StorageTek™ Host Software Component (HSC)

VM software

System Programmer's Guide

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What's New With This Release?

HSC 6.1 includes the following enhancements and modifications:

Enhancement/Modification	Publication(s)/ Primary Locations
Revision B:	
Support for the SL3000 library.	***Installation Guide*** Chapter 2, Calculating DASD Space Chapter 6, SLILSM, SLIDRIVS macros Chapter 7, Storage Cell Capacity for StreamLine SL3000 Libraries Appendix B, Library Configurations ***Operator's Guide*** Chapter 2, CAPPref, DRAin, EJect, ENter, MODify, MOVe, RELease CAP, VIew commands ***System Programmer's Guide*** Chapter 2, Mixing Media Types and Recording Techniques Chapter 4, AUDIt , EJECt Cartridge, Initialize Cartridge utilities Appendix B, HSC Support for the SL3000 Library

Enhancement/Modification	Publication(s)/ Primary Locations
SL8500 library LSM partitioning.	***System Programmer's Guide*** Chapter 3, LMUPATH control statement Chapter 4, SET FREEZE utility Appendix A, HSC Support for the SL8500 Library ***Operator's Guide*** Chapter 2, Display ACS, Display LSM, and Display Exceptions ***Messages and Codes Guide*** New messages: • SLS0073I • SLS0695I • SLS4232I • SLS4412I • SLS4413I • SLS4643I Changed messages: • SLS0653I • SLS0663I • SLS1000I • SLS2008I • SLS4401I • SLS4407I • SLS4610I
Considerations for SL8500 library TCP/IP communications.	***System Programmer's Guide*** Appendix A, HSC Support for the SL8500 Library
Dual IP connections to an SL8500 library.	***System Programmer's Guide*** Appendix A, HSC Support for the SL8500 Library
Multiple connections to an SL8500 library (HSC 6.1 and later).	***System Programmer's Guide*** Appendix A, HSC Support for the SL8500 Library

Enhancement/Modification	Publication(s)/ Primary Locations
Support for T10000 drive encryption recording techniques and model types.	***System Programmer's Guide*** Chapter 2, T10000 Drive Encryption Chapter 3, VOLATTR control statement Chapter 4, EJECt Cartridge and Scratch Redistribution utilities ***Interface to Tape Management Systems Guide*** Chapter 3, MOUNT, QDRLIST, QSCRATCH, and SELSCR requests ***Operator's Guide*** Chapter 2, Display DRives, Display SCRatch, Display THReshld, EJect, Warn commands
Support for T9840D drives.	***Installation Guide*** Chapter 2, Unit Addresses Chapter 6, SLIDRIVS macro Chapter 12, External Media Requirements ***Operator's Guide*** Chapter 2, Display Drives, Display SCRatch, Display Mount, THReshld, EJect, Warn ***System Programmer's Guide*** Chapter 3, TAPEREQ, UNITATTR, VOLATTR Chapter 4, EJECt, SCRatch Redistribution ***Interface to Tape Management Systems Manual*** Chapter 3, MOUNT, QDRLIST, QSCRATCH, SELSCR requests

Enhancement/Modification	Publication(s)/ Primary Locations
Support for LTO generation 4 drives. **Note: LTO transports are not supported in an MVS environment.** These transports are recognized by the HSC but are accessible only to open systems clients using LibraryStation.	***Installation Guide*** Chapter 2, Unit Addresses Chapter 6, SLIDRIVS macro Chapter 12, External Media Requirements ***Operator's Guide*** Chapter 2, Display Drives, Display SCRatch, Display Mount, THReshld, EJect, Warn ***System Programmer's Guide*** Chapter 3, TAPEREQ, UNITATTR, VOLATTR Chaper 4, EJECt, SCRatch Redistribution Appendix H, MOUNT, QDRLIST, QSCRATCH, SELSCR
The SLILIBRY macro adds the FUTRACS parameter to allow new ACSs to be added to the library complex.	***Installation Guide*** Chapter 6, SLILIBRY macro
The SLILSM macro adds the TYPE=3000 and DOOR=3000 parameters for the SL3000 library.	***Installation Guide*** Chapter 6, SLILSM macro
The OPTion command DUPOFL parameter allows the duplicate VOLSER process to continue when the VOLSER being entered exists in an ACS that is disconnected or in an LSM that is offline.	***Operator's Guide*** Chapter 4, OPTion command
The LMUPATH control statement PARTID parameter defines a partition ID for an SL3000 or SL8500 library.	***System Programmer's Guide*** Chapter 3, LMUPATH control statement
The EJECt Cartridge utility SEQ parameter specifies whether or not CAP eject processing fills the CAP cells in the same order specified by the **VOLser** parameter.	***System Programmer's Guide*** Chapter 4, EJECt Cartridge utility
The LIST diagnostic command has been expanded with more control blocks and enhanced storage dump capability.	***System Programmer's Guide*** Chapter 5, LIST command

Enhancement/Modification	Publication(s)/ Primary Locations
Revision A:	
Support for SL8500 Near Continuous Operation (NCO). The main discussion is located in the *System Programmer's Guide*, Appendix A.	***Operator's Guide*** Chapter 2, MODify command ***Installation Guide*** Chapter 6, SLIACS Macro, FUTRLSM parameter ***System Programmer's Guide*** Chapter 2, Near Continuous Operation of the SL8500 Library Appendix B, HSC Support for Near Continuous Operation (NCO)
Appendix B, "HSC Support for the SL8500 Library," in the *Operator's Guide*, has been moved to Appendix A in the *System Programmer's Guide*. The following new topics are introduced: • verifying that SL8500 components are operational before configuring the HSC • merging ACSs • removing PTPs and splitting ACSs • HSC requirements prior to powering down an SL8500.	***System Programmer's Guide*** Appendix A, HSC Support for the SL8500 Library
The Display DRives operator command has added the BYDrive and BYLoc parameters. BYDrive displays drives by host device address; BYLoc displays drives by location.	***Operator's Guide*** Chapter 2, Display DRives command
The ENter command has added the TLSM parameter, which allows you to specify the LSM to receive entered cartridges.	***Operator's Guide*** Chapter 2, ENter command
The TRace command has added component names for allocation volume lookup and XML interface.	***Operator's Guide*** Chapter 2, TRace command
The TMI EJECT request adds a new parameter, SEQ, which specifies that an SL8500 CAP is either filled sequentially or by magazine/home location proximity.	***Interface to Tape Management Systems Manual*** Chapter 3, EJECT request
The Warn command threshold value has been increased from 9999 to 99,999.	***Operator's Guide*** Chapter 2, Warn command.

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 to be useful for reviewing or understanding HSC system concepts.

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

- VM operating system
- ACF/VTAM functions and principles
- VMFMERGE.

Organization of This Guide

This guide contains the following chapters and appendices:

- **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. Items and functions described include: installation tasks, initialization/termination, mount/dismount, volume/cell control, Cartridge Access Port (CAP) processing, recovery, control data set renaming, commands, utilities, LMU server, host-to-host communications, and tape management interface.
- **Chapter 3, "HSC Control Statements and HSC Start Procedure"** describes how to define parameter library (PARMLIB) control statements and how to start HSC execution.

- **Chapter 4, “Utility Functions”** describes control statement conventions for the utilities and presents an overview description, syntax, JCL requirements, JCL examples and a description of output for each utility. Example reports are shown for those utilities producing activity-type reports.
- **Chapter 5, “Problem Determination, Diagnostics, and Recovery”** provides overall diagnostic capabilities supported by the Host Software Component including tracing, dumps, and logging failures.
- **Chapter 6, “Performance Considerations”** contains details on utilities and other features that are available for use in refining overall library performance. Utility syntax and parameter descriptions are included.
- **Appendix A, “HSC Support for the SL8500”** describes issues specific to the SL8500 library.
- **Appendix B, “HSC Support for the SL3000 Library”** describes issues specific to the SL3000 library.
- **Appendix C, “HSC Support for Near Continuous Operation (NCO)”** provides procedures for dynamic hardware reconfiguration of the SL8500 library, tape drives, and expansion panels.
- **Appendix D, “Macros, Control Statements, Utilities, and Commands Syntax Reference”** is a reference section containing: syntax conventions, LIBGEN macros, parameter library (PARMLIB) control statements, utilities, and operator commands.
- **Appendix E, “CP Commands and DIAGNOSE Codes”** lists all CP commands and DIAGNOSE codes that may be issued by the VM HSC.
- **Appendix F, “Record Formats”** contains record layouts for control data set records, SMF records, and LOGREC records.
- **Appendix G, “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 H, “Remote-linked Libraries”** presents typical remote-linked library configurations, programming considerations, and operational considerations.
- **Appendix I, “Batch Application Program Interface (API)”** explains how to retrieve CDS library element information in batch mode.

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 Sun 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 Installation 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

For purposes of convenience, the HSC Release 6.1.0 product is referred to as HSC 6.1 throughout all guides of the HSC documentation set.

Related Publications

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.

- *Installation Guide*
- *Operator's Guide*
- *System Programmer's Guide*
- *Interface to Tape Management Systems*
- *Messages and Codes Guide*
- *SCP Messages and Codes Guide*

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 Sun StorageTek Partners site is a Web site for partners with a Sun StorageTek Partner Agreement. This site provides information about products, services, customer support, upcoming events, training programs, and sales tools to support Sun 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 Sun StorageTek resellers.

The URL for the Sun 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 Sun 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.storagetek.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

Automated Cartridge System Overview

The Sun 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 four major elements:

- **Host Software Component (HSC)—** functions as the interface between the host operating system, and if applicable, a tape management interface (TMI).
- **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 3000)
  - 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 (3000) contains 2, 13-cell removable magazines in each CAP. This library allows up to 12 CAPs.
- 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:

- assisting the tape management system in device allocation
- processing mount and dismount requests
- 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 processing a mount or dismount request from the tape management system, 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 that executes in various environments including a standard class G virtual machine. The HSC contains the following components:

- **External Components** — External components interface with other virtual machines, 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 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 data base server, the LMU server, the WTO component, and the address space communications server.

HSC Architecture

Note: In this discussion, address space refers to a virtual machine.

Figure 1 on page 5 displays external components located in the user's address space on the left side, and other HSC components located in the HSC's 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 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's address space.

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

Operator Command component
The operator command component receives control from other virtual machines to process an HSC command or to call upon services in the HSC.

Batch Utilities external component
The utility component exists mostly within the service machine. However, a few utilities execute in the invoker's CMS virtual machine.

Tape Management Interface external component

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

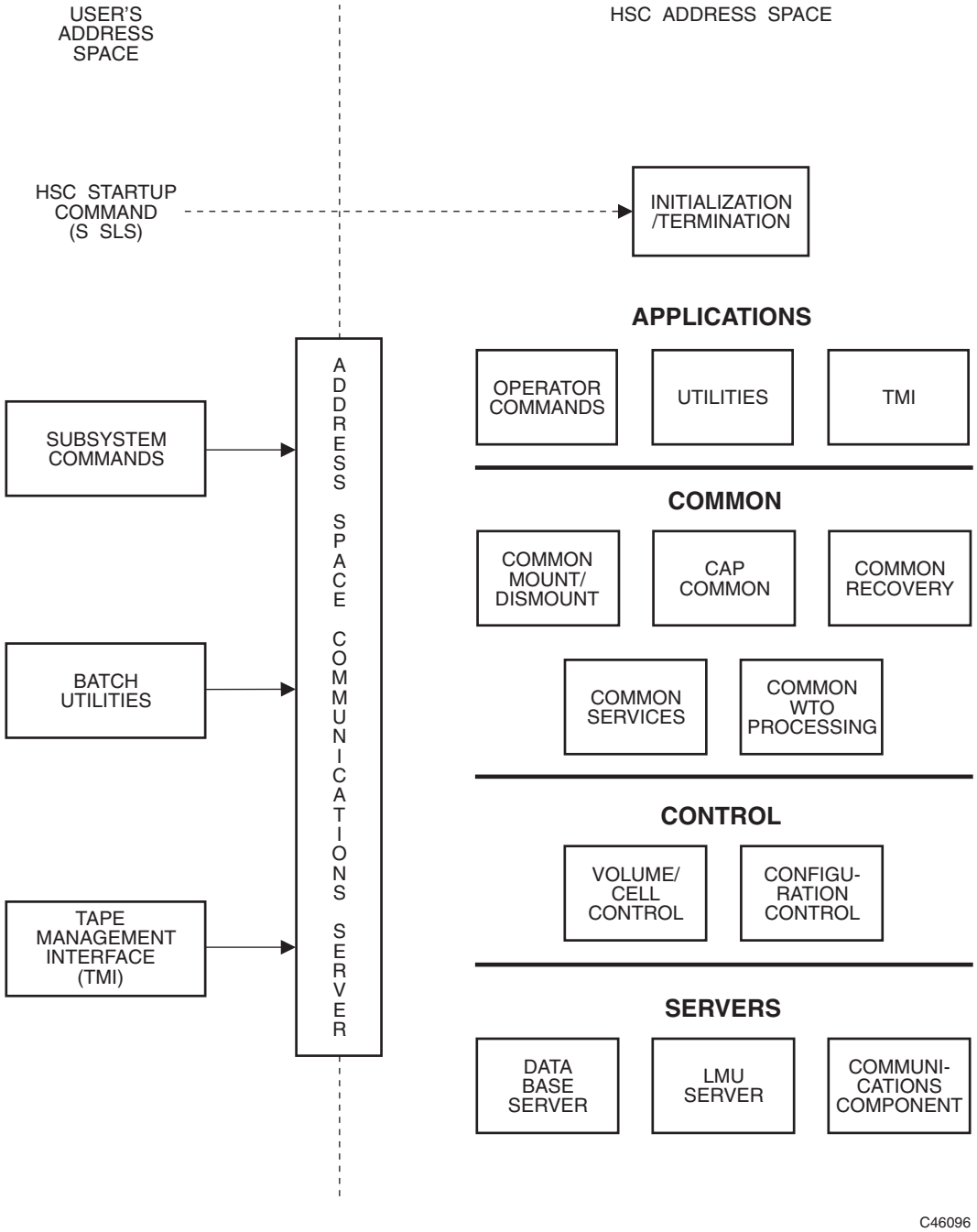


Figure 1. HSC Architecture

VM Environment

The VM version of the HSC product is the implementation of the ACS Host Software Component (HSC) product on VM. The principal interfaces and components under VM are:

- VM Operating System (CP and CMS)
- The System Control Program (SCP)
- The Host Software Component (HSC)
- The tape management system (TMS)
- Operators and utility users.

VM Operating System (CP and CMS)

VM HSC requires relatively few system services. The VM system services that are used are:

- Spool files
- Inter-User Communications Vehicle (IUCV)
- IUCV-based services *MSG and *BLOCKIO
- Diagnose
- RSCS
- VMDUMP Storage Dumps
- Interactive Problem Control System (IPCS) for VM/SP, or Dump Viewing Facility for VM/XA and VM/ESA
- CMS (at initialization only).

CMS

The first portion of the SCP initialization process is executed under CMS. During this time various files are read and some control data set locations are noted for reference. After the program modules have been loaded into storage and the major control blocks have been created, CMS is replaced by the SCP.

System Control Program (SCP)

The service virtual machine executes a proprietary System Control Program which provides a small subset of MVS services that include the following major components:

- Storage management
- Device management
- File management
- Task management
- Job management
- Processor management
- Communication
- Inter-machine communication
- Task recovery/termination.

Storage Management

The storage managed by the SCP is a single ‘‘real’’ storage range; no virtual storage management is performed. The maximum amount of storage that is available to a user is 16 megabytes, but in actual practice 8 megabytes may be sufficient. Any paging or page faults are managed by VM and are transparent to the virtual machine. The SCP associates storage keys with ‘‘JOBS’’. VM job steps are mapped to unique storage keys. Storage Management is a matter of managing available storage and allocating and deallocating storage through standard macro calls.

Device Management

This component has exclusive control over SCP driven I/O activity to virtual devices. IUCV is the interface to the DASD data sets which are accessed through requests to the CP BLOCKIO service (using device I/O mainly for the Reserve-Release mechanism). Other devices include several spool files for console, diagnostic, and performance logs, and DASD I/O for minimal use. Also included with this component is the function of logging unsuccessful attempts to log errors to the Error Recording Data Set (ERDS).

File Management

The SCP supports several access methods:

- Sequential (BSAM/QSAM) for spooled unit record input/output and DASD input/output
- Direct (BDAM) for data base manipulation.

BSAM/QSAM is supported through EXCP processing of channel control word (CCW) chains. BDAM files are accessed through IUCV communication to CP DASD BLOCKIO. The requests are converted from a relative block to a physical block on DASD which is passed to BLOCKIO.

No DASD file allocation is performed. All DASD data sets must be preallocated OS-format data sets or CMS ‘‘reserved’’ minidisks.

Task Management

Multi-tasking is provided by the SCP to support the MVS-type task requests such as POST, WAIT, ATTACH, etc. that the HSC expects. All modules are made resident at the time of initialization. Also included in this component is the processing of System Management Facility (SMF) records for output to a spool file.

Job Management

Most utilities are executed within the SCP environment as batch jobs punched by other virtual machines. Special job statements define both the resources to be used and the parameters to be passed to the desired program.

Processor Management

This component handles the resources of the virtual processor, including:

- interrupt handlers
- timer management
- IUCV paths and messages
- event tracing.

This component also handles authorization checking and PSW mode changing. Interrupts consist of common processing, a first level handler which usually sorts out the interrupt subtypes, and a second level handler which does the bulk of the processing. Timer services include the TOD clock, the TOD clock comparator, and the CPU timer. Tracing includes an internal table and a task which writes records to a spool file.

Communication

Standard MVS-type WTO/R and related operator communications are also supported, with limitations on the routing and descriptor codes. The QEDIT interface, ECBs, and various queues provide for inter-task communication.

Inter-Machine Communication

The Inter-User Communication Vehicle (IUCV) is a closed-loop technique used in VM to communicate between users. A user sends an IUCV message and waits for a reply. This service is used to transfer data between the HSC and the TMS.

Additionally, IUCV is used to access the BLOCKIO and MESSAGE system services. The message service (*MSG) is used to intercept SMSG communications from operators.CP DASD BLOCKIO forms the foundation of the SCP BDAM access method. BLOCKIO reads and writes data to any DASD device with device independence, but the SCP must be aware of the device type, especially when the data set is shared with an MVS host.

Task Recovery/Termination

Task recovery is concerned with resource recovery, possible retry operations, and the logging of software-detected errors. Terminations can be considered a special case of recovery where resources must still be recovered but no retry or logging is necessary. The SCP supports the most common ESTAE and ESTAI options and major SDWA fields. Recovery includes a disabled and enabled (scheduled task) mode. The resources being recovered are files to be closed, storage to be released, tasks to be terminated, and messages and scheduled interrupts to be cancelled.

Host Software Component (HSC)

The HSC runs as an application program in the SCP environment. The HSC source code is compiled by Sun StorageTek.

The HSC accepts requests from the tape management interface (TMI) (see "Tape Management System (TMS)" below) and drives the library hardware.

Tape Management System (TMS)

The TMS uses the IUCV interface to communicate with the virtual machine. It provides a front end between the HSC and the user, and provides allocation, mount, and scratch pool services. The HSC provides the TMS with mount/dismount service and assists it in allocation for those volumes and drives which are under library control.

Note: In this document ''TMS'' is used to refer to any tape management system and not any particular product.

Operators and Utility Users

Operators use CP SMSG to communicate with the SCP via the CP Message System Service (*MSG). Utility users communicate with the SCP via punch spool files containing special control statements. The authorization services allows only specified users to access either of these interfaces; unauthorized users are disconnected from the service machine when any attempt is made to communicate with the subsystem.

Virtual Machine Configuration

Within a VM host system the following virtual machines (users) exist:

- operator(s)
- ACS service machine (SCP and HSC)
- TMS service machine
- administrator(s)
- TMS requestors.

Various illustrations are provided to show relationships. Figure 2 on page 11 illustrates the relationship of users to each other and the virtual machine and hardware relationships.

Figure 3 on page 12 illustrates how the library data sets may be shared by multiple, dissimilar host systems.

HSC and Automated Cartridge System Interaction

After the HSC is started and the tape management system (TMS) service machine has begun a dialog, mount or dismount requests are processed from the TMS, 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 4 on page 14 shows that it is necessary to share the control data set between all hosts requiring access to the library.

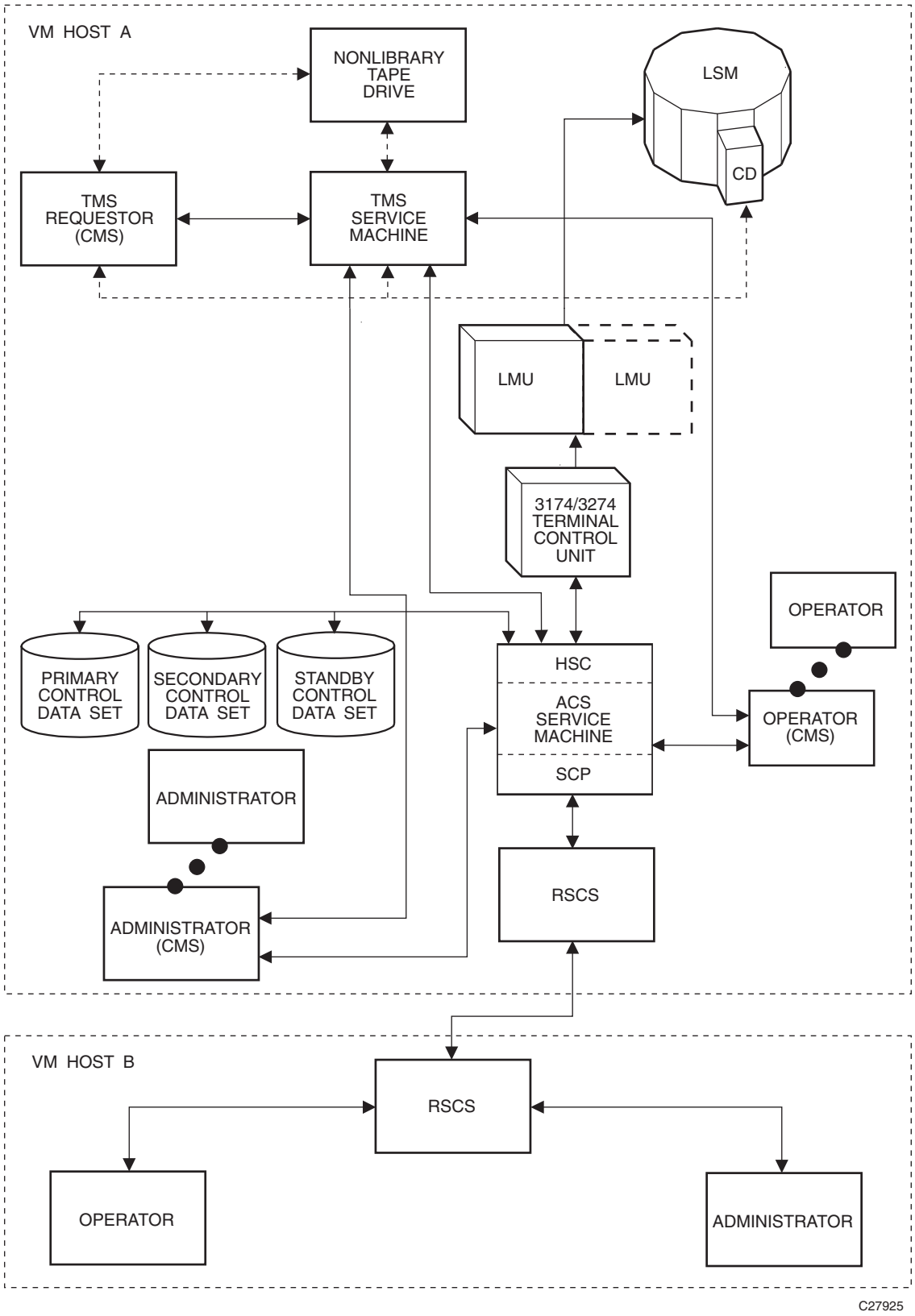


Figure 2. Virtual Machine Relationships

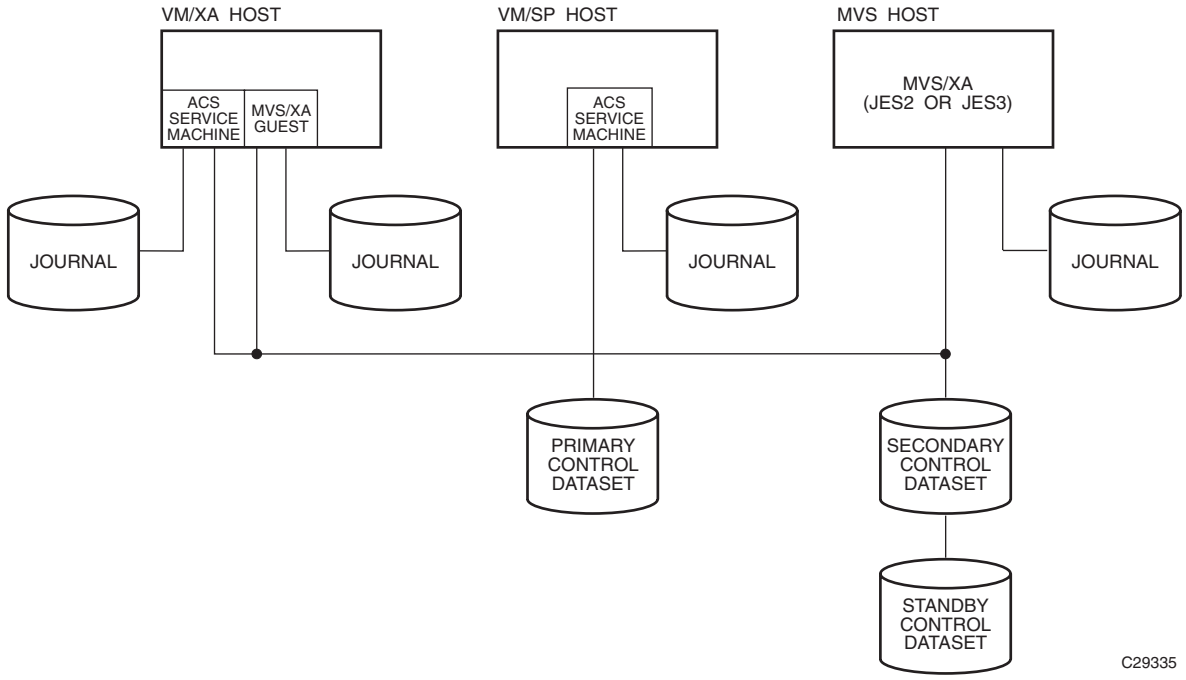


Figure 3. Shared Library Data Sets

Automated cartridge mounts/dismounts are performed in response to calls to the tape management 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 4 on page 14 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.

