B transport.

**STK2PB35**

indicates a 3590-image T9940B transport.

**T1A**

indicates any T10000 transport.

**T1AN**

indicates a non-encryption enabled 3490E- or 3590-image T10000 transport.

**T1A34**

indicates a non-encryption enabled 3490E-image T10000 transport.

**T1A35**

indicates a non-encryption enabled 3590-image T10000 transport.

# QDRLIST

## **T1AE**

indicates an encryption-enabled 3490E- or 3590-image T10000 transport.

## **T1AE34**

indicates an encryption-enabled 3490E-image T10000 transport.

## **T1AE35**

indicates an encryption-enabled 3590-image T10000 transport.

**Note:** The following parameters are ignored if Media, RECtech, or both are specified.

## **DSN**

*datasetname* specifies the data set name.

**This parameter is optional.**

## **EXPDT**

*expirationdate* specifies the expiration date of the data set in *yyddd* or *yyy/ddd* format.

**This parameter is optional.**

## **RETPD**

*retentionperiod* specifies the retention period for the data set in days. Specify the number of days as a one- to four-digit decimal number.

**This parameter is optional.**

## **JOB**

*jobname* specifies the job name.

**This parameter is optional.**

## **STEP**

*stepname* specifies the step name. This parameter is optional. PGM *pgmname* specifies the step name.

**This parameter is optional.**

## **VOLTYPE**

indicates whether or not a nonspecific volume was requested.

### **Specific**

requests a specific volume to be mounted.

### **Nonspecific**

requests a nonspecific volume to be mounted.

**This parameter is optional.**



**SCRATCH**

specifies that the request is for a nonspecific (scratch) volume. If SCRATCH=YES is specified, VOLSER is optional and is used only in messages to the operator.

SCRATCH=(*r*) - Specifies a register (2) - (12) containing the scratch request flag in byte 1 of the register. If bit SLSXSCR is on, the request is a scratch request.

If SCRATCH=NO is specified or the SCRATCH parameter is omitted, the VOLSER parameter is required.

A VOLSER is selected at this time.

**This parameter is required if VOLSER is not specified.** Either SCRATCH or VOLSER must be specified.

**SCRPOOL**

specifies the scratch subpool index for each request. The index ranges from 0 to 255. A value of zero indicates no special subpool request and any available scratch volume is usable. These subpools are defined by the user in the PARMLIB data set.

*value* specifies either an RX-type address of the one-byte subpool or the register (2) - (12) containing the subpool in byte 3 (rightmost).

**This parameter is optional** and defaults to 0 (any scratch volume).

When SCRPOOL is specified, an LTYPE value is also required.

SCRPOOL only has meaning for a scratch request and is disregarded when a SUBPOOL value is issued.

**LTYPE**

specifies the label type for scratch processing. This parameter causes scratch processing to be restricted to the set of scratch volumes associated with the label type specified. These label types are defined in a user defined PARMLIB data set.

**LDT**

specifies the library default label type.

**SL**

specifies the standard-labeled pool.

**NL**

specifies the nonlabeled pool.

**AL**

specifies the ANSI-labeled pool.

**NSL**

specifies the nonstandard-labeled pool.

# QDRLIST

(*r*)

specifies a register (2) - (12) containing the label type in byte 0 of the register. That value is either SLSXLLDT (library default), SLSXLSL (standard label), SLSXLAL (ANSI label), SLSXLNL (nonlabeled) or SLSXLNS (nonstandard label).

This parameter defaults to library default type (LDT). If the default value is accepted for LTYPE, then SCRPOOL defaults to zero (0). If the label type is not the library default type, a nonzero subpool (SCRPOOL) must be specified.

**When SCRPOOL is specified, an LTYPE parameter must also be specified.** LTYPE has meaning for a SCRATCH=YES request only. When SUBPOOL is specified, SCRPOOL and LTYPE have no meaning.

## SUBPOOL

specifies the address of a 13-character field containing the scratch subpool name for the scratch subpool.

If *subpoolname* is not provided, the subpool index is converted into three EBCDIC decimal digits and placed in the leftmost three positions of the subpool name.

Specify either an RX-type address of the data or the number of the register containing the address of the data. When SUBPOOL is specified, SCRPOOL and LTYPE have no meaning.

**This parameter is optional.**

## VOLSER

*voladdr* specifies the address of a six-character volume label. Acceptable characters for a VOLSER are A-Z, 0-9, #, \$, ¥, and trailing blanks.

Specify either an RX-type address of the VOLSER or the register (2) - (12) containing the address of the VOLSER.

**This parameter is required if SCRATCH is not specified.** Either VOLSER or SCRATCH must be specified.

## PROTECT

PROTECT=YES - Specifies the volume is disabled for writing. It causes a volume write enabled by the physical thumbwheel to be write disabled for this mount. There is no way to write-enable a cartridge whose thumbwheel indicates the volume is write disabled.

**This parameter is optional.** If omitted, the write enablement is determined by the thumbwheel on the cartridge.

## Response to QDRLIST Request

A return code (SLXCMDRC in SLXREQM macro) indicates the success of the operation. If the code is SLXRFAIL, a reason code or message is placed in SLXSRC. HSC messages and non-PGMI reason codes are described in the *HSC/MSP Messages and Codes Guide*. PGMI reason codes are described in “Reason Codes” on page 697.

If the request specifies SCRATCH=NO and the volume is not in the library, a code of SLXRWARN is placed in SLXCMDRC, a reason code of 700C is set, and only a Volume Information Section is returned.

The QDRLIST response consists of a Reply Header (mapped by SLX), and a Drive Information Section (mapped by SLXSDRV). If the request specifies SCRATCH=YES, an LSM Information Section (mapped by SLXSLSM) is included, sorted by scratch counts. The Drive Information Section is also sorted by scratch counts (most scratch volumes first). If the request specifies SCRATCH=NO, a Volume Information Section (mapped by SLXSVOL) is returned for the specified volume. The Drive Information Section is sorted by proximity to that volume.

## QDSN

## QDSN

This request is provided to enable the requestor to get information about the current data sets in use by HSC.

### QDSN Considerations

There are no special considerations associated with the QDSN request.

### Syntax

```
►► label — SLSXREQ QDSN — , MF=(E, parmaddr) — , OPTION= 

|        |
|--------|
| SYNCH  |
| ASYNCH |

 , XCALADR=rtnaddr ►►
```

### Parameters

#### MF=(E,*parmaddr*)

specifies the execute form of the SLSXREQ macro using a remote parameter list. The parameter list address *parmaddr* may be specified as an RX-type address or in the register form. Valid register values are (1) - (12).

**This parameter is required.**

#### OPTION

specifies whether the requestor is to wait until the request is complete or continue processing while the request is active

**This parameter is required.**

#### SYNCH

specifies that the requestor wait until the request is complete.

#### ASYNCH

specifies that the requestor continue processing while the request is active. After return from the original request, R1 contains the address of an ECB POSTed when the response completed. R0 contains the token used by SLSXREQ READ to read the response.

#### XCALADR

specifies a location containing the address of the SLSXCAL routine.

*rtnaddr* specifies either an RX-type address of the routine, register (15), or register (2) - (12) containing the routine's address.

**This parameter is required.**

**Response to QDSN Request**

A return code (SLXCMDRC in SLSXREQM macro) indicates the success of the operation. If the code is SLXRFAIL, a reason code or message is placed in SLXSRC

When querying data set information use the new QDSN Information Element Block (QDS) that is mapped by the SLXDSNIM. The response created is in contiguous storage and is composed of the SLX header and the QDSN information elements for a single QDSN request which are pointed to by the QDSN/QCONFIG directory.

# QEJECT

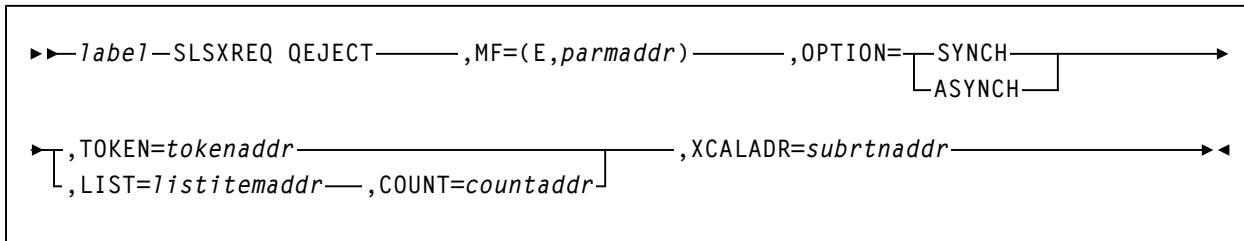
## QEJECT

This request is used to determine the status of individual volser within an eject task.

### QEJECT Considerations

There are no special considerations associated with the QEJECT request.

### Syntax



### Parameters

#### MF=(E,parmaddr)

specifies the execute form of the SLSXREQ macro using a remote parameter list. The parameter list address parmaddr may be specified as an RX-type address or in the register form. Valid register values are (1) - (12).

**This parameter is required.**

#### OPTION

specifies whether the requestor is to wait until the request is complete or continue processing while the request is active.

**This parameter is required.**

#### SYNCH

specifies that the requestor wait until the request is complete.

#### ASYNCH

specifies that the requestor continue processing while the request is active. After return from the original request, R1 contains the address of an ECB POSTed when the response completed. R0 contains the token used by SLSXREQ READ to read the response.

#### TOKEN

specifies the address of the token originally returned in R0 when the request was initiated.

tokenaddr specifies either an RX-type address of the token or the register (2) - (12) containing the address of the token.

**This parameter is required if LIST is not specified.**

**LIST**

*tokenlist* specifies the address of a list of tokens for STOP processing. The parameter list address may be specified as an RX-type address or in register form. Valid register values are (2) - (12).

A special form of this parameter, **LIST=\***, indicates that the list immediately follows the parameter list control block.

**This parameter is required if TOKEN is not specified.**

**COUNT**

*countaddr* specifies the address of a two-byte count value. For QEJECT, COUNT specifies the number of VOLSERS in the list designated by the co-requisite LIST parameter.

**This parameter is required when LIST is specified.**

**XCALADR**

*subrtnaddr* specifies a location containing the address of the SLSXCAL routine. Specify either an RX-type address of the routine, register (15), or register (2) - (12) containing the routine's address.

**This parameter is required.**

**Response to QEJECT Request**

A return code indicates the success of the QEJECT operation. When successful, QEJECT returns the status of each VOLSER in an EJECT request.

## QHSC

## QHSC

This request may be used to determine if the HSC is active or not. This permits programs to poll periodically to determine when the HSC becomes active.

### QHSC Considerations

The QHSC request is synchronous only.

### Syntax

```
►► label — SLSXREQ QHSC — , MF=(E, parmaddr) — , XCALADR=rtnaddr —————►◄
```

### Parameters

#### **MF=(*E*,*parmaddr*)**

specifies the execute form of the SLSXREQ macro using a remote parameter list. The parameter list address *parmaddr* may be specified as an RX-type address or in the register form. Valid register values are (1) - (12).

**This parameter is required.**

#### **XCALADR**

specifies a location containing the address of the SLSXCAL routine.

*rtnaddr* specifies either an RX-type address of the routine, register (15), or register (2) - (12) containing the routine's address.

**This parameter is required.**

### Response to QHSC Request

A return code in R15 indicates if the HSC is active (SLXR0K) or not (SLXRNHSC). The response length (R0) and response address (R1) are zero.



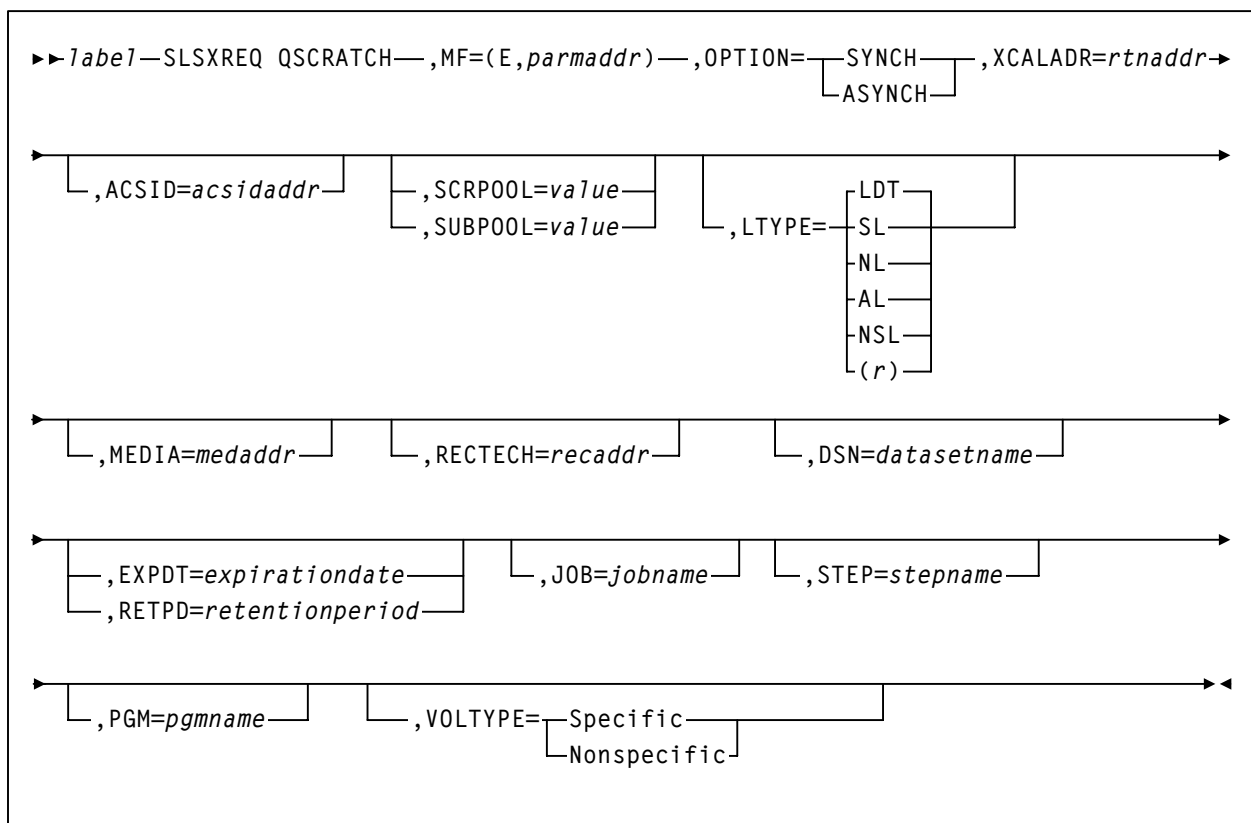
## QSCRATCH

The QSCRATCH request is used to obtain detailed information about the number of scratch volumes in each LSM and ACS.

### QSCRATCH Considerations

When the library and its associated control data sets are shared by more than one HSC, then the reported totals may differ from the true totals because they may not account for recent scratch volume activity on other processors. However, each HSC refreshes its scratch volume totals every 4 minutes (or the time interval specified in the OPTion command), so the variance should be slight. The LSM Information Elements are returned in highest scratch-count to lowest scratch-count order.

### Syntax



### Parameters

**MF=(E,parmaddr)**

specifies the execute form of the SLSXREQ macro using a remote parameter list. The parameter list address *parmaddr* may be specified as an RX-type address or in the register form. Valid register values are (1) - (12).

**This parameter is required.**

# QSCRATCH

## OPTION

specifies whether the requestor is to wait until the request is complete or continue processing while the request is active.

**This parameter is required.**

## SYNCH

specifies that the requestor wait until the request is complete.

## ASYNCH

specifies that the requestor continue processing while the request is active. After return from the original request, R1 contains the address of an ECB POSTed when the response completed. R0 contains the token used by SLSXREQ READ to read the response.

## XCALADR

specifies a location containing the address of the SLSXCAL routine.

*rtnaddr* specifies either an RX-type address of the routine, register (15), or register (2) - (12) containing the routine's address.

**This parameter is required.**

## ACSID

*acsidaddr* specifies the address of the ACS used to satisfy the request. The format of *acsidaddr* is *AA*, where *AA* is the ACS number (00-FF hexadecimal). For example, 01, designates ACS 01. Specify either an RX-type address of the data or the number of the register containing the address of the data.

**This parameter is optional.**

## SCRPOOL

specifies the scratch subpool index for each request. The index ranges from 0 to 255. A value of zero indicates no special subpool request and any available scratch volume is usable. These subpools are defined by the user in the PARMLIB data set.

*value* specifies either an RX-type address of the one-byte subpool or the register (2) - (12) containing the subpool in byte 3.

**This parameter is optional** and defaults to 0 (any scratch volume).

## SUBPOOL

specifies the address of a 13-character field containing the scratch subpool name for the scratch subpool.

*subpoolname* specifies either an RX-type address of the data or the number of the register containing the address of the data.

**This parameter is optional.**

**LTYPE**

specifies the label type for scratch processing. This parameter causes scratch processing to be restricted to the set of scratch volumes associated with the label type specified. These label types are defined in a user defined PARMLIB data set.

**LDT**

specifies the library default label type.

**SL**

specifies the standard-labeled pool.

**NL**

specifies the nonlabeled pool.

**AL**

specifies the ANSI-labeled pool.

**NSL**

specifies the nonstandard-labeled pool.

**(r)**

specifies a register (2) - (12) containing the label type in byte 0 of the register. That value is either SLSXLLDT (library default), SLSXLSL (standard label), SLSXLAL (ANSI label), SLSXLNL (nonlabeled) or SLSXLNS (nonstandard label).

This parameter defaults to library default type (LDT). If the default value is accepted for LTYPE, then SCRPOOL defaults to zero (0). If the label type is not the library default type, a nonzero subpool (SCRPOOL) must be specified.

**This parameter is optional.**

**MEDia**

specifies the address of an 8-byte character field containing the media type of of the requested scratch cartridge. **This parameter is optional.**

**Notes:**

- If MEDia is not specified, scratch cartridges are selected without regard to media type.
- **The SL8500 library supports only the T9840A, T9840B, T9840C, T9940B, and T10000 media types and recording techniques.**

***medaddr***

specifies either an RX-type address of the data or the register (2) - (12) containing the address of the data. Valid media types are:

**LONGItud**

indicates any Standard or ECART cartridge.

## **Standard**

indicates a standard length, 3480 cartridge. It can be read on any longitudinal drives (4480, 4490, 9490, or 9490EE). Data can be written in 36-track mode on a 4490, 9490, or 9490EE transport but cannot be read on an 18-track (4480) drive. Synonyms for this type of cartridge include:

- CST
- MEDIA1
- STD
- 1
- 3480

## **ECART**

indicates a 3490E, extended capacity cartridge. It can be used only on a 36-track drive (4490, 9490, or 9490EE). Synonyms include:

- E
- ECCST
- ETAPE
- Long
- MEDIA2
- 3490E

## **ZCART**

indicates a 3490E, extended capacity cartridge that provides greater storage capacity than an ECART. It can be used only on a 9490EE drive.

ZCART can be abbreviated as Z.

## **DD3**

indicates any DD3A, DD3B, or DD3C (HELical) cartridge. HELical is a synonym for DD3.

## **DD3A, DD3B, DD3C**

indicates a helical cartridge. The media indicator in the external label is encoded with the cartridge type (A, B, or C). DD3A, DD3B, or DD3C can be abbreviated to A, B, or C, respectively.

Types of helical cartridges, along with their associated media capacities, are:

- A — 10GB
- B — 25GB
- C — 50GB.

Data capacity differences between DD3A, DD3B, and DD3C cartridges are related to the length of the tape in the cartridge, not to the recording density of the data.

## **STK1**

indicates any T9840 cartridge.

**STK1R**

indicates a T9840 cartridge. The media indicator in the external label is encoded with the cartridge type (R). STK1R can be abbreviated to R.

T9840 cartridge media capacities are 20GB (T9840A and T9840B) or 40GB (T9840C).

**STK2**

indicates any T9940 cartridge.

**STK2P**

indicates a T9940 data cartridge. The media indicator in the external label is encoded with the cartridge type (P). STK2P can be abbreviated to P.

T9940 cartridge media capacities are 60GB (T9940A) or 200GB (T9940B).

**T10000T1 or T1**

indicates a full-capacity 500GB T10000 cartridge. **T10000T1** can be abbreviated as **T1**.

**T10000TS or TS**

indicates a smaller-capacity 120GB T10000 cartridge. **T10000TS** can be abbreviated as **TS**.

**RECtech**

specifies the address of an 8-byte field containing the recording technique used to record data tracks on the tape surface. **This parameter is optional.**

**Notes:**

- If **RECtech** is not specified, scratch cartridges are selected depending on the MEDia type that has been specified.
- **The SL8500 library supports only the T9840A, T9840B, T9840C, T9940B, and T10000 media types and recording techniques.**

**recaddr**

specifies either an RX-type address of the data or the register (2) - (12) containing the address of the data. Valid recording techniques are:

**LONGItud**

indicates any device that uses longitudinal recording.

**18track**

indicates a 4480 transport.

**36track**

indicates a 4490, 9490, or 9490EE transport (any device that records in 36-track mode).

**36Atrack**

indicates a 4490 (Silverton) transport.

**36Btrack**

indicates a 9490 (Timberline) transport.

**36Ctrack**

indicates a 9490EE transport.

**HELical**

indicates a device using helical recording.

**DD3**

indicates a device using helical recording.

**STK1R**

indicates any 9840 transport.

**STK1R34**

indicates any 3490E-image 9840 transport.

**STK1R35**

indicates any 3590-image 9840 transport.

**STK1RA**

indicates a 3490E or 3590-image T9840A transport.

**STK1RA34**

indicates a 3490E-image T9840A transport.

**STK1RA35**

indicates a 3590-image T9840A transport.

**STK1RB**

indicates a 3490E or 3590-image T9840B transport.

**STK1RB34**

indicates a 3490E-image T9840B transport.

**STK1RB35**

indicates a 3590-image T9840B transport.

**STK1RAB**

indicates a 3490E or 3590-image T9840A or T9840B transport.

**STK1RAB4**

indicates a 3490E-image T9840A or T9840B transport.

**STK1RAB5**

indicates a 3590E-image T9840A or T9840B transport.

**STK1RC**

indicates a 3490E or 3590-image T9840C transport.

**STK1RC34**

indicates a 3490-image T9840C transport.

**STK1RC35**

indicates a 3590-image T9840C transport.

**STK2P**

indicates any 9940 transport.

**STK2P34**

indicates any 3490E-image 9940 transport.

**STK2P35**

indicates any 3590-image 9940 transport.

**STK2PA**

indicates a T9940A transport.

**STK2PA34**

indicates a 3490E-image T9940A transport.

**STK2PA35**

indicates a 3590-image T9940A transport.

**STK2PB**

indicates a T9940B transport.

**STK2PB34**

indicates a 3490E-image T9940B transport.

**STK2PB35**

indicates a 3590-image T9940B transport.

**T1A**

indicates any T10000 transport.

**T1AN**

indicates a non-encryption enabled 3490E- or 3590-image T10000 transport.

**T1A34**

indicates a non-encryption enabled 3490E-image T10000 transport.

**T1A35**

indicates a non-encryption enabled 3590-image T10000 transport.

**T1AE**

indicates an encryption-enabled 3490E- or 3590-image T10000 transport.

# QSCRATCH

## **T1AE34**

indicates an encryption-enabled 3490E-image T10000 transport.

## **T1AE35**

indicates an encryption-enabled 3590-image T10000 transport.

**Note:** The following parameters are ignored if Media, RECtech, or both are specified.

## **DSN**

*datasetname* specifies the data set name.

**This parameter is optional.**

## **EXPDT**

*expirationdate* specifies the expiration date of the data set in *yyddd* or *yyy/ddd* format.

## **RETPD**

*retentionperiod* specifies the retention period for the data set in days. Specify the number of days as a one- to four-digit decimal number.

**This parameter is optional.**

## **JOB**

*jobname* specifies the job name. This parameter is optional. *STEP* stepname specifies the step name. This parameter is optional. *PGM* pgmname specifies the step name.

**This parameter is optional.**

## **VOLTYPE**

indicates whether or not a nonspecific volume was requested.

### **Specific**

requests a specific volume to be mounted.

### **Nonspecific**

requests a nonspecific volume to be mounted.

**This parameter is optional.**



**Response to QSCRATCH Request**

A return code (SLXCMDRC in SLSXREQM macro) indicates the success of the operation. If the code is SLXRFAIL, a reason code or message is placed in SLXSRC. HSC messages and non-PGMI reason codes are described in the *HSC/MSP Messages and Codes Guide*. PGMI reason codes are described in “Reason Codes” on page 697.

In addition to the Reply Header, an LSM information element for each LSM (mapped by SLXSLSM) is returned.

# QVOLUME

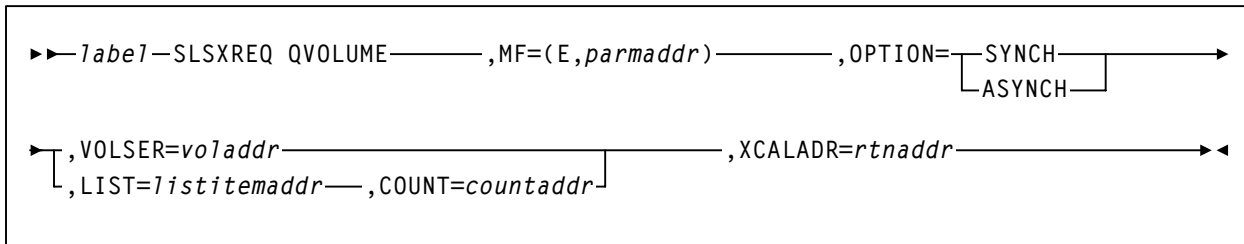
## QVOLUME

The QVOLUME request is used to obtain the library status of a cartridge.

### QVOLUME Considerations

There are no considerations for this PGMI function.

### Syntax



### Parameters

#### MF=(E,parmaddr)

specifies the execute form of the SLSXREQ macro using a remote parameter list. The parameter list address *parmaddr* may be specified as an RX-type address or in the register form. Valid register values are (1) - (12).

**This parameter is required.**

#### OPTION

specifies whether the requestor is to wait until the request is complete or continue processing while the request is active.

**This parameter is required.**

#### SYNCH

specifies that the requestor wait until the request is complete.

#### ASYNCH

specifies that the requestor continue processing while the request is active. After return from the original request, R1 contains the address of an ECB POSTed when the response completed. R0 contains the token used by SLSXREQ READ to read the response.

**VOLSER**

*voladdr* specifies the address of a six-character volume label. Acceptable characters for a VOLSER are A-Z, 0-9, #, \$, ¥, and trailing blanks.

Specify either an RX-type address of the VOLSER or the register (2) - (12) containing the address of the VOLSER.

**This parameter is required.**

**LIST**

specifies the address of a list of elements. *listitemaddr* specifies either an RX-type address of the data or the number of a register containing the address of the data. LIST designates a list of 6-byte VOLSERS.

**This parameter is required if VOLSER is not specified.**

**COUNT**

specifies the address of a two-byte count value.

*countaddr* specifies either an RX-type address of the data or the number of the register containing the address of the data.

**This parameter is required when LIST is specified.**

**XCALADR**

specifies a location containing the address of the SLSXCAL routine.

*rtnaddr* specifies either an RX-type address of the routine, register (15), or register (2) - (12) containing the routine's address.

**This parameter is required.**

**Response to QVOLUME Request**

A return code (SLXCMDRC in SLSXREQM macro) indicates the success of the operation. If the code is SLXRFAIL, a reason code or message is placed in SLXSRC. HSC messages and non-PGMI reason codes are described in the *HSC/MSP Messages and Codes Guide*. PGMI reason codes are described in "Reason Codes" on page 697.

In addition to the Reply Header, the Volume Information Section (mapped by SLXSVOL) is returned.

If the volume is not in the library, a code of SLXRWARN is placed in SLXCMDRC, a reason code of 700C is set.

## READ

## READ

The READ request directs the HSC to return the response(s) associated with a previously initiated request, which has completed as indicated by a posted ECB.

### READ Considerations

This request is used to read a response associated with a particular token. The requestor specifies the token returned on the original request.

The READ request is synchronous only.

### Syntax

```
▶▶ label — SLSXREQ READ —, MF=(E, parmaddr) —, TOKEN=tokenaddr —, XCALADR=rtnaddr —▶▶
```

### Parameters

#### MF=(E, *parmaddr*)

specifies the execute form of the SLSXREQ macro using a remote parameter list. The parameter list address *parmaddr* may be specified as an RX-type address or in the register form. Valid register values are (1) - (12).

**This parameter is required.**

#### TOKEN

specifies the address of the token originally returned in R0 when the request was initiated.

*tokenaddr* specifies either an RX-type address of the token or the register (2) - (12) containing the address of the token.

**This parameter is required.**

#### XCALADR

specifies a location containing the address of the SLSXCAL routine.

*rtnaddr* specifies either an RX-type address of the routine, register (15), or register (2) - (12) containing the routine's address.

**This parameter is required.**

**Response to READ Request**

A return code (SLXCMDRC in SLSXREQM macro) indicates the success of the operation. If zero, R1 contains the address of the response, and R0 contains the length. The area and length are valid until the next SLSXREQ macro. The response area is in HSC key, non-fetch protected, so the user should not attempt to modify the response area.

If the code is SLXRFAIL, a reason code or message is placed in SLXSRC. HSC messages and non-PGMI reason codes are described in the *HSC/MSP Messages and Codes Guide*. PGMI reason codes are described in “Reason Codes” on page 697. Valid reason codes depend on the original request.

# RESET

## RESET

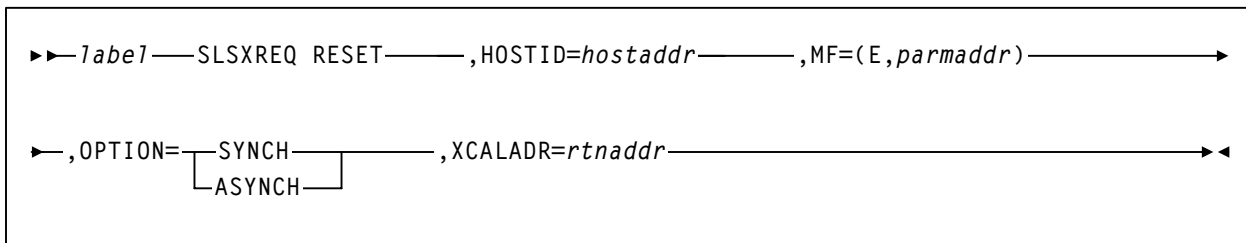
The RESET request causes the HSC to attempt to dismount all volumes that were mounted on behalf of a specified host.

### RESET Considerations

Volumes mounted on a drive can be dismounted by any host connected to the library. This removes the restriction that the host that mounted a volume must be the host to dismount the volume.

When a mounted volume is rewound and the drive is unloaded, the next mount request for that drive causes the volume to be dismounted. Because of this fact, the RESET request no longer physically dismounts a volume.

### Syntax



### Parameters

#### HOSTID

specifies the address of an eight character host ID, left justified and padded with blanks.

*hostaddr* specifies either an RX-type address of the host ID or the register (2) - (12) containing the address of the host ID.

**This parameter is required.**

#### MF=(E,*parmaddr*)

specifies the execute form of the SLSXREQ macro using a remote parameter list. The parameter list address *parmaddr* may be specified as an RX-type address or in the register form. Valid register values are (1) - (12).

**This parameter is required.**

#### OPTION

specifies whether the requestor is to wait until the request is complete or continue processing while the request is active.

**This parameter is required.**

**SYNCH**

specifies that the requestor wait until the request is complete.

**ASYNCH**

specifies that the requestor continue processing while the request is active. After return from the original request, R1 contains the address of an ECB POSTed when the response completed. R0 contains the token used by SLSXREQ READ to read the response.

**XCALADR**

specifies a location containing the address of the SLSXCAL routine.

*rtaddr* specifies either an RX-type address of the routine, register (15), or register (2) - (12) containing the routine's address.