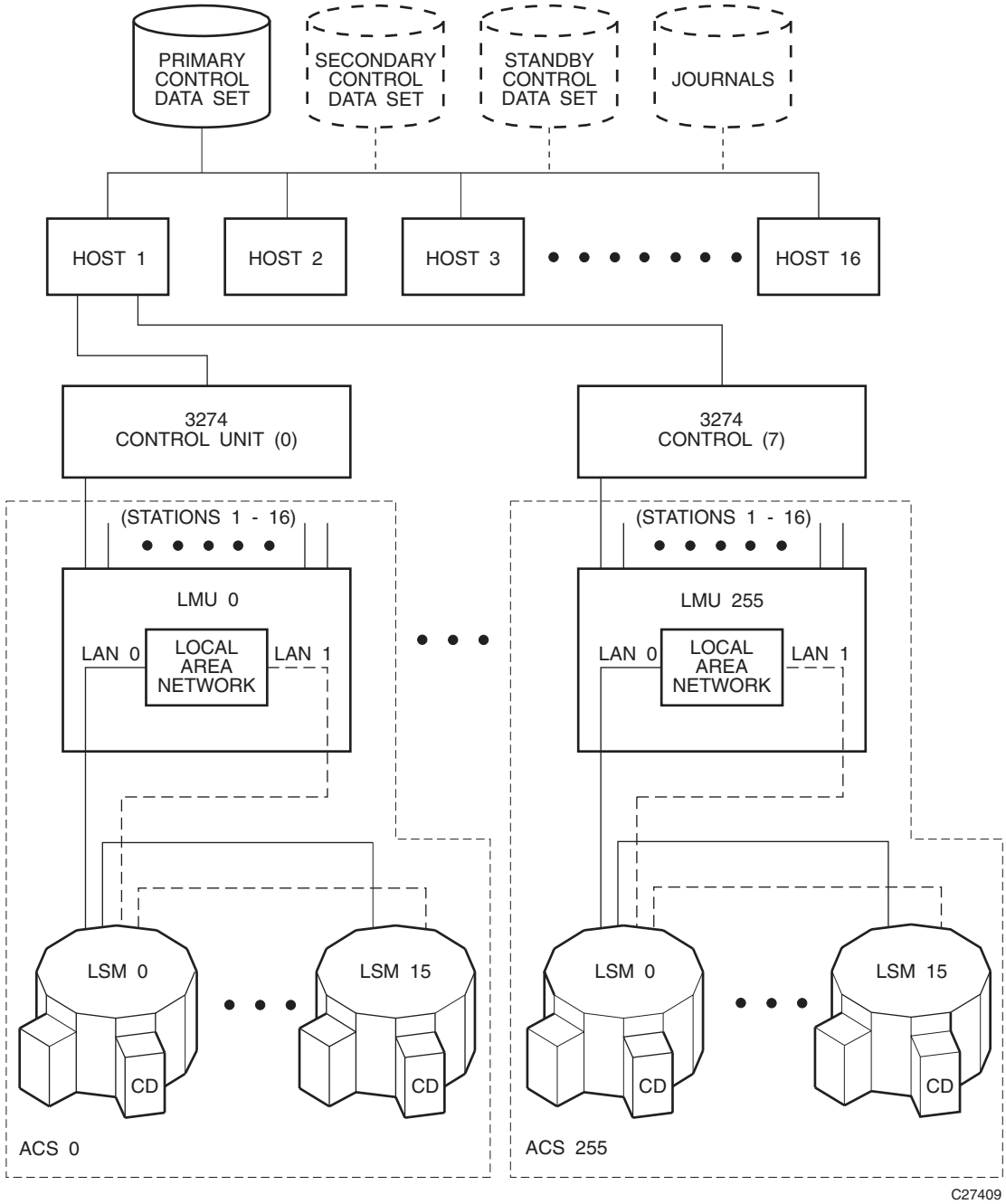


Figure 4. HSC/Automated Cartridge System Interaction

In a library configuration containing more than one LSM, if a cartridge exchange 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 about the MNTD Float command, refer to “Commands, Control Statements, and Utilities” in the *HSC 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 about the MNTD Float command, refer to “Commands, Control Statements, and Utilities” in the *HSC 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, and PARMLIB control statements 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 "Creating the Library Configuration File (LIBGEN)" in the *HSC Installation 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.

PARMLIB Control Statements

PARMLIB control statements are provided to enable you to set initial values for system functions at HSC initialization. The PARMLIB control statements define HSC functions such as:

- host-to-host communications parameters
- definition of scratch subpools

Note: Refer to "Options Offered by PARMLIB Control Statements" on page 80 for an important warning about defining scratch subpools.

- data set definitions including: the primary, secondary, standby control data sets, and journals
- extended parameter list for startup.

Refer to "PARMLIB Control Statements" on page 79 for detailed information about the 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 the *HSC Operator's Guide* for information about HSC operator commands and usage.

Chapter 2. Host Software Component Functions

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 4. Not all of the components of the architecture structure have functions directly visible to you. Only those HSC functions that you can control or those that are operationally apparent are described in this chapter.

System functions relating to HSC architecture components represented in Figure 1 on page 5 include:

- installation
- initialization/termination
- mount/dismount processing
- volume/cell control
- CAP processing
- common recovery
- renaming control data sets
- command
- utility
- LMU server
- communications
- tape management interface (TMI)
- 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 cartridges
- Cartridge Access Port processing to allow the operator to enter or remove cartridges
- tape management system assistance
- 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
- 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
- PARMLIB control statements
- operator commands.

Installation Functions

Installation functions pertain to installation or reconfiguration processing for the HSC subsystem. Since these topics are extensive, they are presented in a separate document. The *HSC Installation Guide* presents detailed information about installation planning and instructions, including:

- Planning the configuration
- Performing preinstallation procedures
- Installing HSC software
- 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
- Migration planning
- Performing library modifications.

Initialization/Termination Functions

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

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 specifying the BASE parameter in the startup SLKJCL file. Refer to “Initializing the HSC to the Base Service Level” on page 129 for more information about HSC startup.

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 21 indicates which commands have complete functionality at the base service level.

Table 2 on page 22 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 the tape management 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 and abnormal termination through abends removes the service level structure and services.

For example, 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. Refer to ‘‘Adding SMF Parameters’’ in the *HSC Installation Guide.*

Conversely, you can change the base service level operation to full service level.

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

Command	Service Level Execution	
	Base	**Full**
CAPPref	NO	YES
CDs	YES	YES
CLean	NO	YES
COMMPath	YES	YES
DISMount	NO	YES
Display	YES*	YES
DRAin	NO	YES
EJect	NO	YES
ENter	NO	YES
Journal	YES	YES
LIst	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
SWitch	NO	YES
TRace	YES	YES
TRACELKP	YES	YES
Vary	NO	YES
VIew	NO	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

Utility	Service Level Execution	
	Base	Full
AUDIt	NO	YES
BACKup	YES	YES
EJECt	NO	YES
ENTEr	NO	YES
LIBGen	YES	YES
MOVe	NO	YES
OFFLoad	YES	YES
REPLaceall	YES	YES
RESTore	NO	NO
SCRAtch	YES	YES
SCREdist	NO	YES
SET	YES	YES
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 information presented on the Display command in “Commands, Control Statements, and Utilities” in the *HSC 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 specifying the BASE parameter in the startup SLKJCL file. Then, the Service Level (SRVlev) command can be used to bring the HSC to full service level whenever you are ready.

Refer to “Initializing the HSC to the Base Service Level” on page 165 for information about setting the service level at HSC initialization.

Media Type and Recording Technique Processing

When a job requests specific media type and recording technique, the HSC uses information provided by TAPEREQ control statements to select a cartridge with the appropriate media type and influence the tape management system to allocate a transport with the requested recording technique.

MEDia and RECtech Parameters

When a TMI request or MOUNT command is executed, the HSC searches the appropriate control statements to determine the media type and recording technique to assign to the data set.

The 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 5 on page 28.

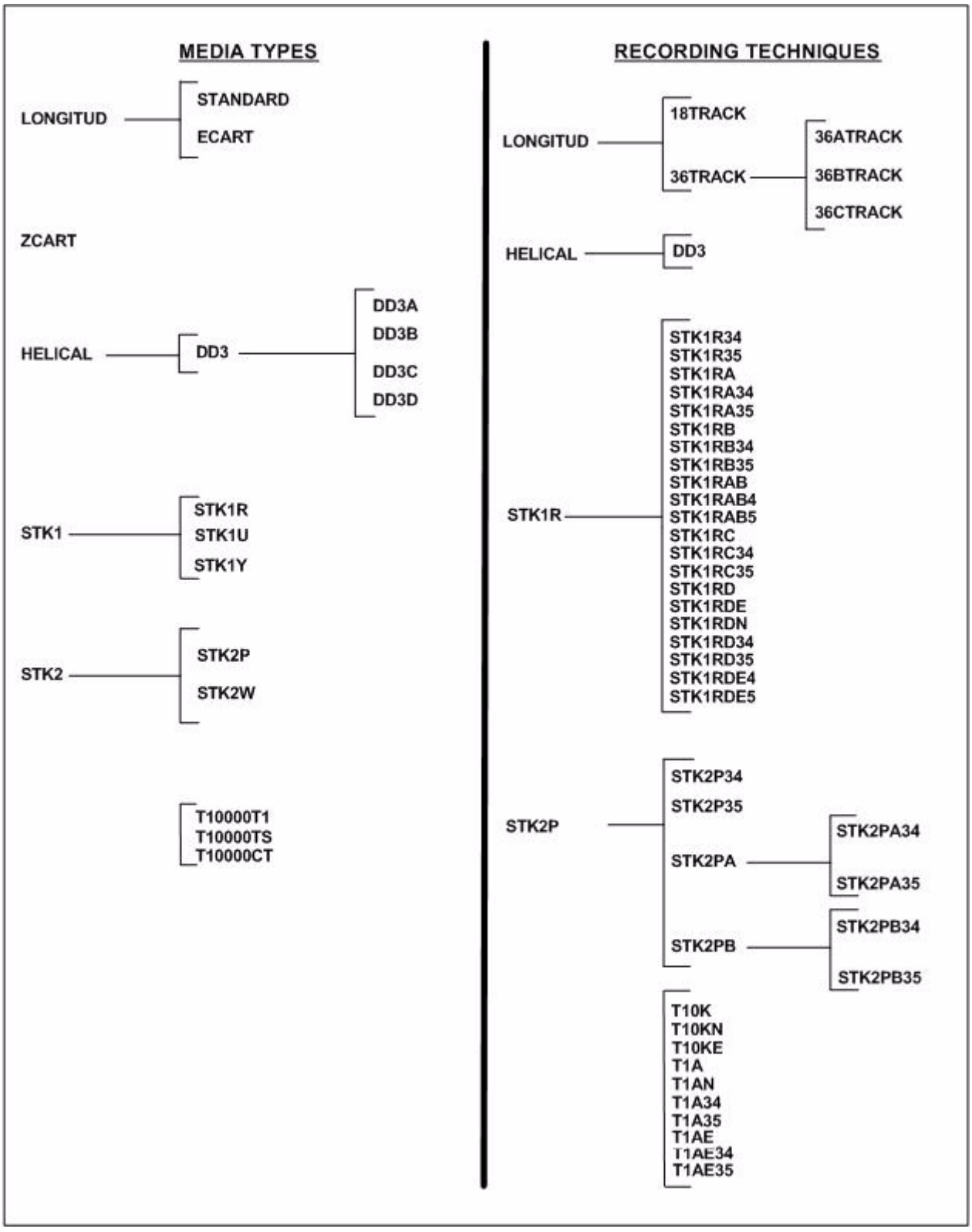


Figure 5. MEDia/RECtech Hierarchy

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 3 shows the relationship between MODel and RECtech parameters.

Table 3. MODel/RECtech Translation

MODel	Resulting RECtech
4480	18track
4490	36Atrack
9490	36Btrack
9490EE	36Ctrack
SD3	DD3
9840	STK1R34
984035	STK1R35
T9840B	STK1RB34
T9840B35	STK1RB35
T9840C	STK1RC34
T9840C35	STK1RC35
T9840D	STK1RD34
T9840D35	STK1RD35
T9840DE	STK1RDE4
T9840DE5	STK1RDE5
T9940A	STK2PA34
T9940A35	STK2PA35
T9940B	STK2PB34
T9940B35	STK2PB35
T1A	T1A34
T1A35	T1A35

Matching VOLATTR and TAPEREQ Statements

The type of request (specific or nonspecific) determines whether the HSC uses media type and recording technique information from the VOLATTR statement or the TAPEREQ statement. (See “Precedence of VOLATTR and TAPEREQ Statements” for additional information.)

The statements are searched until matches are found for both the media type and recording technique. The first control statement that matches the selection (input) criteria is used; there is no attempt to determine the ‘‘best’’ match.

Since MEDia and RECtech parameters may or may not be specified on a single TAPEREQ or VOLATTR control statement, one of the following conditions results:

- Both media type and recording technique are provided by one control statement.
- Media type is provided by one TAPEREQ statement and recording technique is provided by another TAPEREQ statement.
- Media type is provided by one VOLATTR statement and recording technique is provided by another VOLATTR statement.
- Media type is provided by a VOLATTR statement and recording technique is provided by a TAPEREQ statement.
- Media type is provided by a TAPEREQ statement and recording technique is provided by a VOLATTR statement.

As a result of determining the precedence of media and recording technique information between the VOLATTR and TAPEREQ statements, ‘‘final’’ media type and recording technique values are produced. The final media type and recording technique are compared to the aggregate media type and recording technique of the EDL. If an inconsistency is detected, a message is issued to this effect, and the media type and recording technique of the EDL are used. If the final media and recording technique are consistent with the EDL, they are used to satisfy the request, unless doing so would cause the job to fail.

Sun StorageTek recommends placing all control statements in a most specific to least specific order. Very general VOLATTR or TAPEREQ statements should be placed last to act as a global or site defaults.

Precedence of VOLATTR and TAPEREQ Statements

The precedence of VOLATTR and TAPEREQ statements depends on whether the request is for a specific or nonspecific volume.

Specific Volume Requests

For a specific volume request, VOLATTR information overrides TAPEREQ information provided that the VOLATTR statements supply both media type and recording technique.

For example, if the TAPEREQ statement specifies MEDia(ECART) RECtech(36track) and the VOLATTR statement specifies MEDia(Standard) but does not specify RECtech, the result is MEDia(Standard) from the VOLATTR statement and RECtech(36track) from the TAPEREQ statement.

If the VOLATTR statement provides a value for RECtech, then that recording technique is used, but the TAPEREQ statement can ‘‘refine’’ the RECtech value. For example, the VOLATTR statement specifies a recording technique of 36track, and the TAPEREQ statement specifies 36Btrack, then 36Btrack is used.

Nonspecific Volume Requests

Note: When mixing media types, the user must define VOLATTR statements because scratch counts are determined entirely from VOLATTR information.Accurately defined VOLATTR statements are critical for correct processing of nonspecific volume requests.

The HSC analyzes the TAPEREQ information to determine the required media type and recording technique, and then tries to locate available scratch volumes in the library that match these values. If no matching scratch volumes are available, HSC rejects the request.

Scratch Selection

Scratch volumes are segregated by means of scratch subpooling with VOLATTR statements. Assuming that requested subpool definitions do not conflict with the applicable VOLATTR statements, the HSC provides the following services to satisfy a request:

- If scratch volumes are segregated by defining subpools and specifying VOLATTR statements, the HSC ensures that a volume with the appropriate media type is selected from the correct subpool.
- If scratch volumes are segregated only by defining subpools, the HSC selects a standard cartridge from the correct subpool. A standard cartridge is selected because this is the default when VOLATTR statements are not defined.
- If volumes are segregated only by specifying VOLATTR statements, the HSC ensures that a volume with the appropriate media type is selected.

How To Resolve Scratch Shortages

Whenever the HSC cannot satisfy a library mount request for a scratch cartridge, the following message is issued:

```
... SHORTAGE ACS AA; MMMMMMMM; RRRRRRRR; SSSSSSSS; ...
```

This indicates that one of the following has occurred:

- there are no scratch cartridges in the ACS
- there are no scratch cartridges in the requested subpool in the ACS
- there are no scratch cartridges of the requested media type or recording technique in the ACS
- there are no scratch cartridges of the requested media type or recording technique in the requested subpool in the ACS.

The message identifies the media type (MMMMMMMM), recording technique (RRRRRRRR), and subpool (SSSSSSSS) of the scratch shortage.

Note: If the subpool name indicates “SUBPOOL 0”, this means one of the following:

- scratch subpooling is in effect and no subpool was specified
- scratch subpooling is not in effect.

If the recording technique specified in the request is 18-track, then the media type must be standard capacity with a recording technique of 18track, LONGItud, or not specified. If the recording technique specified in the request is 36-track, examine the TAPEREQ statements to determine if the requested media must be:

- Standard and 36track
- Long and 36track
- Standard and LONGItud
- Standard and no recording technique specified.

Notes: If the default VOLATTR specifies MEDia(Standard) RECtech(18track), then scratch volumes defined as MEDia(Standard) and no recording technique specified cannot be mounted on a 36-track device.

If a scratch volume is requested from a specific subpool, then a scratch cartridge of the requested media type must be entered into that subpool in the ACS.

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 Sun StorageTek media (e.g., ECARTs) belong to domain “0”; non-legacy media belong to other domains as defined in Table 4.

Table 4. 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.

Mount/Dismount Functions

Mount and dismount functions consist of the following processing:

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

The mount/dismount component receives the request sent by the tape management interface component and makes the mount/dismount of cartridges occur.

Each mount/dismount function is described in this section.

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

Mount Processing for Specific Volumes

The HSC determines when a library volume is to be mounted on a library-controlled transport. It 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 tape management system (TMS) interpreting a request for library transports
- issuance of the HSC operator Mount command
- change of the HSC from base service level to full service level
- startup of an HSC subsystem
- 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 tape 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 the TMI.

In addition, other means are available for controlling scratch volume activity. These are at the operator command and programmer utility levels. Refer to “Scratch Subpool Management” on page 46 for more information.

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. The Scratch Update function accepts a list of volume serial numbers for addition to, or deletion from the control data set’s list of scratch volumes. If desired, the entire scratch list may be deleted by using the Scratch Update utility.

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:

- a tape management interface request identifying library transports, or
- issuance of the HSC operator DISMount command
- the completion of a clean operation.

The MNTD Float command is useful for influencing cartridge exchange 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 SCRDISM parameter allows scratch volumes mounted in a WolfCreek LSM to be archived either in the same WolfCreek LSM or in the next largest storage device (the 9310 LSM).

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 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.

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” for information about utilities that can be used to control HSC operation of the library. Refer to the *HSC Operator’s Guide* for information about operator commands that can be used for controlling library operation.

Abnormal Mounts/Dismounts

The HSC handles abnormal situations through communication with the operator so intervention may take place to accomplish the mount. The following examples indicate the types of situations in which this communication takes place:

- The transport is in an ACS, but the volume is not. The HSC issues a WTOR.

  The operator may:

  - reply that the mount request is to be ignored and the TMS request is canceled
  - reply that the volume is to be permanently entered into the library
  - reply that the volume is to be temporarily entered into the library
  - enter the volume and the HSC automatically retries the volume lookup.

- The volume and/or transport resides in a manual mode LSM.

  - All mount and dismount requests are queued until either a response is made to one of the manual mode WTORs or the LSM is returned to automatic mode. At this point, all queued requests are processed.
  - A console interaction (WTOR) is provided to indicate the VOLSER’s location.
  - When a transport’s LSM is in manual mode or the robotic control path to the LSM is inoperative, operator intervention is requested to assist in performing the mount.
  - When the transport being dismounted is in a manual mode LSM, the operator is requested to dismount the cartridge and to remove it from the LSM. The volume is deleted, or the operator may be asked if the volume is to be deleted, from the control data set.

    The volume may be deleted from the control data set depending on the setting of the MNTD command. A delete occurs unconditionally if MNTD Dismount(Auto) is entered. Otherwise, a reply is required.

- The TMS is unsatisfied with the scratch cartridge provided.
  - The HSC dismounts the current volume, removes it from the scratch list, and mounts another scratch volume.

Virtual Thumbwheel (VTW)

Virtual thumbwheel is the HSC function that allows read-only access to a cartridge in an ACS. Normally cartridges are stored in the library with the physical cartridge thumbwheel enabled for writing. There are circumstances where it is desirable to allow enforced read-only access to a volume without removing the volume from the LSM, changing the physical thumbwheel, and reentering it.

The HSC may, via the VM HSC Tape Management Interface (TMI) or by operator command, cause a volume to be mounted while instructing the transport to allow read-only access to the volume by simulating that the thumbwheel is in a read-only state. In this virtual thumbwheel mode, the transport ignores the fact that the volume might be physically enabled for writing.

The transport never writes on a cartridge that is physically write-protected.

Tape Management Interface

The TMI utilizes virtual thumbwheel when the PROTECT parameter is specified with MOUNT requests. Refer to the *HSC Interface to Tape Management Systems Manual* for interface details.

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 VOLØØ1,BØØ,,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.

Refer to the *HSC Operator's Guide* for details on the HSC Mount command.

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 37 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 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 JES2 installation unless library transports are allocatable only by some hosts. In a JES3 environment, most mounts are done by the global processor and auto-cleaning should be set on for at least the global processor.

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 HSTA
```

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 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 volser. All cartridges identified with that prefix make up a pool of cleaning cartridges in each LSM.

The parameter CLNPRFX, contained in the LIBGEN SLILIBRY macro, specifies the volser 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 Installation 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. Longitudinal transports must be cleaned with longitudinal cleaning media, RedWood transports must be cleaned with helical cleaning media (DD3D), and 9840 transports must be cleaned with 9840 cleaning media (STK1U).

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
T9840A, T9840B, T9840C, T9840D	STK1U (T9840A, T9840B, T9840C), STK1Y (T9840D)
T9940A, T9940B	STK2W

Notes:

1. Different cleaning cartridge media types may have different maximum cleaning usage limits. Grouping cleaning cartridges of different media types into different volser 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 Sun StorageTek Customer Services Engineer for appropriate MAXclean values for different cleaning media types.

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 surface 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 surface is completely used up or exhausted and can no longer be used for cleaning. When the HSC detects a spent cleaning cartridge, it will not be mounted on a transport 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-use 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-use (over-limit or spent), 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.

Two methods that may 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
- 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.

You can effectively manage your scratch subpools by several available means. These include:

- **Defining subpool information in a PARMLIB control statement —** Scratch subpools can be defined using the Scratch Subpool (SCRPOol) PARMLIB control statement.

  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 80 for detailed information on how to implement scratch subpooling using the SCRPOol control statement. (The syntax for the SCRPOol PARMLIB control statement is also shown in Appendix D, “Macros, Control Statements, Utilities, and Commands Syntax Reference”.)

- **Defining subpool information using the TMI** — Refer to the *HSC Interface to Tape Management Systems Manual* for more information.

- **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 D, “Macros, Control Statements, Utilities, and Commands Syntax Reference”.

  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
  - ENTEr utility
  - EJECt utility.

Refer to “Commands, Control Statements, and Utilities” in the *HSC Operator’s Guide* for detailed information about operator commands and to Chapter 4, “Utility Functions” 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 “Commands, Control Statements, and Utilities” in the *HSC 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 or ENTEr utility
- 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, cartridge exchanges, etc.

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 Tape Management Interface (TMI). Refer to the *Interface to Tape Management Systems Manual*.

Operator commands and detailed instructions for controlling CAP processing functions are described in the *HSC 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 command, SENter command, or ENTer utility 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 "Operating an Automated Cartridge System" in the *HSC 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 "Operating an Automated Cartridge System" in the *HSC 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 "Operating an Automated Cartridge System" in the *HSC Operator's Guide* for more details.

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 “Commands, Control Statements, and Utilities” in the *HSC Operator’s Guide* for detailed information about the RELease CAP command.

Near Continuous Operation (NCO) Support

Near Continuous Operation (NCO) support for the HSC 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.

Two kinds of NCO operations are discussed:

- dynamic hardware reconfiguration for the SL8500 library
- common NCO for all library types.

Where to Find NCO Information

Procedures to accomplish dynamic reconfiguration tasks are discussed in Appendix C, "HSC Support for Near Continuous Operation (NCO)" on page 585.

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 Model Types

When you physically upgrade or change tape transports, a mismatch can occur between the model types stored in the CDS and the updated model types specified in the UNITDEF command. If this situation arises, you receive an error message:

```
SLS1628I UNITDEF: Record 1 ...MODEL is incompatible with UNIT
```

Follow this procedure to avoid the problem:

1. Terminate the HSC on all hosts by issuing the VM STOP command.
2. Physically replace the tape transports.
3. Run the SET SLIDRIVS utility to omit the device numbers being replaced. It is only necessary to specify the device numbers being replaced, not all device numbers on the panel. Example:

   ```
   SET SLIDRIVS(,,,,,,2307,2308,2309,230A),FORLSMID(0000),FORPANEL(01)
   ```

4. Run SET SLIDRIVS again to add the device numbers back in. This action clears the model type in the CDS and allows the UNITDEF command to load at HSC startup. Example:

   ```
   SET SLIDRIVS(2301,2302,2303,2304,2305,2306,2307,2308,2309,230A),+
       FORLSMID(0000),FORPANEL(01)
   ```

5. Update the UNITATTR statements to reflect the new model type.
6. Start the HSC on one host by executing the HSC start procedure.
7. When the HSC reaches the full service level, start the HSC on all remaining hosts.

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 Installation 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.

Refer to “PARMLIB Control Statements” on page 79 for detailed information about PARMLIB control statements.

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 "Commands, Control Statements, and Utilities" in the *HSC 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.

When HSC systems are running, the assignment 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. Backup 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 VM, TSO ISPF, 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 212 for details on the BACKup utility.
3. Rename the control data sets using standard VM or TSO ISPF 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 286 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 6 illustrates the specific areas within a library where HSC commands enable you to control processing.

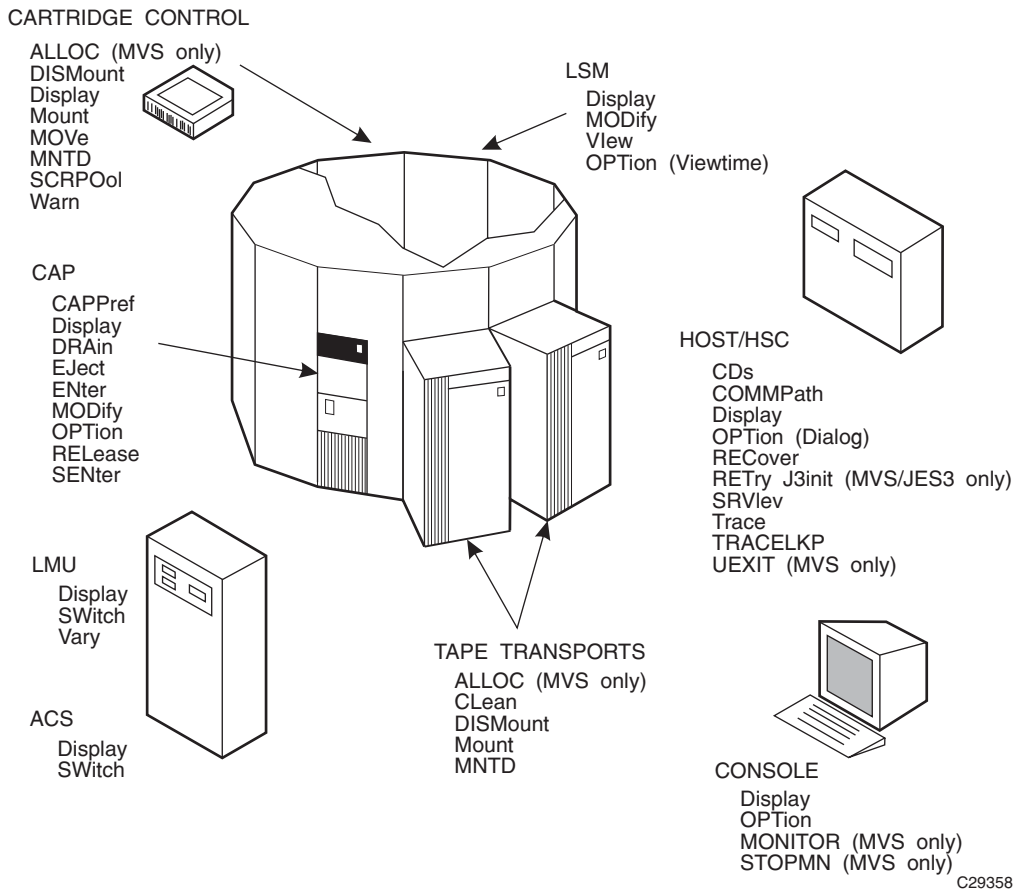


Figure 6. HSC Command Functions Overview

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: Sun StorageTek strongly recommends that you do not place SL3000 and SL8500 libraries in manual mode. To use manual mode, all LSMs in the SL3000 or SL8500 must be offline, and that means all CAPs and drives are unavailable for automated operations.

Additionally, SL3000s and 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 *SL3000* or *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.

Refer to the *HSC Operator's Guide*, "Managing Library Resources," for procedures describing how to operate an LSM in manual or automatic 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 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

If you should 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 a model 4410 (Cimarron) or 9310 (PowderHorn) LSM. A 9360 (WolfCreek) LSM requires an optional vision system. **The SL3000 and SL8500 libraries do 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. The *HSC Operator's Guide*, "Commands, Control Statements, and Utilities," describes 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 VIew command. Refer to Appendix F, "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 7 illustrates the control concept provided by the various HSC utilities.

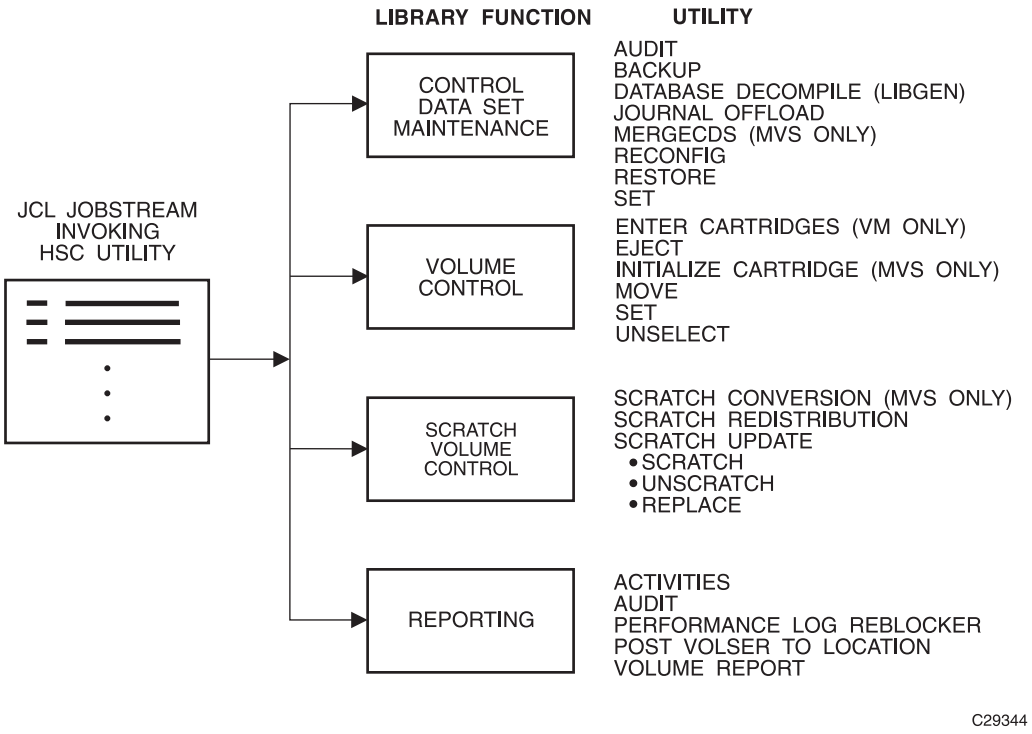


Figure 7. Utility Functions Overview

Refer to Chapter 4, “Utility Functions” 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 an outstanding message. 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 Messages and Codes Guide* 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 re-driven 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 4 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 Sun 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 225 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)
//STEPØ   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 primary CDS
//SLSCNTL2  DD DISP=SHR,DSN=SLS.DBASE2
//SLSIN     DD *
  SET SLISTATN(ØCD,ØCE,ØDØ,ØD1) FORACS(Ø) FORHOST(HST1)
  SET SLISTATN(ØCD,ØCE,ØDØ,ØD1) FORACS(Ø)
//
```

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:

   - 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 Utility Sample Output” on page 230 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 Operator's Guide*.