**This parameter is required.**

**Response to RESET Request**

A return code (SLXCMDRC in SLSXREQM macro) indicates the success of the operation. If the reset was successful, a return code of SLXR0K is placed in SLXCMDRC. A "success" code indicates that a dismount has been attempted for all drives, and not the status of each dismount. If the reset failed, a return code of SLXRFAIL is placed there. If the code is SLXRFAIL, a reason code or message is placed in SLXSRC. HSC messages and non-PGMI reason codes are described in the *HSC/MSP Messages and Codes Guide*. PGMI reason codes are described in "Reason Codes" on page 697.

The response is returned at the completion of the request.





## **VOLSER**

*voladdr* specifies the address of a six-character volume label. Acceptable characters for a VOLSER are A-Z, 0-9, #, \$, ¥, and trailing blanks.

Specify either an RX-type address of the VOLSER or the register (2) - (12) containing the address of the VOLSER.

**This parameter is required.**

## **XCALADR**

specifies a location containing the address of the SLSXCAL routine.

*rtnaddr* specifies either an RX-type address of the routine, register (15), or register (2) - (12) containing the routine's address.

**This parameter is required.**

## **Response to SCRATCH Request**

A return code (SLXCMDRC in SLSXREQM macro) indicates the success of the operation. If the scratch was successful, a return code of SLXR0K is placed in SLXCMDRC. If the scratch failed, a return code of SLXRFAIL is placed there. If the code is SLXRFAIL, a reason code or message is placed in SLXSRC. HSC messages and non-PGMI reason codes are described in the *HSC/MSP Messages and Codes Guide*. PGMI reason codes are described in "Reason Codes" on page 697.

The response is returned at the completion of the request.

## SELSCR

## SELSCR

The SELSCR causes the HSC to choose a library scratch volume and remove it from scratch status in the library control data sets.

### SELSCR Considerations

No volume movement occurs.

When neither ACSID nor DRIVE is specified, the HSC searches through all library LSMs and chooses a scratch volume from the LSM containing the most scratch volumes. When ACSID is specified, the HSC chooses a scratch volume from the LSM in the specified ACS that holds the most cartridges. When DRIVE is specified, the HSC chooses a scratch volume from the closest LSM, if the drive is in an automatic mode LSM. If the drive is in a manual mode LSM, a scratch volume is picked from a manual mode LSM before it is picked from an automatic mode LSM.

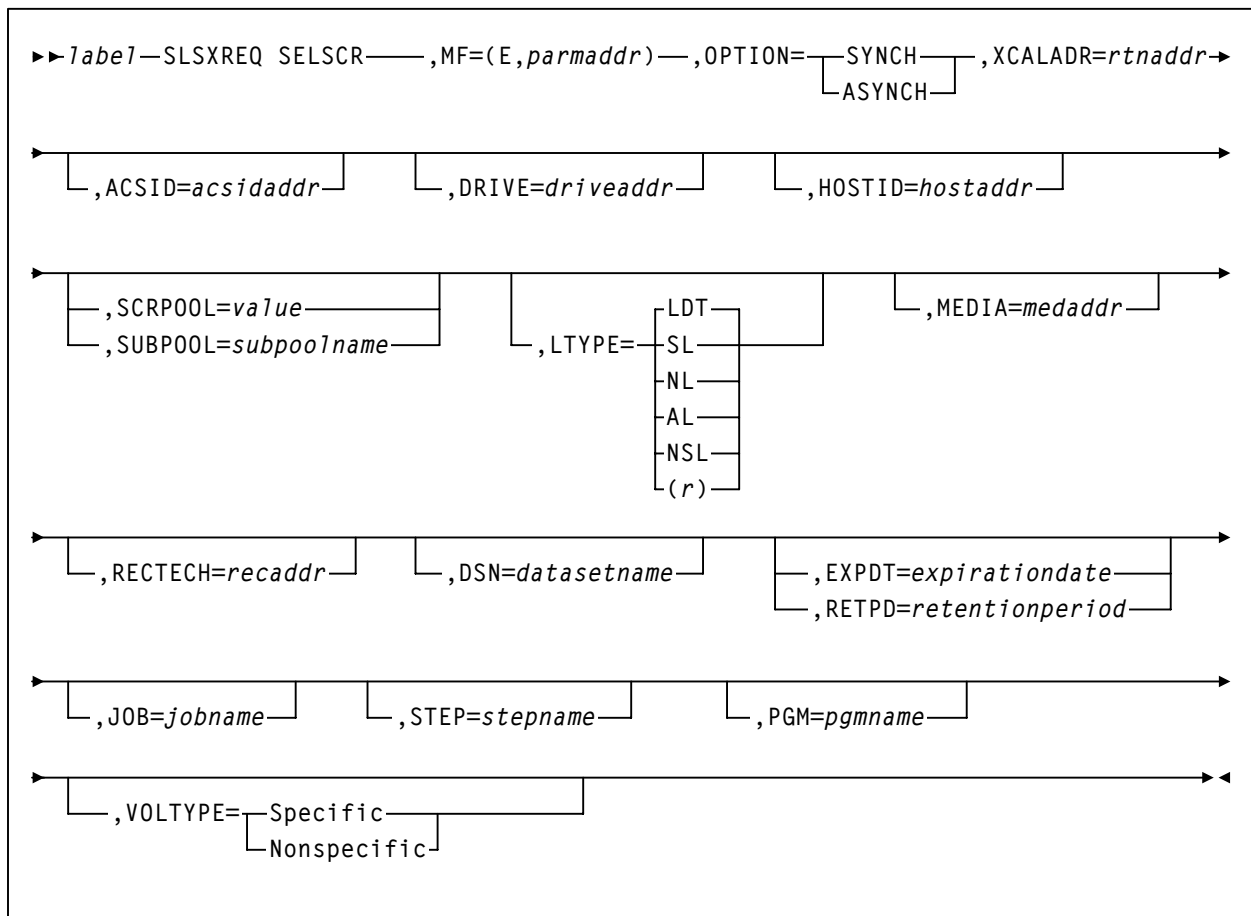


**Caution: StorageTek strongly recommends that you do not place SL8500 libraries in manual mode.** To use manual mode, all LSMs in the SL8500 must be offline, and that means all CAPs and drives are unavailable for automated operations.

Additionally, SL8500s have been designed for high cartridge density, so there is limited room for manually mounting and dismounting cartridges.

Refer to the “Precautions” topic in the *SL8500 Modular Library System User’s Guide* for safety requirements and physical restrictions if you decide that you must enter the library.

## Syntax



## Parameters

### **MF=(E,parmaddr)**

specifies the execute form of the SLSXREQ macro using a remote parameter list. The parameter list address *parmaddr* may be specified as an RX-type address or in the register form. Valid register values are (1) - (12).

**This parameter is required.**

### **OPTION**

specifies whether the requestor is to wait until the request is complete or continue processing while the request is active.

**This parameter is required.**

### **SYNCH**

specifies that the requestor wait until the request is complete.

## ASYNCH

specifies that the requestor continue processing while the request is active. After return from the original request, R1 contains the address of an ECB POSTed when the response completed. R0 contains the token used by SLSXREQ READ to read the response.

## XCALADR

specifies a location containing the address of the SLSXCAL routine.

*rtncaddr* specifies either an RX-type address of the routine, register (15), or register (2) - (12) containing the routine's address.

**This parameter is required.**

## ACSID

*acsidaddr* specifies the address of the ACS used to satisfy the request. The format of *acsidaddr* is *AA*, where *AA* is the ACS number (00-FF hexadecimal). For example, 01, designates ACS 01. Specify either an RX-type address of the data or the number of the register containing the address of the data.

**This parameter is optional.**

## DRIVE

*driveaddr* specifies the address of the 2-byte drive specification (0cua) from which a volume needs dismounting.

Specify either an RX-type address of the data or the register (2) - (12) containing the address of the data.

**This parameter is optional.**

## HOSTID

specifies the address of an eight character host ID, left justified and padded with blanks. *hostaddr* specifies either an RX-type address of the host ID or the register (2) - (12) containing the address of the host ID.

**This parameter is optional.** If the parameter is not specified, the host ID executing the request is used.

## SCRPOOL

specifies the scratch subpool index for each request. The index ranges from 0 to 255. A value of zero indicates no special subpool request and any available scratch volume is usable. These subpools are defined by the user in the PARMLIB data set.

*value* specifies either an RX-type address of the one-byte subpool or the register (2) - (12) containing the subpool in byte 3.

**This parameter is optional** and defaults to 0 (any scratch volume).

**SUBPOOL**

specifies the address of a 13-character field containing the scratch subpool name for the scratch subpool.

*subpoolname* specifies either an RX-type address of the data or the number of the register containing the address of the data.

**This parameter is optional.**

**LTYPE**

specifies the label type for scratch processing. This parameter causes scratch processing to be restricted to the set of scratch volumes associated with the label type specified. These label types are defined in a user defined PARMLIB data set.

**LDT**

specifies the library default label type.

**SL**

specifies the standard-labeled pool.

**NL**

specifies the nonlabeled pool.

**AL**

specifies the ANSI-labeled pool.

**NSL**

specifies the nonstandard-labeled pool.

**(r)**

specifies a register (2) - (12) containing the label type in byte 0 of the register. That value is either SLSXLLDT (library default), SLSXLSL (standard label),

SLSXLAL (ANSI label), SLSXLNL (nonlabeled) or SLSXLNS (nonstandard label).

This parameter defaults to library default type (LDT). If the default value is accepted for LTYPE, then SCRPOOL defaults to zero (0). If the label type is not the library default type, a nonzero subpool (SCRPOOL) must be specified

**This parameter is optional.**

**MEDia**

specifies the address of an 8-byte character field containing the media type of the selected scratch cartridge. **This parameter is optional.**

**Notes:**

- If **MEDia** is not specified, scratch cartridges are selected without regard to media type.

- **The SL8500 library supports only the T9840A, T9840B, T9840C, T9940B, and T10000 media types and recording techniques.**

## *medaddr*

specifies either an RX-type address of the data or the register (2) - (12) containing the address of the data. Valid media types are:

### **LONGItud**

indicates any Standard or ECART cartridge.

### **Standard**

indicates a standard length, 3480 cartridge. It can be read on any longitudinal drives (4480, 4490, 9490, or 9490EE). Data can be written in 36-track mode on a 4490, 9490, or 9490EE transport but cannot be read on an 18-track (4480) drive. Synonyms for this type of cartridge include:

- CST
- MEDIA1
- STD
- 1
- 3480

### **ECART**

indicates a 3490E, extended capacity cartridge. It can be used only on a 36-track drive (4490, 9490, or 9490EE). Synonyms include:

- E
- ECCST
- ETAPE
- Long
- MEDIA2
- 3490E

### **ZCART**

indicates a 3490E, extended capacity cartridge that provides greater storage capacity than an ECART. It can be used only on a 9490EE drive.

ZCART can be abbreviated as Z.

### **DD3**

indicates any DD3A, DD3B, or DD3C (HELical) cartridge. HELical is a synonym for DD3.

**DD3A, DD3B, DD3C**

indicates a helical cartridge. The media indicator in the external label is encoded with the cartridge type (A, B, or C). DD3A, DD3B, or DD3C can be abbreviated to A, B, or C, respectively.

Types of helical cartridges, along with their associated media capacities, are:

- A — 10GB
- B — 25GB
- C — 50GB.

Data capacity differences between DD3A, DD3B, and DD3C cartridges are related to the length of the tape in the cartridge, not to the recording density of the data.

**STK1**

indicates any T9840 cartridge.

**STK1R**

indicates a T9840 cartridge. The media indicator in the external label is encoded with the cartridge type (R). STK1R can be abbreviated to R.

T9840 cartridge media capacities are 20GB (T9840A and T9840B) or 40GB (T9840C).

**STK2**

indicates any T9940 cartridge.

**STK2P**

indicates a T9940 data cartridge. The media indicator in the external label is encoded with the cartridge type (P). STK2P can be abbreviated to P.

T9940 cartridge media capacities are 60GB (T9940A) or 200GB (T9940B).

**T10000T1 or T1**

indicates a full-capacity 500GB T10000 cartridge. **T10000T1** can be abbreviated as **T1**.

**T10000TS or TS**

indicates a smaller-capacity 120GB T10000 cartridge. **T10000TS** can be abbreviated as **TS**.

**RECtech**

specifies the address of an 8-byte field containing the recording technique used to record data tracks on the tape surface. **This parameter is optional.**

**Notes:**

# SELSCR

- If **RECtech** is not specified, scratch cartridges are selected depending on the **MEDIA** type that has been specified.
- **The SL8500 library supports only the T9840A, T9840B, T9840C, T9940B, and T10000 media types and recording techniques.**

## *recaddr*

specifies either an RX-type address of the data or the register (2) - (12) containing the address of the data. Valid recording techniques are:

### **LONGItud**

indicates any device that uses longitudinal recording.

### **18track**

indicates a 4480 transport.

### **36track**

indicates a 4490, 9490, or 9490EE transport (any device that records in 36-track mode).

### **36Atrack**

indicates a 4490 (Silverton) transport.

### **36Btrack**

indicates a 9490 (Timberline) transport.

### **36Ctrack**

indicates a 9490EE transport.

### **HELical**

indicates a device using helical recording.

### **DD3**

indicates a device using helical recording.

### **STK1R**

indicates any 9840 transport.

### **STK1R34**

indicates any 3490E-image 9840 transport.

### **STK1R35**

indicates any 3590-image 9840 transport.

### **STK1RA**

indicates a 3490E or 3590-image T9840A transport.

### **STK1RA34**

indicates a 3490E-image T9840A transport.

### **STK1RA35**

indicates a 3590-image T9840A transport.



**STK1RB**

indicates a 3490E or 3590-image T9840B transport.

**STK1RB34**

indicates a 3490E-image T9840B transport.

**STK1RB35**

indicates a 3590-image T9840B transport.

**STK1RAB**

indicates a 3490E or 3590-image T9840A or T9840B transport.

**STK1RAB4**

indicates a 3490E-image T9840A or T9840B transport.

**STK1RAB5**

indicates a 3590E-image T9840A or T9840B transport.

**STK1RC**

indicates a 3490E or 3590-image T9840C transport.

**STK1RC34**

indicates a 3490-image T9840C transport.

**STK1RC35**

indicates a 3590-image T9840C transport.

**STK2P**

indicates any 9940 transport.

**STK2P34**

indicates any 3490E-image 9940 transport.

**STK2P35**

indicates any 3590-image 9940 transport.

**STK2PA**

indicates a T9940A transport.

**STK2PA34**

indicates a 3490E-image T9940A transport.

**STK2PA35**

indicates a 3590-image T9940A transport.

**STK2PB**

indicates a T9940B transport.

**STK2PB34**

indicates a 3490E-image T9940B transport.

**STK2PB35**

indicates a 3590-image T9940B transport.

**T1A**

indicates any T10000 transport.

**T1AN**

indicates a non-encryption enabled 3490E- or 3590-image T10000 transport.

**T1A34**

indicates a non-encryption enabled 3490E-image T10000 transport.

**T1A35**

indicates a non-encryption enabled 3590-image T10000 transport.

**T1AE**

indicates an encryption-enabled 3490E- or 3590-image T10000 transport.

**T1AE34**

indicates an encryption-enabled 3490E-image T10000 transport.

**T1AE35**

indicates an encryption-enabled 3590-image T10000 transport.

**Note:** The following parameters are ignored if Media, RECtech, or both are specified.

**DSN**

*datasetname* specifies the data set name.

**This parameter is optional.**

**EXPDT**

*expirationdate* specifies the expiration date of the data set in *yyddd* or *yyy/ddd* format.

**This parameter is optional.**

**RETPD**

*retentionperiod* specifies the retention period for the data set in days. Specify the number of days as a one- to four-digit decimal number.

**This parameter is optional.**

**JOB**

*jobname* specifies the job name.

**This parameter is optional.**

**STEP**

*stepname* specifies the step name.

**This parameter is optional.**

**PGM**

*pgmname* specifies the step name.

**This parameter is optional.**

**VOLTYPE**

indicates whether or not a nonspecific volume was requested.

**Specific**

requests a specific volume to be mounted.

**Nonspecific**

requests a nonspecific volume to be mounted.

**This parameter is optional.**

**Response to SELSCR Request**

A return code (SLXCMDRC in the SLSXREQM macro) indicates the success of the operation. If the return code is SLXROK, a volume information element will be returned describing the volume picked.

If the return code is SLXRWARN, there is no scratch volume that met the specifications. A reason code of X'4011' will be set in SLXSRC.

If the return code is SLXRFAIL, a reason code or message is placed in SLXSRC. HSC messages and non-PGMI reason codes are described in the *HSC/MSP Messages and Codes Guide*. PGMI reason codes are described in "Reason Codes" on page 697.

## STOP

## STOP

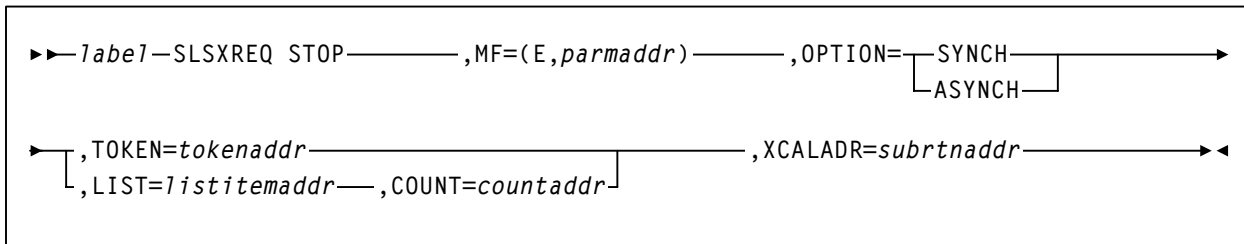
The STOP request causes a specific PGMI request to be terminated.

### STOP Considerations

Each PGMI request is assigned a token number. This token number is available to the operator when submitting a request for tracking or conversational purposes. The HSC's allow for a variable number of EJECT requests. The STOP request provides the ability to interrupt those requests. Through the use of tokens, a STOP request can be issued to terminate any specific request.

The STOP request allows a forced, orderly termination of a given unit or units of work.

### Syntax



### Parameters

#### MF=(E,parmaddr)

specifies the execute form of the SLSXREQ macro using a remote parameter list. The parameter list address *parmaddr* may be specified as an RX-type address or in the register form. Valid register values are (1) - (12).

**This parameter is required.**

#### OPTION

specifies whether the requestor is to wait until the request is complete or continue processing while the request is active.

**This parameter is required.**

#### SYNCH

specifies that the requestor wait until the request is complete.

#### ASYNCH

specifies that the requestor continue processing while the request is active. After return from the original request, R1 contains the address of an ECB POSTed when the response completed. R0 contains the token used by SLSXREQ READ to read the response.

**TOKEN**

Specifies the address of the token originally returned in R0 when the request was initiated.

*tokenaddr* specifies either an RX-type address of the token or the register (2) - (12) containing the address of the token.

**This parameter is required if LIST is not specified.**

**LIST**

*tokenlist* specifies the address of a list of tokens for STOP processing. The parameter list address may be specified as an RX-type address or in register form. Valid register values are (2) - (12).

A special form of this parameter, LIST=\*, indicates that the list immediately follows the parameter list control block.

**This parameter is required if TOKEN is not specified.**

**COUNT**

*countaddr* specifies the RX or register form address of a two-byte binary field containing the number of entries specified in **LIST**. Valid register values for RX addressing are (2) - (12). The maximum number of tokens specified is 500. If COUNT is specified without LIST, an error results.

**This parameter is required when LIST is specified.**

**XCALADR**

*subrtnaddr* specifies a location containing the address of the SLSXCAL routine. Specify either an RX-type address of the routine, register (15), or register (2) - (12) containing the routine's address.

**This parameter is required.**

**Response to STOP Request**

A return code indicates the success of the STOP operation.

## UNSCRATCH

## UNSCRATCH

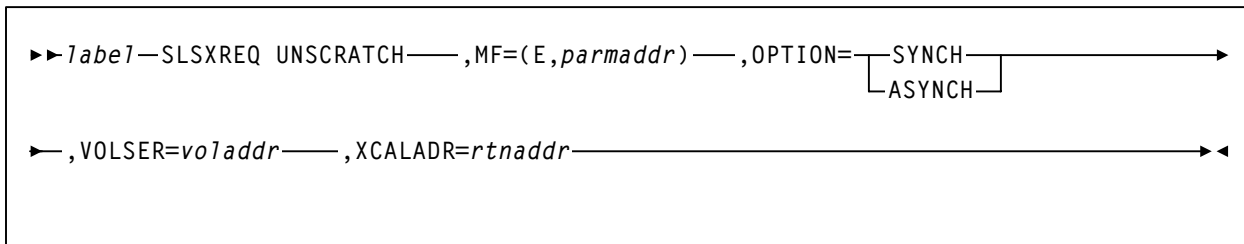
The UNSCRATCH request causes a volume to be removed from scratch status in the HSC control data set.

### UNSCRATCH Considerations

This request removes a volume from scratch status within the library.

No volume movement occurs. However, UNSCRATCH processing must select the cartridge in order to change its status. This means that the UNSCRATCH request will fail if the cartridge is mounted on a drive.

### Syntax



### Parameters

#### MF=(E,parmaddr)

specifies the execute form of the SLSXREQ macro using a remote parameter list. The parameter list address *parmaddr* may be specified as an RX-type address or in the register form. Valid register values are (1) - (12).

**This parameter is required.**

#### OPTION

specifies whether the requestor is to wait until the request is complete or continue processing while the request is active.

**This parameter is required.**

#### SYNCH

specifies that the requestor wait until the request is complete.

#### ASYNCH

specifies that the requestor continue processing while the request is active. After return from the original request, R1 contains the address of an ECB POSTed when the response completed. R0 contains the token used by SLSXREQ READ to read the response.

**VOLSER**

*voladdr* specifies the address of a six-character volume label. Acceptable characters for a VOLSER are A-Z, 0-9, #, \$, ¥, and trailing blanks.

Specify either an RX-type address of the VOLSER or the register (2) - (12) containing the address of the VOLSER.

**This parameter is required.**

**XCALADR**

specifies a location containing the address of the SLSXCAL routine.

*rtnaddr* specifies either an RX-type address of the routine, register (15), or register (2) - (12) containing the routine's address.

**This parameter is required.**

**Response to UNSCRATCH Request**

A return code (SLXCMDRC in SLSXREQM macro) indicates the success of the operation. If the unscratch was successful, a return code of SLXR0K is placed in SLXCMDRC. If the unscratch failed, a return code of SLXRFAIL is placed there. If the return code is SLXRFAIL, a reason code or message is placed in SLXSRC. HSC messages and non-PGMI reason codes are described in the *HSC/MSP Messages and Codes Guide*. PGMI reason codes are described in "Reason Codes" on page 697.

The response is returned at the completion of the request.

## Sample Requests

### Sample Set Up

The following code fragment sets up for the SLSXREQ environment, and then issues QHSC to see if the HSC is available.

```
*
* Get HSC call routine
*
      LOAD EP=SLSXCAL,          LOAD SLSXCAL.          +
          ERRET=NOHSC          ASSUME NOT UP IF LOAD FAILS
      ST      Ø,WXCALADR        SAVE ADDR FOR LATER.
*
* See if the HSC is up
*
      SLSXREQ QHSC,            QUERY HSC STATUS.          +
          XCALADR=WXCALADR,
          MF=(E,W SLSXREQ)
      LTR    15,15              RETURN CODE ZERO
      BNZ    NOHSC              NO - HSC NOT UP.
```

*Figure 48. Sample 1 - SLSXREQ Environment Set Up*

### Sample QVOLUME Request

The following code fragment issues a QVOLUME request to determine if a volume is in the library. If it is, that information could be used in a Display command.



**Note:** The response is copied so that further SLSXREQ requests can be issued without losing the volume data.



```

QVOLUME TITLE '- PROGRAMMATIC INTERFACE - QVOLUME'
*
* QVOLUME - PROGRAMMATIC INTERFACE - QUERY THE STATUS OF A VOLUME
* FUNCTION: USE PROGRAMMATIC INTERFACE SLSXREQ MACRO FUNCTION
* QVOLUME.
*
* ATTRIBUTES:
* ATTRIBUTES --
* 1. PROBLEM STATE, USER KEY
* 2. NON-APF AUTHORIZED
* EXITS
* RETURN CODE:
* R15 = 8 = HSC NOT AVAILABLE
* 4 = QUERY VOLUME FUNCTION FAILED
* 0 = QUERY VOLUME FUNCTION SUCCESSFUL
*
* CHANGE HISTORY:
* 01/05/95-GRC - CORRECT CODING ERRORS
* - AND MISLEADING OMISSIONS.
* 11/30/90-CRTD-VB - MODULE CREATED.
**ENDPROLOGUE*****
TITLE '- ESTABLISH ENTRY, BASE REGISTERS AND WORK AREAS'
PRINT GEN
ENTRY QVOLUME
QVOLUME CSECT
QVOLUME AMODE 31
QVOLUME RMODE ANY
*
* ESTABLISH CSECT ADDRESSABILITY.
* IF NEEDED, R11 HAS BEEN RESERVED FOR A SECOND BASE REGISTER.
*
STM R14,R12,12(R13) SAVE REGISTERS
LR R12,R15 BASE REG 12
USING QVOLUME,R12 SETUP BASE REG 12
B A000
MODNAME DC CL8'QVOLUME '
DC CL8'&SYSDATE'
DC CL5'&SYSTEME'
*
A000 DS 0H
LA R10,QVOLWORK R10 IS WORKAREA BASE
ST R13,4(,R10) PTR TO PREV S.A. FROM NEW
ST R10,8(,R13) PTR TO NEW S.A. FROM OLD
LR R13,R10 ESTABLISH NEW SAVE AREA
*
* ESTABLISH MAP TO SLX RESPONSE AREA.
USING SLX,R5
TITLE '- LOAD SLSXCAL'

```

**Figure 49. Sample 2 - QVOLUME Request**

**(1 of 4)**

```

* LOAD HSC INTERFACE MODULE SLSXCAL.
*
      LOAD EP=SLSXCAL          LOAD SLSXCAL
      ST R0,WSCALADR          SAVE SLSXCAL ROUTINE ADR
      TITLE '- QUERY VOLUME DATA'
*
* QUERY A VOLUME
*
      SLSXREQ QVOLUME,          QUERY VOLUME.          +
              VOLSER=VOLSER,          +
              OPTION=SYNCH,          +
              XCALADR=WSCALADR,          +
              MF=(E,WLSXREQ)
      LTR 15,15          RETURN CODE ZERO?
      BNZ HSCNOTAV          NO - HSC NOT UP.
      LR R5,R1          SAVE STORAGE ADDRESS.
      CLI SLXCMDRC,SLXROK          DID IT WORK?
      BN FUNCFAIL          NO, TELL OPERATOR
      LR 4,1          SAVE REPLY BUFFER ADDRESS.
      LR 3,0          SAVE REPLY LENGTH.
      GETMAIN RU,LV=(3),SP=0          GET PERMANENT STORAGE.
      LR R5,R1          SAVE THE REPLY COPY AREA ADDRESS
      LR 14,1          "TO" ADDRESS.
      LR 15,3          "TO" LENGTH.
      LR 0,4          "FROM" ADDRESS.
      LR 1,3          "FROM" LENGTH.
      MVCL 14,0          MOVE THE REPLY TO PERMANENT STORAGE.
      L 4,SLXXVOLL          LENGTH OF VOLUME SECTION.
      L 2,SLXXVOLO          GET VOLUME OFFSET.
      LA 2,SLX(2)          GET ADDR PF VOLUME SECTION.
      USING SLXSVOL,2          TELL ASSEMBLER.
*****
*---->  CUSTOMER CODE TO PROCESS QVOLUME DATA GOES HERE          *
*****
      WTO 'QVOLUME - SUCCESSFUL'
      FREEMAIN RU,A=(R5),LV=(R3),SP=0          FREE QVOLUME REPLY COPY AREA
      XR R15,R15          NORMAL RETURN
      B FUNCEXIT          EXIT
      TITLE '- ERROR ROUTINES'
*
* HSC IS NOT AVAILABLE.
*
      HSCNOTAV DS 0H
      WTO 'QVOLUME - HSC NOT AVAILABLE'
      LA R15,8          HSC NOT AVAILABLE RETURN CODE
      B FUNCEXIT          EXIT
*
* QVOLUME REQUEST FAILED.
*

```

**Figure 49. Sample 2 - QVOLUME Request  
(2 of 4)**

```

*
FUNCFAIL DS      0H
           LA     R4,SLXCMDRC      POINT TO FAILING RETURN CODE
           LA     R5,WFCMDRC      RECEIVING AREA
           LA     R15,1           NUMBER OF BYTES TO CONVERT
           BAL   R2,CONVHTC       CONVERT
           WTO   MF=(E,WTOQFAIL)  TELL OPERATOR
           LA     R15,4 QVOLUME   FUNCTION FAILED RETURN CODE
           B      FUNCEXIT        EXIT
           TITLE '- COMMON EXIT'

*
* RETURN TO CALLER.
FUNCEXIT DS      0H
           LR     R2,R15          SAVE RETURN CODE
           DELETE EP=SLSXCAL     DELETE SLSXCAL
           L      R13,4(,R13)    POINT TO PREV REG SAVE AREA
           LR     R15,R2         BRING BACK RETURN CODE
           L      R14,12(R13)    RESTORE REG 14
           LM     R0,R12,20(R13) RESTORE REGS 0 - 12
           BR     R14           RETURN TO CALLER
           TITLE '- SERVICE ROUTINES (DATA CONVERSION)'
           CONVERT HEXADECIMAL DATA TO CHARACTER DATA.

*
*
CONVHTC DS      0H
           ICM   R7,B'1000',0(R4) GET ONE HEX BYTE
           LA     R8,2           TWO HEX CHAR IN EACH BYTE

CHTCLOOP DS      0H
           XR     R6,R6          CLEAR
           SLDL  R6,4           SHIFT HALF BYTE TO NEXT REGISTER
           STC   R6,0(R5)       SET IN RECEIVING AREA
           TR    0(1,R5),TRTAB  TRANSLATE TO CHARACTER
           LA     R5,1(,R5)     BUMP TO NEXT RECEIVING BYTE
           BCT   R8,CHTCLOOP    DO FOR BOTH HEX CHAR IN BYTE
           LA     R4,1(,R4)     BUMP TO NEXT HEX BYTE
           BCT   R15,CONVHTC    DO FOR NUMBER OF HEX BYTES
           BR     R2           RETURN TO CALLER

*
           TITLE '- MISCELLANEOUS CONSTANTS AND WORK AREAS'
           TRTAB DC              CL16'0123456789ABCDEF'

*
VOLSER   DC      C'EDU228'      VOLUME SERIAL TO QVOLUME
*
WTOQFAIL WTO     'QVOLUME - SLSXREQ FAILED, SLXCMDRC = XX',MF=L
WFCMDRC  EQU     WTOQFAIL+41
QVOLWORK DS      0D           LINKAGE SAVE AREA
           DS     18F         LINKAGE SAVE AREA

*
WSCALADR DS      F           SLSXCAL ROUTINE ADR
*
WSLSXREQ SLSXREQ MF=L        REMOTE SLSXREQ.