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

- security administration considerations
- recovery maintenance requirements
- HSC port number assignments
- multiple TCP/IP stack implications
- transitioning between 3270 and TCP/IP
- recovering TCP/IP communications
- configuring VM for TCP/IP support.

Recovery Maintenance Requirements

Two sets of PTFs must be applied to allow the recovery processes described in "Recovering TCP/IP Communications" on page 69 to function correctly:

- for HSC 4.0, L1H10KE and L1H10LC
- for HSC 4.1, L1H10L4 and L1H10LE.

These PTFs contain HOLDDATA that describes new messaging and station status during recovery.

For HSC release levels later than HSC 4.0 and 4.1, 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.,

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---
HSTA     4.0.0 (F0)   ACTIVE PRIMARY SECONDARY STANDBY
HSTB     4.0.0 (F0)   ACTIVE PRIMARY SECONDARY STANDBY
HSTC     4.0.0 (F0)   ACTIVE PRIMARY SECONDARY STANDBY
HSTD     4.0.0 (F0)   ACTIVE PRIMARY SECONDARY STANDBY
```

then, HSTA is host index number 1, which when added to 50000 means that the HSC on HSTA uses port number 50001, the HSC on HSTB uses 50002, the HSC on HSTC uses 50003, and the HSC on HSTD uses 50004.

Multiple TCP/IP Stack Implications

The TCP/IP stack used for LMU communications must be identified to the HSC if:

- multiple TCP/IP stacks run on the same host as the HSC, or
- one TCP/IP stack contains a name other than the default, “TCP/IP.”

To make this change, refer to the appropriate release of the IBM publication *z/OS Communications Server: IP Configuration Guide*; in particular, the sections “Configuration files for the TCP/IP stack” and “Configuration files for TCP/IP applications.”

Understanding these sections and your site’s TCP/IP configuration will provide you with the information needed to direct the HSC to the TCP/IP stack used for LMU communications.

Transitioning Between 3270 and TCP/IP

A number of methods are available to move between 3270 station connections and TCP/IP LMU network attachment. **Sun 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 VM 4.0 or higher and must be running IBM 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)')
   ```

   Sun 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

Sun 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 66 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. Sun 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. Sun StorageTek recommends that users allow the HSC network recovery process to remain active and not to force the ACS offline.

Configuring VM for TCP/IP Support

The following items must be updated to allow VM to support TCP/IP station protocol.

- System Definition File
- System Profile File
- HSC Startup Job File
- LMUPATH Definition Data Set.

System Definition File (ACS SYSDEF)

To define the IUCV connection with the LMU communications component, add the TCP/IP file statement to the ACS SYSDEF file.

```
FILE LCOMM IUCV <tcpip> DSN <tcpip>.LMU.COMM
```

where *tcpip* is the user ID of the TCP/IP service machine.

System Profile File (ACS SYSPROF)

Add the LMUPDEF command and control statement to the ACS SYSPROF file.

```
LMUPDEF <vaddr> DSN <dsname> VOL <volser>
```

where

vaddr is the virtual address of the data set that contains the LMUPATH statements.

dsname is data set name.

volser is the volume serial number of the volume on which the data set resides.

HSC Startup Job File (ACS SLKJCL)

Add the LMUPDEF command and control statement to the ACS SLKJCL file.

```
LMUPDEF DSN(dataset.name) VOLUME(volser) UNIT(vaddr)
```

where

dataset.name is data set name of the volume.

volser is the volume serial number of the volume on which the data set resides.

vaddr is the virtual address of the data set that contains the LMUPATH statements.

Initializing the LMUPATH Definition Data Set

The next three tasks apply to the LMUPATH definition data set.

Minidisk Statement for the LMUPATH Data Set

Add a minidisk statement to the directory entry for the STKACS userid. Refer to "Define the ACS Service Machine" in the *HSC Installation Guide* for an example.

Minidisk Format

Format the minidisk as an OS or CMS RESERVED minidisk using the SLIMDISK utility. Refer to "Allocation of OS-formatted Minidisk" and "Allocation of CMS RESERVED Minidisk" in the *HSC Installation Guide* for more information.

Commands to Format OS Minidisk:

```
EXEC SLIMDISK <vaddr> <volser> (INIT
EXEC SLIMDISK <vaddr> <volser> <numcyls> 4080 80 DSN <dsname>
```

where

vaddr is the virtual address.

volser is the DASD volume serial number.

numcyls is the number of cylinders to allocate.

dsname is the data set name to assign to this space.

Commands to Format CMS Reserved Minidisk:

```
EXEC SLIMDISK CMSR <vaddr> <volser> 512 (INIT
EXEC SLIMDISK CMSR <vaddr> <volser> DSN <fname> <ftype>
```

where

vaddr is the virtual address.

volser is the DASD volume serial number.

fname is the file name of the data set.

ftype is the file type of the data set.

LMUPATH Definition Data Set

Add the LMUPATH statements to the LMUPDEF data set using the ACS UTIL VOLCOPY command.

Note: ACS UTIL VOLCOPY creates skeleton JCL that you modify to match your configuration.

```
/JOB  SLSXUTIL SLUGENER
/PARM RECCOPY
/FILE SYSPRINT DEV PRNT CLASS A
/FILE SYSUT2 DEV <vaddr> DSN <dsname>
/FILE SYSUT1 *
LMUPATH ACS(aa) LMUADDR(nnn.nnn.nnn.nnn)
LMUPATH ACS(aa) LMUADDR(nnn.nnn.nnn.nnn)
      .
      .
      .
```

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 three categories:

- Telecommunications access method through the ACF/VTAM network – This method of host-to-host communications provides the highest performance and reliability.
- Communication through the LMU – This method of host-to-host communications is a lower performance method than ACF/VTAM.
- Communication through the CDS – This method of host-to-host communications is a lower performance method than either ACF/VTAM or LMU.

Figure 8 illustrates the available communication methods and relative hierarchy of the methods.

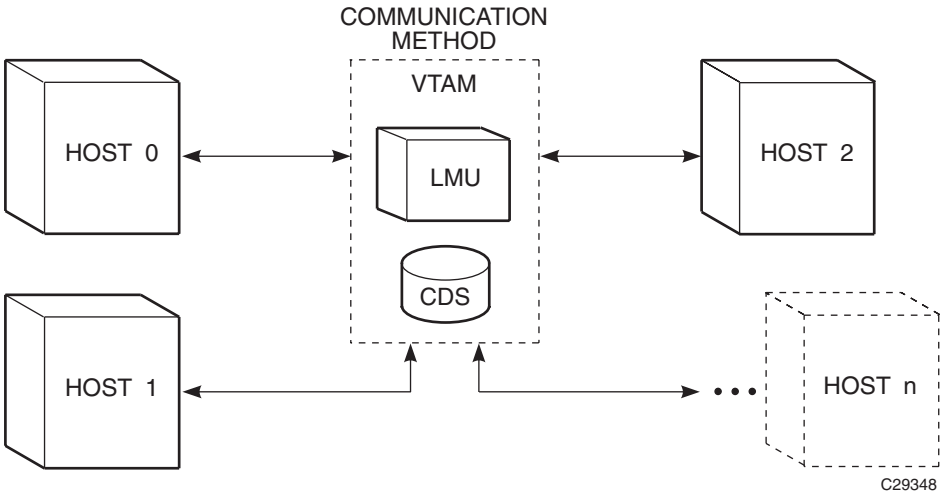


Figure 8. HSC Communication Methods

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, LMU paths and VTAM path name 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 9 illustrates how different communication methods can be used between multiple hosts.

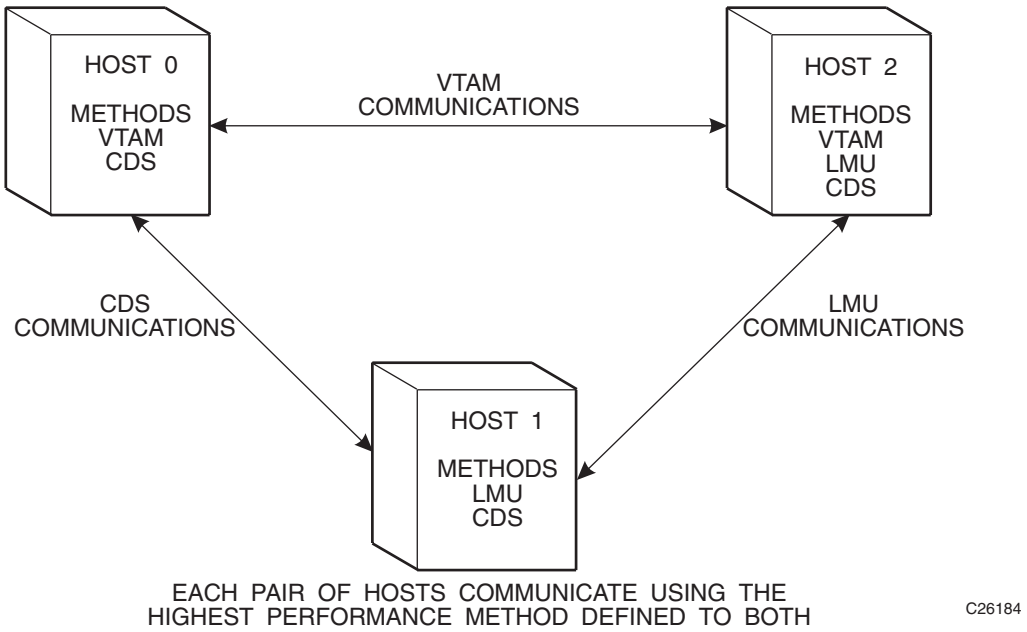


Figure 9. HSC Communication Methods Between Multiple Hosts

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 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 hostids 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.

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 (VTAM to LMU, LMU to CDS, or VTAM 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

The following software requirements apply:

- LMU 3.0 (or higher) or 9315/9330 1.0 (or higher) µ-software is required for a multiple-level communications service.
- ACF/VTAM 3.2 (or higher) must be available to use the VTAM method of communications.

Tape Management Interface

The tape management interface component provides you with the interface definitions that can be used to interface a tape management system with the HSC.

Various functions are provided by the HSC to assist the tape management system (TMS) with device allocation and cartridge mounting to optimize library cartridge handling, and to minimize the need for operator intervention. The HSC provides the following assistance to the tape management system.

- The HSC returns configuration information which describes the location of all drives, the pass-thru connections between LSMs, and other information the TMS might use to understand the library's environment.
- The HSC returns volume location information including: whether the volume resides in an ACS, in which LSM it is located, and the volume's location in the LSM. This information allows the TMS to determine whether the volume should be mounted on an automated or a manual drive.
- The HSC returns a list of drives that are physically accessible to the volume. If a scratch volume was specified, ordering is by LSM scratch counts. Drives in the same LSM are considered to be closest; those accessed by one pass-thru event, the next closest; and so forth. The list is ordered by proximity to the LSM containing the volume. This information allows the TMS to match an ACS drive from this list to a drive which the TMS determines to be available for mounting the cartridge.
- The HSC selects a scratch volume when requested, and returns volume information. This allows the TMS to validate the volume's scratch status before it is mounted. The HSC also supports specifying, at mount time, that a scratch volume be used.
- The HSC mounts, dismounts, and ejects volumes at the request of the TMS. The HSC returns status and success information about the operation.
- The TMS may direct the HSC to operate as if no operator were present. In this mode, any operation which would require operator action, including responding to a message, will be cancelled, and failure returned. The TMS may choose to retry the operation.

Refer to the *HSC Interface to Tape Management Systems Manual* for more information.

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 I, “Batch Application Program Interface (API)” for more information.

Chapter 3. HSC Control Statements and HSC Start Procedure

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 "Starting HSC Execution" on page 161). For more information about HSC installation and initialization, refer to the *HSC Installation 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 "Syntax Flow Diagrams" on page 617 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.

The PARMLIB control statements are invoked by specifying MEMBER(xx) or M(xx) on the /PARM statement in the startup job. The suffix ''xx'' is concatenated with SLSSYS to form a name. The name is used as the ddname in the startup job. The PARMLIB data set (or PDS member) is opened and read to obtain the parameters for running the HSC software.

Note: It is strongly recommended to use shared data sets for PARMLIB control statements.

Processing PARMLIB Control Statements

PARMLIB control statements are processed at HSC initialization.

"Sample ACS SLKJCL File" on page 159 contains /FILE statements defining data sets and members that contain PARMLIB control statement definitions.

Note: In the ACS SLKJCL example, ''MEMBER(xx)'' is the MEMBER parameter described in "Defining PARMLIB Control Statements" on page 79.

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

Examples of SLSSYSXX command lists and PARMLIB control statements are contained in files SLSSYS00 COPY, SLSSYS12 COPY, and SLSSYS20 COPY.

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 628 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 Operator's Guide*.

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 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 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 startup SLKJCL file. 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 START procedure, and must be present for 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 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 VIew 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 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 Control

Warning: If scratch pools are defined by this method and the TMS attempts to define scratch pools with scratch pool indices, the TMS requests will return an invalid return code. If VMTAPE is used as the tape management system, the PARMLIB SCRPOol statements must be in the same alphanumeric order by name as VMTAPE has them defined internally.

With this control statement, you can specify new scratch pools. Refer to “Scratch Subpool Control Statement” on page 96 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 628 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 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:

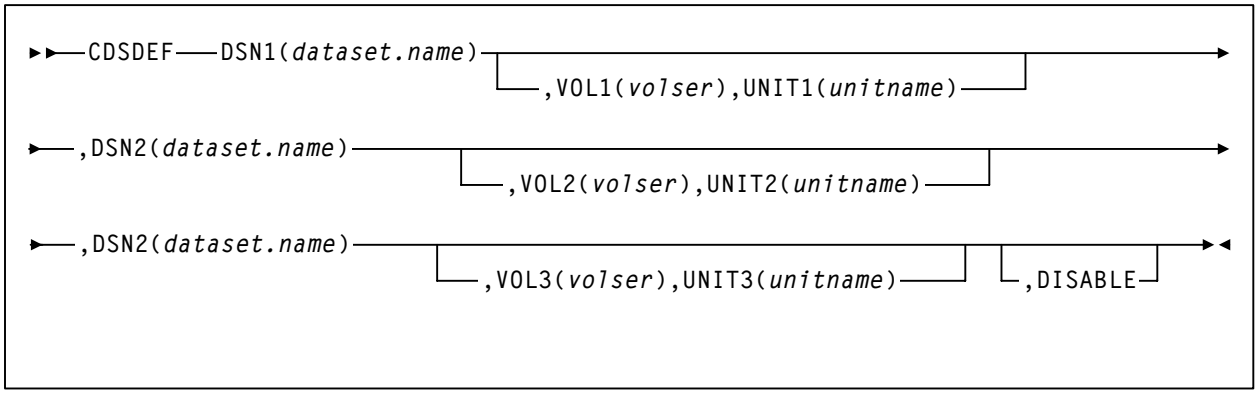
- the name(s) for HSC control data set(s)
- the DASD volume where the specified CDS resides
- the unitname for the SVC99 parameter list for CDS allocation
- switch information controlling the enabling of a standby CDS.

Notes:

- 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 may not be defined in SLKJCL; 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 parameter). However, if journaling is specified by the TCHNIQE parameter, journals must be defined for successful HSC initialization.

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

DSN*x*
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.

VOL*x*
optionally, *volser* is the volume serial number of the DASD volume where the specified CDS resides. The VOL parameter must be specified in VM.

UNIT*x*
optionally, *unitname* is used to specify the unit parameter in the SVC99 dynamic allocation parameter list. The UNIT parameter must be specified in VM.

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 unallocated. 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 DSN1(SLS.DBASE),VOL1(HSC1Ø1),UNIT1(5Ø1),+
       DSN2(SLS.DBSEC),VOL2(HSC1Ø2),UNIT2(5Ø2),+
       DSN3(SLS.DSTBY),VOL3(HSC1Ø3),UNIT3(5Ø3),+
       DISABLE
```

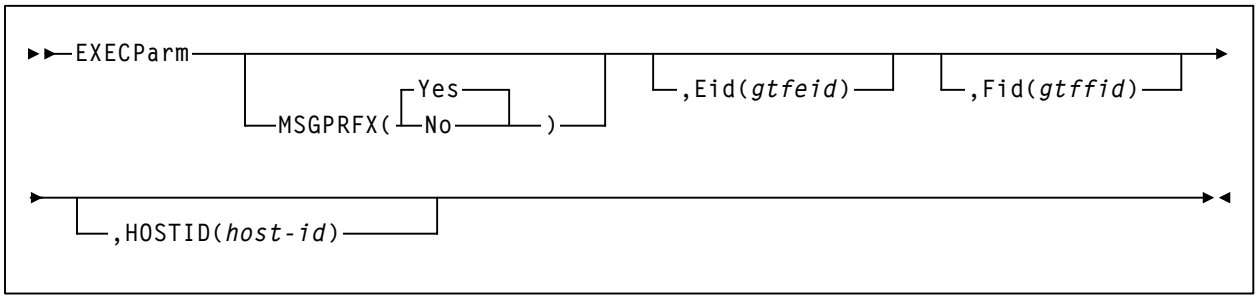
Note: Control statements can only be continued if PARMLIB begins with a /*...*/ comment statement (see “Control Statement Syntax Conventions” on page 628).

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 SLKJCL File for Starting the HSC” on page 155 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.

/PARM Eid(user-specified-event-id) parameter is valid for use in the HSC startup SLKJCL file 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 startup SLKJCL file 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

```
EXECP MSGPRFX(NO) E(Ø86) F(23) HOSTID(HSC1)
```

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:

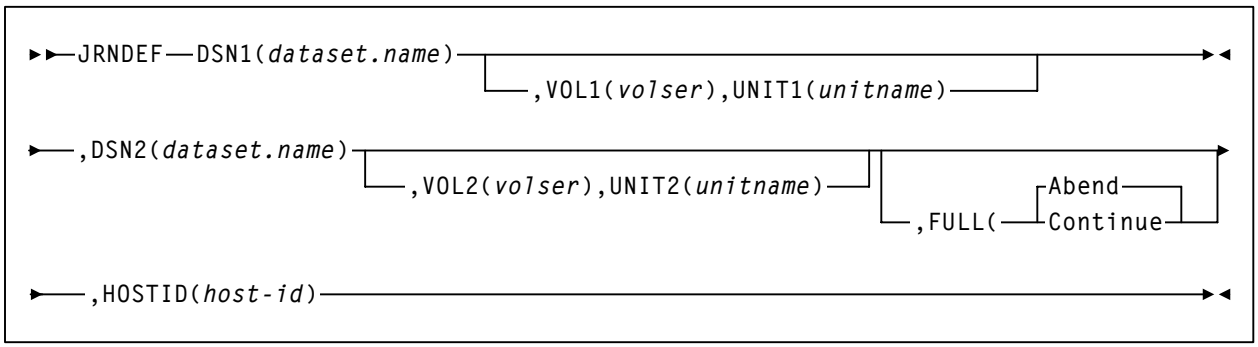
- the name for HSC journal data sets

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*x*

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*x*

optionally, *volser* is the volume serial number of the DASD volume where the specified journal resides. The VOL parameter must be specified in VM.

UNIT*x*

optionally, *unitname* is used to specify the unit parameter in the SVC99 dynamic allocation parameter list. The UNIT parameter must be specified in VM.

FULL

optionally, this parameter provides the following options:

Abend

the HSC 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 DSN1(SLS.JRN01),VOL1(HSC101),UNIT1(510),+
       DSN2(SLS.JRN02),VOL2(HSC102),UNIT2(511),+
       FULL(CONTINUE),+
       HOSTID(HSC1)
```

Note: Control statements can only be continued if PARMLIB begins with a /*...*/ comment statement (see “Control Statement Syntax Conventions” on page 628).

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.

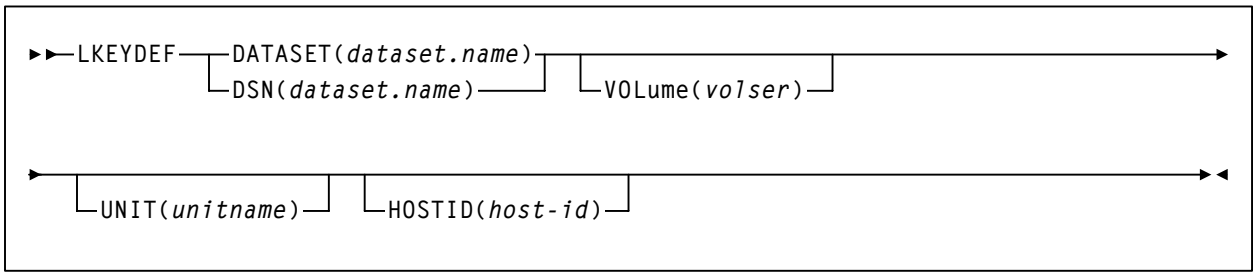
Refer to the *VM/HSC Installation Guide* for more information about Sun StorageTek license keys.

Warning: The LKEYDEF control statement **must** be present in the HSC START procedure prior to initialization.The SLSSYSXX /FILE statement specifies the sequential data set or PDS member that contains PARMLIB start-up parameters. Refer to "Creating an SLKJCL File for Starting the HSC" on page 155 for detailed information.

Warning:

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

(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.

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.

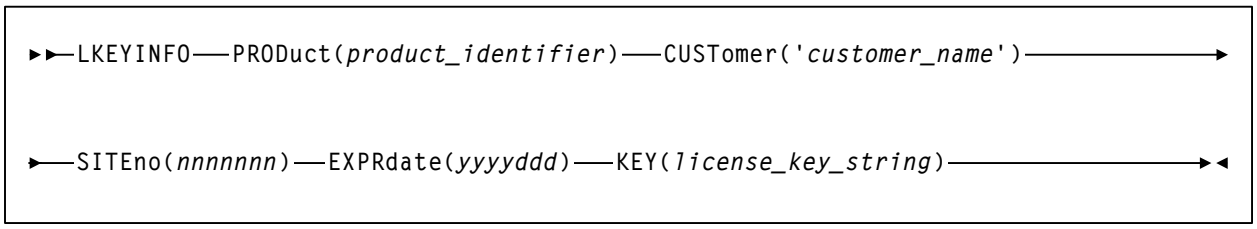
```
LKEYDEF DSN(MY.LKEYINFO.FILE)
```

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 START procedure, and must be present for HSC to initialize.

Note: Refer to the *VM/HSC Installation Guide* for more information about configuring your HSC license key.

Syntax



Parameter Descriptions

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

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

product-identifier
Indicates the product identifier. **For HSC 6.1, the product identifier is VER0610**.

CUSTomer
Specifies the customer name as received from Sun StorageTek. A maximum of 20 characters can be entered for the customer name.

customer-name
Indicates the customer name.

SITEno
Specifies the site number as received from Sun StorageTek.

nnnnnnn
Indicates the site number.

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

yyyyddd
Indicates the expiration date.

KEY

Specifies the license key string as received from Sun 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 Sun StorageTek.

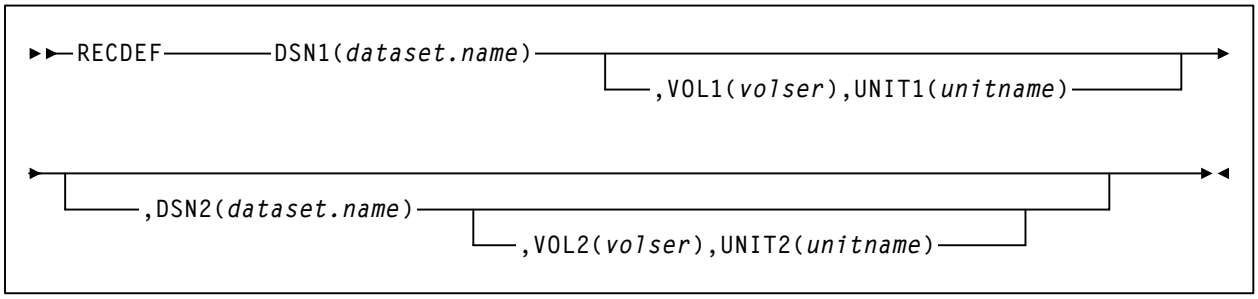
```
LKEYINFO PROD(VER0610) -
         CUST('CUSTOMER NAME') -
         SITE(12345) -
         EXPRD(2004365) -
         KEY(DKEEXEDERTB3466)
```

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 "Allocating and Initializing Control Data Sets" in the *HSC Installation 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

DSN*x*
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.

VOL*x*
optionally, volser is the volume serial number of the DASD volume where the specified CDS resides. The VOL parameter must be specified in VM.

UNIT*x*
optionally, unitname is used to specify the unit parameter in the SVC99 dynamic allocation parameter list. The UNIT parameter must be specified in VM.

Example

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

```
RECDEF DSN1(SLS.DBASE),VOL1(HSC1Ø1),UNIT1(5Ø1),+
       DSN2(SLS.DBSEC),VOL2(HSC1Ø2),UNIT2(5Ø2)
```

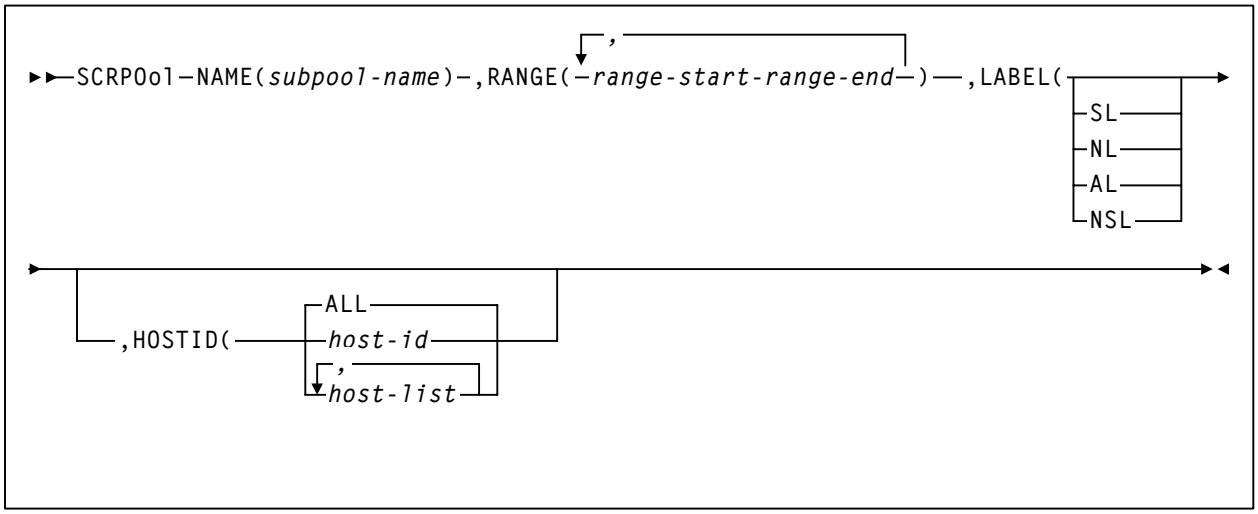
Note: Control statements can only be continued if PARMLIB begins with a /*...*/ comment statement (see “Control Statement Syntax Conventions” on page 628).