```

**Figure 49. Sample 2 - QVOLUME Request  
(3 of 4)**

```
QVOLWKL EQU *-QVOLWORK
*
      LORG
      TITLE '- ESTABLISH REGISTER EQUATES'
      SLSREGS
      TITLE '- DSECT MACROS'
      SLSXREQM ,
*
      END QVOLUME
```

**Figure 49. Sample 2 - QVOLUME Request  
(4 of 4)**

## Sample SCRATCH Request

The following code fragment issues a SCRATCH request to direct the HSC to scratch a volume.

```
SCRATCH TITLE 'SCRATCH - PROGRAMMATIC INTERFACE - SCRATCH'
*
* SCRATCH - PROGRAMMATIC INTERFACE - DIRECT HSC TO SCRATCH A VOLUME
*
* FUNCTION:  USE PROGRAMMATIC INTERFACE SLSXREQ MACRO FUNCTION
*              SCRATCH.
*
* ATTRIBUTES:
* ATTRIBUTES  --
*   1.  PROBLEM STATE, USER KEY
*   2.  NON-APF AUTHORIZED
*
* EXITS
*   RETURN CODE:
*       R15 =
*
* CHANGE HISTORY:
*   11/30/90-CRTD-VB - MODULE CREATED.
**ENDPROLOGUE*****
      TITLE 'SCRATCH - ESTABLISH BASE REGISTER'
      PRINT GEN
      ENTRY SCRATCH
SCRATCH CSECT
*
* ESTABLISH CSECT ADDRESSABILITY.
* IF NEEDED, R11 HAS BEEN RESERVED FOR A SECOND BASE REGISTER.
*
      LR      R12,R15          LOAD EPA AND ESTABLISH
      USING  SCRATCH,R12      ADDRESSABILITY TO THE CSECT
      STM    R14,R12,12(R13)  SAVE REGS
      LA     R10,MAINSAVE     POINT TO OUR SAVE AREA
      ST     R13,4(,R10)      PTR TO PREV S.A. FROM NEW
      ST     R10,8(,R13)      PTR TO NEW S.A. FROM OLD
      LR     R13,R10          ESTABLISH NEW SAVE AREA
*
* ESTABLISH MAP TO SLSX RESPONSE AREA.
*
      USING  SLX,R3
*
* LOAD HSC INTERFACE MODULE SLSXCAL.
*
      LOAD   EP=SLSXCAL       LOAD SLSXCAL
      ST     R0,WSCALADR      SAVE SLSXCAL ROUTINE ADR
```

**Figure 50. Sample 3 - PGMI SCRATCH Request**

**(1 of 3)**

```

* USE SLSXREQ MACRO TO INVOKE SCRATCH OPTION.
*
      SLSXREQ SCRATCH,
      OPTION=SYNCH,
      XCALADR=WSCALADR,
      VOLSER=VOLSER,
      MF=(E,WLSXREQ)
      LTR R15,R15
      BNZ HSCNOTAV
      LR R3,R1
      CLI SLXCMDRC,SLXROK
      BNE FUNCFAIL
      B   FUNCEXIT
      HSC AVAILABLE?
      NO, TELL OPERATOR
      POINT TO START OF REPLY HEADER
      SCRATCH SUCCESSFUL?
      NO, TELL OPERATOR WHY
      EXIT
*
* HSC IS NOT AVAILABLE.
*
      HSCNOTAV DS 0H
      WTO 'SCRATCH - HSC NOT AVAILABLE'
      B   FUNCEXIT
      EXIT
*
* SCRATCH REQUEST FAILED.
*
      FUNCFAIL DS 0H
      LA R4,SLXCMDRC
      LA R5,WFCMDRC
      LA R15,1
      BAL R2,CONVHTC
      WTO MF=(E,WTOQFAIL)
      B   FUNCEXIT
      POINT TO FAILING RETURN CODE
      RECEIVING AREA
      NUMBER OF BYTES TO CONVERT
      CONVERT
      TELL OPERATOR
      EXIT
*
* RETURN TO CALLER.
*
      FUNCEXIT DS 0H
      DELETE EP=SLSXCAL
      L R13,4(,R13)
      L R14,12(R13)
      LM R0,R12,20(R13)
      BR R14
      DELETE SLSXCAL
      POINT TO PREV REG SAVE AREA
      RESTORE REG 14
      RESTORE REGS 0 - 12
      RETURN TO CALLER
*
* TITLE 'SCRATCH - SERVICE ROUTINES (DATA CONVERSION)'
* CONVERT HEXADECIMAL DATA TO CHARACTER DATA.
*
      CONVHTC DS 0H
      ICM R7,B'1000',0(R4)
      LA R8,2
      GET ONE HEX BYTE
      TWO HEX CHAR IN EACH BYTE

```

**Figure 50. Sample 3 - PGMI SCRATCH Request  
(2 of 3)**

```

CHTCLOOP DS 0H
XR R6,R6 CLEAR
SLDL R6,4 SHIFT HALF BYTE TO NEXT REGISTER
STC R6,0(R5) SET IN RECEIVING AREA
TR 0(1,R5),TRTAB TRANSLATE TO CHARACTER
LA R5,1(,R5) BUMP TO NEXT RECEIVING BYTE
BCT R8,CHTCLOOP DO FOR BOTH HEX CHAR IN BYTE
LA R4,1(,R4) BUMP TO NEXT HEX BYTE
BCT R15,CONVHTC DO FOR NUMBER OF HEX BYTES
BR R2 RETURN TO CALLER
TRTAB DC CL16'0123456789ABCDEF'
*
TITLE 'SCRATCH - MISCELLANEOUS CONSTANTS AND EQUATES'
LTORG
*
MAINSAVE DS 9D LINKAGE SAVE AREA
DWORD DS D DOUBLEWORD WORK AREA
*
WSCALADR DS F SLSXCAL ROUTINE ADR
*
VOLSER DC C'EDU228' VOLUME SERIAL TO SCRATCH
*
WTOQFAIL WTO 'SCRATCH - SLSXREQ FAILED, SLXCMDRC = XX',MF=L
WFCMDRC EQU WTOQFAIL+41
*
TITLE 'SCRATCH - SLSXREQ DSECT MACRO'
SLSXREQM ,
*
END SCRATCH

```

**Figure 50. Sample 3 - PGMI SCRATCH Request  
(3 of 3)**

## Sample UNSCRATCH Request

The following code fragment issues a UNSCRATCH request to direct the HSC to remove a volume from scratch status.

```
UNSCRTCH TITLE 'UNSCRATCH - PROGRAMMATIC INTERFACE - UNSCRATCH'
*
* UNSCRATCH - PROGRAMMATIC INTERFACE-DIRECT HSC TO UNSCRATCH A VOLUME
*
* FUNCTION: USE PROGRAMMATIC INTERFACE SLSXREQ MACRO FUNCTION
*           UNSCRATCH.
*
* ATTRIBUTES:
* ATTRIBUTES --
*   1. PROBLEM STATE, USER KEY
*   2. NON-APF AUTHORIZED
*
* EXITS
*   RETURN CODE:
*       R15 =
*
* CHANGE HISTORY:
*   11/30/90-CRTD-VB - MODULE CREATED.
**ENDPROLOGUE*****
                TITLE 'UNSCRTCH - ESTABLISH BASE REGISTER'
                PRINT GEN
                ENTRY UNSCRTCH
UNSCRTCH CSECT
*
* ESTABLISH CSECT ADDRESSABILITY.
* IF NEEDED, R11 HAS BEEN RESERVED FOR A SECOND BASE REGISTER.
*
                LR   R12,R15           LOAD EPA AND ESTABLISH
                USING UNSCRTCH,R12     ADDRESSABILITY TO THE CSECT
                STM  R14,R12,12(R13)   SAVE REGS
                LA   R10,MAINSAVE      POINT TO OUR SAVE AREA
                ST   R13,4(,R10)       PTR TO PREV S.A. FROM NEW
                ST   R10,8(,R13)       PTR TO NEW S.A. FROM OLD
                LR   R13,R10           ESTABLISH NEW SAVE AREA
*
* ESTABLISH MAP TO SLSX RESPONSE AREA.
*
                USING SLX,R3
*
* LOAD HSC INTERFACE MODULE SLSXCAL.
*
                LOAD EP=SLSXCAL        LOAD SLSXCAL
                ST   R0,WSCALADR       SAVE SLSXCAL ROUTINE ADR
```

**Figure 51. PGMI UNSCRATCH Request**  
**(1 of 3)**



```

*
* USE SLSXREQ MACRO TO INVOKE UNSCRATCH OPTION.
*
      SLSXREQ UNSCRATCH,                                +
              OPTION=SYNCH,                              +
              XCALADR=WSCALADR,                          +
              VOLSER=VOLSER,                             +
              MF=(E,WLSXREQ)
      LTR  R15,R15                                       HSC AVAILABLE?
      BNZ  HSCNOTAV                                     NO, TELL OPERATOR
      LR   R3,R1                                         POINT TO START OF REPLY HEADER
      CLI  SLXCMDRC,SLXROK                               UNSCRATCH SUCCESSFUL?
      BNE  FUNCFAIL                                     NO, TELL OPERATOR WHY
      B    FUNCEXIT                                     EXIT
*
* HSC IS NOT AVAILABLE.
*
HSCNOTAV DS    ØH
          WTO  'UNSCRATCH - HSC NOT AVAILABLE'
          B    FUNCEXIT                                EXIT
*
* UNSCRATCH REQUEST FAILED.
*
FUNCFAIL DS    ØH
          LA   R4,SLXCMDRC                             POINT TO FAILING RETURN CODE
          LA   R5,WFCMDRC                               RECEIVING AREA
          LA   R15,1                                   NUMBER OF BYTES TO CONVERT
          BAL  R2,CONVHTC                               CONVERT
          WTO  MF=(E,WTOQFAIL)                         TELL OPERATOR
          B    FUNCEXIT                                EXIT
*
* RETURN TO CALLER.
*
FUNCEXIT DS    ØH
          DELETE EP=SLSXCAL                            DELETE SLSXCAL
          L    R13,4(R13)                              POINT TO PREV REG SAVE AREA
          L    R14,12(R13)                             RESTORE REG 14
          LM   RØ,R12,2Ø(R13)                          RESTORE REGS Ø - 12
          BR   R14                                     RETURN TO CALLER
*
TITLE 'UNSCRATCH - SERVICE ROUTINES (DATA CONVERSION)'

```

**Figure 51. Sample 4 - PGMI UNSCRATCH Request  
(2 of 3)**

```

*
* CONVERT HEXADECIMAL DATA TO CHARACTER DATA.
*
CONVHTC  DS      0H
          ICM     R7,B'1000',0(R4)  GET ONE HEX BYTE
          LA      R8,2              TWO HEX CHAR IN EACH BYTE
CHTCLOOP DS      0H
          XR      R6,R6              CLEAR
          SLDL   R6,4              SHIFT HALF BYTE TO NEXT REGISTER
          STC    R6,0(R5)          SET IN RECEIVING AREA
          TR     0(1,R5),TRTAB     TRANSLATE TO CHARACTER
          LA     R5,1(,R5)         BUMP TO NEXT RECEIVING BYTE
          BCT   R8,CHTCLOOP        DO FOR BOTH HEX CHAR IN BYTE
          LA     R4,1(,R4)         BUMP TO NEXT HEX BYTE
          BCT   R15,CONVHTC        DO FOR NUMBER OF HEX BYTES
          BR     R2                 RETURN TO CALLER
TRTAB    DC      CL16'0123456789ABCDEF'
*
          TITLE 'UNSCRATCH - MISCELLANEOUS CONSTANTS AND EQUATES'
          LTORG
*
MAINSAVE DS      9D                LINKAGE SAVE AREA
DWORD    DS      D                 DOUBLEWORD WORK AREA
*
WSCALADR DS      F                 SLSXCAL ROUTINE ADR
*
VOLSER   DC      C'EDU228'         VOLUME SERIAL TO UNSCRATCH
*
WTOQFAIL WTO     'UNSCRATCH - SLSXREQ FAILED, SLXCMDRC = XX',MF=L
WFCMDRC  EQU     WTOQFAIL+41
*
          TITLE 'UNSCRATCH - SLSXREQ DSECT MACRO'
          SLSXREQM ,
*
          END      UNSCRTCH

```

**Figure 51. Sample 4 - PGMI UNSCRATCH Request  
(3 of 3)**

## Sample DISMOUNT Request

The following code fragment issues a DISMOUNT request to direct the HSC to dismount a volume.

```
DISMOUNT TITLE 'DISMOUNT - PROGRAMMATIC INTERFACE - DISMOUNT'
*
* DISMOUNT - PROGRAMMATIC INTERFACE - DIRECT HSC TO DISMOUNT A VOLUME
*
* FUNCTION: USE PROGRAMMATIC INTERFACE SLSXREQ MACRO FUNCTION
*           DISMOUNT.
*
* ATTRIBUTES:
* ATTRIBUTES --
*     1. PROBLEM STATE, USER KEY
*     2. NON-APF AUTHORIZED
*
* EXITS
*     RETURN CODE:
*         R15 =
*
* CHANGE HISTORY:
*     12/04/90-CRTD-VB - MODULE CREATED.
**ENDPROLOGUE*****
        TITLE 'DISMOUNT - ESTABLISH BASE REGISTER'
        PRINT GEN
        ENTRY DISMOUNT
DISMOUNT CSECT
*
* ESTABLISH CSECT ADDRESSABILITY.
* IF NEEDED, R11 HAS BEEN RESERVED FOR A SECOND BASE REGISTER.
*
        LR     R12,R15           LOAD EPA AND ESTABLISH
        USING DISMOUNT,R12      ADDRESSABILITY TO THE CSECT
        STM    R14,R12,12(R13)  SAVE REGS
        LA     R10,MAINSAVE     POINT TO OUR SAVE AREA
        ST     R13,4(,R10)      PTR TO PREV S.A. FROM NEW
        ST     R10,8(,R13)      PTR TO NEW S.A. FROM OLD
        LR     R13,R10          ESTABLISH NEW SAVE AREA
*
* ESTABLISH MAP TO SLSX RESPONSE AREA.
*
        USING SLX,R3
*
* LOAD HSC INTERFACE MODULE SLSXCAL.
*
        LOAD   EP=SLSXCAL       LOAD SLSXCAL
        ST     R0,WSCALADR      SAVE SLSXCAL ROUTINE ADR
```

**Figure 52. Sample 5 - PGMI DISMOUNT Request**

**(1 of 3)**

```

*
* USE SLSXREQ MACRO TO INVOKE DISMOUNT OPTION.
*
      SLSXREQ DISMOUNT,
              OPTION=SYNCH,
              XCALADR=WSCALADR,
              DRIVE=DRIVEADR,
              VOLSER=VOLSER,
              MF=(E,WLSXREQ)
LTR   R15,R15      HSC AVAILABLE?
BNZ   HSCNOTAV    NO, TELL OPERATOR
LR    R3,R1       POINT TO START OF REPLY HEADER
CLI   SLXCMDRC,SLXROK  DISMOUNT SUCCESSFUL?
BNE   FUNCFAIL    NO, TELL OPERATOR WHY
B     FUNCEXIT     EXIT
*
* HSC IS NOT AVAILABLE.
*
HSCNOTAV DS      0H
      WTO   'DISMOUNT - HSC NOT AVAILABLE'
      B     FUNCEXIT      EXIT
*
* DISMOUNT REQUEST FAILED.
*
FUNCFAIL DS      0H
      LA   R4,SLXCMDRC    POINT TO FAILING RETURN CODE
      LA   R5,WFCMDRC    RECEIVING AREA
      LA   R15,1         NUMBER OF BYTES TO CONVERT
      BAL  R2,CONVHTC    CONVERT
      WTO  MF=(E,WTOQFAIL) TELL OPERATOR
      B     FUNCEXIT     EXIT
*
* RETURN TO CALLER.
*
FUNCEXIT DS      0H
      DELETE EP=SLSXCAL  DELETE SLSXCAL
      L    R13,4(R13)    POINT TO PREV REG SAVE AREA
      L    R14,12(R13)   RESTORE REG 14
      LM   R0,R12,20(R13) RESTORE REGS 0 - 12
      BR   R14          RETURN TO CALLER
*
      TITLE 'DISMOUNT - SERVICE ROUTINES (DATA CONVERSION)'

```

**Figure 52. Sample 5 - PGMI DISMOUNT Request  
(2 of 3)**

```

*
*CONVERT HEXADECIMAL DATA TO CHARACTER DATA
*
CONVHTC DS      0H
          ICM    R7,B'1000',0(R4)  GET ONE HEX BYTE
          LA     R8,2              TWO HEX CHAR IN EACH BYTE
CHTCLOOP DS      0H
          XR     R6,R6              CLEAR
          SLDL  R6,4              SHIFT HALF BYTE TO NEXT REGISTER
          STC   R6,0(R5)          SET IN RECEIVING AREA
          TR    0(1,R5),TRTAB     TRANSLATE TO CHARACTER
          LA    R5,1(,R5)         BUMP TO NEXT RECEIVING BYTE
          BCT  R8,CHTCLOOP        DO FOR BOTH HEX CHAR IN BYTE
          LA   R4,1(,R4)         BUMP TO NEXT HEX BYTE
          BCT  R15,CONVHTC        DO FOR NUMBER OF HEX BYTES
          BR   R2                 RETURN TO CALLER
TRTAB   DC     CL16'0123456789ABCDEF'
*
          TITLE 'DISMOUNT - MISCELLANEOUS CONSTANTS AND EQUATES'
          LTORG
*
MAINSAVE DS      9D              LINKAGE SAVE AREA
DWORD   DS      D              DOUBLEWORD WORK AREA
*
WSCALADR DS      F              SLSXCAL ROUTINE ADR
*
DRIVEADR DC      X'0380'        DRIVE ADDRESS
*
VOLSER   DC      CL6'EDU228'    VOLUME SERIAL NUMBER
*
WTOQFAIL WTO     'DISMOUNT - SLSXREQ FAILED, SLXCMDRC = XX',MF=L
WFCMDRC  EQU     WTOQFAIL+42
*
          TITLE 'DISMOUNT - SLSXREQ DSECT MACRO'
          SLSXREQM ,
*
          END   DISMOUNT

```

**Figure 52. Sample 5 - PGMI DISMOUNT Request  
(3 of 3)**

## Sample MOUNT Request

The following code fragment issues a MOUNT request to direct the HSC to mount a volume.

```
MOUNT TITLE 'MOUNT - PROGRAMMATIC INTERFACE - MOUNT'
*
* MOUNT - PROGRAMMATIC INTERFACE - DIRECT HSC TO MOUNT A VOLUME
*
* FUNCTION: USE PROGRAMMATIC INTERFACE SLSXREQ MACRO FUNCTION
*           MOUNT.
*
* ATTRIBUTES:
* ATTRIBUTES --
*   1. PROBLEM STATE, USER KEY
*   2. NON-APF AUTHORIZED
*
* EXITS
*   RETURN CODE:
*       R15 =
*
* CHANGE HISTORY:
*   11/30/90-CRTD-VB - MODULE CREATED.
**ENDPROLOGUE*****
      TITLE 'MOUNT - ESTABLISH BASE REGISTER'
      PRINT GEN
      ENTRY MOUNT
MOUNT CSECT
*
* ESTABLISH CSECT ADDRESSABILITY.
* IF NEEDED, R11 HAS BEEN RESERVED FOR A SECOND BASE REGISTER.
*
      LR    R12,R15          LOAD EPA AND ESTABLISH
      USING MOUNT,R12      ADDRESSABILITY TO THE CSECT
      STM   R14,R12,12(R13) SAVE REGS
      LA    R10,MAINSAVE   POINT TO OUR SAVE AREA
      ST   R13,4(,R10)     PTR TO PREV S.A. FROM NEW
      ST   R10,8(,R13)    PTR TO NEW S.A. FROM OLD
      LR    R13,R10        ESTABLISH NEW SAVE AREA
*
* ESTABLISH MAP TO SLSX RESPONSE AREA.
*
      USING SLX,R3
*
* LOAD HSC INTERFACE MODULE SLSXCAL.
*
      LOAD  EP=SLSXCAL      LOAD SLSXCAL
      ST   R0,WSCALADR     SAVE SLSXCAL ROUTINE ADR
```

**Figure 53. Sample 6 - PGMI MOUNT Request**

**(1 of 3)**

```

*
* USE SLSXREQ MACRO TO INVOKE MOUNT OPTION.
*
      SLSXREQ MOUNT,                                     +
              OPTION=SYNCH,                             +
              XCALADR=WSCALADR,                         +
              DRIVE=DRIVEADR,                           +
              SCRATCH=YES,                               +
              SCRPOOL=SCRPOOL,                           +
              MF=(E,WLSXREQ)                             +
      LTR R15,R15                                         HSC AVAILABLE?
      BNZ HSCNOTAV                                       NO, TELL OPERATOR
      LR  R3,R1                                           POINT TO START OF REPLY HEADER
      CLI SLXCMDRC,SLXROK                                  MOUNT SUCCESSFUL?
      BNE FUNCFAIL                                       NO, TELL OPERATOR WHY
      B   FUNCEXIT                                       EXIT

*
* HSC IS NOT AVAILABLE.
*
HSCNOTAV DS  ØH
          WTO 'MOUNT - HSC NOT AVAILABLE'
          B   FUNCEXIT                                  EXIT

*
* MOUNT REQUEST FAILED.
*
FUNCFAIL DS  ØH
          LA  R4,SLXCMDRC                               POINT TO FAILING RETURN CODE
          LA  R5,WFCMDRC                               RECEIVING AREA
          LA  R15,1                                     NUMBER OF BYTES TO CONVERT
          BAL R2,CONVHTC                               CONVERT
          WTO MF=(E,WTOQFAIL)                          TELL OPERATOR
          B   FUNCEXIT                                  EXIT

*
* RETURN TO CALLER.
*
FUNCEXIT DS  ØH
          DELETE EP=SLSXCAL                            DELETE SLSXCAL
          L   R13,4(,R13)                               POINT TO PREV REG SAVE AREA
          L   R14,12(R13)                              RESTORE REG 14
          LM  RØ,R12,2Ø(R13)                          RESTORE REGS Ø - 12
          BR  R14                                       RETURN TO CALLER

*
          TITLE 'MOUNT - SERVICE ROUTINES (DATA CONVERSION)'
```

**Figure 53. Sample 6 - PGMI MOUNT Request  
(2 of 3)**

```

*
* CONVERT HEXADECIMAL DATA TO CHARACTER DATA.
*
CONVHTC DS      0H
          ICM    R7,B'1000',0(R4)    GET ONE HEX BYTE
          LA     R8,2                TWO HEX CHAR IN EACH BYTE
CHTCLOOP DS      0H
          XR     R6,R6                CLEAR
          SLDL  R6,4                SHIFT HALF BYTE TO NEXT REGISTER
          STC   R6,0(R5)            SET IN RECEIVING AREA
          TR    0(1,R5),TRTAB      TRANSLATE TO CHARACTER
          LA     R5,1(,R5)          BUMP TO NEXT RECEIVING BYTE
          BCT   R8,CHTCLOOP        DO FOR BOTH HEX CHAR IN BYTE
          LA     R4,1(,R4)          BUMP TO NEXT HEX BYTE
          BCT   R15,CONVHTC        DO FOR NUMBER OF HEX BYTES
          BR    R2                  RETURN TO CALLER
TRTAB    DC      CL16'0123456789ABCDEF'
*
          TITLE 'MOUNT - MISCELLANEOUS CONSTANTS AND EQUATES'
          LTORG
*
MAINSAVE DS      9D                LINKAGE SAVE AREA
DWORD    DS      D                DOUBLEWORD WORK AREA
*
WSCALADR DS      F                SLSXCAL ROUTINE ADR
*
DRIVEADR DC      X'0380'          DRIVE ADDRESS
*
SCRPOOL  DC      X'01'           SCRATCH SUBPOOL ID
*
WTOQFAIL WTO     'MOUNT - SLSXREQ FAILED, SLXCMDRC = XX',MF=L
WFCMDRC  EQU     WTOQFAIL+39
*
          TITLE 'MOUNT - SLSXREQ DSECT MACRO'
          SLSXREQM ,
*
          END    MOUNT

```

**Figure 53. Sample 6 - PGMI MOUNT Request  
(3 of 3)**



## Sample EJECT Request

The following code fragment issues a EJECT request to direct the HSC to eject a volume.

```
EJECT TITLE 'EJECT - PROGRAMMATIC INTERFACE - EJECT'
*
* EJECT - PROGRAMMATIC INTERFACE - DIRECT HSC TO EJECT A VOLUME
*
* FUNCTION:  USE PROGRAMMATIC INTERFACE SLSXREQ MACRO FUNCTION
*           EJECT.
*
* ATTRIBUTES:
* ATTRIBUTES  --
*   1.  PROBLEM STATE, USER KEY
*   2.  NON-APF AUTHORIZED
*
* EXITS
*   RETURN CODE:
*       R15 =
*
* CHANGE HISTORY:
*   11/30/90-CRTD-VB - MODULE CREATED.
**ENDPROLOGUE*****
        TITLE 'EJECT - ESTABLISH BASE REGISTER'
        PRINT GEN
        ENTRY EJECT
EJECT CSECT
*
* ESTABLISH CSECT ADDRESSABILITY.
* IF NEEDED, R11 HAS BEEN RESERVED FOR A SECOND BASE REGISTER.
*
        LR    R12,R15           LOAD EPA AND ESTABLISH
        USING EJECT,R12        ADDRESSABILITY TO THE CSECT
        STM   R14,R12,12(R13)  SAVE REGS
        LA    R10,MAINSAVE     POINT TO OUR SAVE AREA
        ST    R13,4(,R10)      PTR TO PREV S.A. FROM NEW
        ST    R10,8(,R13)      PTR TO NEW S.A. FROM OLD
        LR    R13,R10          ESTABLISH NEW SAVE AREA
*
* ESTABLISH MAP TO SLSX RESPONSE AREA.
*
        USING SLX,R3
*
* LOAD HSC INTERFACE MODULE SLSXCAL.
*
        LOAD  EP=SLSXCAL        LOAD SLSXCAL
        ST    R0,WSCALADR       SAVE SLSXCAL ROUTINE ADR
```

**Figure 54. Sample 7 - PGMI EJECT Request**

**(1 of 3)**

```

*
* USE SLSXREQ MACRO TO INVOKE EJECT OPTION.
*
      SLSXREQ EJECT,                                     +
          OPTION=SYNCH,                                 +
          XCALADR=WSCALADR,                             +
          VOLSER=VOLSER,                               +
          MF=(E,WLSXREQ)
      LTR  R15,R15                                       HSC AVAILABLE?
      BNZ  HSCNOTAV                                     NO, TELL OPERATOR
      LR   R3,R1                                         POINT TO START OF REPLY HEADER
      CLI  SLXCMDRC,SLXROK                               EJECT SUCCESSFUL?
      BNE  FUNCFAIL                                     NO, TELL OPERATOR WHY
      B    FUNCEXIT                                     EXIT
*
* HSC IS NOT AVAILABLE.
*
HSCNOTAV DS    0H
          WTO   'EJECT - HSC NOT AVAILABLE'
          B     FUNCEXIT                               EXIT
*
* EJECT REQUEST FAILED.
*
FUNCFAIL DS    0H
          LA    R4,SLXCMDRC                           POINT TO FAILING RETURN CODE
          LA    R5,WFCMDRC                             RECEIVING AREA
          LA    R15,1                                  NUMBER OF BYTES TO CONVERT
          BAL   R2,CONVHTC                             CONVERT
          WTO   MF=(E,WTOQFAIL)                       TELL OPERATOR
          B     FUNCEXIT                               EXIT
*
* RETURN TO CALLER.
*
FUNCEXIT DS    0H
          DELETE EP=SLSXCAL                           DELETE SLSXCAL
          L     R13,4(R13)                             POINT TO PREV REG SAVE AREA
          L     R14,12(R13)                            RESTORE REG 14
          LM    R0,R12,20(R13)                        RESTORE REGS 0 - 12
          BR    R14                                    RETURN TO CALLER
*
          TITLE 'EJECT - SERVICE ROUTINES (DATA CONVERSION) '
*
* CONVERT HEXADEcimal DATA TO CHARACTER DATA.
*
CONVHTC  DS    0H
          ICM   R7,B'1000',0(R4)                      GET ONE HEX BYTE
          LA    R8,2                                  TWO HEX CHAR IN EACH BYTE

```

**Figure 54. Sample 7 - PGMI EJECT Request  
(2 of 3)**

```

CHTCLOOP   DS      0H
           XR      R6,R6          CLEAR
           SLDL   R6,4          SHIFT HALF BYTE TO NEXT REGISTER
           STC    R6,0(R5)      SET IN RECEIVING AREA
           TR     0(1,R5),TRTAB TRANSLATE TO CHARACTER
           LA     R5,1(,R5)     BUMP TO NEXT RECEIVING BYTE
           BCT    R8,CHTCLOOP   DO FOR BOTH HEX CHAR IN BYTE
           LA     R4,1(,R4)     BUMP TO NEXT HEX BYTE
           BCT    R15,CONVHTC   DO FOR NUMBER OF HEX BYTES
           BR     R2            RETURN TO CALLER
TRTAB      DC      CL16'0123456789ABCDEF'
*
           TITLE 'EJECT - MISCELLANEOUS CONSTANTS AND EQUATES'
           LTORG
*
MAINSAVE   DS      9D          LINKAGE SAVE AREA
DWORD     DS      D          DOUBLEWORD WORK AREA
*
WSCALADR   DS      F          SLSXCAL ROUTINE ADR
*
VOLSER     DC      C'EDU228'   VOLUME SERIAL TO EJECT
*
WTOQFAIL   WTO    'EJECT - SLSXREQ FAILED, SLXCMDRC = XX',MF=L
WFCMDRC    EQU    WTOQFAIL+39
*
           TITLE 'EJECT - SLSXREQ DSECT MACRO'
           SLSXREQM ,
*
           END    EJECT

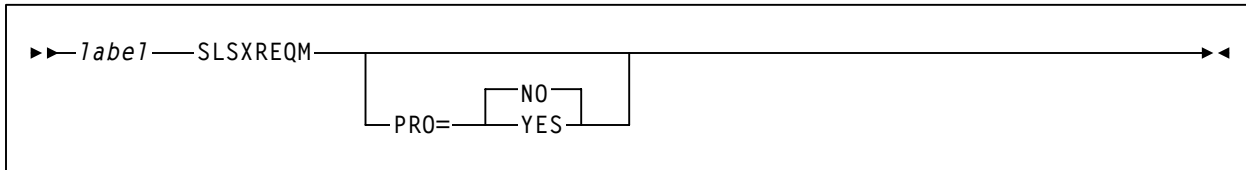
```

**Figure 54. Sample 7 - PGMI EJECT Request  
(3 of 3)**

## SLSXREQM Macro

The macro SLSXREQM must be specified in any assembly that uses the SLSXREQ macro. It generates symbols used by the SLSXREQ macro as well as providing mapping DSECTs of the response areas

### Syntax



### Parameters

**PRO={NO|YES}**

Specifies whether the prologue should be generated (YES) or not (NO). **The default is NO.**

## Programmatic Interface Mapping (SLSXREQM) Macro

**Table 84. SLSXREQM Record Format**

Dec	Hex	Type	Length	Label	Description
0	(0)	STRUCTURE		SLSXREQM	USER INTERFACE
0	(0)	CHARACTER	4	SLSXHDR	EYECATCHER
'SLSX'	(E2D3E2E7)	CHAR CONST		SLSXID	IS AN SLSXREQ
4	(4)	SIGNED-FWORD	4	SLSXLEN	LENGTH OF CONTROL BLOCK
8	(8)	A-ADDR	1	SLSXVER	VERSION OF SLSXREQ
9	(09)	CONST		SLSXVN	CURRENT VERSION
'W'	(E6)	CHAR CONST		SLSXSP	SUB-POOL NUMBER
THE FOLLOWING FLAGS DEFINE THE TYPE OF PROCESSING REQUESTED					
9	(9)	A-ADDR	1	SLSXRT	REQUEST TYPE
0	(00)	CONST		SLSXNOOP	NOOP - NO OPERATION
1	(01)	CONST		SLSXQHSC	QHSC - IS HSC UP?
2	(02)	CONST		SLSXREST	RESET - DISMOUNT ALL VOL
3	(03)	CONST		SLSXREAD	READ - READ A RESPONSE
4	(04)	CONST		SLSXSTOP	STOP - STOP A PROCESS
5	(05)	CONST		SLSXRS05	RESERVED - VM ONLY
20	(14)	CONST		SLSXQCNF	QCONFIG - QUERY CONFIG
21	(15)	CONST		SLSXQDRV	QDRIVES - QUERY DRIVES
22	(16)	CONST		SLSXQDRL	QDRLIST - QUERY DRIVES
23	(17)	CONST		SLSXQSCR	QSCRATCH - QUERY SCRATCH
24	(18)	CONST		SLSXQVOL	QVOLUME - QUERY VOLUME
25	(19)	CONST		SLSXQEJT	QEJECT - QUERY EJECT TASK
26	(1A)	CONST		SLSXQCAP	QCAP - QUERY CAP CONFIG
27	(1B)	CONST		SLSXRS17	RESERVED - VM ONLY
28	(1C)	CONST		SLSXQRQS	QREQUEST QUERY REQUEST
29	(1D)	CONST		SLSXQDSN	QDSN - QUERY DATASET
40	(28)	CONST		SLSXMNT	MOUNT - MOUNT A VOLUME
41	(29)	CONST		SLSXMOVE	MOVE - MOVE A CARTRIDGE
42	(2A)	CONST		SLSXDMS	DISMOUNT - DISMOUNT A VOLUME
43	(2B)	CONST		SLSXEJCT	EJECT - EJECT A VOLUME
60	(3C)	CONST		SLSXSSCR	SELSCR - SELECT SCRATCH

**Table 84. SLSXREQM Record Format**

Dec	Hex	Type	Length	Label	Description
61	(3D)	CONST		SLSXSCRA	SCRATCH - SCRATCH A VOLUME
62	(3E)	CONST		SLSXUNSC	UNSCRATCH - UNSCRATCH A VOL
63	(3F)	CONST		SLSXRS63	RESERVED - VM ONLY
64	(40)	CONST		SLSXRS64	RESERVED - VM ONLY
70	(46)	CONST		SLSXVCI	VCI REQUEST
71	(47)	CONST		SLSXVCIR	READ VCI REQUEST
10	(A)	BITSTRING	1	SLSXFLG1	FLAG BYTE 1 (PGMI CONTROL1)
		1... .... X'80'		SLSXSYNC	OPTION=SYNC SPECIFIED
		.1.. .... X'40'		SLSXF140	RESERVED VM USER=OPTION
		.1. .... X'20'		SLSXF120	RESERVEDVM DIALOG OFF
		...1 .... X'10'		SLSXF110	RESERVED VM DIALOG ON
		.... 1... X'08'		SLSXF108	RESERVED VM NOTIFY=INSEDL
		.... .1.. X'04'		SLSXF104	RESERVED VM NOTIFY=NOINSEDL
		.... ..1. X'02'		SLSXF102	RESERVED VM ACCT2
		.... ...1 X'01'		SLSXF101	RESERVEDVM ACCT1
11	(B)	HEXSTRING	1	SLSXFLG2	FLAG BYTE 2 (PGMI CONTROL 2)
12	(C)	BITSTRING	1	SLSXFLG3	FLAG BYTE3 (MOVEMENT CONTROL 1)
		1... .... X'80'		SLSXVHST	SLSXHOST CONTAINS A HOSTID
		.1.. .... X'40'		SLSXVACS	SLSXACS CONTAINS AN ACSID
		.1. .... X'20'		SLSXVLSM	SLSXLSMI CONTAINS THE LSMID
		...1 .... X'10'		SLSXVCAP	SLSXCAP CONTAINS CAP
		.... 1... X'08'		SLSXF308	RESERVED FUTURE USE
		.... .1.. X'04'		SLSXVVOL	SLSXVOLS CONTAINS A VOLSER
		.... ..1. X'02'		SLSXVLST	SLSXLSTA CONTAINS A LIST ADR
		.... ...1 X'01'		SLSXVCNT	SLSXCNT CONTAINS LIST COUNT
13	(D)	BITSTRING	1	SLSXFLG4	FLAG BYTE 4 (MOVEMENT CONTROL 2)

**Table 84. SLSXREQM Record Format**

Dec	Hex	Type	Length	Label	Description
		1... .... X'80'		SLSXVTLM	SLSXTLSM CONTAINS TOLSM
		.1.. .... X'40'		SLSXVTPN	SLSXTPAN CONTAINS TOPANEL
		.1.. .... X'20'		SLSXF420	RESERVED FUTURE USE
		...1 .... X'10'		SLSXF410	RESERVED FUTURE USE
		.... 1... X'08'		SLSXVPAN	SLSXPAN CONTAINS PANEL #
		.... .1.. X'04'		SLSXVROW	SLSXROW CONTAINS ROW #
		.... .1. X'02'		SLSXVCOL	SLSXCOL CONTAINS COLUMN #
		.... ...1 X'01'		SLSXVDRV	SLSXDRIV CONTAINS DEVICE NUMBER
14	(E)	HEXSTRING	1	SLSXFLG5	FLAG BYTE 5 (MOVEMENT CONTROL 3)
15	(F)	BITSTRING	1	SLSXFLG6	FLAG BYTE 6 (MISCELLANEOUS CONTROL 1)
		1... .... X'80'		SLSXPROT	PROTECT=YES SPECIFIED
		.1.. .... X'40'		SLSXSCR	SCRATCH=YES SPECIFIED
		.1.. .... X'20'		SLSXVSCP	SLSXPOOL HAS A SCRATCH POOL NUM
		...1 .... X'10'		SLSXSUBN	SLSXSUBP CONTAINS TEXT
		.... 1... X'08'		SLSXVTKN	SLSXTKNO CONTAINS TOKEN NUM
		.... .1.. X'04'		SLSXVTXT	SLSXTEXT CONTAINS TEXT
		.... .1. X'02'		SLSXF602	RESERVED FUTURE USE
		.... ...1 X'01'		SLSXF601	RESERVED FUTURE USE
16	(10)	HEXSTRING	1	SLSXFLG7	FLAG BYTE 7 (MISCELLANEOUS CONTROL 2)
17	(11)	BITSTRING	1	SLSXLABT	LABEL TYPE
0	(00)	CONST		SLSXLLDT	LDT (LIBRARY DEFAULT TYPE)
1	(01)	CONST		SLSXLSL	SL (STANDARD LABEL)
2	(02)	CONST		SLSXLAL	AL (ANSI LABEL)
3	(03)	CONST		SLSXLNL	NL (NON-LABELED)
4	(04)	CONST		SLSXLNS	NSL (NON-STANDARD LABEL)
18	(12)	CHARACTER	8	-RESERVED-	RESERVED VM USER
26	(1A)	CHARACTER	8	-RESERVED-	RESERVED VM ACCT1
34	(22)	CHARACTER	8	-RESERVED-	RESERVED VM ACCT2
42	(2A)	HEXSTRING	2	-RESERVED-	

**Table 84. SLSXREQM Record Format**

Dec	Hex	Type	Length	Label	Description
44	(2C)	SIGNED-FWORD	4	SLSXRLEN	RESPONSE LENGTH
48	(30)	SIGNED-FWORD	4	SLSXTKNO	PGMI PASS THRU TOKEN NUMBER
52	(34)	A-ADDR	4	SLSXLSTA	ADDRESS OF LIST
56	(38)	SIGNED-HWORD	2	SLSXCNT	COUNT OF ELEMENTS IN LIST
58	(3A)	SIGNED-HWORD	2	SLSXLOFF	OFFSET, FROM START OF PARAMETER LIST TO START OF THE ELEMENT LIST AREA
60	(3C)	CHARACTER	6	SLSXVOLS	VOLSER FROM VOLSER= PARAMETER
66	(42)	CHARACTER	8	SLSXHOST	ASSOCIATED HOSTID
74	(4A)	AREA	4	SLSXALC	ACS / LSM / CAP IDENTIFICATION
74	(4A)	HEXSTRING	1	SLSXACS	ACS ID NUMBER
74	(4A)	HEXSTRING	2	SLSXLSMI	LSM ID NUMBER
74	(4A)	HEXSTRING	4	SLSXCAP	CAP-ID
74	(4A)	HEXSTRING	3	-RESERVED-	
77	(4D)	HEXSTRING	1	-RESERVED-	NOT IMPLEMENTED (ALWAYS X'00')
78	(4E)	HEXSTRING	1	SLSXPAN	CELL- PANEL
79	(4F)	HEXSTRING	1	SLSXROW	CELL- ROW
80	(50)	HEXSTRING	1	SLSXCOL	CELL- COLUMN
81	(51)	HEXSTRING	2	SLSXTLSM	TOLSM ID FOR MOVE FUNCTION
83	(53)	HEXSTRING	1	SLSXTPAN	“TO” PANEL FOR MOVE FUNCTION
84	(54)	A-ADDR	2	SLSXDRIV	DRIVE DEVICE NUMBER
86	(56)	A-ADDR	1	SLSXPOOL	SCRATCH POOL NUMBER
87	(57)	CHARACTER	32	SLSXTEXT	TEXT ASSOCIATED WITH REQUEST
119	(77)	CHARACTER	13	SLSXSUBP	SCRATCH SUBPOOL NAME
<p>TAPEREQ INPUT KEY VALUES.                      THE FOLLOWING VALUES ARE USED AS THE KEY IN SEARCHING                      THE CURRENT TAPEREQ PARAMETER FILE.</p>					
132	(84)	BITSTRING	1	SLSXFLG8	FLAG BYTE 8: (TAPEREQ CONTROL 1)
		1... .. X'80'		SLSXFJOB	SLSXJOBN PRESENT
		.1.. .. X'40'		SLSXFSTP	SLSXSTEP PRESENT



**Table 84. SLSXREQM Record Format**

Dec	Hex	Type	Length	Label	Description
		..1. .... X'20'		SLSXFPGM	SLSXPGMN PRESENT
		...1 .... X'10'		SLSXFDSN	SLSXDSN PRESENT
		.... 1... X'08'		SLSXFEXP	SLSXEXPD PRESENT
		.... 1.. X'04'		SLSXFRET	SLSXRETP PRESENT
		.... ..1. X'02'		SLSXFVOL	SLSXVOLT PRESENT
133	(85)	OFFSET		SLSXTRI	TAPEREQ INPUT VALUES
133	(85)	CHARACTER	8	SLSXJOBN	STRING TO MATCH TAPEREQ JOBNAME VALUE
141	(8D)	CHARACTER	8	SLSXSTEP	STRING TO MATCH TAPEREQ STEPNAME VALUE
149	(95)	CHARACTER	8	SLSXPGMN	STRING TO MATCH TAPEREQ PROGNAME VALUE
157	(9D)	CHARACTER	44	SLSXDSN	STRING TO MATCH TAPEREQ DSN VALUE
201	(C9)	HEXSTRING	3	SLSXEXPD	VALUE TO MATCH TAPEREQ EXPDT VALUE
204	(CC)	HEXSTRING	2	SLSXRETP	VALUE TO MATCH TAPEREQ RETPD VALUE
206	(CE)	CHARACTER	1	SLSXVOLT	STRING TO MATCH TAPEREQ VOLTYPE VALUE
74	(4A)	LENGTH		SLSXTRIL	
<p>TAPEREQ OUTPUT VALUES. THE FOLLOWING VALUES ARE USED AS OVERRIDE (OR SPECIFIC) VALUES TO THE VALUES FOUND IN THE CURRENT TAPEREQ PARAMETER FILE.</p>					
207	(CF)	BITSTRING	1	SLSXFLG9	FLAG BYTE 9: (TAPEREQ CONTROL 2)
		1... .... X'80'		SLSXFREC	SLSXRECT PRESENT
		.1.. .... X'40'		SLSXFMED	SLSXMED PRESENT
		..1. .... X'20'		SLSXFMGT	SLSXMGMT PRESENT
208	(D0)	CHARACTER	8	SLSXRECT	RECORDING TECHNIQUE
216	(D8)	CHARACTER	8	SLSXMED	MEDIA
224	(E0)	SIGNED-FWORD	4	SLSXVCIP	POINTER TO VCI TEXT
228	(E4)	SIGNED-FWORD	2	SLSXVCIL	LENGTH OF VCI TEST
224	(E0)	SIGNED-FWORD	4	SLSXVCIT	VCI RESPONSE TOKEN
230	(E6)	CHARACTER	8	SLSXMGMT	MANAGEMENT CLASS
238	(EE)	HEXSTRING	242	-RESERVED-	RESERVED FOR FUTURE PARM EXPANSION
480	(1E0)	AREA	8	-RESERVED-	ALIGNMENT

**Table 84. SLSXREQM Record Format**

Dec	Hex	Type	Length	Label	Description
480	(1E0)	LENGTH		SLSXLN	LENGTH OF FIXED AREA OF SLSXREQ
480	(1E0)	AREA	1	SLSXLIST	ELEMENT LIST DESIGNATED BY LIST= PARAMETER BEGINS HERE (FIELD SLSXCNT CONTAINS NUMBER OF ELEMENTS IN THIS LIST).
6	(06)	CONST		SLSXLVSL	LENGTH OF EACH ELEMENT (VOLSER) IN THE LIST USED BY THE EJECT FUNCTION.
500	(1F4)	CONST		SLSXMVSL	MAXIMUM NUMBER OF ELEMENTS ALLOWED IN THE LIST USED BY THE EJECT, QCAP AND QEJECT FUNCTIONS.
4	(04)	CONST		SLSXLCAP	LENGTH OF EACH ELEMENT (CAP IDENTIFIER) IN THE LIST USED BY THE QCAP FUNCTION.
500	(1F4)	CONST		SLSXMCAP	MAXIMUM NUMBER OF ELEMENTS ALLOWED IN THE LIST USED BY THE QCAP FUNCTION.
4	(04)	CONST		SLSXLTK	LENGTH OF EACH ELEMENT (UNIQUE TOKEN) IN THE LIST USED BY THE QCAP FUNCTION.
500	(1F4)	CONST		SLSXMTOK	MAXIMUM NUMBER OF ELEMENTS ALLOWED IN THE LIST USED BY THE QEJECT/STOP FUNCTIONS.
REPLY HEADER					
0	(0)	STRUCTURE		SLX	
0	(0)	AREA	1	SLXRPLY	
0	(0)	CHARACTER	3	SLXHID	HEADER IDENTIFIER
'W'	(E6)	CHAR CONST		SLXSP	SUB-POOL NUMBER
3	(3)	A-ADDR	1	SLXCMDRC	RETURN CODE
0	(00)	CONST		SLXRK	REQUEST SUCCESSFUL
4	(04)	CONST		SLXRWARN	WITH WARNING SLXSRC WILL PROVIDE THE SPECIFIC REASON FOR THE WARNING
8	(08)	CONST		SLXRBADP	REQUEST FAILED - THE PARAMETER LIST (SLSXREQM) CONTAINED INVALID DATA (E.G. INCOMPATIBLE OPTIONS) SLXPFOFF (PARM ERROR OFFSET) WILL PROVIDE AN OFFSET OF THE SLSXREQM FIELD FOUND IN ERROR

**Table 84. SLSXREQM Record Format**

Dec	Hex	Type	Length	Label	Description
12	(C)	CONST		SLXRIERR	REQUEST FAILED - AN UNRECOVERABLE INTERNAL ERROR INTERNAL ERROR OCCURRED WHILE PROCESSING THE REQUEST
16	(10)	CONST		SLXRFAIL	REQUEST FAILED - SLXSRC WILL PROVIDE THE SPECIFIC REASON FOR THE FAILURE
20	(14)	CONST		SLXRNHSC	REQUEST FAILED - HSC NOT AVAILABLE (MVS ONLY)
24	(18)	CONST		SLXRNAUT	REQUEST FAILED - USER NOT AUTHORIZED. THE REQUEST WAS FAILED BY SLSUX05 OR THE HSC DEFAULT AUTHORIZATION (MVS ONLY)
28	(1C)	CONST		SLXNTCB	REQUEST FAILED - THE CALLER WAS NOT IN TASK MODE (MVS ONLY)
32	(20)	CONST		SLXLOCKD	REQUEST FAILED - THE CALLER HELD AT LEAST ONE LOCK (MVS ONLY)
36	(24)	CONST		SLXTPROT	REQUEST FAILED - THE CALLER DID NOT HAVE FETCH/STORE AUTHORITY TO THE SLSXREQM PARAMETER LIST (MVS ONLY)
40	(28)	CONST		SLXNORSP	REQUEST FAILED - NO RESPONSE ELEMENT WITH THE SPECIFIED TOKEN EXISTED. (MVS ONLY)
44	(2C)	CONST		SLXRBADL	REQUEST FAILED; REPLY AREA PROVIDED BY REQUESTOR WAS TOO SMALL TO CONTAIN ALL REPLY DATA ASSOCIATED WITH THE REQUEST. IF FIELD SLXCRLN IS NON-ZERO, IT CONTAINS THE LENGTH VALUE THAT SHOULD BE SPECIFIED FOR THE REPLY AREA FOR THIS REQUEST. (VM ONLY)
48	(30)	CONST		SLXRNVC I	VCIRQST AND VCI RESP NOT SUPPORTED. EITHER VTCS IS NOT INSTALLED - OR - IS NOT AT THE REQUIRED LEVEL TO SUPPORT THE PGMI VCI REQUEST.
52	(34)	CONST		SLXREOV	END OF VCI RESPONSES.
56	(38)	CONST		SLXRVNV	VCI REQUEST NOT VALID. THE VCI COMMAND SUPPLIED ON THE VCIRQST STATEMENT IS NOT VALID.
60	(3C)	CONST		SLXRB TOK	THE VCI TOKEN BEING USED TO OBTAIN VCI RESPONSES IS INVALID

**Table 84. SLSXREQM Record Format**

Dec	Hex	Type	Length	Label	Description
4	(4)	A-ADDR	1	SLXVERS	REPLY VERSION CODE
9	(09)	CONST		SLXVCODE	VERSION 9 OF THE REPLY AREA
5	(5)	BITSTRING 1... .... X'80'	1	SLXRFLG1 SLXROKM	'RESPONSE FLAGS MORE RESPONSES CAN BE READ
6	(6)	HEXSTRING	2	-RESERVED-	RESERVED
8	(8)	SIGNED-FWORD	4	SLXSRC	FAILURE REASON CODE THESE REASON CODES ARE THE ACTUAL RETURN CODES FOR A GIVEN FUNCTION. THEY ARE DOCUMENTED IN THE HSC MESSAGES AND CODES GUIDE, CHAPTER 4 - HSC RETURN CODES.
32772	(8004)	CONST		SLXNOALS	HSC IS NOT ACTIVE
32788	(8014)	CONST		SLXQNOA	ASCOMM IS NOT ACTIVE
32792	(8018)	CONST		SLXINVOP	INVALID QUAB OPTION INTERNAL ERROR - CONTACT STK
32780	(800C)	CONST		SLXINVFC	INVALID FUNCTION CODE INTERNAL ERROR - CONTACT STK.
32784	(8010)	CONST		SLXNOLVT	NO LVT INTERNAL ERROR - CONTACT STK.
32804	(8024)	CONST		SLXTABND	ASCOMM SERVER TASK ABENDED
32818	(8032)	CONST		SLXTINTR	CURRENT TASK INTERRUPTED
32822	(8036)	CONST		SLXSANF	SEARCH ARGUMENT NOT FOUND
32826	(803A)	CONST		SLXMSTT	MIS-MATCHED TOKEN TYPES
32832	(8040)	CONST		SLXTRNF	TOKEN REQUEST AREA NOT FOUND
32848	(8050)	CONST		SLXSFUL	REPLY AREA SPACE FULL
32849	(8051)	CONST		SLXDVMM	DRIVE/MEDIA MISMATCH THE REQUESTED MEDIA (EITHER DIRECTLY VIA PGM MEDIA/RECTECH OR INDIRECTLY VIA TAPEREQ) IS NOT COMPATIBLE WITH THE DRIVE SPECIFIED IN THE PGM CALL
12	(C)	A-ADDR	4	SLXLEN	TOTAL RESPONSE LENGTH.
16	(10)	SIGNED-FWORD	4	SLXPEOFF	PARAMETER ERROR OFFSET
20	(14)	LENGTH		SLXHL	SLX HEADER LENGTH

**Table 84. SLSXREQM Record Format**

Dec	Hex	Type	Length	Label	Description
CONFIGURATION SUMMARY SECTION DIRECTORY					
20	(14)	SIGNED-FWORD	4	SLXXCFGN	NUMBER OF CONFIGURATION ELEMENTS PRESENT IN THIS REPLY
24	(18)	SIGNED-FWORD	4	SLXXCFGO	OFFSET TO CONFIGURATION SECTION FROM START OF REPLY, OR 0 IF REPLY DOESN'T CONTAIN ANY CONFIGURATION ELEMENTS
28	(1C)	SIGNED-FWORD	4	SLXXCFGL	LENGTH OF A CONFIGURATION ELEMENT, OR 0 IF REPLY DOESN'T CONTAIN ANY CONFIGURATION ELEMENTS
VOLUME INFORMATION SECTION DIRECTORY					
32	(20)	SIGNED-FWORD	4	SLXXVOLN	NUMBER OF VOLUME ELEMENTS PRESENT THIS REPLY
36	(24)	SIGNED-FWORD	4	SLXXVOLO	OFFSET TO VOLUME SECTION FROM START OF REPLY, OR 0 IF REPLY DOESN'T CONTAIN ANY VOLUME ELEMENTS
40	(28)	SIGNED-FWORD	4	SLXXVOLL	LENGTH OF A VOLUME ELEMENT, OR 0 IF REPLY DOESN'T CONTAIN ANY VOLUME ELEMENTS
DRIVE INFORMATION SECTION DIRECTORY					
44	(2C)	SIGNED-FWORD	4	SLXXDRVN	NUMBER OF DRIVE ELEMENTS PRESENT IN THIS REPLY
48	(30)	SIGNED-FWORD	4	SLXXDRVO	OFFSET TO DRIVE SECTION FROM START OF REPLY, OR 0 IF REPLY DOESN'T CONTAIN A DRIVE SECTION
52	(34)	SIGNED-FWORD	4	SLXXDRVL	LENGTH OF A DRIVE ELEMENTS OR 0 IF REPLY DOESN'T CONTAIN A DRIVE SECTION
LSM INFORMATION SECTION DIRECTORY					
56	(38)	SIGNED-FWORD	4	SLXXLSMN	NUMBER OF LSM ELEMENTS PRESENT IN THIS REPLY
60	(3C)	SIGNED-FWORD	4	SLXXLSMO	OFFSET TO LSM SECTION FROM START OF REPLY, OR 0 IF REPLY DOESN'T CONTAIN A LSM SECTION
64	(40)	SIGNED-FWORD	4	SLXXLSML	LENGTH OF AN LSM ELEMENT, OR 0 IF REPL DOESN'T CONTAIN AN LSM SECTION
MESSAGE TEXT SECTION DIRECTORY					

**Table 84. SLSXREQM Record Format**

Dec	Hex	Type	Length	Label	Description
68	(44)	SIGNED-FWORD	4	SLXXMSGN	NUMBER OF MESSAGE ELEMENTS PRESENT IN THIS REPLY
72	(48)	SIGNED-FWORD	4	SLXXMSGO	OFFSET TO MESSAGE SECTION, FROM START OF REPLY, OR 0 IF REPLY DOESN'T CONTAIN ANY MESSAGE ELEMENTS
76	(4C)	SIGNED-FWORD	4	SLXXMSGL	LENGTH OF A MESSAGE ELEMENT
QCAP INFORMATION SECTION DIRECTORY					
80	(50)	SIGNED-FWORD	4	SLXXCAPN	NUMBER OF CAP ELEMENTS PRESENT IN THIS REPLY
84	(54)	SIGNED-FWORD	4	SLXXCAPO	OFFSET TO CAP SECTION FROM START OF REPLY
88	(58)	SIGNED-FWORD	4	SLXXCAPL	LENGTH OF A CAP ELEMENT
QEJECT INFORMATION SECTION DIRECTORY					
92	(5C)	SIGNED-FWORD	4	SLXXQJTN	NUMBER OF QEJECT ELEMENTS PRESENT THIS REPLY
96	(60)	SIGNED-FWORD	4	SLXXQJTO	OFFSET TO QEJECT SECTION FROM START OF REPLY
100	(64)	SIGNED-FWORD	4	SLXXQJTL	LENGTH OF A QEJECT ELEMENT
STOP INFORMATION SECTION DIRECTORY					
104	(68)	SIGNED-FWORD	4	SLXXSTPN	NUMBER OF STOP ELEMENTS PRESENT IN THIS REPLY
108	(6C)	SIGNED-FWORD	4	SLXXSTPO	OFFSET TO STOP SECTION FROM START OF REPLY
112	(70)	SIGNED-FWORD	4	SLXXSTPL	LENGTH OF A STOP ELEMENT
QDSN INFORMATION SECTION DIRECTORY					
116	(74)	SIGNED-FWORD	4	SLXXQDSN	NUMBER OF QDSN ELEMENTS PRESENT IN THIS REPLY
120	(78)	SIGNED-FWORD	4	SLXXQDSO	OFFSET TO QDSN SECTION FROM START OF REPLY
124	(7C)	SIGNED-FWORD	4	SLXXQDSL	LENGTH OF A QDSN ELEMENT
VCI INFORMATION SECTION DIRECTORY					
128	(80)	SIGNED-FWORD	4	SLXXVCIN	NUMBER OF VCI ELEMENTS PRESENT IN THIS REPLY
132	(84)	SIGNED-FWORD	4	SLXXVCIO	OFFSET TO VCI SECTION FROM START OF REPLY
136	(88)	SIGNED-FWORD	4	SLXXVCIL	LENGTH OF A VCI ELEMENT

**Table 84. SLSXREQM Record Format**

Dec	Hex	Type	Length	Label	Description
140	(8C)	A-ADDR	4	-RESERVED-(9)	RESERVED FOR FUTURE ENTRIES
176	(B0)	AREA	8	SLXEND	LABEL FOR ADDRESSING NEXT AREA.
176	(B0)	LENGTH		SLXL	SLXLENGTH
<p>CONFIGURATION SUMMARY ELEMENT            THIS ELEMENT APPEARS IN THE REPLY TO A QCONFIG REQUEST AND SUPPLIES SUMMARY INFORMATION ABOUT THE LIBRARY AND ABOUT REPLY LENGTHS NECESSARY FOR OTHER TYPES OF REQUESTS.</p>					
0	(0)	STRUCTURE		SLXSCFG	STANDARD
0	(0)	CHARACTER	3	SLXLID	ELEMENT IDENTIFIER
3	(3)	HEXSTRING	1	-RESERVED-	RESERVED
4	(4)	CHARACTER	8	SLXLHNAM	HOST ID
12	(C)	SIGNED-FWORD	4	SLXLHHBT	HOST PULSE VALUE
16	(10)	SIGNED-FWORD	4	SLXLRSTM	RESERVE TIMEOUT LIMIT
20	(14)	CHARACTER	8	SLXLQNAM	ENQ MAJOR NAME
28	(1C)	CHARACTER	8	-RESERVED-	RESERVED
36	(24)	CHARACTER	1	SLXLCMPF	COMMAND PREFIX CHARACTER
37	(25)	BITSTRING	1	SLXLSCLB	SCRATCH LABEL TYPE:
0	(00)	CONST		SLXLLBSL	
1	(01)	CONST		SLXLLBAL	ASCII
2	(02)	CONST		SLXLLBNL	NON-LABELED
3	(03)	CONST		SLXLLBNS	NON-STANDARD LABEL
		11.. ..1. X'C2'		SLXLLBBL	BYPASS LABEL (CHARACTER = B)
		11.1 .1.1 X'D5'		SLXLLBNA	LABEL INFO NA (CHARACTER = N)
38	(26)	A-ADDR	1	SLXLSMF	SMF RECORD TYPE
39	(27)	HEXSTRING	1	-RESERVED-	RESERVED
40	(28)	SIGNED-FWORD	4	SLXQMDR	LARGEST NUMBER OF DRIVES IN ANY ACS
44	(2C)	SIGNED-FWORD	4	SLXQDRCT	NUMBER OF DRIVES IN THE LIBRARY
48	(30)	SIGNED-FWORD	4	SLXQACNT	NUMBER OF ACSS IN THE LIBRARY
52	(34)	SIGNED-FWORD	4	SLXQLCNT	NUMBER OF LSMS IN THE LIBRARY

**Table 84. SLSXREQM Record Format**

Dec	Hex	Type	Length	Label	Description
56	(38)	SIGNED-FWORD	4	-RESERVED-(15)	RESERVED - VM LENGTHS
WARNING. THE FOLLOWING FIELD DOES NOT EXIST UNLESS THE VERSION IN SLXVERS IS GREATER THAN 2.					
116	(74)	A-ADDR	4	SLXQUCSA	ADDRESS OF SLSUXCSA.
120	(78)	A-ADDR	4	-RESERVED-	RESERVED VM
124	(7C)	SIGNED-FWORD	4	SLXQLCAP	NUMBER OF CAPS IN THE LIBRARY
128	(80)	SIGNED-FWORD	4	SLXEXLM0	ExLM R15
132	(84)	SIGNED-FWORD	4	SLXEXML1	ExLM R1
136	(88)	SIGNED-FWORD	4	SLXEXLM2	ExLM R2
140	(8C)	SIGNED-FWORD	4	-RESERVED-(5)	RESERVED - VM Z-FIELDS
160	(A0)	SIGNED-HWORD	2	SLXHSCV	HSC VERSION NUMBER
162	(A2)	HEXSTRING	6	-RESERVED-	ALIGN TO DOUBLE WORD
168	(A8)	LENGTH		SLXSCFGL	LENGTH
<p>QDSN INFORMATION ELEMENT            THIS ELEMENT APPEARS IN THE REPLY TO A QDSN REQUEST AND SUPPLIES SUMMARY INFORMATION ABOUT THE CURRENT REFERENCED DATASETS USED BY THE HSC.</p>					
0	(0)	STRUCTURE		SLXDSNIM	DATASET INFORMATION MAP
0	(0)	CHARACTER	3	SLXQDID	SECTION IDENTIFIER
3	(3)	BITSTRING	1	SLXDSFLG	DATASET TYPE
1	(01)	CONST		SLXDSPRM	CDS PRIMARY
2	(02)	CONST		SLXDSSEC	CDS SECONDARY
3	(03)	CONST		SLXDSSBY	CDS STANDBY
4	(04)	CONST		SLXD SVAT	VOLUME ATTRIBUTES
5	(05)	CONST		SLXDSUAT	UNIT ATTRIBUTES
6	(06)	CONST		SLXDSTRQ	TAPEREQS
7	(07)	CONST		SLXD SPLB	PARMLIB
8	(08)	CONST		SLXD SJNP	PRIMARY JOURNAL
9	(09)	CONST		SLXD SJNA	ALTERNATE JOURNAL
9	(09)	CONST		SLXD SMAX	MAX NUMBER OF QDS RETURNED
4	(4)	CHARACTER	44	SLXD SNAM	DATASET NAME
48	(30)	CHARACTER	8	SLXD SMBR	MEMBER NAME
56	(38)	CHARACTER	6	SLXD SVOL	VOLUME NAME
62	(3E)	CHARACTER	8	SLXD SUNT	UNIT NAME



**Table 84. SLSXREQM Record Format**

Dec	Hex	Type	Length	Label	Description
70	(46)	CHARACTER	2	-RESERVED-	RESERVED
72	(48)	CHARACTER	96	-RESERVED-	RESERVED
168	(A8)	AREA	8	-RESERVED-	ALIGN
168	(A8)	LENGTH		SLXDSNEL	LENGTH OF ONE DATASET ENTRY
CAP INFORMATION ELEMENT THIS ELEMENT SUPPLIES INFORMATION ABOUT A SINGLE LIBRARY CAP					
0	(0)	STRUCTURE		SLXSCAP	
0	(0)	CHARACTER	4	SLXCID	SECTION IDENTIFIER
4	(4)	HEXSTRING	1	SLXCACS	ACS ADDRESS
5	(5)	HEXSTRING	1	SLXCLSM	LSM ADDRESS
6	(6)	HEXSTRING	1	SLXCCAP	CAP NUMBER
7	(7)	HEXSTRING	1	-RESERVED-	RESERVED
8	(8)	AREA	2	SLXCSTAT	CAP STATUS
8	8	BITSTRING	1	SLXCSTB1	CAP STATUS
		1... .. X'80'		SLXCSTCA	CAP IS ACTIVE
		.1.. .. X'40'		SLXCSTNR	CAP NEEDS RECOVERY
		..1. .... X'20'		SLXCSTAM	CAP IS IN AUTOMATIC MODE
		...1 .... X'10'		SLXCSTCL	CAP IS LINKED
		.... 1... X'08'		SLXCSTCO	CAP IS ONLINE
9	(9)	BITSTRING	1	SLXCSTB2	CAP MODE
		1... .. X'80'		SLXCSTIE	CAP IS ENTERING
		.1.. .. X'40'		SLXCSTID	CAP IS DRAINING
		..1. .... X'20'		SLXCSTIJ	CAP IS EJECTING
		...1 .... X'10'		SLXCSTIC	CAP IS CLEANING
		.... 1... X'08'		SLXCSTII	CAP IS IDLE
10	(A)	BITSTRING	1	SLXCTYPE	TYPE OF CAP
		1... .. X'80'		SLXCTPC	PRIORITY CAP
		.... ..1 X'01'		SLXCTCIM	CIMARRON
		.... ..1. X'02'		SLXCTCLP	CLIPPER
		.... ..11 X'03'		SLXCTTWS	STANDARD CLIPPER
		.... ..1.. X'04'		SLXCTTWO	OPTIONAL CLIPPER
		.... ..1.1 X'05'		SLXCTTIM	(9740/TIMBERWOLF)