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 46 for more information relating to this control statement.

Warning: If scratch pools are defined by this method and the TMS attempts to define scratch pools with scratch pool indices, the TMS requests will return an invalid return code. If VMTAPE is used as the tape management system, the PARMLIB SCRPOol statements must be in the same alphanumeric order by name as VMTAPE has them defined internally.

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.

Note: If scratch subpools are defined using the TMI, the scratch subpool name may be omitted. If the subpool name is not provided by the TMI, the subpool index (subpool 0) is used as the name.

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

RANGE

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.

   Sun 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

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.

```
SCRPO NAME(SITE1),RANGE(100000-200000,300000-400000),LABEL(SL)
SCRPO NAME(SITE2),RANGE(500000-540072),LABEL(NL),HOSTID(HSC1)
SCRPO NAME(SITE3),RANGE(540081-610094),LABEL(NSL)
SCRPO NAME(SITE4),RANGE(AP1000-AP1999),LABEL(SL),HOSTID(HSC1,HSC6)
```

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
- Tape management system (TMS) interface.

Refer to the *HSC 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 628 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 (for LMUPATH)
- SCRPDEF (for SCRPOol)
- TREQDEF (for TAPEREQs)
- UNITDEF (for UNITATTRs)
- VOLDEF (for VOLATTRs).

The user can specify LMUPDEF, SCRPDEF, TREQDEF, UNITDEF, 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 LMUPDEF, SCRPDEF, TAPEREQ, UNITATTR, 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), tape request attribute (TAPEREQ), unit attribute (UNITATTR), 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.

If a single data set contains TAPEREQ, UNITATTR, and VOLATTR statements, the HSC must open the data set three times: once in response to a TREQDEF command, again in response to UNITDEF, and a third time in response to VOLDEF. Each command uses only the statements that apply.

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 110 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 104 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 107 for control statement syntax, parameter information, and example statements.

Scratch Subpool Parameter Statement Definition
The SCRPDEF command and control statement identifies the definition data set where scratch subpool parameter statements reside (see Scratch Subpool Control Statement). SCRPDEF can be issued either in PARMLIB or as an operator command. Refer to “Scratch Subpool Definition (SCRPDEF) Command and Control Statement” on page 112 for control statement syntax, parameter information, and example statements.

Tape Request
The TAPEREQ control statement specifies tape request attributes. Refer to “Tape Request (TAPEREQ) Control Statement” on page 115 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 can be issued either in PARMLIB or as an operator command. Refer to “Tape Request Definition (TREQDEF) Command and Control Statement” on page 131 for control statement syntax, parameter information, and example statements.

Unit Attribute
The UNITATTR control statement specifies unit attributes. Refer to “Unit Attribute (UNITATTR) Control Statement” on page 134 for control statement syntax, parameter information, and example statements.

Unit Attribute Definition

The UNITDEF command and control statement identifies the definition data set where the unit attributes can be found (see UNITATTR). UNITDEF can be issued either in PARMLIB or as an operator command. Refer to “Unit Attribute Definition (UNITDEF) Command and Control Statement” on page 138 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 141 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 152 for control statement syntax, parameter information, and example statements.

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 Tape Request Attributes (TAPEREQ)

TAPEREQ statements describe the media type and recording technique to be used for a particular data set.

TAPEREQ parameters are divided into selection criteria (inputs) and result criteria (outputs). Selection criteria include:

- job name
- step name
- program name (MVS JES2 only)
- data set name
- expiration date or retention period (MVS JES2 only)
- volume type requested (specific or nonspecific).

Result criteria include:

- media type
- recording technique
- model
- subpool.

Collections of data sets with common characteristics can be identified in a single TAPEREQ statement by specifying wild card characters. For example, if all data sets residing on ECARTs are identified with an ‘‘L’’ as the first character of the data set name, an ‘‘L**’’ could be specified to identify all these data sets in a single TAPEREQ statement.

The TREQDEF command causes the HSC to open the definition data set containing the TAPEREQ statements. See “Tape Request Definition (TREQDEF) Command and Control Statement” on page 131 and “Tape Request (TAPEREQ) Control Statement” on page 115 for descriptions of syntax and parameters.

Defining Unit Attributes (UNITATTR)

UNITATTR statements describe the recording technique attributes of library and nonlibrary transports. Transports are described by:

- unit address
- transport model number.

To allow the HSC to operate correctly, the user must specify UNITATTR statements for all *nonlibrary* transport models that appear to the operating system as 3490E-type and 3590-type devices. For library devices, the model type is determined by the LMU. Refer to “Unit Attribute (UNITATTR) Control Statement” on page 134 for more information.

Collections of transports with common characteristics can be identified with a single UNITATTR statement by specifying a list of unit addresses, range of addresses, or multiple ranges of addresses.

The UNITDEF command causes the HSC to open the definition data set containing the UNITATTR statements. See “Unit Attribute Definition (UNITDEF) Command and Control Statement” on page 138 and “Unit Attribute (UNITATTR) Control Statement” on page 134 for descriptions of syntax and parameters.

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, T9840A/T9840B/T9840C/T9840D (STK1R), T9940A/T9940B (STK2), and T10000 media. Volumes not defined by VOLATTRs are presumed to be standard capacity cartridges for scratch counts.

Note: Alternatives to defining VOLATTR statements are available. Refer to “Volume Attribute (VOLATTR) Control Statement” on page 141 for more information.

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 152 and "Volume Attribute (VOLATTR) Control Statement" on page 141 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 110 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 628 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.

Note: If you are using the SL3000 or SL8500 partitioning feature, the PARTID parameter connects to a specific partition defined by the SL3000 or SL8500 library for the HSC host group. Refer to "HSC Support for the SL3000 Library" on page 521 for partitioning procedures.

Users can find additional important TCP/IP-related information by referring to "Dynamic LMU Connection" on page 66. To display the LMUPDEF data set, refer to Display LMUPDEF in the *HSC Operator's Guide*.

LMUPATH Usage

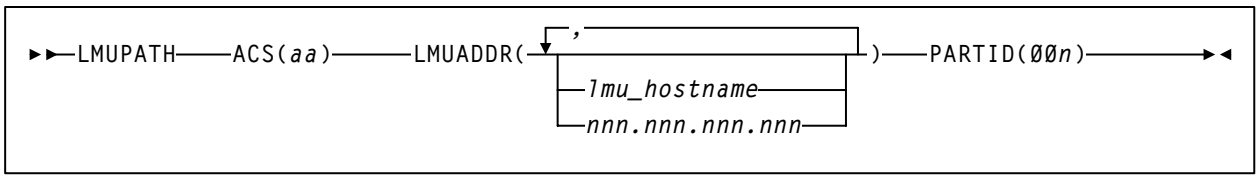
LMUPATH statements define the TCP/IP addresses used to communicate between an HSC on a host and the LMU for a specific ACS. Up to four addresses can be specified for each ACS. The following are possible address combinations:

- For a 9310 library using up to two 9330 LMU units, you can specify up to two addresses, however, a second address indicates a dual LMU environment.
- For an SL8500 ACS with one library, you can specify up to two addresses, which also indicates a dual LMU environment.
- For an SL8500 ACS with four or more libraries, you can specify up to four IP addresses, one for each library of an ACS.

Note:

1. TCP/IP must be initialized prior to bringing the HSC to the full service level.
2. The number of hosts that can be connected to a TCP/IP LMU at one time is hardware dependent. With the help of your Sun StorageTek SE, verify that the LMU is capable of connecting all the required hosts.
3. For more information about connecting multiple libraries within an ACS using TCP/IP, refer to Appendix A, "HSC Support for the SL8500" on page 443.

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.

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 four 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.

Note: A partitioned SL3000 or SL8500 cannot use the multiple TCP/IP connection feature since partitioning applies only to a single SL3000 or SL8500 box.

00*n*
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 example shows multiple LMUADDR parameters consisting of an IP address and a hostname. In this case, the second parameter, LMU01, indicates a dual LMU environment.

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

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

The following example shows multiple LMUADDR parameters consisting of two IP addresses and a partition ID. For an SL8500 library, the second IP address indicates a dual TCP/IP connection to the SL8500. The partition ID, 001, indicates the SL8500 library has been configured with partitioning, and a partition ID of 1 has been assigned for the HSC as ACS 00.

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

The following example shows multiple LMUADDR parameters consisting of four IP addresses. For the SL8500 library only, the first, second, third, and fourth IP addresses indicate a TCP/IP connection to each of four separate SL8500 libraries connected in ACS 00.

```
LMUPATH ACS(00)+
LMUADDR(123.456.789.012,123.456.789.013,123.456.789.014,123.456.789.015)
```

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 Installation Guide* for an explanation of PARMLIB.)

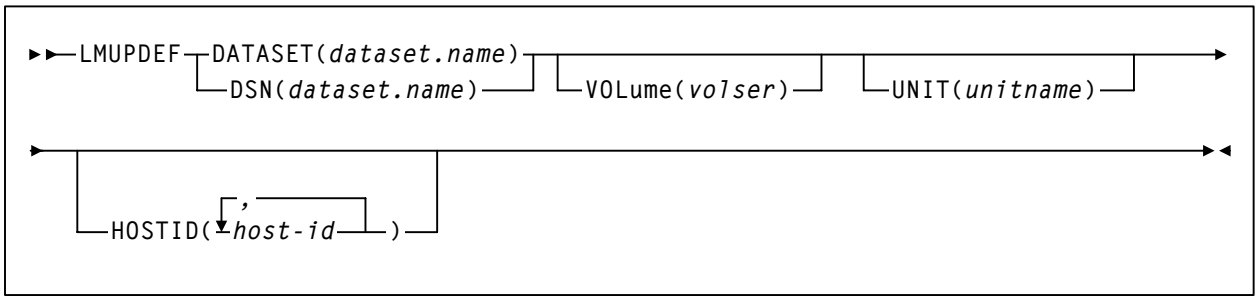
If a definition file is changed by a LMUPDEF operator command, and if the change is to be permanent, you must update PARMLIB before restarting the HSC. If the definition file is to be modified for a given shift or application, remember that the new definition remains in effect until another definition 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 66. To display the LMUPDEF data set, refer to Display LMUPDEF in the *HSC 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.

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(DISKØ3)
```

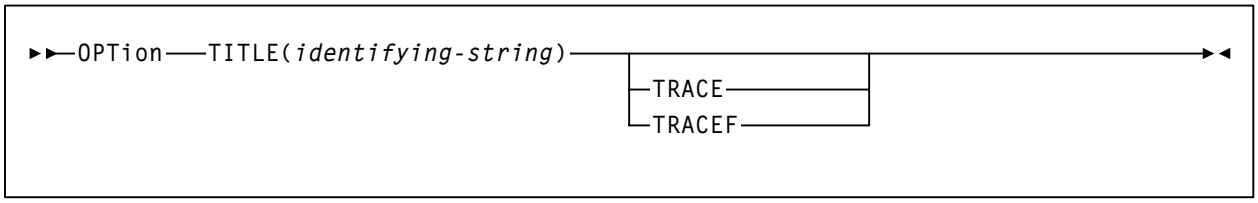
OPTion TITLE Control Statement

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 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

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.

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 79 for an explanation of PARMLIB.)

Warning:

1. 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.
2. The SCRPDEF command does not refresh LibraryStation subpool(s) unless LibraryStation is restarted using LS STOP and LS INIT.

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, SCRPDEF is disabled and dynamic scratch pool reload is not allowed.

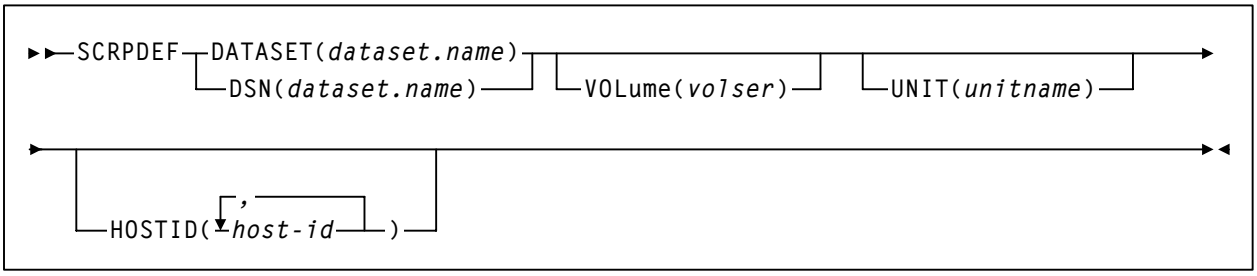
Definition commands issued on one host are in effect only on that host. If different hosts use the same definition data set, then the tape request parameter statements are shared by those hosts.

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 628.

Syntax



Control Statement Name

SCRPDEF
initiates the SCRPDEF 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 110 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(DISKØ1)
```

Tape Request (TAPEREQ) Control Statement

The TAPEREQ control statement is used to specify tape request attributes. TAPEREQ statements are read from the definition data set specified by the TREQDEF command. (Refer to “Tape Request Definition (TREQDEF) Command and Control Statement” on page 131 for details on syntax and parameters.) The TAPEREQ statement must be placed in the definition data set; it cannot be issued as an operator command.

To put multiple data sets on multiple volumes, a TAPEREQ statement must be coded for each data set name.

TAPEREQ Usage

As the HSC processes each allocation request, it searches the TAPEREQ statements in the order that they appear in the definition data set to determine the media type, recording technique or model, and subpool parameters to assign to the request. One or more TAPEREQ statements may match the request’s input criteria.

When there are multiple matching TAPEREQ statements containing different parameters, the HSC merges the parameters from the matching statements. Each parameter value is searched for independently, and for each, the first matching TAPEREQ statement is used.

For this reason, Sun StorageTek recommends that you:

- order the TAPEREQ statements from most specific to most general
- specify all applicable parameters on all TAPEREQ statements.

Conflicting parameter assignment can result when multiple TAPEREQ statements are found and their parameters merged. For example, assuming the subpool REDWOOD contains only HELical (Redwood) cartridges, the following TAPEREQs produce inconsistent parameter assignment:

```
   .
   .
   .
TAPEREQ JOBNAME(ABC) SUBPOOL(REDWOOD)
   .
   .
TAPEREQ JOBNAME(**) MEDIA(S)
   .
   .
   .
```

These statements cause the HSC to attempt to select a Standard scratch cartridge from a subpool that contains only helical cartridges.

To avoid such scenarios, Sun StorageTek recommends that all applicable parameters be coded on each TAPEREQ and that parameters such as SUBPool not be specified on generic TAPEREQ statements. That is, MEDia and RECtech should be specified on the same TAPEREQ statement as SUBPool.

After searching the TAPEREQ statements, the HSC

- selects the appropriate devices
- mounts cartridges that are the right media type.

The TAPEREQ parameters are divided into selection criteria (i.e., input) parameters, and media and recording technique or model (i.e., output or result) parameters. The selection criteria are used to locate the first TAPEREQ statement that matches the request under consideration. Media and recording technique (or model) provide information that is used to modify the request. The TAPEREQ statement is in essence an IF-THEN statement: IF the selection criteria parameters (ANDed together) match the current tape request variables, THEN the media and recording technique parameters apply.

The HSC uses the TAPEREQ specifications during device allocation to determine which transports to leave eligible for selection, and during mount processing to determine media requirements.

During device allocation processing for specific requests, the HSC uses volume and TAPEREQ information. For nonspecific (scratch) requests, the HSC uses only TAPEREQ information. The HSC searches the TAPEREQ statements for media type and recording technique values and uses these values to mark inappropriate transports ineligible for the request.

If the HSC is unable to match the request with media type and recording technique values, then media type and recording technique are set to undefined and any available transport is eligible for allocation. This condition can occur for any of the following reasons:

- None of the TAPEREQ statements matches the request.
- There is a matching TAPEREQ statement, but it does not specify media type and recording technique values.
- There is no TAPEREQ definition data set loaded.

During mount processing for a nonspecific request, the HSC searches the TAPEREQ statements for a media type value. The HSC uses this value to exclude cartridges of the wrong media type.

If the HSC is unable to match the request with a media type value, then media type is determined as shown in Table 7 on page 122.

Disabling a TAPEREQ Definition

Use the following procedure to disable a TAPEREQ definition.

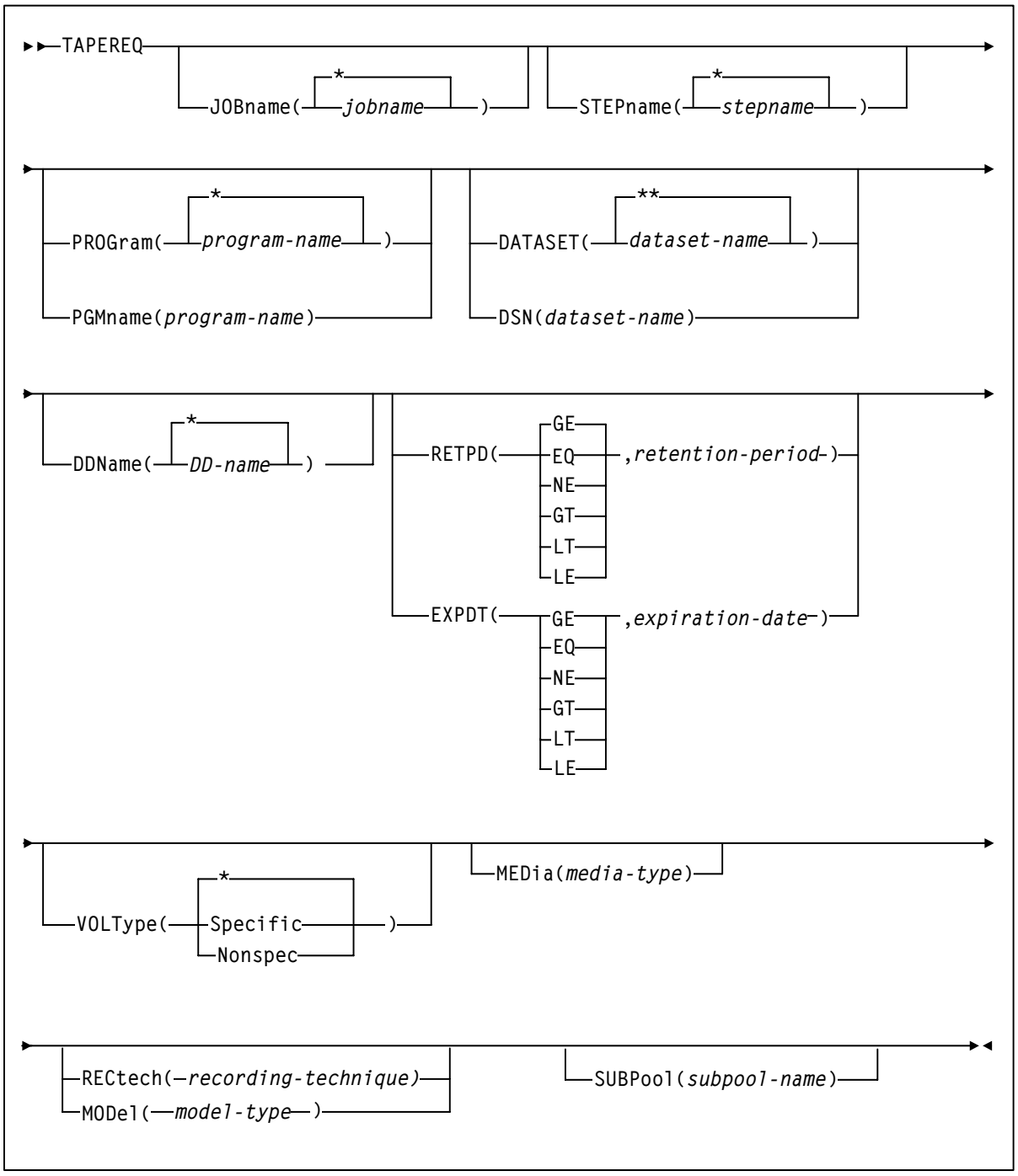
1. Edit the definition data set containing the current TAPEREQ statements.
2. Delete the parameters of the TAPEREQ statement you want to disable, or delete or comment out the TAPEREQ statement.
3. Issue the TREQDEF command to reload the definition data set.

With the modified definition data set in effect, the HSC searches the remaining TAPEREQ statements to determine the media type and recording technique (or model) to assign to a request.

To disable all TAPEREQ definitions, load a definition data set that contains only one TAPEREQ statement with no parameters. Refer to Table 7 on page 122 and Table 8 on page 125 to see a list of TAPEREQ media and recording technique (or model) default values.

TAPEREQ

Syntax



Control Statement Name

TAPEREQ
initiates the TAPEREQ control statement. If any of the following apply:

- there is no TAPEREQ statement specified in the definition data set to match a request, or
- no matching TAPEREQ statement specifies MEDia or RECtech, or
- no definition data set loaded,

then MEDia and RECtech are set to undefined, which matches all requests. Any available device is eligible for allocation.

Table 7 on page 122 shows default values used if the media type is omitted.

Parameters

The TAPEREQ selection criteria parameters are shown below. The JOBname, STEPname, PROGram, and DATASET parameters can have values that include the following wildcard characters:

% or ?	any single non-blank character.
*	any character string (length zero to 8) not to exceed one qualification level. For example, A.B.* matches A.B and A.B.C, but does not match A.B.C.D.
**	used only in DATASET. Indicates any number of qualifiers (zero or more). Cannot be used with any other characters within a qualifier. For example, A.B.** matches A.B, A.B.C, A.B.C.D, A.B.C.D.E, and so forth.

JOBname
optionally, identifies the job name. If JOBname is not specified, the default value is *.

job-name
specifies the job name. The TAPEREQ statement is used only when the specified *job-name* matches the job name in the request.

STEPname
optionally, specifies the step name. If the STEPname parameter is not specified, the default value is *.

step-name
specifies the step name. This parameter cannot be more than eight characters long, and periods are not allowed within *step-name*. The TAPEREQ statement is used only when the specified *step-name* matches the step name in the request.

PROGram or PGMname

optionally, specifies the program name. If PROGram is not specified, the default value is *. The program name used is the job step program name.

program-name

specifies the program name.The TAPEREQ statement is used only when the specified program-name matches the program name in the request.

DATASET or DSN

optionally, specifies the data set name. If DATASET (or DSN) is not specified, the default value is **. The rules of SMS and RACF generics are followed for this parameter.

Note: The name you specify for this parameter may be different from the value coded in the DSN parameter on a DD statement. For example,

```
DSN=&&ABC
```

may be coded on a DD statement if a data set is temporary. However, the actual data set name is not &&ABC. Similarly, if the DSN parameter refers back to a previous DD statement, the data set name is resolved to the referred to data set. Thus, the data set referred to must be coded on the DATASET parameter in order for the TAPEREQ control statement to be processed.

dataset.name

specifies the data set name. The TAPEREQ statement is used only when the specified *dataset.name* matches the data set name in the request.

DDName

optionally, specifies the DDname. If DDName is not specified, the default value is *.

DD-name

specifies the DDname. The TAPEREQ statement is used only when the specified *DD-name* matches the DDname in the request.

RETPD

optionally, specifies the retention period and the relationship that must exist. If you do not specify either RETPD or EXPDT, the default value is RETPD(GE,0) (any expiration date will match this criterion).

EQ equal to

NE not equal to

GT greater than

GE greater than or equal to

LT less than

LE less than or equal to.

retention-period

specifies the retention period in days for the data set. Specify the number of days as a 1- to 4-digit decimal number.

EXPDT

optionally, specifies the expiration date and the relationship that must exist.

EQ equal to

NE not equal to

GT greater than

GE greater than or equal to

LT less than

LE less than or equal to.

expiration-date

specifies the expiration date of the data set in *yyddd* or *yyyy/ddd* format.

VOLType

optionally, indicates whether or not a nonspecific volume was requested. If VOLType is omitted, the default value is * (either scratch or specific will match).

Specific

specifies that a specific volume was requested. The TAPEREQ statement is used only for a scratch request where a specific volume is specified.

Note: TAPEREQ never overrides the actual media type of the specified volume if it is taken from the media label or VOLATTR.

Nonspec

specifies that a nonspecific (scratch) volume was requested. The TAPEREQ statement is matched, only no VOLSER is specified (a scratch request).

The TAPEREQ media and recording technique parameters are as follows:

MEDia

optionally, specifies the type of media for a data set being created. You can enter a list of media types, but they must be separated by commas.

Notes:

1. A list specifies a generic pool from which a selection is made. There is no implied priority.
2. **The SL8500 library supports the T9840A, T9840B, T9840C, T9840D, T9940B, and T10000 media types and recording techniques.**
3. **The SL3000 library supports the T9840C, T9840D, and T10000 media types and recording techniques.**

This parameter is ignored for an existing data set if the media characteristics are determined by the volume.

If this parameter is not specified, a default is chosen based on the value of the RECtech parameter. Table 7 shows default values used if MEDia is omitted.

Table 7. TAPEREQ MEDia Default Values

RECtech Entered:	MEDia Default:
18track	Standard
36track, 36Atrack, 36Btrack	LONGItud
36Ctrack	ZCART
LONGItud	LONGItud
DD3, HELical	DD3
STK1R, STK1R34, STK1R35, STK1RA, STK1RA34, STK1RA35, STK1RB, STK1RB34, STK1RB35, STK1RAB, STK1RAB4, STK1RAB5, STK1RC, STK1RC34, STK1RC35, STK1RD, STK1RDE, STK1RDN, STK1RD34, STK1RD35, STK1RDE4, STK1RDE5	STK1R
STK2P, STK2P34, STK2P35, STK2PA, STK2PA34, STK2PA35, STK2PB, STK2PB34, STK2PB35	STK2P

To avoid problems, Sun StorageTek recommends that all TAPEREQ statements specify MEDia and RECtech consistently. Make sure to include either one or both parameters on each statement. If both media type and recording technique are omitted, all available devices are eligible for allocation.

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 4490, 9490, or 9490EE transports 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.

DD3A, DD3B, DD3C

indicates a helical cartridge. The media indicator in the external label is encoded with the cartridge type (A, B, or C).

Note: 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), 40GB (T9840C), or 75GB (T9840D).

STK2
indicates any T9940 cartridge. This parameter is the default for all T9940A and T9940B data cartridge types.

STK2P
indicates a T9940 data cartridge. The media indicator in the external label is encoded with the cartridge type (P).

Note: 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 for the desired data set. You can enter a list of recording techniques, but they must be separated by commas.

Notes:

1. A list specifies a generic pool from which a selection is made. There is no implied priority.
2. **The SL8500 library supports the T9840A, T9840B, T9840C, T9840D, T9940B, and T10000 media types and recording techniques.**
3. **The SL3000 library supports the T9840C, T9840D, and T10000 media types and recording techniques.**

RECtech and MODel are mutually exclusive.

If this parameter is not specified on any matching TAPEREQ, a default is chosen based on the value of the MEDia parameter on the first matching TAPEREQ. Table 8 shows default values used if RECtech is omitted.

To avoid problems, Sun StorageTek recommends that all TAPEREQ statements specify MEDia and RECtech consistently. Make sure to include either one or both parameters on each statement.

If both media type and recording technique are omitted, all available devices are eligible for allocation.

Table 8. TAPEREQ RECtech Default Values

MEDia Entered:	RECtech Default:
LONGItud	LONGItud
Standard	LONGItud
ECART	36track
ZCART	36Ctrack
DD3, DD3A, DD3B, DD3C	DD3
STK1, STK1R	STK1R
STK2, STK2P	STK2P
T10000T1, T10000TS	T10K

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 transport.

36Btrack
indicates a 9490 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.

STK1RD
indicates any T9840D transport.

STK1RDE
indicates an encryption-enabled T9840D transport.

STK1RDN
indicates a non-encryption enabled T9840D transport.

STK1RD34
indicates a non-encryption enabled 3490E-image T9840D transport.

STK1RD35
indicates a non-encryption enabled 3590-image T9840D transport.

STK1RDE4
indicates an encryption-enabled 3490E-image T9840D transport.

STK1RDE5
indicates an encryption-enabled 3590-image T9840D 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.

MODel

optionally, specifies the model number of a transport. You can enter a list of models, but they must be separated by commas.

Notes:

1. A list specifies a generic pool from which a selection is made. There is no implied priority.
2. **The SL8500 library supports the T9840A, T9840B, T9840C, T9840D, T9940B, and T10000 model types.**
3. **The SL3000 library supports the T9840C, T9840D, and T10000 model types.**

MODel provides the same type of information as RECtech, but a user may find it more convenient to specify a transport model than a recording technique.

MODel and RECtech are mutually exclusive.

model-type

identifies the model type. Valid model types are:

4480
indicates a 4480 (18-track) transport.

4490
indicates a 4490 (36-track Silverton) transport.

9490
indicates a 9490 (36-track Timberline) transport.

9490EE
indicates a 9490EE (36-track Timberline EE) transport.

SD3
indicates an SD-3 (RedWood) transport.

9840
indicates a 3490E-image 9840 transport.

984035
indicates a 3590-image 9840 transport.

T9840B
indicates a 3490E-image T9840B transport.

T9840B35
indicates a 3590-image T9840B transport.

T9840C
indicates a 3490E-image T9840C transport.

T9840C35
indicates a 3590-image T9840C transport.

T9840D
indicates a non-encryption enabled 3490E-image T9840D transport.

T9840D35
indicates a non-encryption enabled 3590-image T9840D transport.

T9840DE
indicates an encryption-enabled 3490E-image T9840D transport.

T9840DE5
indicates an encryption-enabled 3590-image T9840D transport.

T9940A
indicates a 3490E-image T9940A transport.

T9940A35
indicates a 3590-image T9940A transport.

T9940B
indicates a 3490E-image T9940B transport.

T9940B35
indicates a 3590-image T9940B transport.

T1A34
indicates a 3490E-image T10000A transport.

T1A35
indicates a 3590-image T10000A transport.

T1AE34
indicates an encryption-enabled 3490E-image T10000A transport.

T1AE35
indicates an encryption-enabled 3590-image T10000A transport.

SUBPool
optionally, specifies the subpool used to satisfy a scratch request.

subpool-name
specifies the subpool name.

Note: Refer to “TAPEREQ Usage” on page 115 for information about avoiding assignment of inconsistent parameters when using SUBPool.

Example

The following example illustrates how to use TAPEREQ statements to specify tape request attributes.

Set Tape Request Attributes

```
TAPEREQ DSN(BACKUP.**) MEDIA(ECART) RECTECH(36TRACK)
TAPEREQ DSN(PAYROLL.**) MED(DD3A) RECTECH(DD3)
TAPEREQ MED(STANDARD) RECTECH(36TRACK)
TAPEREQ MED(STK1R) RECTECH(STK1)
```

Note: In the example above, the last TAPEREQ statement specifies a user-defined default for all data sets that do not match one of the first three statements.

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. (Refer to “Tape Request (TAPEREQ) 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 definition data set must contain one or more TAPEREQ statements.

The TREQDEF statement may be specified in the HSC PARMLIB, or it may be issued as an operator command to dynamically load or reload tape request parameters. (Refer to “PARMLIB Control Statements” on page 79 for an explanation of PARMLIB.) If a definition file is changed by a TREQDEF operator command, and if the change is to be permanent, you must update PARMLIB before restarting the HSC.

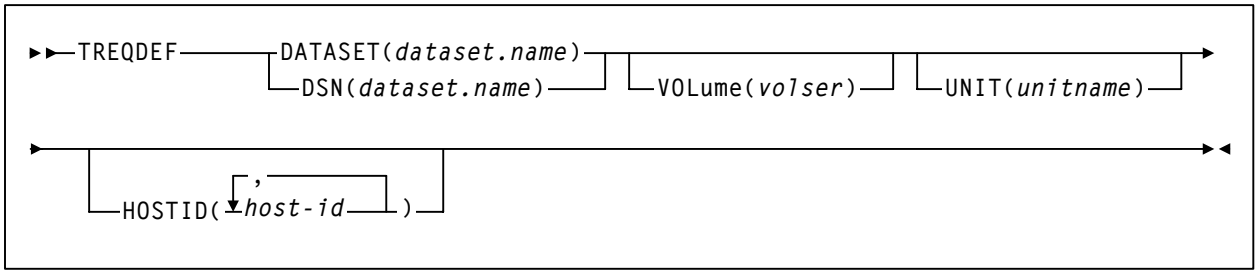
If the definition file is to be modified for a given shift or application, remember that the new definition remains in effect until another definition is loaded or the HSC is recycled. The definition file then reverts to the PARMLIB specification. Thus, TREQDEF can be used to temporarily change a definition file.

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

Notes:

1. When the TREQDEF 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 TAPEREQ 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 TREQDEF command and control statement executes at both base and full service levels of the HSC.
3. If you issue multiple TREQDEF statements, the last one processed is currently active. You can determine which TREQDEF statement is active by entering the Display TREQDEF command.

Syntax



Control Statement Name

TREQDEF
initiates the TREQDEF command and control statement

Parameters

DATASET or DSN
specifies the name of the data set containing the TAPEREQ statements to be processed and, optionally, an OPTion TITLE statement. (Refer to “Tape Request (TAPEREQ) Control Statement” on page 115 and “OPTion TITLE Control Statement” on page 110 for details on syntax and parameters).

Note: The definition data set may contain TAPEREQ, UNITATTR, VOLATTR, and OPTion TITLE statements. Only OPTion TITLE and TAPEREQ 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 tape request 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 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 TREQDEF statement.

Load the TAPEREQ Parameters From YOUR.DSN(MEMBER)

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

Load the TAPEREQ Parameters From DASD Volume DISK01

```
TREQDEF DSN(YOUR.DSN1) VOLUME(DISKØ1)
```

Unit Attribute (UNITATTR) Control Statement

The UNITATTR statement specifies unit attributes and allows the user to define the model number of transports. A series of UNITATTR statements can be specified and are contained in the definition data set named in the UNITDEF statement. The first statement that matches the requested attributes is used. (Refer to "Unit Attribute Definition (UNITDEF) Command and Control Statement" on page 138 for details on syntax and parameters.) The UNITATTR statement must be placed in the definition data set; it cannot be issued as an operator command.

UNITATTR Usage

UNITATTRs are used to distinguish between devices that are configured as either 3490E or 3590 device types:

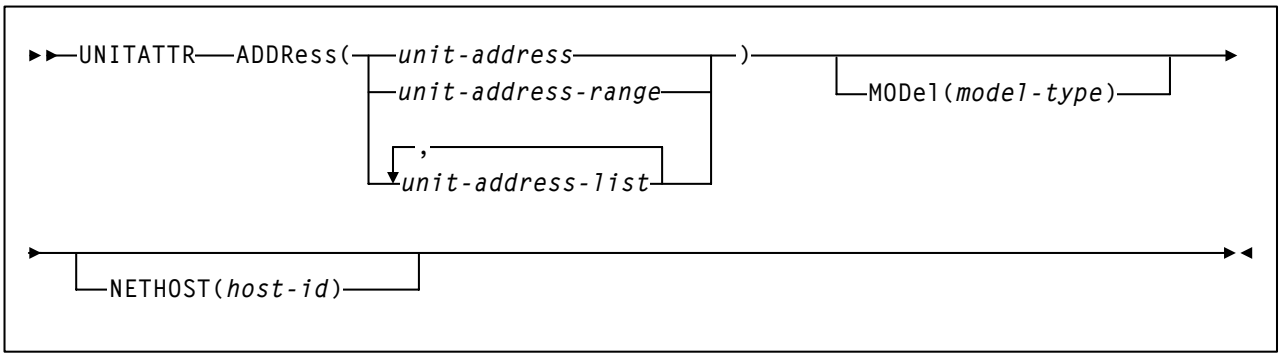
- 3490E-type
  - 4490
  - 9490
  - 9490EE
  - SD-3
  - 9840
  - T9840B
  - T9840C
  - T9840D
  - T9940A
  - T9940B.
- 3590-type
  - SD-3
  - 9840
  - T9840B
  - T9840C
  - T9840D
  - T9940A
  - T9940B.

Note: SD-3s, 9840s, T9840Bs, T9840Cs, T9840Ds, T9940As, and T9940Bs can be defined as either 3490E or 3590. 3490E-type transports not defined by UNITATTRs are presumed to be 4490 transports; 3590-type transports are presumed to be 9840 transports.

To allow the HSC to operate correctly, the user must specify UNITATTR statements for all *nonlibrary* transport models that appear to the operating system as 3490E-type and 3590-type devices. For library devices, the model type is determined by the LMU. For newly defined drives, if the LSM has not been online, the model has not been reported by the LMU. Because of this, Sun StorageTek recommends that UNITATTRs be defined for both library and nonlibrary devices.

Note: If you change your transport configuration, you may need to edit the definition data set containing the UNITATTR statements and reload it by issuing the UNITDEF command.

Syntax



Control Statement Name

UNITATTR
initiates the UNITATTR control statement.

Parameters

ADDRess
specifies the unit address to which this definition applies.

unit-address
indicates a single unit address, multiple addresses, a range of addresses, or multiple ranges of addresses. A unit address can be specified by more than one UNITATTR statement. In this case, the first UNITATTR statement specified for a unit is used.

Note: The HSC does not allow duplicate or overlapping ranges of addresses to be processed. If duplicates are encountered, the HSC issues an error message and does not load any UNITATTRs.

MODel
optionally, specifies the model number of a tape transport.

Notes:

1. A list specifies a generic pool from which a selection is made. There is no implied priority.
2. **The SL8500 library supports the T9840A, T9840B, T9840C, T9840D, T9940B, and T10000 model types.**
3. **The SL3000 library supports the T9840C, T9840D, and T10000 model types.**

model-type

identifies the model type. Valid model types are:

4480
indicates a 4480 (18-track) tape transport.

4490
indicates a 4490 (36-track Silverton) tape transport.

9490
indicates a 9490 (36-track Timberline) tape transport.

9490EE
indicates a 9490EE (36-track Timberline EE) transport.

SD3
indicates an SD-3 (RedWood) tape transport.

9840
indicates a 3490E-image 9840 transport.

984035
indicates a 3590-image 9840 transport.

T9840B
indicates a 3490E-image T9840B transport.

T9840B35
indicates a 3590-image T9840B transport.

T9840C
indicates a 3490E-image T9840C transport.

T9840C35
indicates a 3590-image T9840C transport.

T9840D
indicates a non-encryption enabled 3490E-image T9840D transport.

T9840D35
indicates a non-encryption enabled 3590-image T9840D transport.

T9840DE
indicates an encryption-enabled 3490E-image T9840D transport.

T9840DE5
indicates an encryption-enabled 3590-image T9840D transport.

T9940A
indicates a 3490E-image T9940A transport.

T9940A35
indicates a 3590-image T9940A transport.

T9940B
indicates a 3490E-image T9940B transport.

T9940B35
indicates a 3590-image T9940B transport.

T1A34
indicates a 3490E-image T10000A transport.

T1A35
indicates a 3590-image T10000A transport.

T1AE34
indicates an encryption-enabled 3490E-image T10000A transport.

T1AE35
indicates an encryption-enabled 3590-image T10000A transport.

IGNORE
indicates a nonexistent physical transport.

Note: IGNORE cannot be specified for a device that actually exists inside the library. HSC validates that UNITATTR models, if specified, match those reported by the LMU. If they do not, all UNITATTRs are rejected.

NETHOST
optionally, indicates a parameter used by LibraryStation. If this parameter is specified, the HSC ignores the entire UNITATTR statement. Conversely, LibraryStation ignores the statement unless NETHOST is specified.

Example

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

Specify Unit Attribute Statements

```
UNITATTR ADDRESS(A90-A9F) MODEL(9490)
UNITATTR ADDR(B90,B92,B94) MOD(SD3)
```

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.

The UNITDEF statement can be specified in PARMLIB, or it can be issued as an operator command to dynamically load or reload unit attribute parameters. (Refer to ‘‘PARMLIB Control Statements’’ in the *HSC Installation Guide* for an explanation of PARMLIB.) The definitions are only in effect for the host where UNITDEF is issued.

Caution: UNITATTR statements may not load after you physically update or change devices (for example, from a T9840A to a T9840C).If a UNITDEF control statement is loaded before the HSC reaches the base service level, the model type stored in the CDS may not match the UNITATTR, causing an error to be generated.

```
SLS1628I UNITDEF: Record 1 ...
MODEL is incompatible with UNIT
```

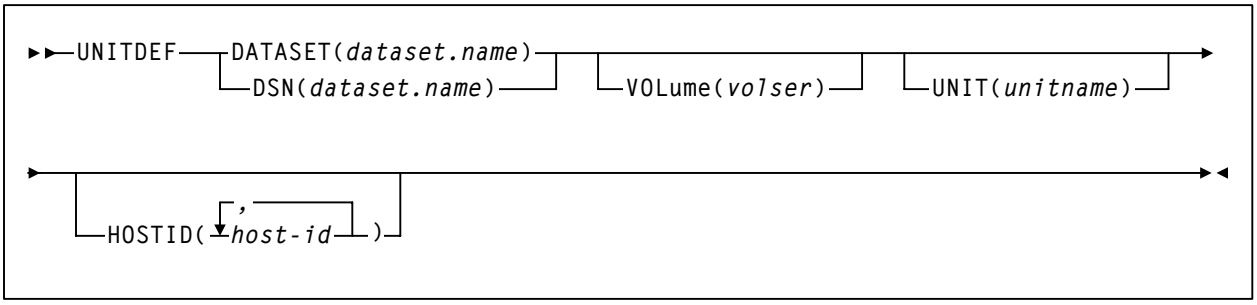
In this case, you need to reload the UNITDEF. Refer to “Swapping Library Transports - New Model Types” on page 52 to see a procedure to remedy the mismatch.

If a definition file is changed by a UNITDEF 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, UNITDEF can be used to temporarily change a definition file.

Notes:

1. When the UNITDEF 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 UNITATTR control statement(s) will be loaded (put into effect), which may cause 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.
2. If you issue multiple UNITDEF statements, the last one processed is currently active. You can determine which UNITDEF statement is active by entering the Display UNITDEF command.

Syntax



Control Statement Name

UNITDEF
initiates the UNITDEF control statement.

Parameters

DATASET or DSN
specifies the name of the data set containing the UNITATTR statements to be processed and, optionally, an OPTion TITLE statement. (Refer to "Unit Attribute (UNITATTR) Control Statement" on page 134 and "OPTion TITLE Control Statement" on page 110 for details on syntax and parameters.) The data set may contain other statements, but they will be ignored.

dataset.name
specifies the name of the data set containing UNITATTR parameters. If the dataset.name includes a member name, the entire dataset.name must be enclosed in single quotes. For example,

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

VOLume
optionally, specifies the serial number of the volume where the data set resides. If this parameter is omitted, the data set must be cataloged.

Note: The volume 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 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 example illustrates the use of the UNITDEF command and control statement.

Specify a Data Set Containing UNITATTR Statements

```
UNITDEF DSN('HSC.DEF(UNITDEF)')
UNITDEF DATASET('HSC.PARMLIB(MVSUNITS)') VOLUME(MVSA01)
UNITDEF DATASET(SYSB.UNITDEFS) UNIT(A90)
```

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 152 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, Sun 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.

Sun StorageTek recommends that the volume attribute statements in effect be the same on all processors; if not, results are unpredictable.

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 T9840A, T9840B, and T9840C drives, MEDia(STK1U)
- for T9840D drives, MEDia(STK1Y)
- 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

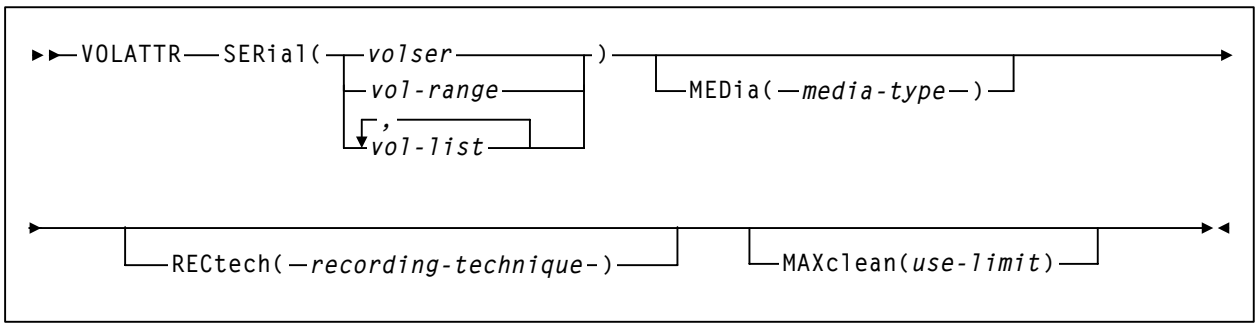
Use the following procedure to disable a VOLATTR definition.

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 9 on page 144 and Table 10 on page 147 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.

MEDia

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

Notes: T

1. **The SL8500 library supports the T9840A, T9840B, T9840C, T9840D, T9940B, and T10000 media types and recording techniques.**
2. **The SL3000 library supports the T9840C, T9840D, 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, a default is chosen based on the value of the RECtech parameter. Table 9 shows default values used if MEDia is omitted.

Table 9. 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, STK1RD, STK1RDE, STK1RDN, STK1RD34, STK1RD35, STK1RDE4, STK1RDE5	STK1R
STK2P, STK2P34, STK2P35, STK2PA, STK2PA34, STK2PA35, STK2PB, STK2PB34, STK2PB35	STK2P
T10K, T10KN, T10KE, T1A, T1AN, T1A34, T1A35, T1AE, T1AE34, T1AE35	T10000T1

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

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 4490, 9490, or 9490EE transports 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, 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).

Note: 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.

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

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), 40GB (T9840C), or 75GB (T9840D).

STK1U
indicates a T9840 cleaning cartridge. STK1U can be abbreviated to U.

STK1Y
indicates a T9840D cleaning cartridge. STK1Y can be abbreviated to Y.

STK2
indicates any T9940 cartridge. This parameter is the default for all T9940A and T9940B data cartridge types.

STK2P, STK2W
indicates a T9940 cartridge. The media indicator in the external label is encoded with the cartridge type (P or W).

Note: STK2P or STK2W can be abbreviated to P or W, respectively.

Types of T9940 cartridges, along with their associated media capacities are:

- STK2P — 60GB (T9940A) or 200GB (T9940B)
- STK2W — cleaning cartridge.

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**.

T10000CT or **CT**
indicates a T10000 cleaning cartridge. **T10000CT** 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.

Notes:

1. **The SL8500 library supports the T9840A, T9840B, T9840C, T9840D, T9940B, and T10000 media types and recording techniques.**
2. **The SL3000 library supports the T9840C, T9840D, and T10000 media types and recording techniques.**

If this parameter is not specified, a default is chosen based on the value of the MEDia parameter. Table 10 shows default values used if RECtech is omitted.

Table 10. VOLATTR RECtech Default Values

MEDia Entered:	RECtech Default:
Standard	LONGItud
ECART	36track
ZCART	36Ctrack
DD3A, DD3B, DD3C, DD3D	DD3
STK1R, STK1U, STK1Y	STK1R
STK2, STK2P, STK2W	STK2P
T10000T1, T10000TS, T10000CT	T10K

If both media type and recording technique are omitted, all available cartridges are eligible for allocation.

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.

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.

STK1RD
indicates any T9840D transport.

STK1RDE
indicates an encryption-enabled T9840D transport.

STK1RDN
indicates a non-encryption enabled T9840D transport.

STK1RD34
indicates a non-encryption enabled 3490E-image T9840D transport.

STK1RD35
indicates a non-encryption enabled 3590-image T9840D transport.

STK1RDE4
indicates an encryption-enabled 3490E-image T9840D transport.

STK1RDE5
indicates an encryption-enabled 3590-image T9840D 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.

T10K
indicates all T10000 transports.

T10KN
indicates all non-encrypted T10000 transports.

T10KE
indicates all encrypted T10000 transports.

T1A
indicates any T10000A transport.

T1AN
indicates a non-encryption enabled 3490E- or 3590-image T10000A transport.

T1A34
indicates a non-encryption enabled 3490E-image T10000A transport.

T1A35
indicates a non-encryption enabled 3590-image T10000A transport.

T1AE
indicates an encryption-enabled 3490E- or 3590-image T10000A transport.

T1AE34
indicates an encryption-enabled 3490E-image T10000A transport.

T1AE35
indicates an encryption-enabled 3590-image T10000A transport.

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 can be used before it is ejected.

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, STK1U, or STK2W.

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)
VOLATTR SER(S*,PRD000-PRD499,BY*) MED(S) RECTECH(36)
VOLATTR SER(CLN200-CLN299) MED(DD3D) REC(HEL) MAXCLEAN(50)
VOLATTR SER(CLN300-CLN599) MED(S) REC(LONGI)
VOLATTR SER(*) REC(18)
```

Notes:

1. Ask your Sun 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 141 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 Installation Guide* for an explanation of PARMLIB.)

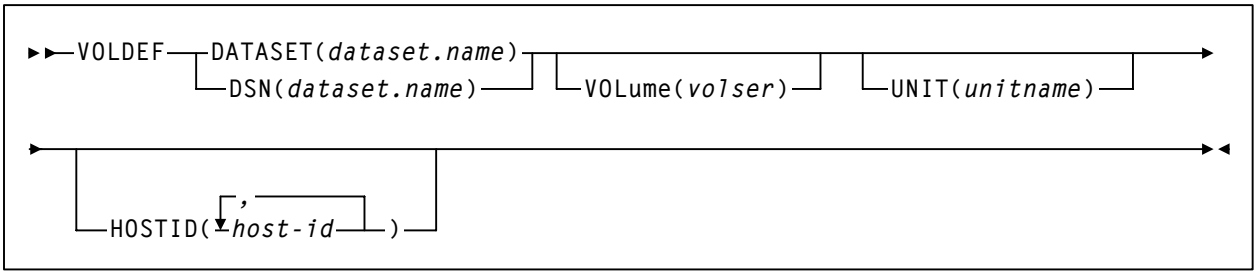
If a definition file is changed by a VOLDEF operator command, and if the change is to be permanent, you must update PARMLIB before restarting the HSC. If the definition file is to be modified for a given shift or application, remember that the new definition remains in effect until another definition 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. Sun 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 628.

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 141 and "OPTion TITLE Control Statement" on page 110 for details on syntax and parameters).

Note: The definition data set may contain 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 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(DISKØ2)
```

Creating an SLKJCL File for Starting the HSC

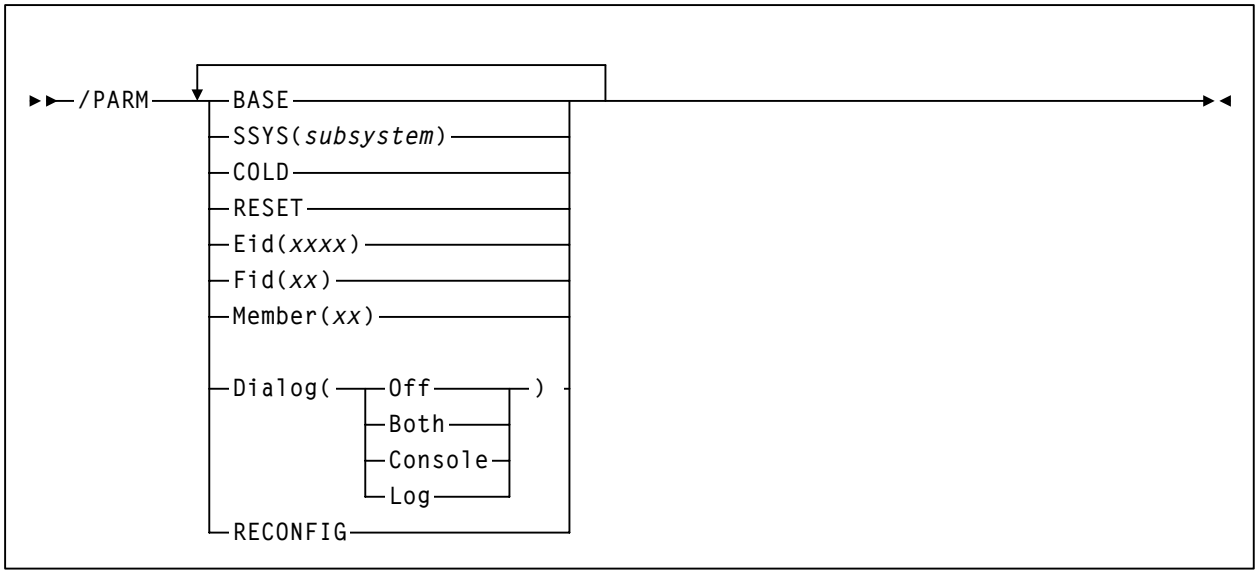
An SLKJCL file must be created on the ACS191-disk. The ACS INIT command submits the SLKJCL file. This loads the nucleus of the HSC into main storage, instructs the SCP to allocate data sets, and invokes the library host software initialization routine.

Note: Refer to "EXECParm Control Statement" on page 86 for an alternative method of specifying GTF Eid and Fid parameters. Also, see ''HSC Initialization Parameters'' and ''HSCPARM'' in the *HSC Installation Guide*.

This section describes how to create the SLKJCL file. A typical syntax for the /PARM statement and full descriptions of each of the parameters follows.

/PARM Statement

Syntax



/PARM 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 SSYS is specified, the name must match the LIBSUBSYS parameter value in the system profile (SYSPROF). 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 if the job name in the startup SLKJCL file does not match the subsystem name.

Note: Either the job name or the SSYS value must match the subsystem name or the HSC will not initialize.

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.

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.

Contact Sun 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 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.