**Table 84. SLSXREQM Record Format**

Dec	Hex	Type	Length	Label	Description
12	(C)	SIGNED-HWORD	2	SLXCCELL	CELLS IN CAP
14	(E)	HEXSTRING	1	SLXCNROW	ROWS
15	(F)	HEXSTRING	1	SLXCNCOL	COLUMNS
16	(10)	HEXSTRING	1	SLXCCMAG	MAGAZINES
17	11	HEXSTRING	1	SLXCCMGC	CELLS IN MAGAZINE
18	(12)	CHARACTER	8	SLXCJOB	JOBNAME OF OWNER
26	(1A)	HEXSTRING	6	-RESERVED-	ALIGN TO DOUBLE WORD
32	(20)	LENGTH		SLXSCAPL	LENGTH
<p>QEJECT INFORMATION ELEMENT            THIS ELEMENT SUPPLIES INFORMATION ABOUT A SINGLE EJECT VOLUME            AND IS REPEATED FOR EACH VOLUME WITHIN AN EJECT LIST</p>					
0	(0)	STRUCTURE		SLXQJT	
0	(0)	CHARACTER	4	SLXQID	SECTION IDENTIFIER
4	(4)	HEXSTRING	4	SLXQJTT	TOKEN OF EJECT TASK
8	(8)	HEXSTRING	4	SLXQJTC	EJECT (ACS / LSM / CAP 00 )
12	(C)	HEXSTRING	2	SLXQJTS	TARGETED VOLUME EJECT STATUS
65535	(FFFF)	CONST		SLXQJTN	VOLUME NOT PROCESSED YET
0	(00)	CONST		SLXQJTD	VOLUME HAS BEEN EJECTED
14	(E)	HEXSTRING	6	SLXQJTV	VOLUME NUMBER
20	(14)	HEXSTRING	4	-RESERVED-	ALIGN TO DOUBLE WORD
24	(18)	LENGTH		SLXQJTL	LENGTH
<p>STOP INFORMATION ELEMENT            THIS ELEMENT SUPPLIES STATUS FOR A TOKEN OF A PGMI TASK            REQUESTED TO BE STOPPED. THIS DEFINITION WILL BE REPEATED            FOR EACH ELEMENT WITHIN A TASK STOP LIST</p>					
0	(0)	STRUCTURE		SLXSTP	
0	(0)	CHARACTER	4	SLXSID	SECTION IDENTIFIER
4	(4)	HEXSTRING	4	SLXSTPT	TOKEN NUMBER
8	(8)	HEXSTRING	1	SLXSTPY	TARGET PROCESS TYPE X'FF' PROCESS TYPE UNKNOWN
9	(9)	BITSTRING	1	SLXSTPS	TARGET PROCESS STOP STATUS
		..... X'00'		SLXSTPK	PROCESS MARKED TO STOP
		111. 111. X'EE'		SLXSTPE	PROCESS DOES NOT SUPPORT STOP
		1111 1111 X'FF'		SLXSTPN	SLXSTPN PROCESS TOKEN NOT FOUND

**Table 84. SLSXREQM Record Format**

Dec	Hex	Type	Length	Label	Description
10	(A)	HEXSTRING	6	-RESERVED-	ALIGN TO DOUBLE WORD
16	(10)	LENGTH		SLXSTPL	LENGTH
<p>VOLUME INFORMATION ELEMENT            THIS ELEMENT SUPPLIES INFORMATION ABOUT A SINGLE VOLUME AND IS REPEATED FOR EACH VOLUME ASSOCIATED WITH A REQUEST. THIS ELEMENT MAY APPEAR IN REPLIES TO THE FOLLOWING REQUESTS:            QDRLIST - RETURN DRIVE INFORMATION, ORDERED BY PREFERENCE            QVOLUME - RETURN VOLUME INFORMATION            SELSCR - SELECT A SCRATCH VOLUME            EJECT - EJECT VOLUMES</p>					
0	(0)	STRUCTURE		SLXSVOL	
0	(0)	CHARACTER	3	SLXVID	SECTION IDENTIFIER
3	(3)	BITSTRING	1	SLXVSTA	VOLUME STATUS:
		1... .... X'80'		SLXVILB	VOLUME IS IN LIBRARY
		.1.. .... X'40'		SLXVOHST	VOLUME IS IN USE BY ANOTHER HOST
		..1. .... X'20'		SLXVSCR	VOLUME IS CONSIDERED SCRATCH
		...1 .... X'10'		SLXVMAL	VOLUME IS IN MANUAL-MODE LSM
		.... 1... X'08'		SLXVDSC	VOLUME IS IN DISCONNECTED ACS
		.... .1.. X'04'		SLXVMNT	VOLUME IS MOUNTED ON A DRIVE
		.... ..1. X'02'		SLXVERR	VOLUME IS 'ERRANT' (I.E. ITS LOCATION WITHIN THE LIBRARY IS UNCERTAIN) EQU X'01' RESERVED
		.... ...1 X'01'		SLXVTV	VOLUME IS A VTCS VIRTUAL VOLUME
4	(4)	CHARACTER	6	SLXVSER	VOLUME SERIAL
10	(A)	A-ADDR	1	SLXVLC	VOLUME LOCATION CODE:
0	(00)	CONST		SLXVUNK	LOCATION DATA UNAVAILABLE (SLXVLOC IS
1	(01)	CONST		SLXVCEL	LOCATION DATA IS A CELL ADDRESS
2	(02)	CONST		SLXVDRV	LOCATION DATA IS A DRIVE ADDRESS
11	(B)	AREA	5	SLXVLOC	VOLUME LOCATION DATA:
11	(B)	HEXSTRING	1	SLXVACS	ACS ADDRESS
12	(C)	HEXSTRING	1	SLXVLSM	LSM ADDRESS
13	(D)	HEXSTRING	3	SLXVPNL	PANEL, ROW, COL

**Table 84. SLXREQM Record Format**

Dec	Hex	Type	Length	Label	Description
13	(D)	HEXSTRING	2	SLXVDRIV	DRIVE ADDRESS (0CUU)
15	(F)	BITSTRING	1	SLXVSTA2	MORE VOLUME STATUS: EQU X'E0' RESERVED
		....1 .... X'10'		SLXVMLMU	VOLUME MEDIA TYPE CAME FROM LMU. EQU X'08' RESERVED.
		.... 1... X'04'		SLXVMUNR	VOLUME MEDIA TYPE UNREADABLE.
		.... 1. X'02'		SLXVMVLA	VOLUME MEDIA TYPE CAME FROM VOLATTR
		.... 1 X'01'		SLXVMDFL	VOLUME MEDIA TYPE DEFAULT ASSIGNED.
16	(10)	AREA	8	SLXVTSSN	VTSS NAME
16	(10)	SIGNED-FWORD	4	SLXVDATI	HI-WORD OF TOD AT INSERTION
20	(14)	SIGNED-FWORD	4	SLXVDATL	HI-WORD OF TOD LAST SELECTION
24	(18)	SIGNED-FWORD	4	SLXVSCNT	SELECTION COUNT
28	(1C)	SIGNED-FWORD	4	SLXVDATD	HI-WORD OF TOD LAST MOUNT/DISMOUNT
32	(20)	CHARACTER	8	SLXVMED	TYPE OF MEDIA
40	(28)	AREA	8	-RESERVED-	ALIGN
40	(28)	LENGTH		SLXSVOLL	LENGTH OF SLXSVOL
<p>DRIVE INFORMATION ELEMENT            THIS ELEMENT SUPPLIES INFORMATION ABOUT A SINGLE LIBRARY TAPE DRIVE AND IS REPEATED FOR EACH DRIVE ASSOCIATED WITH A REQUEST. THIS ELEMENT MAY APPEAR IN REPLIES TO THE FOLLOWING REQUESTS:            QDRIVES - RETURN DRIVE AND LSM INFORMATION            QDRLIST - RETURN DRIVE INFORMATION, ORDERED BY PREFERENCE</p>					
0	(0)	STRUCTURE		SLXSDRV	
0	(0)	CHARACTER	3	SLXDID	SECTION IDENTIFIER
3	(3)	BITSTRING	1	SLXDSTA	LIBRARY STATUS
		...1 .... X'10'		SLXDMANU	LSM IS IN MANUAL MODE
		.... 1... X'08'		SLXDDISC	ACS IS DISCONNECTED
		.... 1 X'01'		SLXDVRT	DRIVE IS VIRTUAL
4	(4)	HEXSTRING	1	SLXQDEAC	ACS ADDRESS
5	(5)	HEXSTRING	1	SLXQDELS	LSM ADDRESS
6	(6)	HEXSTRING	2	SLXQDECU	DRIVE ADDRESS (0CUA)
8	(8)	CHARACTER	8	SLXQDRT	RECORDING TECHNIQUE OF DRIVE

**Table 84. SLSXREQM Record Format**

Dec	Hex	Type	Length	Label	Description
16	(10)	AREA	8	-RESERVED-	ALIGN
16	(10)	LENGTH		SLXSDRVL	LENGTH OF SLSXDRV
<p>LSM INFORMATION ELEMENT            THIS ELEMENT SUPPLIES INFORMATION ABOUT A SINGLE LSM (LIBRARY STORAGE MODULE) AND IS REPEATED FOR EACH LSM ASSOCIATED WITH A REQUEST. THIS ELEMENT MAY APPEAR IN REPLIES TO THE FOLLOWING REQUESTS:            QDRIVES - RETURN DRIVE AND LSM INFORMATION            QDRLIST - RETURN LSM INFORMATION FOR SCRATCH=YES            QSCRATCH - RETURN LSM INFORMATION, ORDERED BY PREFERENCE</p>					
0	(0)	STRUCTURE		SLXSLSM	
0	(0)	CHARACTER	3	SLXMID	SECTION IDENTIFIER
3	(3)	BITSTRING	1	SLXMSTAT	LSM STATUS FLAGS:
		...1 .... X'10'		SLXMANUL	LSM IS IN MANUAL MODE
		.... 1... X'08'		SLXMDISC	LSM'S ACS IS DISCONNECTED
4	(4)	HEXSTRING	1	SLXMACS	ACS ADDRESS
5	(5)	HEXSTRING	1	SLXMLSM	LSM ADDRESS
6	(6)	A-ADDR	1	SLXMADJN	NUMBER OF ADJACENT LSMS
7	(7)	A-ADDR	1	SLXMADJI(4)	ADJACENT LSM INDICES (ONLY THE FIRST N IDS ARE VALID, WHERE N IS THE VALUE IN SLXMADJN)
11	(B)	HEXSTRING	1	-RESERVED-	RESERVED
12	(C)	SIGNED-FWORD	4	SLXMNSCR	SCRATCH COUNT FOR LSM
16	(10)	SIGNED-FWORD	4	SLXMTCEL	TOTAL CELLS IN LSM
20	(14)	SIGNED-FWORD	4	SLXMFCEL	LSM FREE CELL COUNT
24	(18)	LENGTH		SLXSLSML	LENGTH
<p>MESSAGE TEXT ELEMENT            THIS ELEMENT SUPPLIES THE COMPLETE TEXT OF THE MESSAGE WHOSE BINARY MESSAGE ID NUMBER IS REPORTED IN HEADER FIELD SLXSRC. THIS ELEMENT MAY APPEAR IN REPLIES TO THE FOLLOWING REQUESTS:            DISMOUNT - DISMOUNT A VOLUME            MOUNT - MOUNT A VOLUME            EJECT - EJECT VOLUMES</p>					
0	(0)	STRUCTURE		SLXSMSG	MESSAGE TEXT ELEMENT
0	(0)	CHARACTER	3	SLXGID	ELEMENT IDENTIFIER
3	(3)	CHARACTER	125	SLXGTEXT	TEXT OF A MESSAGE. FOR MOUNT AND DISMOUNT, THE MESSAGE NUMBER IS IN FIELD SLXSRC OF THE REPLY HEADER
128	(80)	AREA	8	-RESERVED-	ALIGN

**Table 84. SLSXREQM Record Format**

<b>Dec</b>	<b>Hex</b>	<b>Type</b>	<b>Length</b>	<b>Label</b>	<b>Description</b>
128	(80)	LENGTH		SLXSMSGL	LENGTH

## Cross Reference

Name	Len	Offset Value
SLSXACS	000001	4A
SLSXALC	000004	4A
SLSXCAP	000004	4A
SLSXCNT	000002	38
SLSXCOL	000001	50
SLSXDRIV	000002	54
SLSXDSM	-	2A
SLSXDSN	000044	9D
SLSXEJCT	-	2B
SLSXEXPD	000003	C9
SLSXFDSN	-	10
SLSXFEXP	-	08
SLSXFJOB	-	80
SLSXFLG1	000001	0A
SLSXFLG2	000001	0B
SLSXFLG3	000001	0C
SLSXFLG4	000001	0D
SLSXFLG5	000001	0E
SLSXFLG6	000001	0F
SLSXFLG7	000001	10
SLSXFLG8	000001	84
SLSXFLG9	000001	CF
SLSXFMED	-	40
SLSXFMGT	-	20
SLSXFPGM	-	20
SLSXFREC	-	80
SLSXFRET	-	04
SLSXFSTP	-	40
SLSXFVOL	-	02
SLSXF101	-	01
SLSXF102	-	02

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
SLSXF104	-	04
SLSXF108	-	08
SLSXF110	-	10
SLSXF120	-	20
SLSXF140	-	40
SLSXF308	-	08
SLSXF410	-	10
SLSXF420	-	20
SLSXF601	-	01
SLSXF602	-	02
SLSXHDR	000004	00
SLSXHOST	000008	42
SLSXID	-	'CVAL'
SLSXJOBN	000008	85
SLSXLABT	000001	11
SLSXLAL	-	02
SLSXLCAP	-	04
SLSXLEN	000004	04
SLSXLIST	000001	1E0
SLSXLDDT	-	00
SLSXLN	-	1E0
SLSXLNL	-	03
SLSXLNS	-	04
SLSXLOFF	000002	3A
SLSXLSL	-	01
SLSXLSMI	000002	4A
SLSXLSTA	000004	34
SLSXLTK	-	04
SLSXLVSL	-	06
SLSXMCAP	-	1F4
SLSXMED	000008	D8
SLSXMGMT	000008	E6



<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
SLSXMNT	-	28
SLSXMOVE	-	29
SLSXMTOK	-	1F4
SLSXMVSL	-	1F4
SLSXNOOP	-	00
SLSXPAN	000001	4E
SLSXPGMN	000008	95
SLSXPOOL	000001	56
SLSXPROT	-	80
SLSXQCAP	-	1A
SLSXQCNF	-	14
SLSXQDRL	-	16
SLSXQDRV	-	15
SLSXQDSN	-	1D
SLSXQEJT	-	19
SLSXQHSC	-	01
SLSXQRQS	-	1C
SLSXQSCR	-	17
SLSXQVOL	-	18
SLSXREAD	-	03
SLSXRECT	000008	D0
SLSXREST	-	02
SLSXRETP	000002	CC
SLSXRLEN	000004	2C
SLSXROW	000001	4F
SLSXRS05	-	05
SLSXRS17	-	1B
SLSXRS63	-	3F
SLSXRS64	-	40
SLSXRT	000001	09
SLSXSCR	-	40
SLSXSCRA	-	3D

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
SLSXSP	-	'W'
SLSXSSCR	-	3C
SLSXSTEP	000008	8D
SLSXSTOP	-	04
SLSXSUBN	-	10
SLSXSUBP	000013	77
SLSXSYNC	-	80
SLSXTEXT	000032	57
SLSXTKNO	000004	30
SLSXTLSM	000002	51
SLSXTPAN	000001	53
SLSXTRI	-	85
SLSXTRIL	-	4A
SLSXUNSC	-	3E
SLSXVACS	-	40
SLSXVCAP	-	10
SLSXVCI	-	46
SLSXVCIL	000002	E4
SLSXVCIP	000004	E0
SLSXVCIR	-	47
SLSXVCIT	000004	E0
SLSXVCNT	-	01
SLSXVCOL	-	02
SLSXVDRV	-	01
SLSXVER	000001	08
SLSXVHST	-	80
SLSXVLSM	-	20
SLSXVLST	-	02
SLSXVN	-	09
SLSXVOLS	000006	3C
SLSXVOLT	000001	CE
SLSXVPAN	-	08

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
SLSXVROW	-	04
SLSXVSCP	-	20
SLSXVTKN	-	08
SLSXVTLM	-	80
SLSXVTPN	-	40
SLSXVTXT	-	04
SLSXVVOL	-	04
SLXCACS	000001	04
SLXCCAP	000001	06
SLXCCELL	000002	0C
SLXCCMAG	000001	10
SLXCCMGC	000001	11
SLXCID	000004	00
SLXCJOB	000008	12
SLXCLSM	000001	05
SLXCMDRC	000001	03
SLXCNCOL	000001	0F
SLXCNRW	000001	0E
SLXCSTAM	-	20
SLXCSTAT	000002	08
SLXCSTB1	000001	08
SLXCSTB2	000001	09
SLXCSTCA	-	80
SLXCSTCL	-	10
SLXCSTCO	-	08
SLXCSTIC	-	10
SLXCSTID	-	40
SLXCSTIE	-	80
SLXCSTII	-	08
SLXCSTIJ	-	20
SLXCSTNR	-	40
SLXCTCIM	-	01

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
SLXCTCLP	-	02
SLXCTPC	-	80
SLXCTTIM	-	05
SLXCTTWO	-	04
SLXCTTWS	-	03
SLXCTYPE	000001	0A
SLXDDISC	-	08
SLXDID	000003	00
SLXDMANU	-	10
SLXDSFLG	000001	03
SLXDSJNA	-	09
SLXDSJNP	-	08
SLXDSEMAX	-	09
SLXDSEMBR	000008	30
SLXDSENAM	000044	04
SLXDSENEL	-	A8
SLXDSEPLB	-	07
SLXDSEPRM	-	01
SLXDSESBY	-	03
SLXDSESEC	-	02
SLXDSESTA	000001	03
SLXDSESTRQ	-	06
SLXDSESUAT	-	05
SLXDSEUNT	000008	3E
SLXDSEVAT	-	04
SLXDSEVOL	000006	38
SLXDSEVIRT	-	01
SLXDSEVMM	-	8051
SLXEND	000008	B0
SLXEXLM0	000004	80
SLXEXLM1	000004	84
SLXEXLM2	000004	88

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
SLXGID	000003	00
SLXGTEXT	000125	03
SLXHID	000003	00
SLXHL	-	14
SLXHSCV	000002	A0
SLXINVFC	-	800C
SLXINVOP	-	8018
SLXL	-	B0
SLXLCMPF	000001	24
SLXLEN	000004	0C
SLXLHHBT	000004	0C
SLXLHNAM	000008	04
SLXLID	000003	00
SLXLLBAL	-	01
SLXLLBBL	-	C2
SLXLLBNA	-	D5
SLXLLBNL	-	02
SLXLLBNS	-	03
SLXLLBSL	-	00
SLXLOCKD	-	20
SLXLQNAM	000008	14
SLXLRSTM	000004	10
SLXLSCLB	000001	25
SLXLSMF	000001	26
SLXMACS	000001	04
SLXMADJI	000001	07
SLXMADJN	000001	06
SLXMANUL	-	10
SLXMDISC	-	08
SLXMFCEL	000004	14
SLXMID	000003	00
SLXMLSM	000001	05

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
SLXMNSCR	000004	0C
SLXMSTAT	000001	03
SLXMSTT	-	803A
SLXMTCEL	000004	10
SLXNOALS	-	8004
SLXNOLVT	-	8010
SLXNORSP	-	28
SLXNTCB	-	1C
SLXPEOFF	000004	10
SLXQACNT	000004	30
SLXQDEAC	000001	04
SLXQDECU	000002	06
SLXQDELS	000001	05
SLXQDID	000003	00
SLXQDRCT	000004	2C
SLXQDRT	000008	08
SLXQID	000004	00
SLXQJTC	000004	08
SLXQJTD	-	00
SLXQJTL	-	18
SLXQJTN	-	FFFF
SLXQJTS	000002	0C
SLXQJTT	000004	04
SLXQJTV	000006	0E
SLXQLCAP	000004	7C
SLXQLCNT	000004	34
SLXQMDR	000004	28
SLXQNOA	-	8014
SLXQUCSA	000004	74
SLXRBADL	-	2C
SLXRBADP	-	08
SLXRB TOK	-	3C

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
SLXREOV	-	34
SLXRFAIL	-	10
SLXRFLG1	000001	05
SLXRIERR	-	0C
SLXRNAUT	-	18
SLXRNHSC	-	14
SLXRNHCI	-	30
SLXROK	-	00
SLXROKM	-	80
SLXRPLY	000001	00
SLXRVNV	-	38
SLXRWARN	-	04
SLXSANF	-	8036
SLXSCAPL	-	20
SLXSCFGL	-	A8
SLXSDRVL	-	10
SLXSFUL	-	8050
SLXSID	000004	00
SLXSLSML	-	18
SLXSMSGGL	-	80
SLXSP	-	'W'
SLXSRC	000004	08
SLXSTPE	-	EE
SLXSTPK	-	00
SLXSTPL	-	10
SLXSTPN	-	FF
SLXSTPS	000001	09
SLXSTPT	000004	04
SLXSTPY	000001	08
SLXSVOLL	-	28
SLXTABND	-	8024
SLXTINTR	-	8032

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
SLXTPROT	-	24
SLXTRNF	-	8040
SLXVACS	000001	0B
SLXVCEL	-	01
SLXVCODE	-	09
SLXVDATD	000004	1C
SLXVDATI	000004	10
SLXVDATL	000004	14
SLXVDRIV	000002	0D
SLXVDRV	-	02
SLXVDSC	-	08
SLXVERR	-	02
SLXVERS	000001	04
SLXVID	000003	00
SLXVILB	-	80
SLXVLC	000001	0A
SLXVLOC	000005	0B
SLXVLSM	000001	0C
SLXVMAL	-	10
SLXVMDFL	-	01
SLXVMED	000008	20
SLXVMLMU	-	10
SLXVMNT	-	04
SLXVMUNR	-	04
SLXVMVLA	-	02
SLXVOHST	-	40
SLXVPNL	000003	0D
SLXVSCNT	000004	18
SLXVSCR	-	20
SLXVSER	000006	04
SLXVSTA	000001	03
SLXVSTA2	000001	0F



<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
SLXVTSSN	000008	10
SLXVTV	-	01
SLXVUNK	-	00
SLXXCAPL	000004	58
SLXXCAPN	000004	50
SLXXCAPO	000004	54
SLXXCFGL	000004	1C
SLXXCFGN	000004	14
SLXXCFGO	000004	18
SLXXDRVL	000004	34
SLXXDRVN	000004	2C
SLXXDRVO	000004	30
SLXXLSML	000004	40
SLXXLSMN	000004	38
SLXXLSMO	000004	3C
SLXXMSGL	000004	4C
SLXXMSGN	000004	44
SLXXMSGO	000004	48
SLXXQDSL	000004	7C
SLXXQDSN	000004	74
SLXXQDSO	000004	78
SLXXQJTL	000004	64
SLXXQJTN	000004	5C
SLXXQJTO	000004	60
SLXXSTPL	000004	70
SLXXSTPN	000004	68
SLXXSTPO	000004	6C
SLXXVCIL	000004	88
SLXXVCIN	000004	80
SLXXVCIO	000004	84
SLXXVOLL	000004	28
SLXXVOLN	000004	20

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
SLXXVOLO	000004	24

# Appendix H. Batch Application Program Interface (API)

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## Overview

The Batch API allows you to retrieve CDS information in batch mode. The CDS specified as input to the request does not have to be active nor does it have to be currently referenced by the HSC address space (the request can execute entirely in the user address space). In addition, the HSC does not have to be active to submit the request.

## QCDS Request

The QCDS request reads records from the input CDS and provides information about various library elements (e.g., CAPs, drives, volumes, and so forth). QCDS requests are synchronous, meaning that multiple requests cannot be active at the same time.

QCDS does not interact with the HSC address space except when the request specifies automatic allocation of the CDS. In this case, the HSC executes a single query operation to obtain data set information for CDS dynamic allocation. All other request processing occurs in the user address space. QCDS requests are limited to a single task within the current job step.

## How QCDS Functions

QCDS automatically creates a DCB and opens and closes an input CDS as required. The request opens the CDS only if no other library element record areas are currently open for that CDS. Conversely, QCDS closes the CDS only if all other record areas for that CDS are closed.



**Note:** Do not issue MSP I/O macros or instructions for an input CDS whenever any associated record area is open.

## Invoking QCDS (SLSUREQ Macro)

QCDS requests are issued by the SLSUREQ macro. Results from the request are returned in a response area that contains a reply header describing the results and a set of library element records. The response area must be long enough to contain the reply header and at least one library element record of the requested type. A read request transfers as many whole records as possible without exceeding the response area capacity.



**Note:** To retrieve individual records from the response area, deblock those records using the record length constant settings provided in the SLUVxDAT record formats.

Refer to “Volume Report and Batch API Mapping Macros” on page 594 to see these layouts.

The SLSUREQM macro maps the SLSUREQ reply header, parameter list, and return code values. Refer to “SLSUREQM Macro” on page 839 to see the record layout.

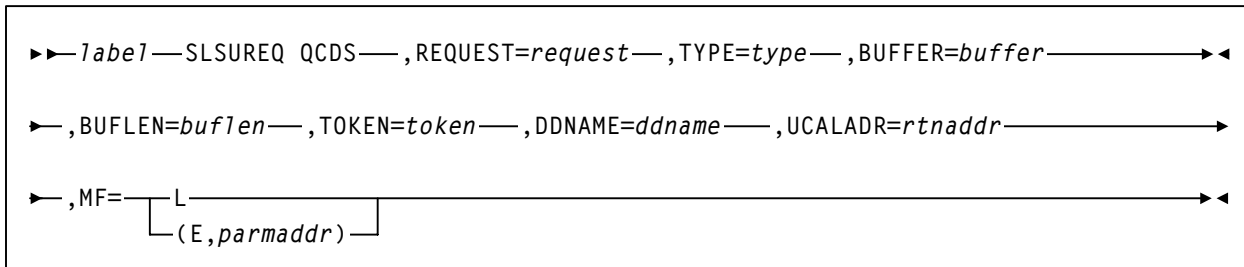
Reply header length is defined in SLSUREQM, and library element record lengths are defined in the SLUVxDAT macros. Return codes for each request (see “Return Codes” on page 827) are stored in register 15.

## Addresses and Registers

- RX-type address: specifies an address that is valid in an RX-type instruction.
- Register (2) - (12): indicates that one of the general registers, 2 through 12, should be specified, enclosed in parentheses. The register must have been previously loaded with the value required by the parameter. Unused bits must be zeroed.
- Register (13) must point to a 72-byte MSP register save area when a QCDS request is issued.
- Register (15): stores QCDS request return codes.

## Syntax

The syntax for the QCDS request is:



## Parameters

### *label*

*label* indicates a user-defined assembler label.

### REQUEST

*request* indicates to access a library element record area.

### OPEN

specifies to open a library element area and move to the first record of the area.

### READ

specifies to retrieve the next group of library element records.

**CLOSE**

specifies to close a library element area.

**This parameter is required.**

**TYPE**

*type* indicates a library element record area type.

**ACS**

specifies the ACS/LSM record area

**CAP**

specifies the CAP record area

**CDS**

specifies the CDS information record area

**CFG**

specifies the configuration record area

**DRV**

specifies the drive record area

**HST**

specifies the host information record area

**MVC**

specifies the Multi-Volume Cartridge record area

**STA**

specifies the station record area

**VOL**

specifies the volume record area

**VTV**

specifies the Virtual Tape Volume record area

**This parameter is required.**

**BUFFER**

*buffer* indicates an RX-type fullword location or a register (2) - (12) containing the response area address for this READ request.

**This parameter is required for the READ request** but is ignored for OPEN and CLOSE requests.

## BUFLEN

*buflen* indicates an RX-type fullword location or a register (2) - (12) containing the response area length for this READ request.

**This parameter is required for the READ request** but is ignored for OPEN and CLOSE requests.

## TOKEN

*token* indicates an RX-type fullword location or a register (2) - (12) containing a fullword address that maintains QCDS state information for an input CDS.

The token value for an OPEN request must be zero when no associated CDS record areas are open. In this case, OPEN assigns a value to token that must be presented with all other QCDS requests for that CDS.

When all record areas of the CDS are closed, the token is no longer valid.

**This parameter is required.**

## DDNAME

*ddname* indicates an RX-type address or a register (2) - (12) containing the address of the eight-character DDname of an input CDS. A DDname less than eight characters must be padded with trailing blanks.

### Notes:

1. A CDS must be preallocated to *ddname* in the JCL or in a SVC 99 dynamic allocation request before issuing QCDS requests.
2. The input CDS does not need to be active or referenced by the HSC address space.
3. QCDS allows for multiple input CDSs, as long as each uses a unique *ddname* and specifies a different token for each open CDS. For example, an application can open two input CDSs and process them in an alternating, or interleaved, fashion.

**This parameter is optional.** If DDNAME is omitted, QCDS attempts to open the most recently updated CDS specified in the SLSCNTL, SLSCNTL2, or SLSSTBY DDnames for the current job step. If none of these DDnames is defined, QCDS tries to open an active CDS. In this case, the HSC address space must be active or the OPEN fails.

## UCALADR

*rnaddr* indicates an RX-type fullword location, register (15), or a register (2) - (12) containing the address of the SLSUCAL routine.

**This parameter is required.** You must load the SLSUCAL module into storage before issuing a QCDS request.

**MF**

indicates either the list or execute form of the macro.

**L**

specifies the list form of the macro. This parameter generates a remote parameter list that can be referenced by the execute form of the macro.

**Note:** When **L** is specified, all other parameters are ignored.

**E,parmaddr**

specifies the execute form of the macro. parmaddr is an RX-type address or a register (1) - (12) containing the address of the remote parameter list.

**This parameter is required.**

**QCDS Programming Considerations**

- Only one instance of each library element record area can be open for each invocation.
- QCDS does not account for CDS switches for any open input CDS.
- The job step or task should define DDname SYSMDUMP to capture diagnostic information if an internal QCDS error occurs.
- Record order within a library element record area is unpredictable.

**Return Codes**

Invalid SLSUREQ requests and QCDS access requests provide return codes in register 15. Table 85 shows the list of return codes.

**Table 85. Batch API Return Codes**

Return Field Name:	Decimal Value and Description:
<b>Invalid SLSUREQ Requests:</b>	
SLURRQPL	1000 - SLSUREQ request failed: Invalid SLSUREQ parameter list.
SLURRQRT	1001 - SLSUREQ request failed: Invalid SLSUREQ request type.
SLURQCRT	1002 - SLSUREQ request failed: Invalid QCDS access request type.
<b>OPEN Return Codes:</b>	
SLUROPOK	0 - Record area was opened successfully.
SLUROPAO	4 - Open failed: Attempt to open a record area that is already open.
SLUROFIT	8 - Open failed: Invalid token value.
SLUROPPRA	12 - Open failed: Invalid record area type.

**Table 85. Batch API Return Codes (Continued)**

<b>Return Field Name:</b>	<b>Decimal Value and Description:</b>
SLUROPIO	16 - Open failed: I/O error while accessing the associated CDS.
SLUROPDD	20 - Open failed: An input CDS is not allocated to the designated DDname.
SLUROPNA	24 - Open failed: HSC address space not operational during automatic CDS allocation attempt.
SLUROPDA	28 - Open failed: Error during automatic CDS dynamic allocation operation.
<b>READ Return Codes:</b>	
SLURRDOK	0 - Successful read. One or more records were transferred to the response area and one or more additional records can be obtained by a subsequent READ request.
SLURRDEA	4 - Successful read. One or more records were transferred to the response area and no additional records can be read from the associated record area.
SLURRDIT	8 - Read failed: Invalid token value.
SLURRDRA	12 - Read failed: Invalid record area type.
SLURRDIO	16 - Read failed: I/O error while accessing the associated CDS.
SLURRDNO	20 - Read failed: Attempt to read a record area that is not currently open.
SLURRDBA	24 - Read failed: Attempt to read beyond the end of the record area.
SLURRDIB	28 - Read failed: Invalid response area buffer address.
SLURRDIL	32 - Read failed: Response area buffer length too short to contain both the reply header and at least one library element record.
<b>CLOSE Return Codes:</b>	
SLURCLOK	0 - Record area was closed successfully.
SLURCLAC	4 - Close failed: Attempt to close a record area that is already closed.
SLURCLIT	8 - Close failed: Invalid token value.
SLURCLRA	12 - Close failed: Invalid record area type.
SLURCLIO	16 - Close failed: I/O error while accessing the associated CDS.



## Sample QCDS Requests

The following QCDS program samples detail two different scenarios:

- a request to open the current primary CDS
- a request to process two library element record area types.

Both of these examples can be found in the SAMPLIB data set distributed to customers. Error processing code has been omitted in the examples.

### Sample 1 - Reading the Volume Record Area of the Current Primary CDS

This sample QCDS request uses automatic CDS allocation to open the current primary CDS. Automatic CDS allocation does not require JCL to identify the input CDS but does require an operational HSC address space.

After opening the CDS volume record area, the program reads groups of volume records into a 64 KB response area buffer.

```

QCDSVTV TITLE 'QCDS Read current primary CDS VTV record area'
*
*
* Function: Use QCDS to automatically allocate and Open the
*           current primary CDS. Issue SLSUREQ QCDS requests to
*           read all the VTV records.
*
* Attributes:
*   1. Problem state, user key.
*   2. Non-APF authorized.
*   3. AMODE 24, RMODE 24 (for below-the-line QSAM), reentrant.
*
* Notes:
*   The caller must have read access for the current primary
*   CDS.
*
**ENDPROLOGUE*****
      PRINT GEN
      ENTRY QCDSVTV
QCDSVTV CSECT
QCDSVTV AMODE 24           Below the line for QSAM (PUT macro).
QCDSVTV RMODE 24
*
* Save the caller's registers, establish CSECT addressability
* and create the module work area:
*
      STM  R14,R12,12(R13)  Save registers
      LR   R12,R15          Load base register R12
      USING QCDSVTV,R12    Declare CSECT base register R12
      GETMAIN R,LV=WKAREAL  Allocate module work area
      ST   R13,WKSAVE-WKAREA+4(,R1) Link new save area to old one
      ST   R1,8(,R13)      Link old save area to new one
      LR   R13,R1          Pointer to module work area
      USING WKAREA,R13     Addressability to module work area
*
* Load module SLSUCAL:
*
      LOAD EP=SLSUCAL      Load SLSUCAL into storage
      ST   R0,WKUCAL       Save SLSUCAL routine address
*
* Initialize the QCDS token and the SLSUREQ plist:
*
      XC   WKTOK,WKTOK     QCDS token initially zero
      LA   R0,WKQCDS       Pointer to SLSUREQ plist storage
      LA   R1,QCDSMLEN     Length of SLSUREQ plist
      LA   R14,QCDSMODL    Pointer to SLSUREQ plist model
      LR   R15,R1          Length of SLSUREQ plist model
      MVCL R0,R14          Initialize SLSUREQ plist storage
*

```

**Figure 55. Sample 1 - Automatic CDS Allocation**

**(1 of 4)**

```

MVC WKFLATDD(KFLATDDL),KFLATDD Initialize the working
LA R4,WKFLATDD storage version of the DCB from the
OPEN ((R4),(OUTPUT)) copy in the constants area.
*
* Use QCDS OPEN to automatically allocate the current primary CDS
* and open the VTV record area:
*
OPENVOL DS ØH Open CDS VTV record area:
SLSUREQ QCDS, +
REQUEST=OPEN, +
DDNAME==CL8'CDS1', +
TYPE=VTV, +
TOKEN=WKTOK, +
UCALADR=WKUCAL, +
MF=(E,WKQCDS)
C R15,=A(SLUROPOK) Check for OPEN failure
BNE OPENERR Handle OPEN error
*
* Allocate response area buffer and map the response area:
*
L RØ,QCDSBLEN Load response area buffer length
GETMAIN R,LV=(Ø) Request storage
ST R1,WKBUFP Store pointer to response area
LR R1Ø,R1 Load pointer to response area
USING SLUR,R1Ø Map QCDS READ response area
*
* Outer loop - read CDS VTV record area in blocks:
*
READVOL DS ØH Read block of VTV records:
SLSUREQ QCDS, +
REQUEST=READ, +
DDNAME==CL8'CDS1', +
TYPE=VTV, +
BUFFER=WKBUFP, +
BUFLN=QCDSBLEN, +
TOKEN=WKTOK, +
UCALADR=WKUCAL, +
MF=(E,WKQCDS)
ST R15,WKRDR C Save READ return code
C R15,=A(SLURRDEA) Check for READ failure
BH READERR Handle READ error
L R9,SLURQCDN Get number of VTV records
present in this reply
*
L R7,SLURQCDO Offset to first VTV record
LA R8,SLURRPLY(R7) Pointer to first VTV record
USING SLUVTDAT,R8 Map VTV record
*

```

**Figure 55. Sample 1 - Automatic CDS Allocation  
(2 of 4)**

```

* Inner loop - process each VTV record in the response area:
*
VOLPROC DS    0H                Over all VTV records in reply:
*      ... process VTV record here ...
      PUT    WKFLATDD,((R8))
      LA     R8,VDRECLN(,R8)  Pointer to next VTV record
      BCT    R9,VOLPROC      Process next VTV record
CHECKEOA DS    0H                Check for more VTV records
      CLC    WKRDRCL=A(SLURRDEA) VTV end-of-area?
      BNE    READVOL         No, read more VTV records
*
* Close the CDS VTV record area:
*
CLOSEVOL DS    0H                Close VTV record area:
      LA     R4,WKFLATDD
      CLOSE ((R4))
      SLSUREQ QCDS,
      REQUEST=CLOSE,
      DDNAME==CL8'CDS1',
      TYPE=VTV,
      TOKEN=WKTOK,
      UCALADR=WKUCAL,
      MF=(E,WKQCDS)
      LTR    R15,R15          Check for CLOSE failure
      BNZ    CLOSEERR       Handle CLOSE error
      B      EXIT
READERR  WTO    'READ ERROR'
      B      EXIT
CLOSEERR WTO    'CLOSE ERROR'
      B      EXIT
*
* Clean up and return to caller:
*
OPENERR  WTO    'OPEN ERROR'
EXIT     DS    0H                Clean up and return to caller:
      DELETE EP=SLSUCAL     Unload SLSUCAL routine
      L      R0,QCDSBLEN    Load response area length
      L      R1,WKBUFP      Pointer to response area
      FREEMAIN R,A=(R1),LV=(R0) Release response area buffer
      LR     R1,R13         Pointer to module work area
      L      R13,4(,R13)    Restore caller's save area pointer
      FREEMAIN R,A=(R1),LV=WKAREAL Release module work area
      L      R14,12(,R13)   Restore return address
      LM     R0,R12,20(R13) Restore caller's registers 0-12
      XR     R15,R15        Set return code zero
      BR     R14           Return to caller
*

```

**Figure 55. Sample 1 - Automatic CDS Allocation  
(3 of 4)**

```

* Constants:
*
QCDSMODL SLSUREQ MF=L           SLSUREQ plist model
QCDSMLEN EQU *-QCDSMODL        Length of SLSUREQ plist model
QCDSBLEN DC F'655360'          QCDS READ response area buffer length
KFLATDD DCB DDNAME=VDRECDAT,DSORG=PS,MACRF=(PM),          +
              LRECL=VDRECLN,                                +
              BLKSIZE=VDRECLN*100,RECFM=FB
KFLATDDL EQU *-KFLATDD
*
* Module work area map:
*
WKAREA DSECT                    Module work area
WKSAVE DS 18F                    MSP register save area
WKUCAL DS A                       SLSUCAL routine address
WKTOK DS F                         QCDS request token
WKRDRC DS F                       QCDS READ return code
WKBUFP DS A                       QCDS READ response area buffer addr
WKQCDS DS XL(QCDSMLEN)           SLSUREQ plist storage
WKFLATDD DS XL(KFLATDDL)
WKAREAL EQU *-WKAREA            Length of module work area
*
* Mapping macros:
*
          SLSREGS ,              Register equates
          SLSUREQM ,             SLSUREQ mapping macro
          SLUVTDAT ,            VTV record mapping macro
          END QCDSVTV

```

**Figure 55. Sample 1 - Automatic CDS Allocation  
(4 of 4)**

## **Sample 2 - Reading the ACS and DRV Record Areas Together**

This sample QCDS request reads two different CDS record areas (ACS and DRV), alternating between the two. The job step JCL must include a DDNAME statement for the input CDS DDname (MSP1CDS in this example).

```

QACSDRV TITLE 'QCDS READ ACS AND DRIVE RECORD AREAS TOGETHER'
*
* QACSDRV - QCDS READ ACS AND DRIVE RECORD AREAS TOGETHER.
*
* FUNCTION: USE SEPARATE RESPONSE AREAS TO READ THE ACS AND DRV
*           RECORD AREAS IN AN ALTERNATING FASHION.
*           EACH RESPONSE AREA IS A 1KB BUFFER.
*
* ATTRIBUTES:
*   1. PROBLEM STATE, USER KEY.
*   2. NON-APF AUTHORIZED.
*   3. AMODE 31, RMODE ANY, REENTRANT.
*
* NOTES:
*   THE CALLER MUST HAVE READ ACCESS FOR THE INPUT CDS.
*
**ENDPROLOGUE*****
      PRINT GEN
      ENTRY QACSDRV
QACSDRV CSECT
QACSDRV AMODE 31
QACSDRV RMODE ANY
*
* SAVE THE CALLER'S REGISTERS, ESTABLISH CSECT ADDRESSABILITY
* AND ESTABLISH NEW REGISTER SAVE AREA:
*
      STM  R14,R12,12(R13)    SAVE REGISTERS
      LR   R12,R15           LOAD BASE REGISTER R12
      USING QACSDRV,R12      DECLARE CSECT BASE REGISTER R12
      GETMAIN R,LV=WKAREAL    ALLOCATE MODULE WORK AREA
      ST   R13,WKSAVE-WKAREA+4(,R1) LINK NEW SAVE AREA TO OLD ONE
      ST   R1,8(,R13)        LINK OLD SAVE AREA TO NEW ONE
      LR   R13,R1            POINTER TO MODULE WORK AREA
      USING WKAREA,R13       ADDRESSABILITY TO MODULE WORK AREA
*
* LOAD MODULE SLSUCAL:
*
      LOAD EP=SLSUCAL        LOAD SLSUCAL INTO STORAGE
      ST   R0,WKUCAL         SAVE SLSUCAL ROUTINE ADDRESS
*
* INITIALIZE THE QCDS TOKEN AND THE SLSUREQ PLIST:
*
      XC   WKTOK,WKTOK       QCDS TOKEN INITIALLY ZERO
      LA   R0,WKQCDS         POINTER TO SLSUREQ PLIST STORAGE
      LA   R1,QCDSMLN        LENGTH OF SLSUREQ PLIST
      LA   R14,QCDSMODL      POINTER TO SLSUREQ PLIST MODEL
      LR   R15,R1            LENGTH OF SLSUREQ PLIST MODEL
      MVCL R0,R14            INITIALIZE SLSUREQ PLIST STORAGE

```

**Figure 56. Sample 2 - Reading ACS and DRV Together  
(1 of 4)**

```

*
* OPEN ACS AND DRIVE RECORD AREAS AND MAP THE RESPONSE AREAS:
*
OPEN          DS  ØH          OPEN ACS AND DRIVE RECORD AREAS:
              SLSUREQ QCDS,    OPEN ACS RECORD AREA
              REQUEST=OPEN,
              TYPE=ACS,
              TOKEN=WKTOK,
              DDNAME=QCDSDD,
              UCALADR=WKUCAL,
              MF=(E,WKQCDS)
              SLSUREQ QCDS,    OPEN DRIVE RECORD AREA
              REQUEST=OPEN,
              TYPE=DRV,
              TOKEN=WKTOK,
              UCALADR=WKUCAL,
              MF=(E,WKQCDS)
              USING SLUR,R9    MAP QCDS READ RESPONSE AREA
*
* MAIN PROCESSING LOOP - INTERLEAVED PROCESSING OF ACS AND
* DRIVE RECORDS:
*
PROCESS       DS  ØH          MAIN PROCESSING LOOP:
              LA  R9,WKACSBUF  POINTER TO ACS RESPONSE AREA
              SLSUREQ QCDS,    READ ACS RECORD AREA
              REQUEST=READ,
              TYPE=ACS,
              BUFFER=(R9),
              BUFLN=QCDSBLEN,
              TOKEN=WKTOK,
              UCALADR=WKUCAL,
              MF=(E,WKQCDS)
              L   R7,SLURQCDO   OFFSET TO FIRST ACS RECORD
              LA  R11,SLURRPLY(R7) POINTER TO FIRST ACS RECORD
              USING SLUVADAT,R11 MAP ACS RECORD FORMAT
*
*           ... PROCESS ACS RECORDS ...
*
              LA  R9,WKDRVBUF   POINTER TO DRIVE RESPONSE AREA
              SLSUREQ QCDS,    READ DRIVE RECORD AREA
              REQUEST=READ,
              TYPE=DRV,
              BUFFER=(R9),
              BUFLN=QCDSBLEN,
              TOKEN=WKTOK,
              UCALADR=WKUCAL,
              MF=(E,WKQCDS)
              L   R7,SLURQCDO   OFFSET TO FIRST DRIVE RECORD
              LA  R1Ø,SLURRPLY(R7) POINTER TO FIRST DRIVE RECORD
              USING SLUVDDAT,R1Ø MAP DRIVE RECORD FORMAT
*
*           ... PROCESS DRIVE RECORDS ...

```

**Figure 56. Sample 2 - Reading ACS and DRV Together  
(2 of 4)**



```

*
* CONDITIONALLY BRANCH TO CLOSE LABEL WHEN AN APPROPRIATE
* LOOP TERMINATION CONDITION HAS BEEN SATISFIED (NOT SHOWN).
*
          B      PROCESS          REPEAT MAIN PROCESSING LOOP
*
* CLOSE THE ACS AND DRIVE RECORD AREAS:
*
CLOSE     DS      ØH              CLOSE ACS AND DRIVE RECORD AREAS:
          SLSUREQ QCDS,          CLOSE THE ACS RECORD AREA
          REQUEST=CLOSE,
          TYPE=ACS,
          TOKEN=WKTOK,
          UCALADR=WKUCAL,
          MF=(E,WKQCDS)
          SLSUREQ QCDS,          CLOSE THE DRIVE RECORD AREA
          REQUEST=CLOSE,
          TYPE=DRV,
          TOKEN=WKTOK,
          UCALADR=WKUCAL,
          MF=(E,WKQCDS)
*
* CLEAN UP AND RETURN TO CALLER:
*
EXIT      DS      ØH              CLEAN UP AND RETURN TO CALLER:
          DELETE EP=SLSUCAL     UNLOAD SLSUCAL ROUTINE
          LR      R1,R13         POINTER TO MODULE WORK AREA
          L       R13,4(,R13)    RESTORE CALLER'S SAVE AREA
          FREEMAIN R,A=(R1),LV=WKAREAL RELEASE MODULE WORK AREA
          L       R14,12(,R13)   RESTORE RETURN ADDRESS
          LM      RØ,R12,2Ø(R13) RESTORE CALLER'S REGISTERS Ø-12
          XR      R15,R15        SET ZERO RETURN CODE
          BR      R14            RETURN TO CALLER
*
* CONSTANTS:
*
QCDSMODL SLSUREQ MF=L          SLSUREQ PLIST MODEL
QCDSMLN  EQU  *-QCDSMODL      LENGTH OF SLSUREQ PLIST MODEL
QCDSDD   DC   CL8'MSP1CDS '    8-CHAR BLANK-PADDED CDS DDNAME
QCDSBLEN DC   F'1Ø24'         QCDS READ RESPONSE AREA BUFFER LENGTH
*
* MODULE WORK AREA MAP:
*
WKAREA   DSECT                MODULE WORK AREA
WKSAVE   DS    18F             MSP REGISTER SAVE AREA
WKUCAL   DS    A               SLSUCAL ROUTINE ADDRESS
WKTOK    DS    F               QCDS REQUEST TOKEN
WKQCDS   DS    XL(QCDSMLN)     SLSUREQ PLIST STORAGE
WKACSBUF DS    XL1Ø24          ACS RESPONSE AREA BUFFER
WKDRVBUF DS    XL1Ø24          DRV RESPONSE AREA BUFFER
WKAREAL  EQU   *-WKAREA        LENGTH OF MODULE WORK AREA

```

**Figure 56. Sample 2- Reading ACS and DRV Together  
(3 of 4)**

```

*
* MAPPING MACROS:
*
          SLSREGS                REGISTER
EQUATES
          SLSUREQM ,             SLSUREQ
MAPPING MACRO
          SLUVADAT ,             ACS

```

**Figure 56. Sample 2 - Reading ACS and DRV Together (4 of 4)**

**Output Description**

Each successful OPEN request returns the name of the input CDS in the SLSUREQ parameter list (SLSUREQM field SLSUQDSN).

Each successful READ request returns one or more library element records in the user-designated response area. Use the SLUR DSECT in the SLSUREQM macro to map the response area reply header. This header contains the number of library element records present within the response area.

Library element records are mapped by the SLUVxDAT macros. These macros are SMP-distributed and are discussed in “Volume Report and Batch API Mapping Macros” on page 594.

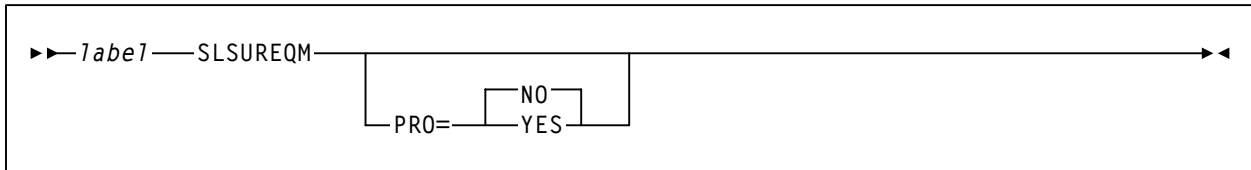
**Table 86. Library Element Record Mapping**

<b>Request Entered:</b>	<b>Records Returned:</b>
READ ACS	ACS/LSM records mapped by SLUVADAT macro.
READ CAP	CAP records mapped by SLUVPDAT macro.
READ CDS	CDS information records mapped by SLUVIDAT macro.
READ CFG	Configuration information records mapped by SLUVCDAT macro.
READ DRV	Drive records mapped by the SLUVDDAT macro.
READ HST	Host information records mapped by the SLUVHDAT macro.
READ STA	Station records mapped by the SLUVSDAT macro.
READ VOL	Volume records mapped by the SLUVVDAT macro.

## SLSUREQM Macro

The SLSUREQM mapping macro must be specified in any assembly that uses the SLSUREQ macro.

### Syntax



### Parameters

**PRO={NO|YES}**

Specifies whether the prologue should be generated (YES) or not (NO). **The default is NO.**

## Batch API Mapping (SLSUREQM) Macro

Table 87. SLSUREQM Record Format

Dec	Hex	Type	Length	Label	Description
MACRO: SLSUREQM - BATCH API USER INTERFACE MAPPING MACRO					
FUNCTION: THIS MACRO MAPS THE SLSUCAL PARAMETER LIST, REPLY HEADER, AND RETURN CODES.					
0	(0)	STRUCTURE		SLSUREQM	PARAMETER LIST
0	(0)	CHARACTER	4	SLSUHDR	EYE-CATCHER FIELD:
'SLSU'	(E2D3E2E4)	CHAR CONST		SLSUID	EYE-CATCHER VALUE
4	(4)	A-ADDR	1	SLSUVER	VERSION OF SLSUREQ:
2	(02)	CONST		SLSUVN	CURRENT VERSION
5	(5)	A-ADDR	1	SLSURT	REQUEST TYPE:
1	(01)	CONST		SLSUQCDS	QCDS REQUEST
6	(6)	A-ADDR	1	SLSUQCDD	QCDS REQUEST TYPE:
0	(00)	CONST		SLSUQCDO	OPEN REQUEST
1	(01)	CONST		SLSUQCDD	READ REQUEST
2	(02)	CONST		SLSUQCDC	CLOSE REQUEST
7	(7)	A-ADDR	1	SLSUQCDA	QCDS RECORD AREA:
0	(00)	CONST		SLSUACSA	ACS RECORD AREA
1	(01)	CONST		SLSUCAPA	CAP RECORD AREA
2	(02)	CONST		SLSUCDSA	CDS RECORD AREA
3	(03)	CONST		SLSUCFGA	CONFIGURATION RECORD AREA
4	(04)	CONST		SLSUDRVA	DRIVE RECORD AREA
5	(05)	CONST		SLSUHSTA	HOST RECORD AREA
6	(06)	CONST		SLSUSTAA	STATION RECORD AREA
7	(07)	CONST		SLSUVOLA	VOLUME RECORD AREA
8	(08)	CONST		SLSUMVCA	MVC RECORD AREA
9	(09)	CONST		SLSUVTVA	VTV RECORD AREA
10	(0A)	CONST		SLSUARAN	ABSOLUTE RECORD AREA NUMBER USED WHEN ALLOCATING STORAGE.
8	(8)	A-ADDR	4	SLSUQCDD	QCDS TOKEN POINTER

**Table 87. SLSUREQM Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
12	(C)	A-ADDR	4	SLSUQCDB	QCDS RESPONSE AREA BUFFER ADDRESS
16	(10)	SIGNED-FWORD	4	SLSUQCDL	QCDS RESPONSE AREA BUFFER LENGTH
20	(14)	A-ADDR	4	SLSUQCDD	QCDS INPUT CDS DDNAME POINTER
24	(18)	CHARACTER	44	SLSUQDSN	QCDS INPUT CDS DATA SET NAME
68	(44)	CHARACTER	256	-RESERVED-	RESERVED FOR FUTURE PARM EXPANSION
328	(148)	AREA	8	-RESERVED-	ALIGNMENT
328	(148)	LENGTH		SLSULN	LENGTH OF FIXED AREA OF SLSUREQM
SLSUREQ INVOCATION FAILURE RETURN CODES:					
1000	(3E8)	CONST		SLURRQPL	SLSUREQ REQUEST FAILED: INVALID SLSUREQ PARAMETER LIST.
1001	(3E9)	CONST		SLURRQRT	SLSUREQ REQUEST FAILED: INVALID SLSUREQ UTILITY REQUEST TYPE.
1002	(3EA)	CONST		SLURQCRT	SLSUREQ REQUEST FAILED: INVALID QCDS ACCESS REQUEST TYPE.
SLSUREQ RESPONSE AREA:					
0	(0)	STRUCTURE		SLUR	RESPONSE AREA
0	(0)	AREA	1	SLURRPLY	START OF REPLY HEADER
0	(0)	CHARACTER	4	SLURHDR	EYE-CATCHER FIELD:
'SLUR'	(E2D3E4D9)	CHAR CONST		SLURID	EYE-CATCHER VALUE
4	(4)	SIGNED-HWORD	2	SLURHSCV	HSC VERSION NUMBER
6	(6)	HEXSTRING	1	SLURVER	VERSION NUMBER OF SLSUREQM
7	(7)	HEXSTRING	1	-RESERVED-	***** RESERVED *****
8	(8)	SIGNED-FWORD	4	SLURQCDN	NUMBER OF QCDS LIBRARY ELEMENT RECORDS PRESENT IN THIS REPLY.

**Table 87. SLSUREQM Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
12	(C)	SIGNED-FWORD	4	SLURQCDO	OFFSET TO QCDS LIBRARY ELEMENT RECORD SECTION FROM START OF REPLY HEADER. QCDS OPEN RETURN CODES:
0	(00)	CONST		SLUROPOK	RECORD AREA WAS OPENED SUCCESSFULLY.
4	(04)	CONST		SLUROPAO	OPEN FAILED - ATTEMPT TO OPEN A RECORD AREA THAT IS ALREADY OPEN.
8	(08)	CONST		SLUROFIT	OPEN FAILED - INVALID TOKEN VALUE.
12	(0C)	CONST		SLUROPPA	OPEN FAILED - INVALID RECORD AREA TYPE.
16	(10)	CONST		SLUROPIO	OPEN FAILED - I/O ERROR WHILE ACCESSING THE ASSOCIATED CDS.
20	(14)	CONST		SLUROPPD	OPEN FAILED - AN INPUT CDS IS NOT ALLOCATED TO THE DESIGNATED DDNAME.
24	(18)	CONST		SLUROPPA	OPEN FAILED - HSC ADDRESS SPACE NOT OPERATIONAL DURING AUTOMATIC CDS ALLOCATION ATTEMPT.
28	(1C)	CONST		SLUROPPA	OPEN FAILED - ERROR DURING AUTOMATIC CDS DYNAMIC ALLOCATION OPERATION.
QCDS READ RETURN CODES:					
0	(00)	CONST		SLURRDOK	READ SUCCEEDED - ONE OR MORE RECORDS WERE TRANSFERRED TO THE RESPONSE AREA AND ONE OR MORE ADDITIONAL RECORDS CAN BE OBTAINED BY A SUBSEQUENT READ REQUEST.

**Table 87. SLSUREQM Record Format (Continued)**

Dec	Hex	Type	Length	Label	Description
4	(04)	CONST		SLURRDEA	READ SUCCEEDED - ONE OR MORE RECORDS WERE TRANSFERRED TO THE RESPONSE AREA AND NO ADDITIONAL RECORDS CAN BE READ FROM THE ASSOCIATED RECORD AREA.
8	(08)	CONST		SLURRDIT	READ FAILED - INVALID TOKEN VALUE.
12	(0C)	CONST		SLURRDRA	READ FAILED - INVALID RECORD AREA TYPE.
16	(10)	CONST		SLURRDIO	READ FAILED - I/O ERROR WHILE ACCESSING THE ASSOCIATED CDS.
20	(14)	CONST		SLURRDNO	READ FAILED - ATTEMPT TO READ A RECORD AREA THAT IS NOT CURRENTLY OPEN.
24	(18)	CONST		SLURRDBA	READ FAILED - ATTEMPT TO READ BEYOND THE END OF THE RECORD AREA.
28	(1C)	CONST		SLURRDIB	READ FAILED - INVALID RESPONSE AREA BUFFER ADDRESS.
32	(20)	CONST		SLURRDIL	READ FAILED - RESPONSE AREA BUFFER LENGTH TOO SHORT TO CONTAIN BOTH THE REPLY HEADER AND AT LEAST ONE LIBRARY ELEMENT RECORD.
QCDS CLOSE RETURN CODES:					
0	(00)	CONST		SLURCLOK	RECORD AREA WAS CLOSED SUCCESSFULLY.
4	(04)	CONST		SLURCLAC	CLOSE FAILED - ATTEMPT TO CLOSE A RECORD AREA THAT IS ALREADY CLOSED.
8	(08)	CONST		SLURCLIT	CLOSE FAILED - INVALID TOKEN VALUE.
12	(0C)	CONST		SLURCLRA	CLOSE FAILED - INVALID RECORD AREA TYPE.

**Table 87. SLSUREQM Record Format (Continued)**

<b>Dec</b>	<b>Hex</b>	<b>Type</b>	<b>Length</b>	<b>Label</b>	<b>Description</b>
16	(10)	CONST		SLURCLIO	CLOSE FAILED - I/O ERROR WHILE ACCESSING THE ASSOCIATED CDS.
16	(10)	LENGTH		SLURRHLN	LENGTH OF REPLY HEADER.
16	(10)	AREA	4	SLURFRS	START OF VARIABLE-LENGTH FORMATTED RECORD SEGMENT.



## Cross Reference

Name	Len	Offset Value
SLSUACSA	-	00
SLSUARAN	-	0A
SLSUCAPA	-	01
SLSUCDSA	-	02
SLSUCFGA	-	03
SLSUDRVA	-	04
SLSUHDR	000004	00
SLSUHSTA	-	05
SLSUID	-	'CVAL'
SLSULN	-	148
SLSUMVCA	-	08
SLSUQCDA	000001	07
SLSUQCDB	000004	0C
SLSUQCDC	-	02
SLSUQCDD	000004	14
SLSUQCDK	000004	08
SLSUQCDL	000004	10
SLSUQCDO	-	00
SLSUQCDR	-	01
SLSUQCDS	-	01
SLSUQCDT	000001	06
SLSUQDSN	000044	18
SLSURT	000001	05
SLSUSTAA	-	06
SLSUVER	000001	04
SLSUVN	-	02
SLSUVOLA	-	07
SLSUVTVA	-	09
SLURCLAC	-	04
SLURCLIO	-	10
SLURCLIT	-	08

<b>Name</b>	<b>Len</b>	<b>Offset Value</b>
SLURCLOK	-	00
SLURCLRA	-	0C
SLURFRS	000004	10
SLURHDR	000004	00
SLURHSCV	000002	04
SLURID	-	'CVAL'
SLUROPAO	-	04
SLUROPDA	-	1C
SLUROPDD	-	14
SLUROPIO	-	10
SLUROPIT	-	08
SLUROPNA	-	18
SLUROPOK	-	00
SLUROPRA	-	0C
SLURQCDN	000004	08
SLURQCDO	000004	0C
SLURQCRT	-	3EA
SLURRDBA	-	18
SLURRDEA	-	04
SLURRDIB	-	1C
SLURRDIL	-	20
SLURRDIO	-	10
SLURRDIT	-	08
SLURRDNO	-	14
SLURRDOK	-	00
SLURRDRA	-	0C
SLURRHNL	-	10
SLURRPLY	000001	00
SLURRQPL	-	3E8
SLURRQRT	-	3E9
SLURVER	000001	06

# Appendix I. Remote-linked Libraries

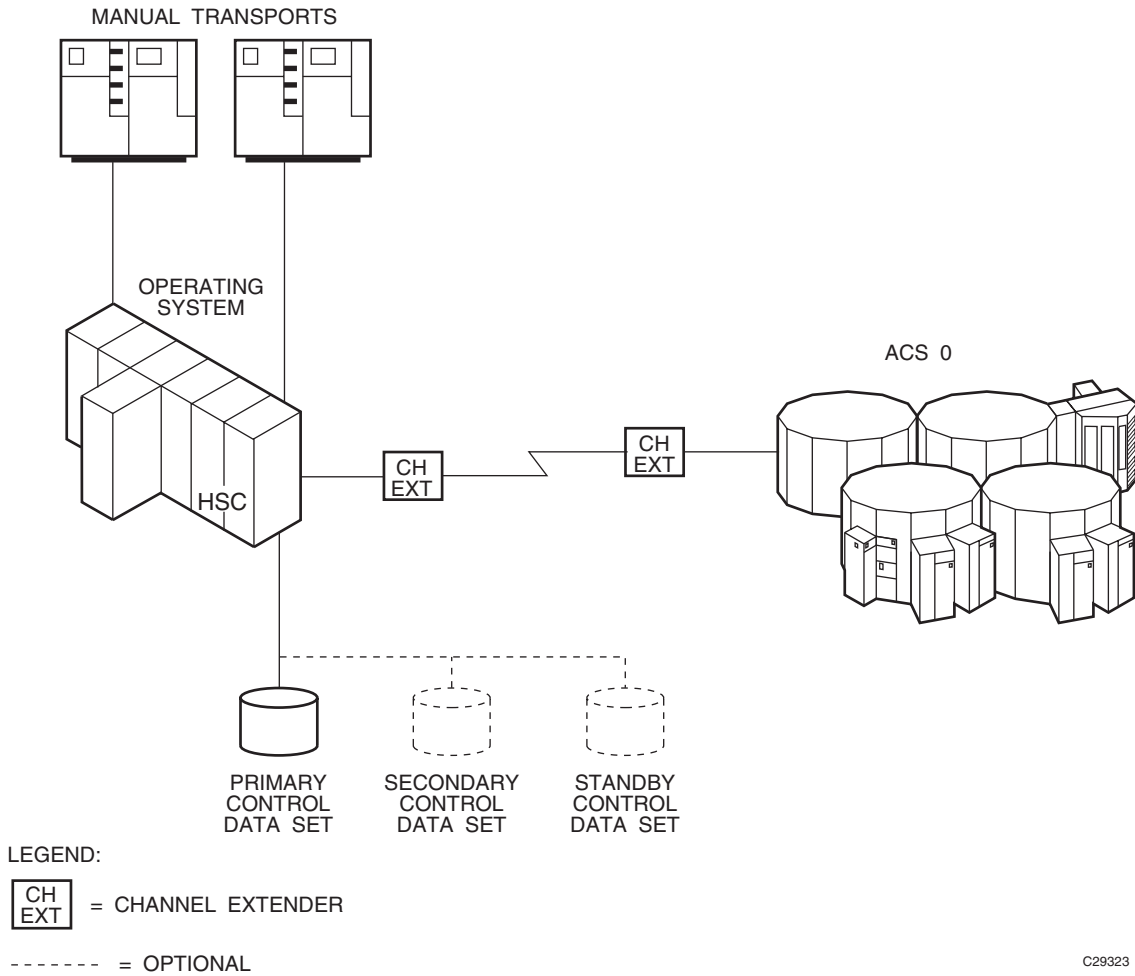
---

## Overview

This appendix contains illustrations of configurations for remote-linked libraries. In addition, programming and operational considerations for each of the configurations are presented.