One possible symptom of this situation is the message:

```
... 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 Sun 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 VM, xx is the suffix of an SLSSYSxx /FILE statement in the startup job to be used as the automatic commands data set. This /FILE statement may define an MVS sequential data set or PDS member, or it may define the last /FILE statement in the startup job, specified as:

```
/FILE SLSSYSxx *
```

‘‘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. These messages indicate that the HSC is waiting for an active task to complete before the HSC terminates.

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. If Dialog is not specified, Both is the default. For more information on Dialog, see ‘‘OPTION Command and Control Statement’’ in the *HSC Operator’s Guide*.

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.

HSC Startup Job (ACS SLKJCL)

Perform the steps in the following procedure to create the job file to be used to start the library subsystem. It is later invoked in an AUTOJOB statement in the ACS SYSPROF file.

1. Log on to MAINTSTK.
2. Issue the command:

   ```
   ACS UTIL HSCINIT (NOSEND
   ```

3. When XEDIT displays the file, modify it as desired.
   a. If the PARMLIB data set is shared with other hosts, specify the data set information and delete the remaining lines. or
   b. If PARMLIB statements and commands are to be specified in the startup SLKJCL file, delete the first /FILE SLSSYSxx statement. Then do the following:
      1. Verify that the CDSDEF statement contains DSNx, VOLx, and UNITx values for each control data set you want to define.
      2. Verify that the JRNDEF statement contains DSNx, VOLx, and UNITx values for each journal data set you want to define.
      3. Delete any statements that are not required.
      4. Modify or delete the startup commands provided to satisfy your site requirements and add other commands as necessary. Refer to the *HSC Operator's Guide* for explanations of commands.
4. File it to the 191 disk when the file appears as desired.
5. Rename the file (if desired).
6. Copy the file to the MAINTSTK ACS191-disk.

Example

The following listing is an example job for the ACS INIT command.

Sample ACS SLKJCL File

```
/JOB  jobname SLSBINIT
/PARM E(EØ86) F(17) MEMBER(xx)
/FILE SLSSYSXX DEV <vaddr> DSN <dsname><(member)>
/COMM If using a library with multiple hosts
/COMM   modify the /FILE SLSSYSXX statement above
/COMM   and delete the lines following it
/COMM Else delete the /FILE SLSSYSXX statement above
/COMM   and use the following for initial parameters
/FILE SLSSYSXX *
/*************************************************/
/*                                               */
/* Commands to execute automatically at startup:   */
/*                                               */
/*************************************************/
/*          Set some options                     */
  OPTion Output=<Upper|Mixed>
  MNTD AUTocln=<OFf|ON>
  MNTD Dismount=<Auto|Manual>
  MNTD Scratch=<Auto|Manual>
/*          Set CAP preferences                  */
  CAPPref <prefvalue>,<cap-list>
/*          Define control data sets             */
  CDSDEF DSN1=<prm.dsname>,VOL1=volunit1,UNIT1=unit1 -
         DSN2=<sec.dsname>,VOL2=volunit2,UNIT2=unit2 -
         DSN3=<stb.dsname>,VOL3=volunit3,UNIT3=unit3
            Define journal data sets             */
  JRNDEF DSN1=<jrn1.dsname>,VOL1=volunit1,UNIT1=unit1 -
         DSN2=<jrn2.dsname>,VOL2=volunit2,UNIT2=unit2 -
         HOSTID=<hostid>
/*          Define host-to-host communications   */
  COMMPath HOSTid=<hostid> METHod=vtam VTAMpath=<applid1> LMUpath=<ØØ>
  COMMPath HOSTid=<hst2> METHod=vtam VTAMpath=<applid2> LMUpath=<ØØ>
/*          Define scratch subpools              */
  SCRPOol NAME=<pool1> RANGE=<ØØØ3ØØ-ØØ32Ø> LABEL=<sl> HOSTID=<hostid>
/*          Define scratch thresholds            */
  Warn SCRatch <ØØ> SUBpool=<pool1> THReshld=<4ØØ>
/*          Get LSMs online                      */
  MODify <ØØØ> <ONline|OFFline>
  MODify <ØØ1> <ONline|OFFline>
/*          Display library status               */
  Display ALl
  Display CDS
```

Notes:

1. The job name in the startup SLKJCL file must match the subsystem name specified with the LIBSUBSYS parameter in the SYSPROF or it must be specified with the SSYS parameter in the /PARM statement. Refer to “SSYS” on page 156 for more information.
2. 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’’ in the *HSC System Programmer’s Guide* for more information.
3. 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).
4. 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’’ in the *HSC System Programmer’s Guide* for more information.
5. 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.

Description of /FILE Statement

The following is a description of the JCL /FILE statement used in the example job for the ACS INIT command.

SLSSYSXX
: statement that defines the sequential data set or PDS member containing the PARMLIB definitions.

Starting HSC Execution

Initialize the HSC. Refer to “Starting the HSC” on page 163 for information about how to start execution of the HSC.

Note: The subsystem name specified with the LIBSUBSYS parameter in the SYSPROF must match the jobname in the startup SLKJCL file or it must be specified with the SSYS parameter in the /PARM statement. Refer to “SSYS” on page 156 for more information.

When phases of HSC initialization are completed, messages are displayed indicating completion of the initialization phases. Messages inform you when HSC base service level and when HSC full service level initialization is completed.

If SMF options for the HSC were not specified by a SET PERFlog command in the system profile, 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 statement in the HSC startup SLKJCL, HSC issues a message indicating that default Eid and Fid values are being used.

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 the 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 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/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.**

Starting the HSC

The HSC software can be initialized in three ways:

- Start the ACS service machine via the CP AUTOLOG command.
- Issue the ACS INIT command from the service machine virtual console.
- Submit the HSC startup SLKJCL to the ACS service machine, if the SCP is already executing but without the HSC.

Parameters associated with the /PARM statement in the HSC startup SLKJCL (see “Creating an SLKJCL File for Starting the HSC” on page 155) can also be supplied via a PARM= option with the ACS INIT command and the ACS SUBMIT command. Specifying the PARM= option appends the parameters specified to the parameters on an existing /PARM statement, or creates a new /PARM statement. In this way, most of the startup parameters can be overridden.

The HSC can be initialized to a full or base service level via parameters on an existing /PARM statement in the startup SLKJCL, or by issuing the ACS INIT or ACS SUBMIT commands with the PARM= option.

Initializing the HSC to the Full Service Level

Normally, HSC software is initialized to the full service level when it is started. The syntax for the commands used to initialize the HSC to the full service level is shown below.

Syntax for Initializing HSC to Full Service Level

```
AUTOLOG svmname pswd
  - or -
ACS INIT
  - or -
ACS SUBMIT strtjclfn strtjclft strtjclfm  libclass
```

AUTOLOG svmname pswd - or - ACS INIT - or - ACS SUBMIT strtjclfn strtjclft strtjclfm libclass.

Initializing the HSC to the Base Service Level

HSC software can be started to the base service level by adding the BASE parameter on the /PARM statement of the startup SLKJCL, this includes specifying it on the ACS INIT or ACS SUBMIT commands. When using the CP AUTOLOG command, the BASE parameter must be specified on an existing /PARM statement in the startup SLKJCL. The BASE parameter can be used with other parameters on the /PARM statement.

When the BASE parameter is specified in the startup SLKJCL, the syntax to initialize the HSC to the base service level is the same as for initializing to the full service level.

When the BASE parameter is not specified in the startup SLKJCL, the commands used to initialize the HSC to the base service level must include a PARM=BASE parameter.

Syntax for Initializing HSC to Base Service Level

```
ACS INIT ( PARM=BASE
  - or -
ACS SUBMIT strtjclfn strtjclft strtjclfm  libclass ( PARM=BASE
```

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 11. Utilities Overview

Function	Utility
Library Control Data Set Maintenance	AUDIt BACKup Database Decompile (LIBGEN) Directory Rebuild (DIRBLD) Journal Offload (OFFLoad) RESTore SET
Cartridge Control	Eject Cartridge (EJECt) Enter Cartridges (ENTer) MOVe UNSElect
Scratch Volume Control	Scratch Redistribution (SCREdist) Scratch Update (SCRAtch, UNSCratch, and REPLaceall)
Reporting	Activities Report (ACTIvities) Performance Log Reblocker (SLUPERF) Volume Report (VOLRpt)

In addition, utilities contain the following attributes:

- Most are submitted to the SCP for execution, but some require or allow special environments.
- Utilities submitted as batch jobs to the SCP require the use of special SCP JCL (SLKJCL) statements.
- Specific utility functions are requested by special utility control statements which define the function and supply all required parameters; these are distinct from JCL statements.

- The ACS UTIL exec can be used to generate a template for all required SLKJCL and control statements for any utilities requested, and is recommended for beginners.

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 12. The applicable utility for each specific function is contained in the table.

Table 12. 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
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
Enter one or more cartridges into the ACS in batch mode	ENTer
Force unselection of a volume selected by the HSC	UNSElect
Inventory cartridges in the library	AUDIt
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)
207Print 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)

Table 12. HSC Utilities and Functions (Continued)

Function	Utility to Use
Restore or recreate the library CDS	RESTore
Set or change library configuration information, including: - ACS esoteric - CDS level - cleaning prefix - delete disposition - device numbers for drives - eject password - host identification - HSC command prefix - HSC level - library station device numbers - MAJNAME (QNAME) - nonlibrary esoteric - scratch label type - SMF record type - recovery technique	SET

Note: If you are running a mixed multi-host complex of HSC 5.1, 6.0, and 6.1 systems, refer to “Migration and Coexistence Processes” in the *HSC Installation Guide* for the proper utility release level.

Typical Use of Utilities

A typical use of utility functions might be, for example, to enter some cartridges into the library through the CAP using the Enter Cartridges utility, add scratch volumes to the CDS by invoking the Scratch Update utility, and run the Volume Report utility to determine the physical location of volumes in an LSM. In the following example

- cartridges are being entered through CAP 02
- volumes A1B1C1 through A1B1C4 have been designated as scratch volumes
- the volume report is being run for ACS 01, LSMs 0 and 1.

Note: /PARM MIXED in the JCL specifies mixed characters.

The JCL for invoking these utilities is:

```
/JOB     jobname  SLUADMIN
/PARM    MIXED
/FILE    SLSCNTL  DEV vaddr  DSN dsname
/FILE    SLSPRINT DEV PRNT CLASS A
  ENTER CAP(Ø2)
  SCRATCH  VOLSER(A1B1C1,A1B1C2,A1B1C3,A1B1C4)
  VOLRPT ACS(Ø1) LSM(Ø,1)
```

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.

For convenience, most utility programs can be run as a single-step batch job submitted to the ACS service machine, otherwise known as the SCP environment. The submitted file consists of SCP job control statements which define the files needed to run the SLUADMIN program, and utility control statements which specify the desired utility functions and parameters.

Any virtual machine that is authorized for commands to the ACS service machine may submit library utilities. The file to be submitted is ‘‘punched and spooled’’ to the ACS service machine’s ‘‘reader.’’ Within the SCP environment, utilities then run as batch jobs under the SCP. The submitting virtual machine is notified (via console messages) when the job begins execution, when it ends, and what the final return code is. The resulting reports are then spooled back to the submitter.

Exceptions to this are these reporting utilities:

- Activities Report utility
- Performance Log Reblocker
- Volume Report.

The Activities Report utility runs in the CMS environment, and the Performance Log Reblocker runs in either the CMS or MVS environments. Utilities that are run in the CMS environment require CP LINK read access to the MAINTSTK RUN-disk.

The Volume Report utility executes in the SCP batch job environment in CMS, or in stand-alone mode in the POST/SAE environment. Stand-alone mode allows the administrator to locate backup tapes when the ACS service machine cannot be started due to the loss of a critical DASD data set.

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 D, “Macros, Control Statements, Utilities, and Commands Syntax Reference”.

Utility Syntax Conventions

Utility syntax is illustrated using syntax flow diagrams. For a complete description of this syntax convention, refer to Appendix D, “Macros, Control Statements, Utilities, and Commands Syntax Reference”.

Utility Environmental Requirements

Most of the utility functions require the HSC (Host Software Component) to be operational. However, a few are either independent of the HSC or have special environmental requirements:

- The Backup utility and the Journal Offload utility require the ACS service machine SCP to be available, but not the HSC.
- The Restore utility likewise requires the SCP to be available and also requires the HSC to be non-operational.
- The Activities Report utility, the Performance Log Reblocker utility, and the Volume Report utility run in the CMS environment and are independent of the HSC and the SCP. The Performance Log Reblocker can also be run in the MVS environment.

Note: For systems running VM ESA Version 2 or higher, utilities that are run in CMS can run in XA or XC mode with SET 370ACCOM ON. For VM ESA below Version 2, utilities run in CMS must run in 370 mode.

ACS UTIL Exec

The most convenient way for a beginner to run the utilities is to use the ACS UTIL exec. When provided with the names of the utilities to be executed, the ACS UTIL exec builds a file containing the control statements required to execute these utilities in the appropriate SCP or CMS environment. The file is then displayed for editing by the user who must then fill in, or change the supplied template parameters. The exec then checks these parameters for errors and submits the utility for execution.

The ACS UTIL exec may be used for any utilities that run in the SCP or CMS environments.

More than one utility may be invoked at a time.

The ACS UTIL command has the following syntax:

```
EXEC ACS UTIL util-list
```

This command creates utility statements to execute all the utilities named in util-list. The valid values that may be entered in the util-list are listed below and are also shown in the utility syntax examples provided throughout the remainder of this chapter. The minimum abbreviation is denoted by uppercase letters. Appendix D, “Macros, Control Statements, Utilities, and Commands Syntax Reference” contains a complete syntax for all of the utilities.

ACTIVities	Activity distribution report
ACTIVity	Activity distribution report
AUDIT	Audit library contents
BACKup	Back up the library control data set
EJECt	Eject a list of volumes
ENTEr	Enter volumes through the CAP
HSCINIT	Create HSC startup job
IVP1	JCL for Installation Verification
LIBGen	Decompile the LIBGEN database
MOVe	Move volume(s) to other locations in the library
OFFLoad	Offload a journal data set
RECONfig	Reconfigure the library subsystem
REPLaceall	Replace the scratch volume list
RESTore	Restore control data set from a backup
SCRAtch	Change volumes to scratch status
SCREdist	Scratch volume redistribution

SET	Change library configuration information
SLICREAT	Library control data set creation
SLIMDisk	Allocate an OS-format data set on a minidisk
SLIVInt	Initialize a volume in OS format
SLSBINIT	Create HSC startup job
SLUACtv	Activity distribution report
SLUETRac	Format trace records
SLUPErf	Reblock performance log data
TRAce	Format execution trace data
UNSCratch	Change volumes to non-scratch status
UNSElect	Unselect a volume that was left selected by HSC
VOLRpt	Volume location report

CMS Environment

For utilities that run in the CMS environment, an edit session of an EXEC 2 file is presented for you to modify. The file identifier is ACSCMS EXEC.

Note: For systems running VM ESA Version 2 or higher, utilities that are run in CMS can run in XA or XC mode with SET 370ACCOM ON. For VM ESA below Version 2, utilities run in CMS must run in 370 mode.

For example, entering:

```
EXEC ACS UTIL SLUACTV
```

produces the edit session display of this ACSCMS EXEC file:

ACSCMS EXEC

```
&TRACE ALL
* EXEC SLUACTV <ctlfname|SLUACTV> <ctlftype|PARMS> <ctlfmode|*>
```

If you decide not to execute the utility, then enter the XEDIT command QUIT.

To execute the utility, perform the following steps:

1. Delete the lines in the template that are not required, or leave the comment indicator (*) in column one.
2. Remove the comment indicator (*) from the desired lines.
3. Specify values for the desired parameters.
4. Delete the parameters that are not desired.

5. Enter the XEDIT command FILE. The file ACSCMS EXEC A is then executed to run the utility, and the ACSCMS exec remains on the caller's A-disk.

SCP Environment

For utilities that run in the SCP environment, job statements for the requested utilities are constructed from parameters in the system profile (ACS SYSPROF). Parameter statement templates are presented for the caller to edit. Only noncomment statements are processed further.

For example, entering:

```
EXEC ACS UTIL AUDIT
```

produces an edit session display of this ACSUTIL SLKJCL file:

ACSUTIL SLKJCL file

```
/JOB ACSUTIL SLUADMIN
/PARM MIXED
/FILE SLSPRINT DEV PRNT CLASS A
/FILE SLSIN *
* AUDIT ALL APPLY(YES)
* AUDIT ACS(acsid) LSM(lsm-list) PANEL(panel-list) CAP(capid)-
*       ROW(row-list) COLumn(col-list) APPLY(YES)
```

This file provides templates for two AUDIT runs. The first is a complete audit of an entire ACS (note that this would run many hours). The second provides all the parameters that may be used to limit the scope of the audit. As initially presented, all control statements are actually just comments.

If you decide not to execute the utility, then enter the XEDIT command QUIT.

To execute the utility, perform the following steps:

1. Delete the lines in the template that are not required, or leave the comment indicator (*) in column one.
2. Remove the comment indicator (*) from the desired lines.
3. Specify values for the desired parameters.
4. Delete the parameters that are not desired.
5. Enter the command ‘‘FILE.’’
6. The job statements are then checked for errors, and if none are found, the file ACSUTIL SLKJCL A is both saved on the user's A-disk and submitted to the ACS service machine to run as an SCP batch job (class U). The submitting virtual machine is notified (via console messages) when the job begins execution, when it ends, and what the final return code is. The resultant reports are then spooled back to the submitter.

JCL and Control Statements

Although the ACS exec can generate a template job file, the utility control statements (and possibly the SCP JCL) must be modified by the user. To do this the user should have some understanding of the format and function of these statements.

SCP Batch Job Control Language (JCL)

The function of the SCP Job Control Language is to provide enough information to the SCP to execute the requested utility within the SCP batch job environment. It defines the name of the job to be executed, the name of program module to execute, the specific files to be used by the program, and perhaps some miscellaneous parameters.

The suggested file type is SLKJCL, and the file must consist of fixed, 80 column card-image records, composed of the following job control statements:

```
/JOB jobname pgmname
/PARM parms ...
/COMM comments ...
/FILE fileopts ...
```

Note: With the exception of the /PARM statement values, all JCL statements are case insensitive.

/JOB Statement

The /JOB statement must be the first statement in a file of Job Control statements known as a job stream or JCL. It defines the name of the job (jobname), and the name of the program module to be executed (pgmname). Typically this is SLUADMIN.

There must be one and only one /JOB statement per job stream.

```
/JOB jobname pgmname
```

jobname

the name of the job. It must be from 1 to 8 alphanumeric characters beginning with an alphabetic character.

pgmname

the name of the program to be executed. It must be from 1 to 8 alphanumeric characters beginning with an alpha. Program must be a module in one of the SCP/HSC LOADLIBs.

/PARM Statement

The /PARM statement supplies parameters for the program (pgmname). These parameters and their format are program dependent.

There may be only one /PARM statement per job. If supplied, it must immediately follow the /JOB statement.

```
/PARM parms
```

parms
the parameters to be passed.

Note: Mixed case parameters will not be forced to uppercase.

/COMM Statement

A /COMM statement is a comment statement. It may be used only before or after /FILE statements.

Note: After a ‘‘/FILE ddname *’’ statement, a /COMM statement is interpreted as data.

```
/COMM comments
```

comments
comments of any format.

/FILE Statement

The /FILE statement describes a file to be used by the job. The parameters are identical to the FILE command, described in the *HSC Operator’s Guide*.

There may be zero or more /FILE statements.

Note: A ‘‘/FILE ddname *’’ statement defines a file of user-data card-image records that begins with the next record and continues until end-of-file. This type of /FILE statement must be the last JCL statement in the job file.

```
/FILE fileopts
```

fileopts
FILE command parameters.

Submitting Jobs

Jobs may be submitted to the ACS service machine in several ways.

1. One method is to use ACS EXEC. This method does not require that the sender knows the protocol or the name/node of the ACS service machine. It is the recommended technique.

   ```
   EXEC ACS SUBMIT fname ftype fmode class
   ```

   fname
   the CMS filename of the job file.

   ftype
   the CMS filetype of the job file. If omitted, it defaults to 'SLKJCL'.

   fmode
   the CMS filemode of the job file. If omitted, it defaults to ''*''.

   class
   the job class desired. If omitted, it defaults to ''U''.

   Note: These jobs must be submitted in job class L:

   - HSC startup (HSCINIT, SLSBINIT)
   - RECONFIG

2. From a virtual machine on the same host:

   ```
   CP SPOOL PUN acsname NOCONT NOHOLD CLASS class
   PUNCH fname ftype fmode (NOHeader
   ```

   acsname
   the name of the ACS service machine

3. From a virtual machine on another network node:

   ```
   CP SPOOL PUN RSCS NOCONT NOHOLD CLASS class
   CP TAG DEV PUN nodename acsname
   PUNCH fname ftype fmode (NOHeader
   ```

   acsname
   the name of the ACS service machine

   nodename
   the name of the RSCS network node where the service machine resides

Utility Control Statements

Control Statements vs. JCL

In contrast to the SCP Job Control Language, the utility control statements are processed only by the executed utility, not by the SCP. They supply all the specific parameters required to execute a utility program (that is, function, cartridge VOLSER, location, etc.).

Briefly then, a control statement consists of a command (indicating the utility function) followed by zero or more parameters in 80 column card-image records. A complete syntax for the statements can be found in Appendix D, “Macros, Control Statements, Utilities, and Commands Syntax Reference”.

Sample SCP Batch Job File - JCL and Control Statements

The ACS UTIL command used to create a template for invoking three utility functions (first a Scratch Update utility, followed by an Audit utility against one Library Storage Module [LSM], and finally a Volume Report) is:

```
EXEC ACS UTIL SCRATCH AUDIT VOLRPT
```

A sample job file might appear as follows:

```
/JOB   jobname SLUADMIN
/FILE  SLSPRINT DEV PRNT CLASS A
/FILE  SLSIN    *
* SCRATCH  VOLSER(vol-list)
* AUDIT    ALL APPLY(YES)
* AUDIT    ACS(acsid) LSM(lsmlist) PANEL(panel-list) CAP(capid) -
*          ROW(row-list) COLUMN(col-list) APPLY(YES)
* VOLRPT   ACS(acsid) LSM(lsmlist)
* VOLRPT   VOLSER(vol-list)
```

Note: It is only necessary to supply those /FILE statements required by the particular utility function(s) being invoked. Utility functions can also share data sets represented by the same /FILE statement.

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 SLS0241I 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 statements’’ appears in this sample JCL, enter the utilities you want to execute.

For example:

```
SET HOSTID(HSC2) FORHOST(HSCB)
OFFLoad
SCREdist ACS(Ø1)
```

JCL to Invoke SLUADMIN

```
/JOB    jobname
/PARM   MIXED
/FILE   SLSPRINT DEV PRNT CLASS A
/FILE   SLSIN    *
  utility statements
          .
          .
          .
```

How to Invoke Utility Programs

For convenience, most utility programs are packaged to appear as a single, user-invoked program. The Performance Log Reblocker utility is an exception.

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.

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. **Note**: 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 Messages and Codes Guide* 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, and
- name of the utility function executed.

Parameters Controlling Report Headings

There are two optional parameters that change the format of output reports.

Parameter	Description
NOHDR	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. This parameter can be used only with the Activities Report, MOVe, and Volume Report utilities. NOHDR and LINECNT are mutually exclusive. If NOHDR is not specified, the default is to print headings containing the following information: • date/time of the report • page number(s) • host software version number • name of the utility function executed.
MIXED	Prints all report headings and messages in mixed case. The default is uppercase.
LINECNT=*nn*	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.

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 10 on page 195 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 VM Operating System to be available and some require the SCP to be running. These stand-alone utilities are:

- Activities Report
- BACKup
- Database Decompile
- Directory Rebuild
- Journal Offload
- RESTore, which requires the HSC to be quiesced
- 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 executes in the CMS environment using the SLUACTV exec.

SLUACTV EXEC

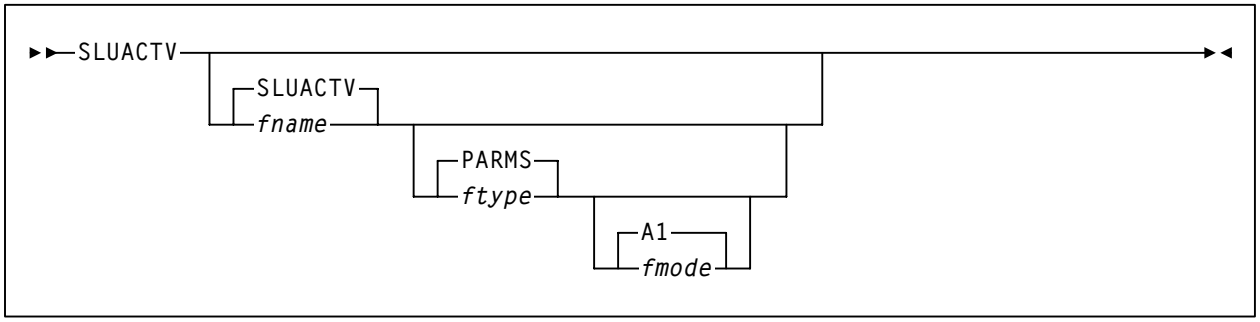
The SLUACTV EXEC is the means to execute the library Activities Report utility in the CMS environment.

Note: In the CMS environment, this utility can report only on SMF data created by the library when running in the Sun StorageTek SCP environment.

The Performance Log Reblocker (SLUPERF) utility must be run prior to executing the Activities Report utility. Parameters are passed to the utility in a control file (SLUACTV PARMS). These parameters include:

- parameters (/PARM) to pass to the utilities driver
- the name and location of the library's primary control data set
- the destination of the report output
- the names of files containing SMF data to be reported on
- the date/time range that is to be reported.

Note: The Activities Report utility is not supported for the SL8500 library.



fname

the CMS filename of the control file. The file must be fixed-format, record length 80. The default is **SLUACTV**.

type

the CMS filetype of the control file. The default is **PARMS**.

fmode

the CMS filemode of the control file. The default is A1.

The control file must be fixed-format, record length 80, and must contain the following statements:

PARM
parameters to the SLUADMIN program that drive the utility.

MIXED
specifies that output is to be mixed case. The default is uppercase.

NOHD
specifies that page headers are not to be printed. The default is to print page headers.

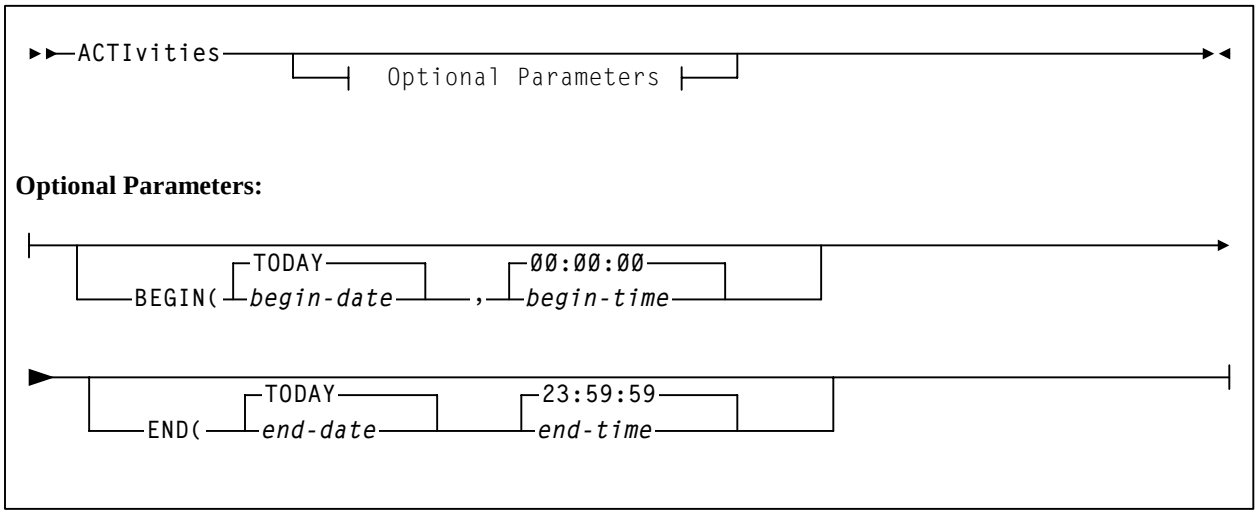
SLSCNTL *vaddr* DSN *dsname*
specifies the name of the library's primary control data set (*dsname*). The default is obtained from the ACS SYSPROF file. The caller must have the volume it is on accessible as the given device address (*vaddr*). This parameter is required so that the SMF record type code may be retrieved.

SLSPRINT DISK *fname ftype fmode* or SLSPRINT PRINTER
identifies the definition of the output file to be produced. The output may either go to the named file or directly to a print spool file. This file contains the output messages and report from the utility.

SLSSMF *fname ftype fmode*
identifies the names of the SMF data files (output by the SLUPERF utility) to be examined. The filename specified will be used as a parameter to the CMS LISTFILE command to produce a list of all qualified files. See the documentation for that command for details on special wildcard symbols which may be used.

SLSIN ACTIvities *parms*
specifies the input to the utility taken from the parameter list that follows (see ''Syntax'' and ''Parameters'' below).

Syntax



Utility Name

ACTIvities
specifies that an activities report is to be produced.

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 (19*xx*) date. Specify a *yy* value of 70 or less to indicate a 21st century (20*xx*) 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 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)
```

Invoking the Activities Report Utility

To invoke the Activities Report utility in VM, enter:

```
EXEC ACS UTIL ACTIVities
```

Execution of the statement results in the following ACSCMS EXEC file:

ACSCMS EXEC

```
&TRACE ALL
* EXEC SLUACTV <ctlfname|SLUACTV> <ctlftype|PARMS> <ctlfmode|*>
```

To execute the ACTIvities utility:

1. Remove the comment indicator (*) on the left, and specify the name of the control file to be used to specify the actual utility parameters.
2. Enter the ‘‘FILE’’ command after the previous step is done.
3. The named file (or the default control file) will then be presented to the caller for modification.
4. Change any statements, then enter ‘‘FILE.’’

Control File Example

The following example shows a control file for producing an Activities report beginning on December 2, 1999 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.)

Note: An Activities Report is run from a control file in the invoker’s virtual machine rather than as JCL in SCP.

Control File to Produce an Activities Report

```
* Parameters for SLUACTV EXEC
PARM      MIXED
SLSCNTL   5F0
SLSPRINT  DISK SLUACTV SLSPRINT A
SLSSMF    * PERFLOG A
SLSIN     ACTIVITIES BEGIN (12/02/99,12:00:00)
```

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 LSM
- 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.

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 193).
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 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=SCRTCH. If this defaults to or specifies DELDISP=NOSCRTCH, then there are no scratch dismounts.
7. 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.
8. 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 ‘‘Adding SMF Parameters’’ in the *HSC Installation Guide*).

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 ‘‘Adding SMF Parameters’’ in the *HSC 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 SLSSLSB SMF record (refer to “SLSSLSB” on page 693) will contain zeroes in the LMU ATHS Statistics Buffer entries, and the SLSSLLG6 LOGREC record (refer to “SLSSLLG6” on page 728) will not write robotics motion and soft fail counts for 9740s.

Figure 10 on page 195 is an example of a typical Activities report.

```
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 HSCH HSCF HSCE HSC6 HSC2
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-THRUS      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-THRUS      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-THRUS      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-THRUS      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  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  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  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  N/A
SLS0155I CONDITION CODE FOR UTILITY FUNCTION IS 0
```

Figure 10. 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).

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. **SL8500 and SL3000 libraries will not enter a non-labeled cartridge.**

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, 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.

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 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.