## Configuration 1

This configuration consists of one ACS remote-linked to one CPU. The primary, secondary, and standby control data sets all run on the one CPU.

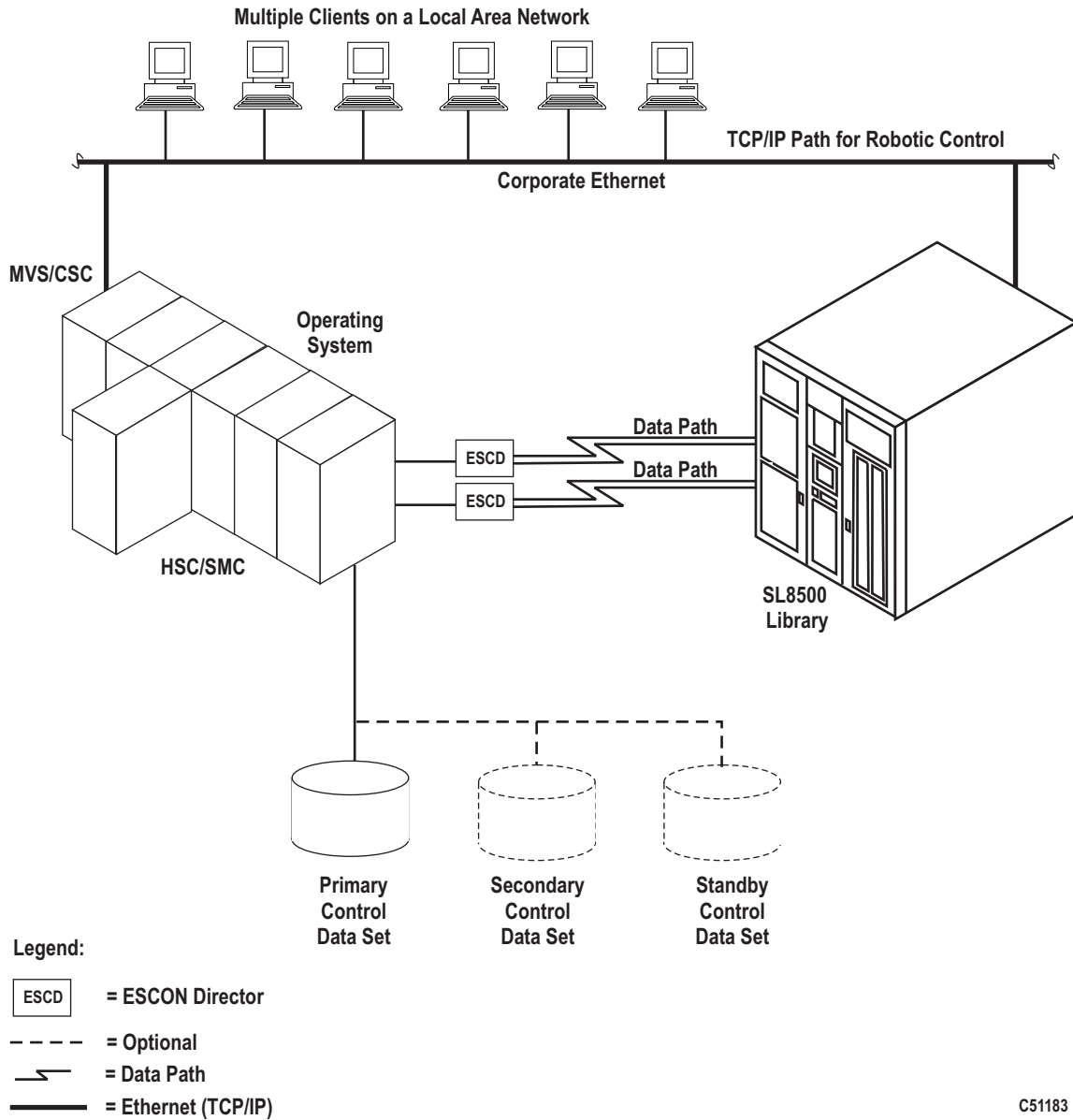


C29323

**Figure 57. Configuration 1**

## Configuration 2

This configuration consists of one ACS remote-linked to one CPU. The primary, secondary, and standby control data sets all run on the one CPU.

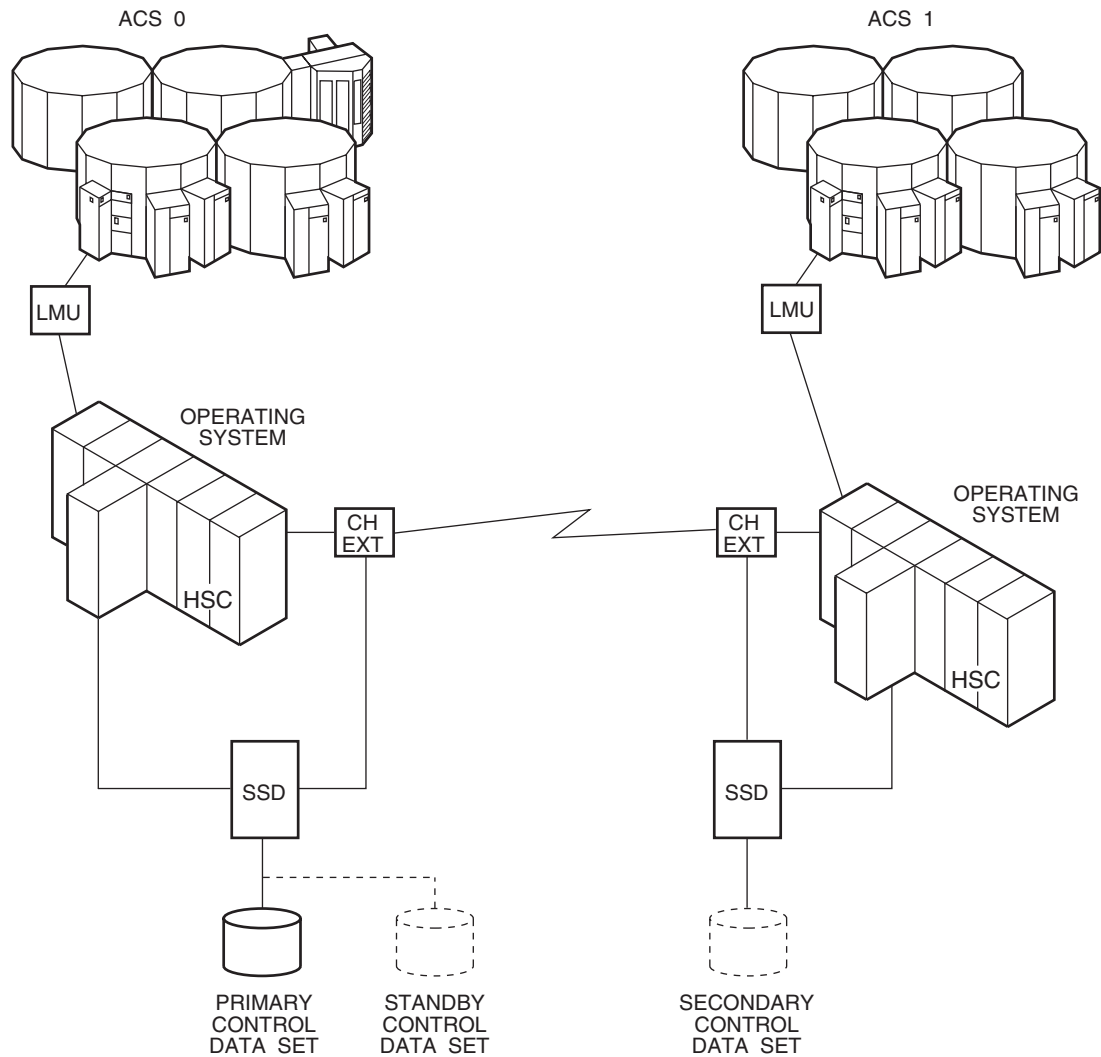


C51183

**Figure 58. Configuration 2**

### Configuration 3

This configuration consists of one ACS local to one CPU that is remote-linked to another CPU with one ACS local to it. The primary and secondary control data sets run on separate SSDs each attached to separate CPUs. The standby control data set can be attached to either SSD.



LEGEND:

**CH EXT** = CHANNEL EXTENDER

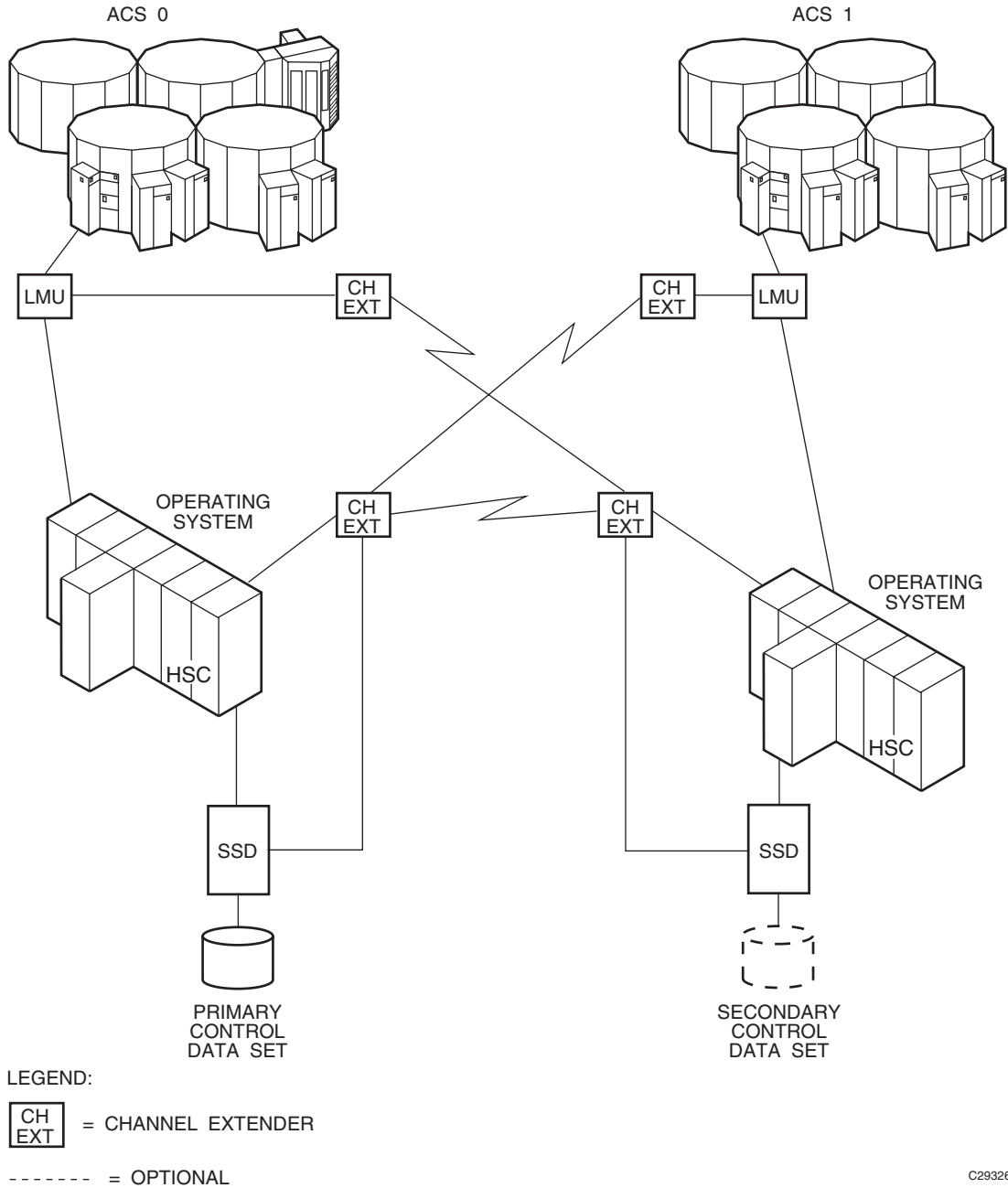
----- = OPTIONAL

C29325

**Figure 59. Configuration 3**

## Configuration 4

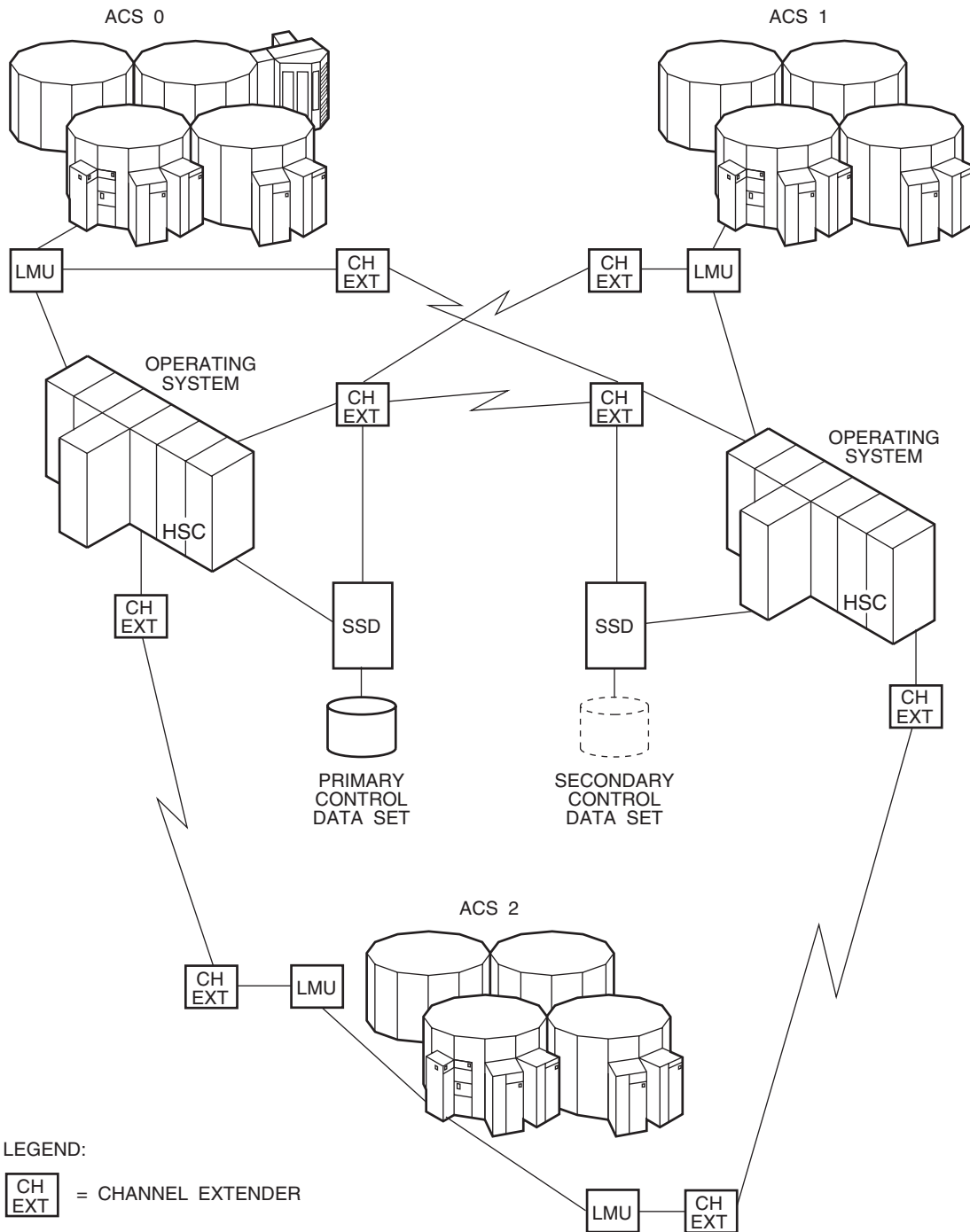
This configuration consists of one ACS local to one CPU that is remote-linked to another CPU with one ACS local to it. The primary and secondary control data sets run on separate SSDs each attached to separate CPUs.



C29326

## Configuration 5

This configuration consists of one ACS local to one CPU that is remote-linked to another CPU with one ACS local to it. In addition, a third ACS is remote-linked to both CPUs. The primary and secondary control data sets run on separate SSDs each attached to separate CPUs.



C29327

Figure 61. Configuration 5



## Programming and Operational Considerations

The following are programming and operational considerations that should be observed if you have libraries resembling any of the illustrated configurations. The HSC permits operation of these library configurations provided that some programming and operational precautions are observed.

These precautions are based on various functional restrictions described in following paragraphs. Table 88 lists the functions and the programming precautions that must be followed for associated configurations.

**Table 88. Programming and Operation Precautions for Remote-linked Libraries**

Function	Applicable Configuration(s)
Allocation	1 - 5
Resolving CDS issues after a remote-link failure	3 - 5
Restore involving journals from channel extended hosts	3 - 5
Control data set integrity	3 - 5

### Allocation

Refer to the *SMC Configuration and Administration Guide* for information about allocation.

### Resolving CDS Issues After a Remote-Link Failure

In configurations 3, 4, and 5, if there is a failure in the remote link while ACS1 has a hardware reserve issued against the primary CDS, ACS0 is locked out and is not able to perform any automated tape services until the reserve is released. This problem can happen even if the two ACSs are not remote-linked.

The reserve can be released by disabling the remote-link interface. Operator intervention is required to disable the link.

### Restore Involving Journals from Channel-Extended Hosts

In configurations 3, 4, and 5, if a restore of the control data set is needed, and the journaling option is invoked, all journal files must be obtained from every host that was included in the library LIBGEN. If all of the journals are not applied when the RESTore utility is executed, an accurate control data set may not be constructed during the restore operation.

Obtaining all journals from remote-linked hosts can be a problem if the link is down. Consequently, not all journals can be obtained to fully satisfy a successful restore of the control data set.

Careful planning must be done before executing the RESTore utility to ensure that journals are available from each host and that the remote link is fully operational when the restore operation is performed.

## Control Data Set Integrity

In configurations 3, 4, and 5, the primary control data set and the secondary control data set are separated across a remote link. If the link is interrupted, the secondary data set becomes the primary control data set for ACS1.

The original primary control data set continues to operate for ACS0 only. As the library operates, any updates occurring to either control data set after the link was severed causes the data sets to be unsynchronized. It is a difficult task to resynchronize the data for both data sets.

Possible solutions to resynchronize the data sets include:

- Execute the AUDIt utility and reconcile the differences between the primary control data set and the secondary data set. This solution is not recommended because of the time required to perform a full audit operation.
- Execute the BACKUp utility, specifying OPTion(Analyze), immediately followed by the RESTore utility, specifying GENERate(YES). The BACKUp utility performs error and comparison checking of records for the data sets and enables you to reconcile the differences. With this utility, you can ensure that the two data sets are properly synchronized. Library operation can be resumed at a high confidence level.
- Prior to reestablishing the link:
  1. Bring the HSC down.
  2. Reestablish the link.
  3. Run BACKUp OPTion(Analyze) and RESTore GENERate(YES).
  4. Bring the HSC up.
  5. Use the discrepancy report produced by the backup to determine discrepancies between copies of the CDS.

Refer to Chapter 4, “Utility Functions” and the AUDIt, BACKUp, and RESTore utilities for detailed information.

## Glossary

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Terms are defined as they are used in the text. If you cannot find a term here, check the index.

### A

**AC**— Alternating current.

**access method**— A technique for moving data between processor storage and I/O devices.

**ACS**— *See* Automated Cartridge System.

**ACSid**— An ACSid (*acs-id*) is a hexadecimal value from 00 through FF that identifies the LMU. An ACSid is the result of defining the SLIALIST macro during the library generation (LIBGEN) process. The first ACS listed in this macro acquires a hexadecimal identifier of 00, the second acquires a hexadecimal identifier of 01, and so forth, until all ACSs are identified.

**allocation**— The selection of a cartridge drive, either inside the library or outside (by the SMC software for SMC allocation, or MSP for MSP allocation without the SMC).

**APF**— Authorized Program Facility.

**APPL**— VTAM APPLID definition for the HSC.

**archiving**— The storage of backup files and associated journals, usually for a given period of time.

**Automated Cartridge System (ACS)**— The library subsystem consisting of one or two LMUs, and from 1 to 16 attached LSMs.

**automated library**— *See* library.

**automatic mode**— A relationship between an LSM and all attached hosts. LSMs operating in automatic mode handle cartridges without operator

intervention. This is the normal operating mode of an LSM that has been modified online.

### B

**basic direct access method (BDAM)**— An access method used to directly retrieve or update particular blocks of a data set on a direct access device.

**basic sequential access method (BSAM)**— An access method for storing and retrieving data blocks in a continuous sequence, using either a sequential access or direct access device.

**BDAM**— *See* Basic direct access method.

**beginning-of-tape (BOT)**— The location on a tape where written data begins.

**block**— A collection of contiguous records recorded as a unit. Blocks are separated by interblock gaps, and each block may contain one or more records.

**BOT**— *See* beginning-of-tape.

**BSAM**— *See* Basic Sequential Access Method.

**buffer**— A routine or storage used to compensate for a difference in rate of data flow, or time of occurrence of events, when transferring data from one device to another.

### C

**CA-1 (TMS)**— Computer Associates Tape Management

**System**— Third-party software by Computer Associates International, Inc.

**CAP**— *See* Cartridge Access Port.

**capacity**— *See* media capacity.

**CAPid**— A CAPid uniquely defines the location of a CAP by the LSM on which it resides. A CAPid is of the form *AAL:CC* where *AA* is the ACSid, *L* is the LSM number, and *CC* is the CAP number. Some commands and utilities permit an abbreviated CAPid format of *AAL*.

**cartridge**— The plastic housing around the tape. It is approximately 4 inches (100 mm) by 5 inches (125 mm) by 1 inch (25 mm). The tape is threaded automatically when loaded in a transport. A plastic leader block is attached to the tape for automatic threading. The spine of the cartridge contains a Tri-Optic label listing the VOLSER.

**Cartridge Access Port (CAP)**— An assembly which allows an operator to enter and eject cartridges during automated operations. The CAP is located on the access door of an LSM.

*See also* standard CAP, enhanced CAP, priority CAP, WolfCreek CAP, WolfCreek optional CAP, or TimberWolf CAP.

**Cartridge Drive (CD)**— A device containing two or four cartridge transports with associated power and pneumatic supplies.

**Cartridge Scratch Loader**— An optional feature for the Cartridge Drive. It allows the automatic loading of premounted tape cartridges or the manual loading of single tape cartridges.

**cartridge system tape**— Also known as a Standard tape. The basic tape cartridge media that can be used with 4480, 4490, or 9490 Cartridge Subsystems. They are visually identified by a one-color cartridge case.

**CAW**— *See* Channel Address Word.

**CD**— *See* Cartridge Drive.

**CDRM**— Cross Domain Resource Manager definition (if not using existing CDRMs).

**CDRSC**— Cross Domain Resource definition.

**CDS**— *See* control data set.

**CE**— Channel End.

**CEL**— Customer Emulation Lab. cell. A storage slot in the LSM that is used to store a tape cartridge.

**Central Support Remote Center (CSRC)**— *See* Remote Diagnostics Center.

**CFT**— Customer Field Test.

**channel**— A device that connects the host and main storage with the input and output control units.

**Channel Address Word (CAW)**— An area in storage that specifies the location in main storage where a channel program begins.

**channel command**— A command received by a CU from a channel.

**Channel Status Word (CSW)**— An area in storage that provides information about the termination of I/O operations.

**check**— Detection of an error condition.

**CI**— Converter/Interpreter (JES3).

**connected mode**— A relationship between a host and an ACS. In this mode, the host and an ACS are capable of communicating (at least one station to this ACS is online).

**control data set (CDS)**— The data set containing all configuration and volume information used by the host software to control the functions of the automated library. Also known as a library control data set.

*See also* Primary CDS, Secondary CDS, and Standby CDS.

**control data set allocation map**— A CDS subfile that marks individual blocks as used or free.

**control data set data blocks**— CDS blocks that contain information about the library and its configuration or environment.

**control data set directory**— A part of the CDS that maps its subdivision into subfiles.

**control data set free blocks**— CDS blocks available for future subfile expansion.

**control data set pointer blocks**— CDS blocks that contain pointers to map data blocks belonging to a subfile.

**control data set recovery area**— A portion of the CDS reserved for maintaining integrity for updates that affect multiple CDS blocks.

**control data set subfile**— A portion of the CDS consisting of Data Blocks and Pointer Blocks containing related information.

**Control Unit (CU)**— (1) A microprocessor-based unit situated logically between a host channel (or channels) and from two to sixteen transports. It functions to translate channel commands into transport commands, send transport status to the channel(s), and pass data between the channel(s) and transport(s). (2) A device that controls I/O operations for one or more devices. cross-host recovery. The ability for one host to perform recovery for another host that has failed.

**CSE**— Customer Service Engineer.

**CSI**— Consolidated System Inventory.

**CSL**— *See* Cartridge Scratch Loader.

**CSRC**— Central Support Remote Center (*See* Remote Diagnostics Center)

**CST**— (1) A value that can be specified on the MEDia parameter and that includes only standard capacity cartridge tapes. (2) An alias of Standard. (3) *See* Cartridge System Tape.

**CSW**— *See* Channel Status Word.

**CU**— *See* Control Unit.

## D

**DAE**— Dump Analysis Elimination.

**DASD**— Direct access storage device.

**data**— Any representations such as characters or analog quantities to which meaning is, or might be, assigned.

**Database Heartbeat record (DHB)**— The record that contains the names of the control data sets recorded by the HSC and identifies the correct primary, secondary, and standby CDS.

**data class**— A collection of allocation and space attributes, defined by the storage administrator, that are used to create a data set.

**data compaction**— An algorithmic data-reduction technique that encodes data from the host and stores it in less space than unencoded data. The original data is recovered by an inverse process called decompression.

**data-compaction ratio**— The number of host data bytes mathematically divided by the number of encoded bytes. It is variable depending on the characteristics of the data being processed. The more random the data stream, the lower the opportunity to achieve compaction.

**Data Control Block (DCB)**— A control block used by access routines in storing and retrieving data.

**data set**— The major unit of data storage and retrieval, consisting of a collection of data in one of several prescribed arrangements and described by control information to which the system has access.

**data streaming**— A continuous stream of data being transmitted in character or binary-digit form, using a specified format.

**DC**— Direct current.

**DCB**— *See* Data Control Block.

**DD3**— A generic value that can be specified on the MEDia and RECtech parameters and includes all types of helical cartridges and recording techniques.

**DD3A, DD3B, DD3C, DD3D**— Values that can be specified on the MEDia parameter and include only the specified type of helical cartridge. Aliases are A, B, C, and D, respectively.

**DDR**— *See* Dynamic Device Reconfiguration.

**default value**— A value assumed when no value has been specified.

**demand allocation**— An MSP term meaning that a user has requested a specific unit.

**device allocation**— The HSC function of *influencing* the MSP device selection process to choose either a manual transport or a transport in a particular ACS, based on the location of the volume (specific requests) or the subpool rules in effect (scratch requests).

**device group**— A subset of the eligible devices. Device groups are defined by esoteric unit names but also may be created implicitly if common devices exist in different device groups.

**device number**— A four-digit hexadecimal number that uniquely identifies a device attached to a processor.

**device separation**— *See* drive exclusion.

**DFP**— Data Facility Product. A program that isolates applications from storage devices, storage management, and storage device hierarchy management.

**DFSMS**— Refers to an environment running MVS/ESA SP and DFSMS/MVS, DFSORT, and RACF. This environment helps automate and centralize the management of storage through a combination of hardware, software, and policies.

**DFSMS ACS routine**— A sequence of instructions for having the system assign data class, storage class, management class, and storage group for a data set.

**DHB**— *See* Database Heartbeat record.

**directed allocation**— *See* drive prioritization.

**disconnected mode**— A relationship between a host and an ACS. In this mode, the host and an ACS are not capable of communicating (there are no online stations to this ACS).

**DOMed**— Pertaining to a console message that was previously highlighted during execution, but is now at normal intensity.

**drive exclusion**— (previously referred to as *device separation*) refers to the Storage Management Component (SMC) function of excluding drives for an allocation request based on SMC exclusion criteria. *See the SMC Configuration and Administration Guide* for more information.

**drive loaded**— A condition of a transport in which a tape cartridge has been inserted in the transport, and the tape has been threaded to the beginning-of-tape position.

**drive panel**— A wall of an LSM that contains tape transports. Drive panels for 9840 transports have either 10 or 20 transports per panel; drive panels for

all other transports contain up to four transports per panel.

**drive prioritization**— (previously referred to as *directed allocation*) refers to the Storage Management Component (SMC) function of influencing selection of a particular drive based on allocation criteria, including volume location. *See the SMC Configuration and Administration Guide* for more information.

**DRIVEid**— A DRIVEid uniquely defines the location of a tape transport by its location within an LSM. A DRIVEid is of the form *AAL:PP:NN* where *AA* is the ACSid, *L* is the LSM number, *PP* is the panel where the drive is located, and *NN* is the drive number within the panel.

**DSI**— Dynamic System Interchange (JES3).

**dual LMU**— A hardware/ $\mu$ -software feature that provides a redundant LMU capability.

**dual LMU HSC**— HSC release 1.1.0 or later that automates a switch-over to the standby LMU in a dual LMU configuration.

**dump**— To write the contents of storage, or of a part of storage, usually from an internal storage to an external medium, for a specific purpose such as to allow other use of storage, as a safeguard against faults or errors, or in connection with debugging.

**Dynamic Device Reconfiguration (DDR)**— An MSP facility that allows a dismountable volume to be moved and repositioned if necessary, without abnormally terminating the job or repeating the initial program load procedure.

## E

**ECAP**— *See* enhanced CAP.

**ECART**— (1) Cartridge system tape with a length of 1100 feet that can be used with 4490 and 9490 Cartridge Drives. These tapes are visually identified by a two-tone (black and tan) colored case. (2) A value that can be specified on the MEDIA parameter and that includes only 36-track enhanced capacity cartridge system tapes. (3) *See* Enhanced Capacity Cartridge System Tape.

**ECCST**— (1) A value that can be specified on the MEDia parameter and that includes only enhanced capacity cartridge system tapes. (2) An alias of ECART. (3) *See* Enhanced Capacity Cartridge System Tape.

**EDL**— *See* eligible device list.

**EDTGEN**— Eligible Device Table Generation. A process used to replace an installation-defined and named representation of the devices that are eligible for allocation.

**EETape**— *See* Extended Enhanced Tape.

**Effective Recording Density**— The number of user bytes per unit of length of the recording medium.

**eject**— The process where the LSM robot places a cartridge in a Cartridge Access Port (CAP) so the operator can remove it from the LSM.