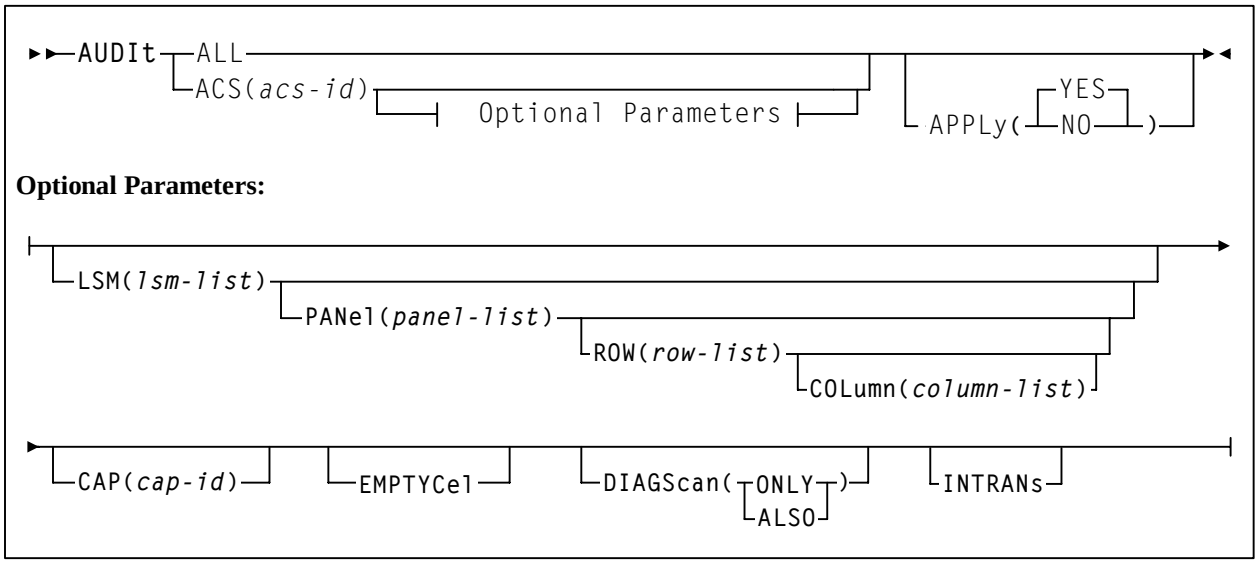
In some cases, running concurrent audits may compromise the accuracy of the audits. For example, two concurrent audits running on different VM systems may not detect duplicate volumes if both utilities audit separate library elements containing duplicate volumes.

To avoid compromising audit accuracy, secondary audits are not allowed within elements of any LSM participating in any concurrent audit situation until all audits running concurrently finish. A message is displayed when a secondary audit is attempted against elements in an LSM for which another audit completed but was participating in concurrent audit processing for which all audits have not completed.

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 Scratch Redistribution utility 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 (*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. 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.
- LSM Model SL3000 StreamLine Library
  - Access Expansion Module (AEM optional) - panels 0 -1 and 22-23 are located on both ends of the library and in this release serve only as library end caps
  - Base Drive Module (BDM required) - panels 12-13
  - Drive Expansion Module (DEM optional) - panels 10-11 are located left of the BDM
  - Cartridge Expansion Module (CEM optional) panels 2-9 are located left of the BDM or optional DEM.
  - Cartridge Expansion Module (CEM optional) panels 14 -21 are located right of the BDM.

- Parking Expansion Module (PEM) - **Dual Robots only** - panel numbers equate to the same panel numbers of the CEM it replaces, depending on its location right or left of the BDM.

Note: The library has static panels numbers starting with the left-most back panel (panel 0), alternating back-to-front left to right, and ending the right-most front panel (panel 23).

- 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.
- LSM Model SL3000 StreamLine Library
  - Access Expansion Modules - panels 0-1 and 22-23 (no cells in this initial release)
  - Base Drive Module (BDM) - panel 12 (back)
    12-47 with 8 drives installed
    23-47 with 16 drives installed
    35-47 with 24 drives installed

- Base Drive Module (BDM) - panel 13 (front)
  0-51 on the front panel

- Drive Expansion Module (DEM) - panel 10 (back)
  12-47 available with 8 drives installed
  23-47 available with 16 drives installed
  35-47 available with 24 drives installed
  No rows available with 32 drives installed

- Drive Expansion Module (DEM) - panel 11 (front)
  0-51 available on the front panel

- Cartridge Expansion Modules (CEM) - all panels
  0-51 available on both front and back panels

- Parking Expansion Module (PEM) - all panels
  0-51 available on the back and front panels

- 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 though 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 SL3000 libraries:
  - Access Expansion Module (AEM) panels 0-1 and 22-23
    No columns available in the initial release.
  - Base Drive Module (BDM) - panel 12 (back)
    0 is available, if a CEM or DEM is added to the left of the BDM
    1-5 available for rows 12-47 with 8 drives installed
    1-5 available for rows 23-47 with 16 drives installed
    1-5 available for rows 35-47 with 24 drives installed.
  - Base Drive Module (BDM) - panel 13 (front)
    0 available with expansion to the left of the BDM
    5 available for rows 39-51 with expansion to the right of the BDM
    1-3 available for rows 0-38 with a CAP installed
    1-4 available for rows 39-51 with a CAP installed
    1-3 not available for rows 9-16 with optional window/Operator panel installed.
  - Drive Expansion Module (DEM) - panel 10 (back)
    0 is available with expansion to the left of the DEM
    1-5 available for rows 12-47 with 8 drives installed
    1-5 available for rows 23-47 with 16 drives installed
    1-5 available for rows 35-47 with 24 drives installed
    No columns available with 32 drives installed.
  - Drive Expansion Module (DEM) - panel 11 (front)
    0 available with expansion to the left DEM
    1-3 available for rows 0-38 with a CAP installed
    1-5 available for rows 39-51, with a CAP installed
    1-3 not available for rows 9-16 with a window installed
    1-5 available for rows 0-51 on a standard DEM panel.
  - Cartridge Expansion Module (CEM) - panels 2, 4, 6, 8 (back)
    0 available with expansion to the left
    1- 5 available on the standard CEM back panel.
  - Cartridge Expansion Module (CEM) - panels 3, 5, 7, 9 (front)
    0 available with expansion to the left
    1-3 available for rows 0-38 with a CAP installed
    1-4 available for rows 39-51, with a CAP installed
    1-4 available on the standard CEM front panel.
  - Cartridge Expansion Module (CEM) - panels 14, 16, 18, 20 (back)
    0-5 available on the standard CEM back panel.
  - Cartridge Expansion Module (CEM) - panels 15, 17, 19, 21 (front)
    0-3 available for rows 0-39 with a CAP installed
    0-5 available for rows 39-51 with a CAP installed
    0-5 available on the standard CEM front panel.

- Parking Expansion Module (PEM) - left side PEM
  3-5 available on the back and front panels with a second robot installed.

- Parking Expansion Module (PEM) - right side PEM
  0-2 available on the back and front panels with a second robot installed.

- 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
- an unused SL3000 AEM 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
- an optional SL3000 CEM CAP consisting of 2, 13-cell removable magazines
- 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.
- an optional SL3000 CEM CAP consisting of 2, 13-cell removable magazines.

03, 04, 05 indicates the following:

- optional SL3000 CEM/DEM CAPs each consisting of 2, 13-cell removable magazines.

06 indicates the following:

- the only required SL3000 BDM CAP consisting of 2, 13-cell removable magazines.

07, 08, 09, 0A indicates the following:

- optional SL3000 CEM CAPs each consisting of 2, 13-cell removable magazines.

0B indicates the following:

- an optional SL3000 AEM CAP.

Notes:

- If SL3000 library CAPs are not present, the HSC reports them as “not installed” This keeps CAP addresses from changing as new CAPs are added.
- Refer to the individual command explanations for additional information on specifying CAPids.
- SL3000 and SL8500 libraries do not contain a PCAP.
- 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: Sun StorageTek does not recommend running an empty cell audit on an SL3000 or 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.

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 Requirements

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.

Invoking the Audit Utility

The easiest way to run utilities is to execute the ACS UTIL exec by entering the following command:

```
EXEC ACS UTIL AUDIT
```

Execution of the statement results in the ACSUTIL SLKJCL file:

ACSUTIL SLKJCL File

```
/JOB  jobname SLUADMIN
/PARM MIXED
/FILe SLSPRINT DEV PRNT CLASS A
/FILE SLSIN    *
* AUDIT ALL APPLY (YES)
* AUDIT ACS(acsid) LSM(lsm-list) PANEL(panel-list) CAP(capid) -
*       ROW(row-list) COLUMN(col-list) APPLY(YES)
```

To execute the utility:

1. Delete the lines in the template that are not required, or leave the comment indicator (*) in column one.
2. Remove the comment indicator from the desired lines.
3. Specify values for the desired parameters.
4. Delete the parameters that are not desired.
5. Enter the command ‘‘FILE.’’

The job file is then submitted to the ACS service machine for execution.

JCL Examples

The following example shows JCL for auditing an entire library (all ACSs).

JCL for Audit of Entire Library (all ACSs)

```
/JOB     jobname   SLUADMIN
/PARM    MIXED
/FILE    SLSPRINT  DEV PRNT CLASS A
/FILE    SLSIN     *
  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)

```
/JOB     jobname   SLUADMIN
/PARM    MIXED
/FILE    SLSPRINT DEV PRNT CLASS A
/FILE    SLSIN    *
  AUDIT  ACS(Ø1) LSM(Ø1,Ø2) CAP(ØØ)
```

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)

```
/JOB     jobname   SLUADMIN
/PARM    MIXED
/FILE    SLSPRINT DEV PRNT CLASS A
/FILE    SLSIN    *
  AUDIT  ACS(Ø1) LSM(Ø4) 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)
/*
//
```

JCL for Selective Audit that Includes Diagnostic Cells

```
/JOBAUDT     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 11 on page 211)
- 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 11. AUDIt Utility Sample Output

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 multi-processor 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 non-identical 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 Remote-linked Libraries” on page 214 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.

Note: 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.

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 /FILE 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 225).

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 286 for detailed information on the RESTore 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 “JCL Examples” on page 220 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’s volume 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 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.

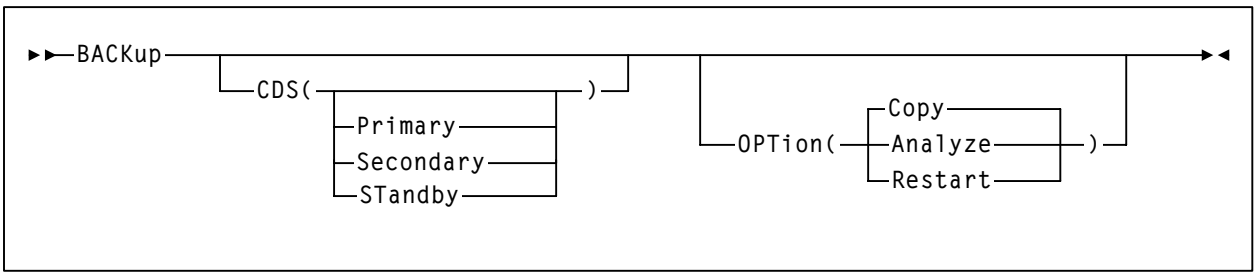
Special considerations after the link is restored include:

- 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 /FILE 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.

Parameters

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. /FILE 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 12 on page 223 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 12 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.

Note: 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.

(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.

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 /FILE 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 /FILE 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. 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.

Invoking the BACKup Utility

The easiest way to run utilities is to execute the ACS UTIL exec by entering the following command:

```
EXEC ACS UTIL BACKUP
```

Execution of the statement results in the ACSUTIL SLKJCL file:

ACSUTIL SLKJCL File

```
/JOB  jobname   SLUADMIN
/PARM MIXED
/FILE SLSPRINT DEV PRNT CLASS A
/FILE SLSCNTL  DEV <vaddr>   DSN <dsname>
/FILE SLSCNTL2 DEV <vaddr>   DSN <dsname>
/FILE SLSBKUP  DEV <vaddr>   DSN <dsname>
/FILE SLSCOPY1 DEV <vaddr>   DSN <dsname>
/FILE SLSCOPY2 DEV <vaddr>   DSN <dsname>
/FILE SLSJRNØ1 DEV <vaddr>   DSN <dsname>
/FILE SLSJRNØ2 DEV <vaddr>   DSN <dsname>
/FILE SLSIN    *
* BACKUP OPT(COPY)
```

To execute the utility:

1. Delete the lines in the template that are not required, or leave the comment indicator (*) in column one.
2. Remove the comment indicator from the desired lines.
3. Specify values for the desired parameters.
4. Delete the parameters that are not desired.
5. Enter the command ‘‘FILE.’’

The job file is then submitted to the ACS service machine for execution.

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    jobname SLUADMIN
/PARM   MIXED
/FILE   SLSCNTL   DEV vaddr  DSN primary.set.name
/FILE   SLSCNTL2  DEV vaddr  DSN secondary.set.name
/FILE   SLSSTBY   DEV vaddr  DSN standby.set.name
/FILE   SLSBKUP   DEV vaddr  DSN backup.set.name
/FILE   SLSJRN#1  DEV vaddr  DSN journal1.set.name
/FILE   SLSJRN#2  DEV vaddr  DSN journal2.set.name
/FILE   SLSCOPY1  DEV vaddr  DSN copy1.set.name
/FILE   SLSCOPY2  DEV vaddr  DSN copy2.set.name
/FILE   SLSPRINT  DEV PRNT CLASS A
/FILE   SLSIN     *
  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 /FILE SLSCNTL2 statement is not provided, a return code of four (RC=4) is generated, and a backup of the primary is taken.

JCL for Backup of Primary or Secondary CDS with Journals

```
/JOB    jobname   SLUADMIN
/PARM   MIXED
/FILE   SLSBKUP   DEV vaddr  DSN backup.set.name
/FILE   SLSCNTL   DEV vaddr  DSN primary.set.name
/FILE   SLSCNTL2  DEV vaddr  DSN secondary.set.name
/FILE   SLSJRN#1  DEV vaddr  DSN journal1.set.name
/FILE   SLSJRN#2  DEV vaddr  DSN journal2.set.name
/FILE   SLSPRINT  DEV PRNT CLASS A
/FILE   SLSIN     *
  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    jobname   SLUADMIN
/PARM   MIXED
/FILE   SLSBKUP   DEV vaddr  DSN backup.set.name
/FILE   SLSCNTL   DEV vaddr  DSN primary.set.name
/FILE   SLSPRINT  DEV PRNT CLASS A
/FILE   SLSIN     *
  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

  These messages may include error conditions.
- an ‘‘Errant and In-transit Location Report’’ (refer to Figure 12 on page 223)

  This report is normal. In-transit and possibly errant VOLSERs are normal when the HSC is active.
- a ‘‘Block Processing Report’’ and a “Block Record Element Discrepancy Report,” which may include reports of mismatches between the primary and secondary CDS (refer to Figure 12 on page 223)

  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.

```
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 SLSCNTL WAS SELECTED AS THE CONTROL DATA SET TO OUTPUT
SLS1215I SLSCNTL WAS SUCCESSFULLY COPIED TO SLSCOPY1



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 12. 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 12. BACKup Utility Sample Output (2 of 2)

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 216 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 286 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 6.1 load libraries, you must run the LIBGEN using HSC 6.1 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.

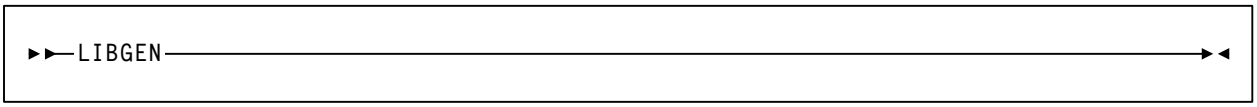
How the Database Decompile Utility Functions

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 Installation 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 Messages and Codes Guide* 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 Installation Guide* for information on data set initialization using the SLICREAT program).

Syntax



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). This is a PUNCH file. This statement is required.

SLSIN
input to the utility in the form of control cards.

Invoking the Database Decompile Utility

The easiest way to run utilities is to execute the ACS UTIL exec by entering the following command:

```
EXEC ACS UTIL LIBGEN
```

Execution of the statement results in the ACSUTIL SLKJCL file:

ACSUTIL SLKJCL File

```
/JOB    jobname   SLUADMIN
/PARM   MIXED
/FILE   SLSPRINT  DEV PRNT CLASS A
/FILE   SLSCNTL   DEV <500>  DSN <dsname>
/FILE   SLSLIBGN  DEV PNCH CLASS A
/FILE   SLSIN     *
* LIBGEN
```

To execute the utility:

1. Delete the lines in the template that are not required, or leave the comment indicator (*) in column one.
2. Remove the comment indicator from the desired lines.
3. Specify values for the desired parameters.
4. Delete the parameters that are not desired.
5. Enter the command ‘‘FILE.’’

The job file is then submitted to the ACS service machine for execution.

JCL Example

The following example shows JCL for creating a LIBGEN from the existing control data set.

JCL for Database Decompile

```
/JOB    jobname  SLUADMIN
/FILE   SLSCNTL  DEV vaddr  DSN dsname
/FILE   SLSLIBGN DEV PNCH CLASS A
/FILE   SLSPRINT DEV PRNT CLASS A
/FILE   SLSIN    *
* 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=????????

Table 14. Label Descriptions for Devices in Output LIBGEN

Device	Label	Description
ACS	ACS*aa*	*aa* is the sequential hexadecimal ACSid value (00 through FF), beginning with zero.
LSM	LSM*aall*	*aa* is the ACSid, and *ll* is the sequential hexadecimal LSMid value (00 through 17), beginning with zero.
STATION	ST*aah*	*aa* is the ACSid, and *h* is the sequential hexadecimal host index value (0 through F), beginning with zero.
PANEL	P*aallpp*	*aa* is the ACSid, *ll* is the LSMid, and *pp* is the sequential decimal panel number (0 through 10).
DRIVE	D*aallpph*	*aa* is the ACSid, *ll is* the LSMid, *pp* is the decimal panel number, and *h* is the hexadecimal host index value, beginning with zero.

- messages associated with error conditions resulting from an unsuccessful execution of the utility.

Refer to Figure 13 on page 230 for an example of output from the 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,ECCE,EC41,EC21,ECC43,                X
               ECCY,ECC42),                                         X
               NNLBDRV=(TNLCART,TNLCART,TNLCART,TNLCART,TNLCART,    X
               TNLCART,TNLCART,TNLCART,TNLCART,TNLCART,TNLCART,     X
               TNLCART,TNLCART,TNLCART,TNLCART,TNLCART),            X
               DELDISP=SCRTCH,                                      X
               MAJNAME=STKALSQN,                                    X
               CLNPRFX=CLN,                                         X
               COMPRFX=<,                                           X
               SCRLABL=SL
*
ACSLIST  SLIALIST ACS00,ACS01,ACS02
*
ACS00    SLIACS ACSDRV=(HVZZZZ0,HVZZZZ0,HVZZZZ0,HVZZZZ0,HVZZZZ0,     X
               HVZZZZ0,HVZZZZ0,HVZZZZ0,HVZZZZ0,HVZZZZ0,HVZZZZ0,     X
               HVZZZZ0,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)
*
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=((8,M)),                                    X
               ADJACNT=(LSM0001),                                   X
               DRIVE=(1,2,3,10),                                    X
               DRVELST=(P000001,P000002,P000003,P000010),           X
               TYPE=9310,                                           X
               DOOR=STD
*
P000001  SLIDLIST HOSTDRV=(D0000010,D0000011,D0000012,D0000013,     X
               D0000014,D0000015,D0000016,D0000017,D0000018,        X
               D0000019,D000001A,D000001B,D000001C,D000001D,        X
               D000001E,D000001F)
*
D0000010 SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF,           X
               ,,,)
D0000011 SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF,           X
               ,,,)
D0000012 SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF,           X
               ,,,)
D0000013 SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF,           X
               ,,,)
D0000014 SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF,           X
               ,,,)
D0000015 SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF,           X
               ,,,)
D0000016 SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF,           X
               ,,,)
D0000017 SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF,           X
               ,,,)
D0000018 SLIDRIVS ADDRESS=(11C4,11C5,11C6,11C7,11C8,11CF,           X
               ,,,)
```

Figure 13. Database Decompile Utility Sample Output

(1 of 11)

```
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 13. Database Decompile Utility Sample Output (2 of 11)

```
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
*
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 13. Database Decompile Utility Sample Output (3 of 11)

```
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 13. Database Decompile Utility Sample Output (4 of 11)

```
D0100074 SLIDRIVS ADDRESS=(11D8,11D9,11DA,11DB)
D0100075 SLIDRIVS ADDRESS=(11D8,11D9,11DA,11DB)
D0100076 SLIDRIVS ADDRESS=(11D8,11D9,11DA,11DB)
D0100077 SLIDRIVS ADDRESS=(11D8,11D9,11DA,11DB)
D0100078 SLIDRIVS ADDRESS=(11D8,11D9,11DA,11DB)
D0100079 SLIDRIVS ADDRESS=(11D8,11D9,11DA,11DB)
D010007A SLIDRIVS ADDRESS=(11D8,11D9,11DA,11DB)
D010007B SLIDRIVS ADDRESS=(11D8,11D9,11DA,11DB)
D010007C SLIDRIVS ADDRESS=(11D8,11D9,11DA,11DB)
D010007D SLIDRIVS ADDRESS=(11D8,11D9,11DA,11DB)
D010007E SLIDRIVS ADDRESS=(11D8,11D9,11DA,11DB)
D010007F SLIDRIVS ADDRESS=(11D8,11D9,11DA,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 13. Database Decompile Utility Sample Output (5 of 11)

```
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,       X
               D0101044,D0101045,D0101046,D0101047,D0101048,          X
               D0101049,D010104A,D010104B,D010104C,D010104D,          X
               D010104E,D010104F)
*
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,       X
               D0101064,D0101065,D0101066,D0101067,D0101068,          X
               D0101069,D010106A,D010106B,D010106C,D010106D,          X
               D010106E,D010106F)
*
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,       X
               D0101104,D0101105,D0101106,D0101107,D0101108,          X
               D0101109,D010110A,D010110B,D010110C,D010110D,          X
               D010110E,D010110F)
*
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 13. Database Decompile Utility Sample Output (6 of 11)

```
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,           X
               SL8500,SL8500,SL8500,SL8500,SL8500,SL8500,             X
               SL8500,SL8500,SL8500,SL8500,SL8500),                   X
               STATION=(ST020,ST021,,ST023,ST024,ST025,ST026,         X
               ST027,ST028,ST029,ST02A,ST02B,ST02C,ST02D,             X
               ST02E,ST02F),                                          X
               LSM=(LSM0200,LSM0201,LSM0202,LSM0203,LSM0204,          X
               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)),                    X
               ADJACNT=(LSM0203,LSM0202,LSM0201,LSM0204),             X
               DRIVE=(1),                                             X
               DRVELST=(P020001),                                     X
               TYPE=8500,                                             X
               DOOR=8500-1
*
P020001  SLIDLIST HOSTDRV=(D0200010,D0200011,D0200012,D0200013,        X
               D0200014,D0200015,D0200016,D0200017,D0200018,          X
               D0200019,D020001A,D020001B,D020001C,D020001D,          X
               D020001E,D020001F)
*
D0200010 SLIDRIVS ADDRESS=(,,,9500,,9501,,,,9502,,,9503,,             X
               9512,9513)
D0200011 SLIDRIVS ADDRESS=(,,,9500,,9501,,,,9502,,,9503,,             X
               9512,9513)
D0200012 SLIDRIVS ADDRESS=(,,,9500,,9501,,,,9502,,,9503,,             X
               9512,9513)
D0200013 SLIDRIVS ADDRESS=(,,,9500,,9501,,,,9502,,,9503,,             X
               9512,9513)
D0200014 SLIDRIVS ADDRESS=(,,,9500,,9501,,,,9502,,,9503,,             X
               9512,9513)
D0200015 SLIDRIVS ADDRESS=(,,,9500,,9501,,,,9502,,,9503,,             X
               9512,9513)
D0200016 SLIDRIVS ADDRESS=(,,,9500,,9501,,,,9502,,,9503,,             X
               9512,9513)
D0200017 SLIDRIVS ADDRESS=(,,,9500,,9501,,,,9502,,,9503,,             X
               9512,9513)
D0200018 SLIDRIVS ADDRESS=(,,,9500,,9501,,,,9502,,,9503,,             X
               9512,9513)
D0200019 SLIDRIVS ADDRESS=(,,,9500,,9501,,,,9502,,,9503,,             X
               9512,9513)
D020001A SLIDRIVS ADDRESS=(,,,9500,,9501,,,,9502,,,9503,,             X
               9512,9513)
D020001B SLIDRIVS ADDRESS=(,,,9500,,9501,,,,9502,,,9503,,             X
               9512,9513)
D020001C SLIDRIVS ADDRESS=(,,,9500,,9501,,,,9502,,,9503,,             X
               9512,9513)
D020001D SLIDRIVS ADDRESS=(,,,9500,,9501,,,,9502,,,9503,,             X
               9512,9513)
D020001E SLIDRIVS ADDRESS=(,,,9500,,9501,,,,9502,,,9503,,             X
               9512,9513)
D020001F SLIDRIVS ADDRESS=(,,,9500,,9501,,,,9502,,,9503,,             X
               9512,9513)
*
```

Figure 13. Database Decompile Utility Sample Output (7 of 11)

```
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 13. Database Decompile Utility Sample Output (8 of 11)

```
D020201B SLIDRIVS ADDRESS=(9510,,,950B,,,,,9506,,,,9507,,             X
               ,9511)
D020201C SLIDRIVS ADDRESS=(9510,,,950B,,,,,9506,,,,9507,,             X
               ,9511)
D020201D SLIDRIVS ADDRESS=(9510,,,950B,,,,,9506,,,,9507,,             X
               ,9511)
D020201E SLIDRIVS ADDRESS=(9510,,,950B,,,,,9506,,,,9507,,             X
               ,9511)
D020201F SLIDRIVS ADDRESS=(9510,,,950B,,,,,9506,,,,9507,,             X
               ,9511)
*
LSM0203  SLILSM PASTHRU=((0,S),(0,S),(0,S),(0,S)),                    X
               ADJACNT=(LSM0202,LSM0201,LSM0200,LSM0207),             X
               DRIVE=(1),                                             X
               DRVELST=(P020301),                                     X
               TYPE=8500,                                             X
               DOOR=8500-2
*
P020301  SLIDLIST HOSTDRV=(D0203010,D0203011,D0203012,D0203013,       X
               D0203014,D0203015,D0203016,D0203017,D0203018,          X
               D0203019,D020301A,D020301B,D020301C,D020301D,          X
               D020301E,D020301F)
*
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)),                    X
               ADJACNT=(LSM0200,LSM0205,LSM0206,LSM0207),             X
               DRIVE=(1),                                             X
               DRVELST=(P020401),                                     X
               TYPE=8500,                                             X
               DOOR=8500-1
*
P020401  SLIDLIST HOSTDRV=(D0204010,D0204011,D0204012,D0204013,       X
               D0204014,D0204015,D0204016,D0204017,D0204018,          X
               D0204019,D020401A,D020401B,D020401C,D020401D,          X
               D020401E,D020401F)
*
D0204010 SLIDRIVS ADDRESS=(,,,9400,,,,9401,940A,,940B,,940E,          X
               940F,,)
D0204011 SLIDRIVS ADDRESS=(,,,9400,,,,9401,940A,,940B,,940E,          X
               940F,,)
D0204012 SLIDRIVS ADDRESS=(,,,9400,,,,9401,940A,,940B,,940E,          X
               940F,,)
D0204013 SLIDRIVS ADDRESS=(,,,9400,,,,9401,940A,,940B,,940E,          X
               940F,,)
D0204014 SLIDRIVS ADDRESS=(,,,9400,,,,9401,940A,,940B,,940E,          X
               940F,,)
D0204015 SLIDRIVS ADDRESS=(,,,9400,,,,9401,940A,,940B,,940E,          X
               940F,,)
D0204016 SLIDRIVS ADDRESS=(,,,9400,,,,9401,940A,,940B,,940E,          X
               940F,,)
D0204017 SLIDRIVS ADDRESS=(,,,9400,,,,9401,940A,,940B,,940E,          X
               940F,,)
D0204018 SLIDRIVS ADDRESS=(,,,9400,,,,9401,940A,,940B,,940E,          X
               940F,,)
D0204019 SLIDRIVS ADDRESS=(,,,9400,,,,9401,940A,,940B,,940E,          X
               940F,,)
D020401A SLIDRIVS ADDRESS=(,,,9400,,,,9401,940A,,940B,,940E,          X
               940F,,)
D020401B SLIDRIVS ADDRESS=(,,,9400,,,,9401,940A,,940B,,940E,          X
               940F,,)
D020401C SLIDRIVS ADDRESS=(,,,9400,,,,9401,940A,,940B,,940E,          X
               940F,,)
D020401D SLIDRIVS ADDRESS=(,,,9400,,,,9401,940A,,940B,,940E,          X
               940F,,)
D020401E SLIDRIVS ADDRESS=(,,,9400,,,,9401,940A,,940B,,940E,          X
               940F,,)
D020401F SLIDRIVS ADDRESS=(,,,9400,,,,9401,940A,,940B,,940E,          X
               940F,,)
```

Figure 13. Database Decompile Utility Sample Output (9 of 11)

```
*
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 13. Database Decompile Utility Sample Output (10 of 11)

```
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 13. Database Decompile Utility Sample Output (11 of 11)

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

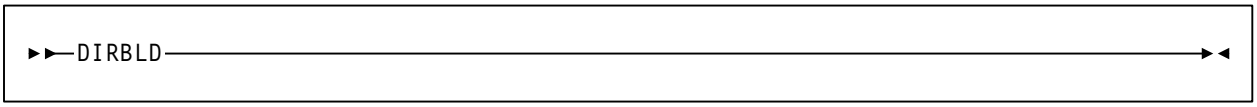
The major purpose of the Directory Rebuild utility is to repair a corrupted CDS database directory when the HSC is not active. Normally, the HSC corrects errors automatically.