**eligible device list**— (1) A group of transports that are available to satisfy an allocation request. (2) For JES2 and JES3, a list of devices representing the UNIT parameter specified by way of invoking JCL. The EDL can contain both library and nonlibrary transports depending on the I/O GEN.

**enable**— The modification of system, control unit, or device action through the change of a software module or a hardware switch (circuit jumper) position.

**enhanced CAP (ECAP)**— An enhanced CAP contains two forty-cell magazine-style CAPs and a one-cell priority CAP (PCAP). Each forty-cell CAP holds four removable magazines of ten cells each. An LSM access door with an enhanced CAP contains no cell locations for storing cartridges.

*See also* Cartridge Access Port, standard CAP, priority CAP, WolfCreek CAP, WolfCreek optional CAP, or TimberWolf CAP.

**Enhanced Capacity Cartridge System Tape**— Cartridge system tape with increased capacity that can be used with 4490 and 9490 Cartridge Drives. These tapes are visually identified by a two-tone (black and tan) housing.

**EOF**— End-of-File.

**EOT**— End-of-Tape marker.

**EPO**— Emergency Power Off.

**EREP**— Environmental Recording, Editing, Printing.

**ERP**— *See* error recovery procedures.

**error recovery procedures (ERP)**— Procedures designed to help isolate and, where possible, to recover from errors in equipment.

**esoteric**— A user-defined name that groups devices into classes.

**ETAPE**— (1) A value that can be specified on the MEDia parameter and that includes only enhanced capacity cartridge system tapes. (2) An alias of ECART. (3) *See* Enhanced Capacity Cartridge System Tape.

**Extended Capacity Tape**— *See* Enhanced Capacity Cartridge System Tape.

**Extended Enhanced Tape (EETape)**— A synonym for a ZCART, which is a cartridge that can only be used with a 9490EE drive. An EETape (ZCART) provides greater storage capacity than an ECART.

**ExtendedStore Library**— One or more LSMs with no Cartridge Drives (CDs) that are attached by pass-thru ports to other LSMs (with CDs) in an ACS. These LSMs provide archive storage for cartridges containing less active data sets. Cartridges can be entered and ejected directly into and out of this LSM though either a standard CAP or an enhanced CAP.

## F

**FDRPAS™**— A product from Innovation Data Processing, Inc. that allows two disk devices to be non-disruptively swapped with each other.

**FIFO**— First in, first out.

**file protected**— Pertaining to a tape volume from which data can be read only. Data cannot be written on or erased from the tape.

**format**— The arrangement or layout of data on a data medium.

**frozen panel**— A panel to which cartridges cannot be moved. This restriction includes allocating new cartridge locations on a panel as a result of:

- a MOVE command, utility, or PGMI request
- cartridge entry into the ACS
- float, scratch dismount, or scratch redistribution processing.

## G

**GB**— Gigabyte, billion ( $10^9$ ) bytes.

**GDG**— Generation Data Group. An MVS data set naming convention. Sequence numbers are appended to the basic data set name to track the generations created for that data set.

**GDG Separation**— Occurs when a Generation Data Group gets separated because the volumes of different generations reside in different locations. Usually, all generations of a GDG are mounted on a single drive to reduce the number of drives needed for a job.

**GTF**— Generalized Trace Facility. An MVS facility used to trace software functions and events.

## H

**HDA**— Head/disk assembly.

**Helical**— A generic value that can be specified on the RECTECH parameter and includes all helical transports.

**HOSTid**— A HOSTid is the host identifier specified in the HOSTID parameter of the SLILIBRY LIBGEN macro. The HOSTid is the SMF system identifier for both JES2 and JES3.

**High Watermark Setup (HWS)**— In JES3, a setting specified on the HWSNAME initialization statement that reduces the number of devices reserved for a job. JES3 accomplishes this task by assessing each jobstep to determine the maximum number of devices needed for each device type and reserving those devices.

**Host Software Component (HSC)**— That portion of the Automated Cartridge System which executes on host systems attached to an automated library. This component acts as the interface between the

operating system and the rest of the automated library.

**host system**— A data processing system that is used to prepare programs and the operating environments for use on another computer or controller.

**HSC**— *See* Host Software Component.

**HWS**— *See* High Watermark Setup.

## I

**ICRC**— *See* Improved Cartridge Recording Capability.

**ID**— Identifier or identification.

**IDAX**— Interpreter Dynamic Allocation Exit. This is a subfunction of the DFSMS/MVS subsystem request (SSREQ 55) that the MVS JCL Interpreter and dynamic allocation functions issue for calling DFSMS ACS routines for management of the data set requested.

**IDRC**— Improved Data Recording Capability.

**IML**— *See* Initial Microprogram Load.

**Improved Cartridge Recording Capability (ICRC)**— An improved data recording mode that, when enabled, can increase the effective cartridge data capacity and the effective data rate when invoked.

**index**— A function performed by the cartridge scratch loader that moves cartridges down the input or output stack one cartridge position. A scratch loader can perform multiple consecutive indexes.

**INISH deck**— A set of JES3 initialization statements.

**Initial Microprogram Load (IML)**— A process that activates a machine reset and loads system programs to prepare a computer system for operation. Processors having diagnostic programs activate these programs at IML execution. Devices running  $\mu$ -software reload the functional  $\mu$ -software usually from a floppy diskette at IML execution.

**Initial Program Load (IPL)**— A process that activates a machine reset and loads system programs to prepare a computer system for operation. Processors having diagnostic programs activate these



programs at IPL execution. Devices running  $\mu$ -software reload the functional  $\mu$ -software usually from a floppy diskette at IPL execution.

**initial value**— A value assumed until explicitly changed. It must then be explicitly specified in another command to restore the initial value. An initial value for the HSC is the value in effect when the product is installed.

**inline diagnostics**— Diagnostic routines that test subsystem components while operating on a time-sharing basis with the functional  $\mu$ -software in the subsystem component.

**input stack**— The part of the cartridge loader where cartridges are premounted.

**intervention required**— Manual action is needed.

**IPL**— *See* Initial Program Load.

**ips**— Inches per second.

**IVP**— Installation Verification Programs. A package of programs that is run by a user after the library is installed in order to verify that the library is functioning properly.

## J

**JCL**— *See* Job Control Language.

**Job Control Language**— Problem-oriented language designed to express statements in a job that are used to identify the job or describe its requirements to an operating system.

**journal**— The log associated with journaling. The log (stored in a data set) contains a record of completed work and changes to the control data set since the last backup was created.

**journaling**— A technique for recovery that involves creating a backup control data set and maintaining a log of all changes (transactions) to that data set.

**JST**— Job Summary Table (JES3).

## K

**KB**— Kilobyte, thousand ( $10^3$ ) bytes.

**keyword parameter**— In command and utility syntax, operands that include keywords and their related values (*See* positional parameter).

Values are concatenated to the keyword either by an equal sign, “KEYWORD=value,” or by parentheses, “KEYWORD(value).” Keyword parameters can be specified in any order. The HSC accepts (tolerates) multiple occurrences of a keyword. The value assigned to a keyword reflects the last occurrence of a keyword within a command.

## L

**LAN**— *See* Local Area Network.

**LCU**— *See* Library Control Unit.

**LED**— *See* Light Emitting Diode.

**LIBGEN**— The process of defining the configuration of the automated library to the host software.

**library**— An installation of one or more ACSs, attached cartridge drives, volumes placed into the ACSs, host software that controls and manages the ACSs and associated volumes, and the library control data set that describes the state of the ACSs.

**library control data set**— *See* control data set.

**Library Control Unit (LCU)**— The portion of the LSM that controls the picking, mounting, dismounting, and replacing of cartridges.

**Library Management Unit (LMU)**— The portion of the ACS that manages from one to sixteen LSMs and communicates with the host CPU.

**Library Storage Module (LSM)**— The storage area for cartridges plus the robot necessary to move the cartridges. The term LSM often means the LCU and LSM combined.

**Light Emitting Diode (LED)**— An electronic device used mainly as an indicator on status panels to show equipment on/off conditions.

**Linear Tape Open (LTO)**— A technology developed jointly by HP, IBM, and Seagate for new tape storage options. LTO technology is an open format, which means that users have multiple sources of products and media.

**LMU**— See Library Management Unit.

**LMUPATH**— An HSC control statement contained in the definition data set specified by the LMUPDEF command. An LMUPATH statement allows users to define network LMU attachments.

**LMUPDEF**— An HSC command used to load the definition data set that contains LMUPATH control statements.

**load point**— The beginning of the recording area on magnetic tape.

**loader**— See Cartridge Scratch Loader.

**Local Area Network (LAN)**— A computer network in which devices within the network can access each other for data transmission purposes. The LMU and attached LCUs are connected with a local area network.

**logical ejection**— The process of removing a volume from the control data set without physically ejecting it from its LSM location.

**Logical End Of Tape**— A point on the tape where written data normally ends.

**LONG**— (1) A value that can be specified on the MEDia parameter and that includes only enhanced capacity cartridge system tapes (not to be confused with LONGitud). (2) An alias of ECART. (3) See Enhanced Capacity Cartridge System Tape.

**LONGitud**— (1) A generic value that can be specified on the RECtech parameter and includes all 18-track and 36-track devices. (2) A generic value that can be specified on the MEDia parameter and includes all standard and enhanced capacity cartridge system tapes.

**LSM**— See Library Storage Module.

**LSMid**— An LSMid (*lsm-id*) is a hexadecimal value that consists of the ACSid and LSM number separated by a colon (i.e., *AA:LL*, where *AA* is the ACSid and *LL* is the LSMid). The LSMid differentiates an LSM from every other LSM in a library.

**LSM number**— A method used to identify an LSM. An LSM number is the result of defining the SLIACS macro LSM parameter during a LIBGEN.

The first LSM listed in this parameter acquires the LSM number of 00 (hexadecimal), the second LSM listed acquires a hexadecimal number of 01, and so forth, until all LSMs are identified (maximum of 24 or hexadecimal 17).

**LTO**— See Linear Tape Open.

**LTOx**— A media type designating either an LTO data cartridge with a capacity between 10GB and 400GB or an LTO cleaning cartridge.

## M

**machine initiated maintenance**— See ServiceTek.

**magnetic recording**— A technique of storing data by selectively magnetizing portions of a magnetizable material.

**magnetic tape**— A tape with a magnetizable surface layer on which data can be stored by magnetic recording.

**magnetic tape drive**— A mechanism for moving magnetic tape and controlling its movement.

**maintenance facility**— Hardware contained in the CU and LMU that allows a CSE and the RDC to run diagnostics, retrieve status, and communicate with respective units through their control panels.

**management class**— A collection of management attributes, assigned by the storage administrator, that are used to control the allocation and use of space by a data set.

**manual mode**— A relationship between an LSM and all attached hosts. LSMs operating in manual mode have been modified offline and require human assistance to perform cartridge operations.

**master LMU**— The LMU currently controlling the functional work of the ACS in a dual LMU configuration.

**MB**— Megabyte, million ( $10^6$ ) bytes.

**MDS**— Main Device Scheduler (JES3).

**MEDia**— The parameter used to specify media type.

This is not to be confused with MEDIA1 or MEDIA2, which are values that can be specified on the MEDia parameter.

**MEDIA1**— (1) A value that can be specified on the MEDIA parameter and that includes only standard capacity cartridge tapes. (2) An alias of Standard.

**MEDIA2**— (1) A value that can be specified on the MEDIA parameter and that includes only enhanced capacity cartridge system tapes. (2) An alias of ECART. (3) *See* Enhanced Capacity Cartridge System Tape.

**media capacity**— The amount of data that can be contained on storage media and expressed in bytes of data.

**media mismatch**— A condition that occurs when the media value defined in a VOLATTR control statement does not match the media value recorded in the CDS VAR record.

**micro-software**— *See*  $\mu$ -software under Symbols.

**MIM**— Multi-Image Manager. Third-party software by Computer Associates International, Inc.

**mixed configurations**— Installations containing cartridge drives under ACS control and cartridge drives outside of library control. These configurations cause the Host Software Component to alter allocation to one or the other.

**MODEL**— The parameter used to specify model number.

**modem**— Modulator/demodulator. An electronic device that converts computer digital data to analog data for transmission over a telecommunications line (telephone line). At the receiving end, the modem performs the inverse function.

**monitor**— A device that observes, records, and verifies selected system activities to determine significant departure from expected operation.

**MSM**— Multiple Sessions Management. Third-party software by Computer Associates International, Inc.

## N

**Near Continuous Operation (NCO)** — Facilities and techniques that allow customers to make dynamic changes to the library that do not disrupt the library hardware and environment. In most cases,

users can perform these procedures without requiring the HSC to be terminated and restarted.

## O

**OCR**— Optical Character Recognition.

**operating system (OS)**— Software that controls the execution of programs that facilitate overall system operation.

**output stack**— The part of the cartridge loader that receives and holds processed cartridges.

**over-limit cleaning cartridge**— A cleaning cartridge that has been used more than the value (limit) specified by either the MNTD MAXclean or VOLATTR MAXclean settings. This kind of cartridge may not be able to adequately clean a tape transport, however, it can be mounted and will attempt to execute the cleaning process. *See also* spent cleaning cartridge.

**over-use cleaning cartridge**— A cartridge that has a usage (select) count over the MAXclean value (*see* over-limit cleaning cartridge) or that has used up its cleaning surface (*see* spent cleaning cartridge).

## P

**paired-CAP mode**— The two forty-cell CAPs in an enhanced CAP function in paired-CAP mode as a single eighty-cell CAP.

**PARMLIB control statements**— Parameter library (PARMLIB) control statements allow you to statically specify various operation parameters which take effect at HSC initialization. Identifying your system requirements and then specifying the appropriate control statements permits you to customize the HSC to your data center.

**pass-thru port (PTP)**— A mechanism that allows a cartridge to be passed from one LSM to another in a multiple LSM ACS.

**PCAP**— *See* priority CAP.

**P/DAS**— Peer-to-Peer Remote Copy Dynamic Address Switching. An IBM capability to non-disruptively swap PPRC volumes.

**Peer-to-Peer Remote Copy (PPRC)**— An IBM capability to mirror disk volumes from one storage subsystem to another.

**physical end of tape**— A point on the tape beyond which the tape is not permitted to move.

**playground**— The playground is a reserved area of cells where the robot deposits cartridges that it finds in its hands during LSM initialization. Normal LSM initialization recovery processing moves cartridges from the playground cells to either their home cells or their intended destinations, but under abnormal circumstances cartridges may be left in playground cells.

**positional parameter**— In command and utility syntax, operands that are identified by their position in the command string rather than by keywords (*See* keyword parameter).

Positional parameters must be entered in the order shown in the syntax diagram.

**PowderHorn (9310) LSM**— A high-performance LSM featuring a high-speed robot. The PowderHorn has a capacity of up to approximately 6000 cartridges.

**PPRC**— *See* Peer-to-Peer Remote Copy.

**primary CDS**— The active control data set. It contains the inventory of all cartridges in the library, the library configuration, information about library hardware and resource ownership across multiple processors, and serves as a vehicle of communication between HSCs running on multiple processors.

**priority CAP (PCAP)**— A one-cell CAP that is part of an enhanced CAP. A PCAP allows a user to enter or eject a single cartridge that requires immediate action.

*See also* Cartridge Access Port, standard CAP, enhanced CAP, WolfCreek CAP, WolfCreek optional CAP, or TimberWolf CAP.

**Program Temporary Fix (PTF)**— A unit of corrective maintenance delivered to a customer to repair a defect in a product, or a means of packaging a Small Programming Enhancement (SPE).

**Program Update Tape (PUT)**— A tape containing a collection of PTFs. PUTs are shipped to customers

on a regular basis under the conditions of the customer's maintenance license.

**PTF**— *See* Program Temporary Fix.

**PTP**— *See* pass-thru port.

**PUT**— *See* Program Update Tape.

## Q

**QSAM**— *See* Queued Sequential Access Method.

**Queued Sequential Access Method (QSAM)**— An extended version of the basic sequential access method (BSAM). When this method is used, a queue is formed of input data blocks that are awaiting processing or output data blocks that have been processed and are awaiting transfer to auxiliary storage or to an output device.

## R

**RACF**— *See* Resource Access Control Facility.

**RDC**— *See* Remote Diagnostics Center.

**Recording Density**— The number of bits in a single linear track measured per unit of length of the recording medium.

**RECtech**— The parameter used to specify recording technique.

**RedWood**— (1) The program name of the StorageTek transport that supports a helical recording technique. (2) *See* SD-3.

**Remote Diagnostics Center (RDC)**— The Remote Diagnostics Center at StorageTek. RDC operators can access and test StorageTek systems and software, through telecommunications lines, from remote customer installations. Also referred to as the Central Support Remote Center (CSRC).

**Resource Access Control Facility (RACF)**— Security software controlling access to data sets.

## S

**SCP**— *See* System Control Program.

**scratch tape subpool**— A defined subset of all scratch tapes. Subpools are composed of one or more ranges of VOLSERS with similar physical

characteristics (type of volume {reel or cartridge}, reel size, length, physical location, etc.). Some installations may also subdivide their scratch pools by other characteristics, such as label type (AL, SL, NSL, NL).

The purpose of subpooling is to make sure that certain data sets are built only within particular ranges of volumes (for whatever reason the user desires). If a volume which does not belong to the required subpool is mounted for a particular data set, it is dismounted and the mount reissued.

**SD-3**— The model number of the StorageTek transport that supports a helical recording technique.

**SDLT**— *See* SuperDLT.

**SDLTx**— A media type designating an SDLT data cartridge with a capacity of either 125GB or 160GB.

**secondary CDS**— The optional duplicate copy of the primary CDS.

**secondary recording**— A technique for recovery involving maintaining both a control data set and a copy (secondary) of the control data set.

**SEN** — *See* Significant Event Notification.

**SER**— Software Enhancement Request.

**ServiceTek (machine initiated maintenance)**— A unique feature of the ACS in which an expert system monitors conditions and performance of subsystems and requests operator attention before a potential problem impacts operations. Customers can set maintenance threshold levels.

**servo**— A device that uses feedback from a sensing element to control mechanical motion.

**Shared Tape Allocation Manager (STAM)**— Third-party software by Computer Associates International, Inc.

**Significant Event Notification (SEN)** — An HSC facility that allows an application to request notification of specific HSC and VTCS events.

**Silverton**— *See* 4490 Cartridge Subsystem.

**SL8500 library**— *See* Streamline (SL8500) library.

**Small Programming Enhancement (SPE)**— A supplement to a released program that can affect several products or components.

**SMC**— Storage Management Component.

**SMF**— System Management Facility. An MVS facility used to record system actions which affect system functionality.

**SMP**— System Modification Program.

**SMP/E**— *See* System Modification Program Extended.

**SMS**— Storage Management Subsystem.

**SPE**— *See* Small Programming Enhancement.

**special use cartridge**— A generic description for a type of cartridge used on 9840 drives. These include:

- 9840 cleaning cartridge
- 9840 microcode load cartridge
- 9840 dump collection cartridge.

When an attempt is made to mount a special use cartridge, LMU error response code 1012 is generated.

The error code is defined as “load failure for special use cartridge.”

If the error code is received for a special use cleaning cartridge, it is either ejected or marked as unusable, and it is retained in the ACS (depending on the MNTD EJtauto setting). The HSC does not mount unusable cartridges.

**spent cleaning cartridge**— A cleaning cartridge that has exhausted its cleaning material and can no longer be used to clean tape transports. *See also* over-limit cleaning cartridge.

**SSD**— Solid state disk.

**STAM**— *See* Shared Tape Allocation Manager.

**Standard**— (1) A value that can be specified on the MEDIA parameter and that includes only standard capacity cartridge tapes. (2) *See* Cartridge System Tape.

**standard CAP**— A standard CAP has a capacity of twenty-one cartridges (three rows of seven cells

each). An LSM access door with a standard CAP contains cell locations for storing cartridges.

*See also* Cartridge Access Port, enhanced CAP, priority CAP, WolfCreek CAP, WolfCreek optional CAP, or TimberWolf CAP.

**standard (4410) LSM**— An LSM which provides a storage capacity of up to approximately 6000 cartridges.

**standby**— The status of a station that has been varied online but is connected to the standby LMU of a dual LMU ACS.

**standby CDS**— The optional data set that contains only one valid record, the Database Heartbeat (DHB). The DHB contains the names of the control data sets recorded by the HSC and is used to identify the correct primary, secondary, and standby CDS.

**standby LMU**— The redundant LMU in a dual LMU configuration that is ready to take over in case of a master LMU failure or when the operator issues the SWitch command.

**station**— A hardware path between the host computer and an LMU over which the HSC and LMU send control information.

**STD**— (1) A value that can be specified on the MEDia parameter and that includes only standard capacity cartridge tapes. (2) An alias of Standard.

**STK1**— A generic value that can be specified on the MEDia and RECtech parameters and includes all types of 9840 cartridges and recording techniques.

**STK1R**— Value that can be specified on the MEDia and RECtech parameters and includes only the specified type of 9840 cartridge or recording technique. STK1R can be abbreviated as R.

**STK1U**— Value that can be specified on the MEDia parameter and includes only the specified type of 9840 cleaning cartridge. STK1U can be abbreviated as U.

**STK2**— A generic value that can be specified on the MEDia parameter and includes all types of 9940 cartridges and recording techniques.

**STK2P**— Value that can be specified on the MEDia and RECtech parameters and includes only the

specified type of 9940 cartridge or recording technique. STK2P can be abbreviated as P.

**STK2W**— Value that can be specified on the MEDia parameter and includes only the specified type of 9940 cleaning cartridge. STK2W can be abbreviated as W.

**storage class**— A named list of storage attributes that identify performance goals and availability requirements for a data set.

**storage group**— A collection of storage volumes and attributes defined by the storage administrator.

**Storage Management Component (SMC)**— Required NCS software component that performs the allocation function for NCS, replacing the functions previously performed by HSC and MVS/CSC. The SMC resides on the MVS host with HSC and/or MVS/CSC, and communicates with these products to determine policies, volume locations, and drive ownership.

**StreamLine (SL8500) library**— A modular library that can scale from 1,500 to over 200,000 cartridges in mainframe, Windows, UNIX, and supercomputer environments. The SL8500 utilizes hot swap components and multiple robots.

**StreamLine CAP**— The StreamLine CAP contains 3, 13-cell removable magazines. You can also add an optional CAP that has the same configuration.

**SuperDLT**— The next generation of DLT (Digital Linear Tape) products, which remains a standard for mid-range operating systems.

**switchover**— The assumption of master LMU functionality by the standby LMU.

**SYNCSORT**— Third-party software by Syncsort, Inc.; a sort, merge, copy utility program.

**System Control Program**— The general term to describe a program which controls access to system resources, and allocates those resources among executing tasks.

**system-managed storage**— Storage that is managed by the Storage Management Subsystem, which attempts to deliver required services for availability, performance, space, and security applications.

**System Modification Program Extended**— An IBM-licensed program used to install software and software maintenance.

## T

**T10000 Tape Drive** — A cartridge tape drive that features a 500GB cartridge capacity and data transfer rates up to 120MB/sec native, uncompressed. In addition, the T10000 offers media reusability for at least two generations and device-based encryption.

**tape cartridge**— A container holding magnetic tape that can be processed without separating it from the container.

**tape drive**— A device that is used for moving magnetic tape and includes the mechanisms for writing and reading data to and from the tape.

**tape unit**— A device that contains tape drives and their associated power supplies and electronics.

**TAPEREQ**— An SMC control statement that is contained in the definition data set specified by the TREQDEF command. A TAPEREQ statement defines a specific tape request. It is divided into two parts, the input: job name, step name, program name, data set name, expiration date or retention period, and an indication for specific requests or nonspecific (scratch) requests; and the output: media type and recording technique capabilities.

**TDMF™**— Transparent Data Migration Facility. A product from Softek Storage Solutions Corp. that allows two disk devices to be non-disruptively swapped with each other.

**Timberline**— *See* 9490 Cartridge Subsystem.

**Timberline EE**— *See* 9490EE Cartridge Subsystem.

**TimberWolf (9740) LSM**— A high performance LSM that provides a storage capacity of up to 494 cartridges. Up to 10 drives (STD, 4490, 9490, 9490EE, 9840, and SD-3) can be configured. TimberWolf LSMs can only attach to other TimberWolfs.

**TimberWolf CAP**— The TimberWolf CAP contains either a 10-cell removable magazine or a 14-cell permanent rack. It is not necessary to define a

configuration; the HSC receives CAP information directly from the LMU.

*See also* Cartridge Access Port, standard CAP, enhanced CAP, priority CAP, WolfCreek CAP, or WolfCreek optional CAP.

**TP**— Tape-to-Print.

**transaction**— A short series of actions with the control data set. These actions are usually related to a specific function (e.g., Mount, ENter).

**transport**— An electromechanical device capable of threading tape from a cartridge, moving the tape across a read/write head, and writing data onto or reading data from the tape.

**TREQDEF**— An SMC command that is used to load the definition data set that contains TAPEREQ control statements.

**Tri-Optic label**— An external label attached to the spine of a cartridge that is both human and machine readable.

**TT**— Tape-to-Tape.

## U

**unit affinity**— A request that all cartridges be mounted on a single drive (either for read or write purposes), usually to reduce the number of drives needed for a job.

**unit parameter value**— A JCL term meaning the value of a JCL UNIT parameter. The value can be a single address of a drive, an esoteric list, or a generic list.

**UNITATTR**— An SMC control statement that is contained in the definition data set specified by the UNITDEF command. A UNITATTR statement defines to the HSC the transport's media type and recording technique capabilities.

**UNITDEF**— An SMC command that is used to load the definition data set that contains UNITATTR control statements.

**utilities**— Utility programs. The programs that allow an operator to manage the resources of the library and to monitor overall library performance.

## V

**VAR**— *See* Volume Attribute Record.

**VAT**— *See* Volume Attribute Table Entry.

**Virtual Storage Manager (VSM)**— A storage solution that virtualizes volumes and transports in a VTSS buffer in order to improve media and transport use.

**Virtual Tape Control System (VTCS)**— The primary host code for the Virtual Storage Manager (VSM) solution. This code operates in a separate address space, but communicates closely with HSC.

**Virtual Tape Storage Subsystem (VTSS)**— The DASD buffer containing virtual volumes (VTVs) and virtual drives (VTDs). The VTSS is a StorageTek RAID 6 hardware device with microcode that enables transport emulation. The RAID device can read and write “tape” data from/to disk, and can read and write the data from/to a real tape drive (RTD).

**virtual thumbwheel**— An HSC feature that allows read-only access to a volume that is not physically write-protected.

**VOLATTR**— An HSC control statement that is contained in the definition data set specified by the VOLDEF command. A VOLATTR statement defines to the HSC the media type and recording technique of the specified volumes.

**VOLDEF**— An HSC command that is used to load the definition data set that contains VOLATTR control statements.

**VOLSER**— A six-character alphanumeric label used to identify a tape volume.

**volume**— A data carrier that is mounted or dismounted as a unit. (*See* cartridge).

**Volume Attribute Record (VAR)**— An HSC internal record that contains the data base-resident information of a cartridge entered into the library.

**Volume Attribute Table Entry (VAT)**— An HSC internal table that contains entries to the intransit record token and the Volume Attribute Record (VAR). The VAT is used as the communications area for internal service calls.

## W

**WolfCreek (9360) LSM**— A smaller capacity high-performance LSM. WolfCreek LSMs are available in 500, 750, and 1000 cartridge capacities (model numbers 9360-050, 9360-075, and 9360-100, respectively). WolfCreek LSMs can be connected by pass-thru ports to 4410, 9310, or other WolfCreek LSMs.

**WolfCreek CAP**— The standard WolfCreek CAP contains a 20-cell magazine-style CAP and a priority CAP (PCAP).

*See also* Cartridge Access Port, standard CAP, enhanced CAP, priority CAP, WolfCreek optional CAP, or TimberWolf CAP.

**WolfCreek optional CAP**— The WolfCreek optional CAP contains a 30-cell magazine-style CAP which is added to the standard WolfCreek CAP.

*See also* Cartridge Access Port, standard CAP, enhanced CAP, priority CAP, WolfCreek CAP, or TimberWolf CAP.

**Write Tape Mark (WTM)**— The operation performed to record a special magnetic mark on tape. The mark identifies a specific location on the tape.

**WTM**— *See* Write Tape Mark.

**WTO**— Write-to-Operator.

**WTOR**— Write-to-Operator with reply.

## Z

**ZCART**— (1) Cartridge system tape with a length of 2200 feet that can be used only with 9490EE Cartridge Drives. (2) A value that can be specified on the MEDIA parameter and that includes only 36-track 9490EE cartridge system tapes. (3) *See also* Extended Enhanced Tape.

## Symbols

**μ-software**— Microprogram. A sequence of microinstructions used to perform preplanned functions and implement machine instructions.



## Numerics

**18-track**— A recording technique that uses 18 tracks on the tape. The tape is written in only the forward motion.

**18track**— A generic value that can be specified on the RECTech parameter and includes all 18-track transports.

**3480**— (1) A value that can be specified on the MEDIA parameter and that includes only standard capacity cartridge tapes. (2) An alias of Standard.

**3480X**— The 3480 upgrade that supports ICRC.

**3490**— The IBM cartridge drive that replaced the 3480X and supports ICRC but not 36-track or long tape. It is equivalent to the IBM 3480X.

**3490E**— (1) The IBM cartridge drive that replaced the 3490 and supports ICRC, 36-track, and long tape. It reads 18-track but does not write 18-track. (2) A value that can be specified on the MEDIA parameter and that includes only enhanced capacity cartridge system tapes. (3) An alias of ECART.

**3590**— The IBM cartridge drive that supports 128-track recording and holds 10GB of uncompressed data. It has the same form factor as a 3490E.

**36-track**— A recording technique that uses 36 tracks on the tape. 18 tracks of data are written in the forward motion and then an additional 18 tracks in the backward motion for a total of 36.

**36track**— A generic value that can be specified on the RECTech parameter and includes all 36-track transports.

**36Atrack**— A value that can be specified on the RECTech parameter and includes only 4490 (Silverton) 36-track transports.

**36Btrack**— A value that can be specified on the RECTech parameter and includes only 9490 (Timberline) 36-track transports.

**36Ctrack**— A value that can be specified on the RECTech parameter and includes only 9490EE (Timberline EE) transports.

**4410 LSM**— *See* standard LSM.

**4480 Cartridge Subsystem**— Cartridge tape transports that provide read/write capability for 18-track recording format. The StorageTek 4480 Cartridge Subsystem is equivalent to a 3480 device.

**4490 Cartridge Subsystem**— Cartridge tape transports that provide read/write capability for 36-track recording format and extended capacity tape. 4490 transports can also read data recorded in 18-track format. The StorageTek 4490 Cartridge Subsystem is equivalent to a 3490E device.

**8500 library**— *See* StreamLine (SL8500) library.

**9310 LSM**— *See* PowderHorn LSM.

**9360 LSM**— *See* WolfCreek LSM.

**9490 Cartridge Subsystem**— Cartridge tape transports that provide read/write capability for 36-track recording format and extended capacity tape and provide improved performance over the 4490 Cartridge Subsystem. 9490 transports can also read data recorded in 18-track format. The StorageTek 9490 Cartridge Subsystem offers better performance (faster data transfer rate, faster load/unload) than a 3490E device.

**9490EE Cartridge Subsystem**— A high-performance tape transport that provides read/write capability for Extended Enhanced tape (EETape) cartridges. It is functionally equivalent to the IBM 3490E device.

**9740 LSM**— *See* TimberWolf LSM.

**9840 Cartridge Subsystem**— A high performance tape transport for enterprise and open systems environments that reads and writes 9840 cartridges. 9840s can be defined in 10-drive and 20-drive panel configurations. The 9840 can perform as a standalone subsystem with a cartridge scratch loader attached, or it can be attached to a StorageTek ACS.

**T9840B**—The StorageTek cartridge transport that reads and writes T9840B cartridges.

**T9840C**— The StorageTek cartridge transport that reads and writes T9840C cartridges.

**T9940A**— The StorageTek capacity-centric cartridge transport capable of reading and writing 60GB T9940A cartridges.

**T9940B**— The StorageTek capacity-centric cartridge transport capable of reading and writing 200GB T9940B cartridges.

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