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



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.

Invoking the Database Decompile Utility

The easiest way to run utilities is to execute the ACS UTIL exec by entering the following command:

```
EXEC ACS UTIL DIRBLD
```

Execution of the statement results in the ACSUTIL SLKJCL file:

ACSUTIL SLKJCL File

```
/JOB   jobname  SLUADMIN
/PARM  MIXED
/FILE  SLSCNTL  DEV <vaddr> DSN <dsname>
/FILE  SLSPRINT DEV PRNT CLASS A
/FILE  SLSIN    *
* DIRBLD
```

To execute the utility:

1. Delete the lines in the template that are not required, or leave the comment indicator (*) in column one.
2. Remove the comment indicator from the desired lines.
3. Specify values for the desired parameters.
4. Delete the parameters that are not desired.
5. Enter the command ‘‘FILE.’’

The job file is then submitted to the ACS service machine for execution.

JCL Example

The following example shows JCL for Directory Rebuild execution.

JCL for Directory Rebuild

```
/JOB   jobname  SLUADMIN
/PARM  MIXED
/FILE  SLSCNTL  DEV 501  DSN SLS.DBASE
/FILE  SLSPRINT DEV PRNT CLASS A
/FILE  SLSIN    *
* 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

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 SLS0241I to be displayed, which indicates an invalid utility control statement.

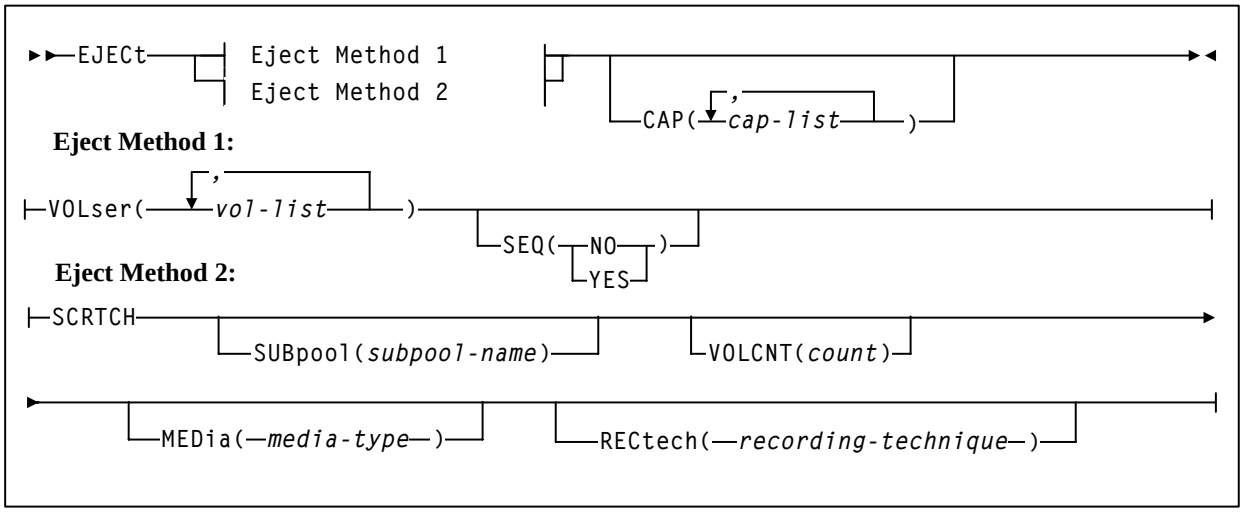
Ejections in a multiple ACS configuration may specify CAPs in each ACS if volumes reside in each ACS. If a CAP list is not provided, the utility selects the highest priority CAP available for each ACS (refer to the ‘‘CAP Preference (CAPPref) Command and Control Statement’’ in the *HSC Operator’s Guide*).

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.

Syntax



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.

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.

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 the T9840A, T9840B, T9840C, T9840D, T9940B, and T10000 media types and recording techniques.**
3. **The SL3000 library supports the T9840C, T9840D, 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 used on any longitudinal drives (4480, 4490, 9490, or 9490EE). Data can be written in 36-track mode on 4490, 9490, or 9490EE transports 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

indicates a helical cartridge. The media indicator in the external label is encoded with the cartridge type (A, B, or C).

Notes: 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 20GB data 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), 40GB (T9840C), or 75GB (T9840D).

STK2

indicates any T9940 cartridge. This parameter is the default for all T9940A and T9940B data cartridge types.

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 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:

1. 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.
2. **The SL8500 library supports the T9840A, T9840B, T9840C, T9840D, T9940B, LTO, SDLT, and T10000 media types and recording techniques.**
3. **The SL3000 library supports the T9840C, T9840D, LTO, SDLT, 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.

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.

STK1RD
indicates any T9840D transport.

STK1RDE
indicates an encryption-enabled T9840D transport.

STK1RDN
indicates a non-encryption enabled T9840D transport.

STK1RD34
indicates a non-encryption enabled 3490E-image T9840D transport.

STK1RD35
indicates a non-encryption enabled 3590-image T9840D transport.

STK1RDE4
indicates an encryption-enabled 3490E-image T9840D transport.

STK1RDE5
indicates an encryption-enabled 3590-image T9840D 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.

T10K
indicates all T10000 transports.

T10KN
indicates all non-encrypted T10000 transports.

T10KE
indicates all encrypted T10000 transports.

T1A
indicates any T10000A transport.

T1AN
indicates a non-encryption enabled 3490E- or 3590-image T10000A transport.

T1A34
indicates a non-encryption enabled 3490E-image T10000A transport.

T1A35
indicates a non-encryption enabled 3590-image T10000A transport.

T1AE
indicates an encryption-enabled 3490E- or 3590-image T10000A transport.

T1AE34
indicates an encryption-enabled 3490E-image T10000A transport.

T1AE35
indicates an encryption-enabled 3590-image T10000A transport.

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 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
- an unused SL3000 AEM 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
- an optional SL3000 CEM CAP consisting of 2, 13-cell removable magazines
- 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.
- an optional SL3000 CEM CAP consisting of 2, 13-cell removable magazines.

03, 04, 05 indicates the following:

- an optional SL3000 CEM/DEM CAPs each consisting of 2, 13-cell removable magazines.

06 indicates the following:

- the only required SL3000 BDM CAP consisting of 2, 13-cell removable magazines.

07, 08, 09, 0A indicates the following:

- optional SL3000 CEM CAPs each consisting of 2, 13-cell removable magazines.

0B indicates the following:

- an optional SL3000 AEM CAP.

Notes:

- If SL3000 library CAPs are not present, the HSC reports them as “not installed” This keeps CAP addresses from changing as new CAPs are added.
- Refer to the individual command explanations for additional information on specifying CAPids.
- SL3000 and SL8500 libraries do not contain a PCAP.

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.

Invoking the Eject Cartridge Utility

The easiest way to run utilities is to execute the ACS UTIL exec by entering the following command:

```
EXEC ACS UTIL EJECT
```

Execution of the statement results in the ACSUTIL SLKJCL file:

ACSUTIL SLKJCL File

```
/JOB   jobname  SLUADMIN
/PARM  MIXED
/FILE  SLSPRINT DEV PRNT CLASS A
/FILE  SLSIN
* EJECT VOLSER(vol-list) CAP(cap-list)
```

To execute the utility:

1. Delete the lines in the template that are not required, or leave the comment indicator (*) in column one.
2. Remove the comment indicator from the desired lines.
3. Specify values for the desired parameters.
4. Delete the parameters that are not desired.
5. Enter the command ‘‘FILE.’’

The job file is then submitted to the ACS service machine for execution.

JCL Examples

The following example shows JCL for ejecting a single volume from the library.

JCL for Ejecting a Single Volume

```
/JOB    jobname  SLUADMIN
/PARM   MIXED
/FILE   SLSPRINT DEV PRNT CLASS A
/FILE   SLSIN    *
  EJECT VOLSER(A1B1C1)
```

The following example shows JCL for ejecting one standard scratch cartridge.

JCL to Eject One STD Scratch Cartridge

```
/JOB   jobname  SLUADMIN
/PARM  MIXED
/FILE  SLSPRINT DEV PRNT CLASS A
/FILE  SLSIN    *
  EJECT SCRTCH MEDIA(STD)
```

The following example shows JCL for ejecting five SD-3 (helical) scratch cartridges.

JCL to Eject Five SD-3 Scratch Cartridges

```
/JOB   jobname  SLUADMIN
/PARM  MIXED
/FILE  SLSPRINT DEV PRNT CLASS A
/FILE  SLSIN    *
  EJECT SCRTCH 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 14).

```
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 funtion is 0
```

Figure 14. EJECt Cartridge Utility Sample Output

Enter Cartridges Utility

The Enter Cartridges utility permits you to batch enter cartridges into the library through the CAP.

CAP Operating Instructions

Operating instructions for the CAP are provided in the *HSC Operator's Guide*.

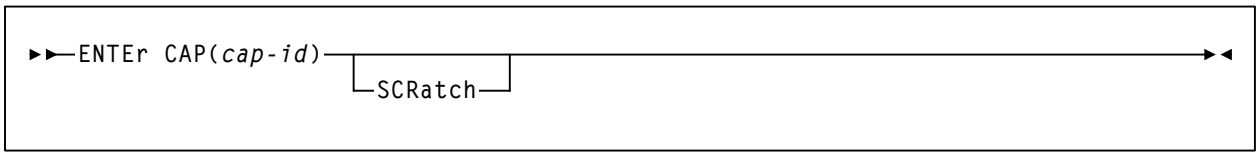
Note: When there are no more cartridges to be entered, open the CAP once again to ensure that no cartridges are present in the CAP cells, and then close the CAP to complete processing.

The utility returns a print file containing a list of the volumes entered to the virtual machine which submitted the job. That virtual machine should copy the print file onto disk. The listing is then available for you to initialize the internal magnetic labels in any manner you choose, to inform the tape management system that the volumes are scratch volumes, and/or to eject the volumes.

Note: The Enter Cartridges 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 Enter Cartridges SCRatch option is specified.

If either of these conditions is not followed, an HSC message is generated and the utility must be resubmitted.

Syntax



Utility Name

ENTEr
specifies that cartridges are to be batch entered into the library via a designated CAP.

Parameters

CAP
specifies a particular Cartridge Access Port to be used for the operation.

(cap-id)
cap-id identifies the Cartridge Access Port. 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 SL3000 libraries, this is an unused SL3000 AEM 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 SL3000 libraries, an optional CEM CAP consisting of 2, 13-cell removable magazines
- 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.
- an optional SL3000 CEM CAP consisting of 2, 13-cell removable magazines.

03, 04, 05 indicates the following:

- optional SL3000 CEM/DEM CAPs each consisting of 2, 13-cell removable magazines.

06

- the only required SL3000 BDM CAP consisting of 2, 13-cell removable magazines.

07, 08, 09

- optional SL3000 CEM CAPs each consisting of 2, 13-cell removable magazines.

0B

- an optional SL3000 AEM CAP.

SCRatch

When SCRatch is specified, it causes volumes to be put into scratch status.

JCL Requirements

The following definitions apply to the Enter Cartridges utility JCL:

SLSPRINT
output messages from the utility.

SLSIN
input to the utility in the form of control statement card images.

Invoking the Enter Cartridges Utility

The easiest way to run utilities is to execute the ACS UTIL exec by entering the following command:

```
EXEC ACS UTIL ENTER
```

Execution of the statement results in the ACSUTIL SLKJCL file:

ACSUTIL SLKJCL File

```
/JOB   jobname  SLUADMIN
/PARM  MIXED
/FILE  SLSPRINT DEV PRNT CLASS A
/FILE  SLSIN *
* ENTER CAP(capid)
```

To execute the utility:

1. Delete the lines in the template that are not required, or leave the comment indicator (*) in column one.
2. Remove the comment indicator from the desired lines.
3. Specify values for the desired parameters.
4. the parameters that are not desired.
5. Enter the command ‘‘FILE.’’

The job file is then submitted to the ACS service machine for execution.

JCL Example

The following example shows JCL for entering a cartridge(s) into a CAP. The volume(s) is placed into scratch status.

JCL for Entering Cartridges in a CAP

```
/JOB   jobname  SLUADMIN
/PARM  MIXED
/FILE  SLSPRINT DEV PRNT CLASS A
/FILE  SLSIN    *
  ENTER CAP(Ø1) SCRATCH
```

Output Description

Output resulting from the execution of the Enter Cartridges utility includes:

- a listing of input commands with appropriate messages when syntax errors occur (see Figure 15 on page 259)
- console messages informing the console operator when new volumes are entered
- messages associated with error conditions resulting from an unsuccessful attempt to enter cartridges
- updated library control data set containing new volumes with the proper scratch dispositions.

```
SLUADMIN (n.n.n)               StorageTek Automated Cartridge System Utility                    PAGE Ø001
 TIME hh:mm:ss                           Control Card Image Listing                          DATE yyyy-mm-dd

ENTER CAP(Ø1)



SLUADMIN (n.n.n)               StorageTek Automated Cartridge System Utility                    PAGE Ø002
 TIME hh:mm:ss                          Enter Cartridges Utility                             DATE yyyy-mm-dd


SLSØ211I Volume C83Ø4Ø successfully entered into library
SLSØ211I Volume C84181 successfully entered into library
SLSØ211I Volume C84182 successfully entered into library
SLSØ211I Volume C8418Ø successfully entered into library
SLSØ211I Volume C83Ø39 successfully entered into library
SLSØ155I Condition code for utility funtion is Ø
```

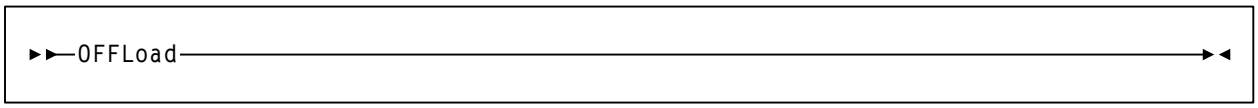
Figure 15. Enter Cartridge Utility Sample Output

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



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.

SYSPRINT
SLUOFFLD message output.

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).

Note: The offload data sets created by SLSOFF01 and SLSOFF02 must be allocated on DASD. You can then copy the offloaded DASD data sets to tape if you desire.

SLSIN
input to the utility in the form of control statement card images.

Invoking the Journal Offload Utility

The easiest way to run utilities is to execute the ACS UTIL exec by entering the following command:

```
EXEC ACS UTIL OFFLoad
```

Execution of the statement results in the ACSUTIL SLKJCL file:

ACSUTIL SLKJCL File

```
/JOB   jobname  SLUADMIN
/PARM  MIXED
/FILE  SLSPRINT DEV PRNT CLASS A
/FILE  SYSPRINT DEV PRNT CLASS A
/FILE  SLSCNTL  DEV <500> DSN <dsname>
/FILE  SLSJRN01 DEV <502> DSN <dsname>
/FILE  SLSJRN02 DEV <503> DSN <dsname>
/FILE  SLSOFF01 DEV <504> DSN <dsname>
/FILE  SLSOFF02 DEV <505> DSN <dsname>
/FILE  SLSIN    *
* OFFLOAD
```

To execute the utility:

1. Delete the lines in the template that are not required, or leave the comment indicator (*) in column one.
2. Remove the comment indicator from the desired lines.
3. Specify values for the desired parameters.
4. Delete the parameters that are not desired.
5. Enter the command ‘‘FILE.’’

The job file is then submitted to the ACS service machine for execution.

JCL Example

The following example shows JCL for the offload of both journals.

JCL for Offload of Journals

```
/JOB   jobname  SLUADMIN
/PARM  MIXED
/FILE  SLSCNTL  DEV vaddr  DSN control.set.name
/FILE  SLSOFF01 DEV vaddr  DSN offload.file1
/FILE  SLSOFF02 DEV vaddr  DSN offload.file2
/FILE  SLSJRN01 DEV vaddr  DSN journal.file1
/FILE  SLSJRN02 DEV vaddr  DSN journal.file2
/FILE  SLSPRINT DEV PRNT CLASS A
/FILE  SYSPRINT DEV PRNT CLASS A
/FILE  SLSIN    *
  OFFLOAD
```

Output Description

Output resulting from the execution of the Journal Offload utility (see Figure 16 on page 263) 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.

```
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 16. Journal Offload Utility Sample Output

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.

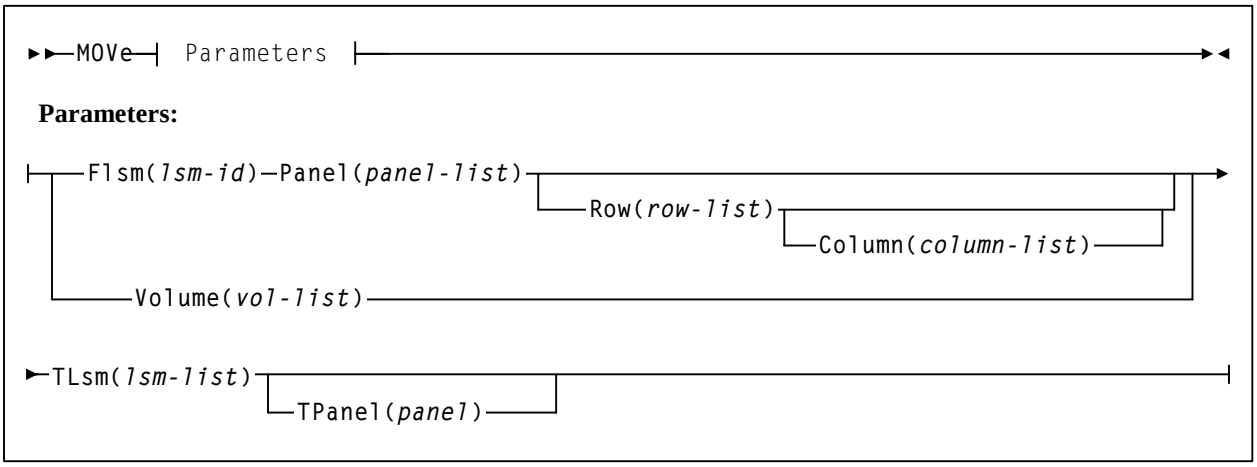
  The cartridges being moved may be specified in the following ways:

  - 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.

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 designate the Flsm parameter, you may not designate the Volume parameter.

(lsm-id)
LSM identifier name. LSMs are specified as *AA*:*LL*, where *AA* is the ACSid and *LL* is the LSMid. An LSMid 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.

- LSM Models 4410 and 9310 PowderHorn
  - 0-11 for outer wall panels
  - 12-19 for inner wall panels.

- LSM Model 9360 WolfCreek
  - 0-2 for Model 9360-050
  - 0-3 for Model 9360-075
  - 0-4 for Model 9360-100.
- LSM Model 9740 TimberWolf
  - 0-2 (panel 3 is included if the optional cells are present).
- LSM Model SL3000 StreamLine Library
  - Access Expansion Module (AEM optional) - panels 0 -1 and 22-23 are located on both ends of the library and in this release serve only as library end caps
  - Base Drive Module (BDM required) - panels 12-13
  - Drive Expansion Module (DEM optional) - panels 10-11 are located left of the BDM
  - Cartridge Expansion Module (CEM optional) panels 2-9 are located left of the BDM or optional DEM.
  - Cartridge Expansion Module (CEM optional) panels 14 -21 are located right of the BDM.
  - Parking Expansion Module (PEM) - **Dual Robots only** - panel numbers equate to the same panel numbers of the CEM it replaces, depending on its location right or left of the BDM.

Note: The library has static panels numbers starting with the left-most back panel (panel 0), alternating back-to-front left to right, and ending the right-most front panel (panel 23).

- 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

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.

- LSM Models 4410 and 9310 PowderHorn
  - 0-14 for outer wall panels
  - 0-5 and 8-14 for inner wall panels.
  - The maximum list is 4 rows (approximately 100 cells).
- LSM Model 9360 WolfCreek - 0-41 (all models). The maximum list is 20 rows (approximately 100 cells).
- LSM Model 9740 TimberWolf - 0-41 on panels 0, 2, and 3; and 36-41 on panel 1.

Notes:

- Column 3 on panel 2 allows row entries only on rows 28-41.
- The cells on panel 3 are optional.

- LSM Model SL3000 StreamLine Library
  - Access Expansion Modules - panels 0-1 and 22-23 (no cells in this initial release)
  - Base Drive Module (BDM) - panel 12 (back)
    12-47 with 8 drives installed
    23-47 with 16 drives installed
    35-47 with 24 drives installed
  - Base Drive Module (BDM) - panel 13 (front)
    0-51 on the front panel
  - Drive Expansion Module (DEM) - panel 10 (back)
    12-47 available with 8 drives installed
    23-47 available with 16 drives installed
    35-47 available with 24 drives installed
    No rows available with 32 drives installed
  - Drive Expansion Module (DEM) - panel 11 (front)
    0-51 available on the front panel
  - Cartridge Expansion Modules (CEM) - all panels
    0-51 available on both front and back panels
  - Parking Expansion Module (PEM) - all panels
    0-51 available on the back and front panels

- 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)

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.

- LSM Models 4410 and 9310 PowderHorn
  - 0-23 for outer wall panels
  - 0-19 for inner wall panels.
- LSM Model 9360 WolfCreek - 0-5 (all models).
- LSM Model 9740 TimberWolf - 0-3 for panels 0, 2, and 3 (if the optional cells are present); 0-2 for panel 1.
- LSM Model SL3000 StreamLine Library
  - Access Expansion Module (AEM) panels 0-1 and 22-23
    No columns available in the initial release.
  - Base Drive Module (BDM) - panel 12 (back)
    0 is available, if a CEM or DEM is added to the left of the BDM
    1-5 available for rows 12-47 with 8 drives installed
    1-5 available for rows 23-47 with 16 drives installed
    1-5 available for rows 35-47 with 24 drives installed.
  - Base Drive Module (BDM) - panel 13 (front)
    0 available with expansion to the left of the BDM
    5 available for rows 39-51 with expansion to the right of the BDM
    1-3 available for rows 0-38 with a CAP installed
    1-4 available for rows 39-51 with a CAP installed
    1-3 not available for rows 9-16 with optional window/Operator panel installed.
  - Drive Expansion Module (DEM) - panel 10 (back)
    0 is available with expansion to the left of the DEM
    1-5 available for rows 12-47 with 8 drives installed
    1-5 available for rows 23-47 with 16 drives installed
    1-5 available for rows 35-47 with 24 drives installed
    No columns available with 32 drives installed.

- Drive Expansion Module (DEM) - panel 11 (front)
  0 available with expansion to the left DEM
  1-3 available for rows 0-38 with a CAP installed
  1-5 available for rows 39-51, with a CAP installed
  1-3 not available for rows 9-16 with a window installed
  1-5 available for rows 0-51 on a standard DEM panel.

- Cartridge Expansion Module (CEM) - panels 2, 4, 6, 8 (back)
  0 available with expansion to the left
  1- 5 available on the standard CEM back panel.

- Cartridge Expansion Module (CEM) - panels 3, 5, 7, 9 (front)
  0 available with expansion to the left
  1-3 available for rows 0-38 with a CAP installed
  1-4 available for rows 39-51, with a CAP installed
  1-4 available on the standard CEM front panel.

- Cartridge Expansion Module (CEM) - panels 14, 16, 18, 20 (back)
  0-5 available on the standard CEM back panel.

- Cartridge Expansion Module (CEM) - panels 15, 17, 19, 21 (front)
  0-3 available for rows 0-39 with a CAP installed
  0-5 available for rows 39-51 with a CAP installed
  0-5 available on the standard CEM front panel.

- Parking Expansion Module (PEM) - left side PEM
  3-5 available on the back and front panels with a second robot installed.

- Parking Expansion Module (PEM) - right side PEM
  0-2 available on the back and front panels with a second robot installed.

- LSM Model SL8500 StreamLine - 0-1 for all panel types.

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. 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.

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.

Invoking the Move Utility

The easiest way to run utilities is to execute the ACS UTIL exec by entering the following command:

```
EXEC ACS UTIL MOVe
```

Execution of the statement results in the ACSUTIL SLKJCL file:

ACSUTIL SLKJCL File

```
/JOB   jobname  SLUADMIN
/PARM  MIXED
/FILE  SYSPRINT DEV PRNT CLASS A
/FILE  SLSIN    *
* MOVE Flsm(lsm-id) Panel(panel-list) Row(row-list) Column(col-list)
*      Tlsm(lsm-list) TPanel(panel)
* MOVE Volume(vol-list) TLsm(lsm-list) TPanel(panel)
```

To execute the utility:

1. Delete the lines in the template that are not required, or leave the comment indicator (*) in column one.
2. Remove the comment indicator from the desired lines.
3. Specify values for the desired parameters.
4. Delete the parameters that are not desired.
5. Enter the command ‘‘FILE.’’

The job file is then submitted to the ACS service machine for execution.

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

```
/JOB   jobname  SLUADMIN
/PARM  MIXED
/FILE  SYSPRINT DEV PRNT CLASS A
/FILE  SLSIN    *
  MOVE FLSM(00:01) PANEL(00) 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

```
/JOB   jobname  SLUADMIN
/PARM  MIXED
/FILE  SYSPRINT DEV PRNT CLASS A
/FILE  SLSIN    *
  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 17 on page 272)
- an updated control data set indicating the volume is moved
- a condition code indicating successful or unsuccessful volume movement (see Figure 17).

```
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 17. MOVe Utility Sample Output

Performance Log Reblocker Utility

The Performance Log Reblocker utility is used by sites sharing an ACS between MVS and VM hosts. The utility is used to reformat the VM performance log data to a common format similar to that of the MVS/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 MVS environments.

This utility prepares the generated performance log (SMF data) for use by the Activities Report utility.

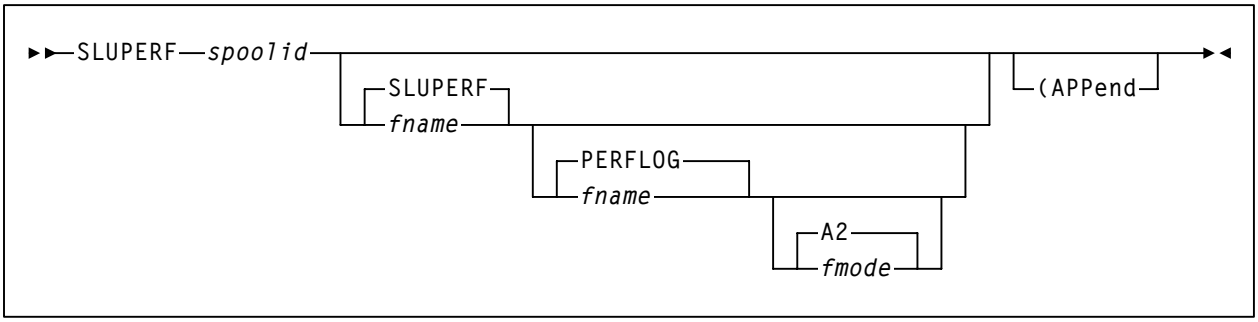
SMF records passed to the SCP (see the glossary for a definition of SCP) are variable in length and can be up to 32K bytes long. The SCP breaks these records into sections that fit in a VM punch spool file, and passes reblocking information with each segment.

The CMS version takes SCP performance log output (without any header/trailer data) and reads it into a CMS file without altering the internal format of the records. The CMS version of the Activities Report utility (SLUACTV EXEC) reconstructs the original SMF record images during its own execution.

The MVS version reads the SCP performance log data and creates data set records reblocked into the original SMF record format and length. Then, as specified by the PERFJCL trailer data, the reblocked SMF data optionally may be merged with SMF data created on the MVS system.

Syntax (CMS Statement)

Performance Log Reblocker utility



Parameters

spoolid
the VM spoolid of a punch file in the caller's virtual reader. This parameter is required.

fname
the CMS filename of the output file. The default is SLUPERF.

ftype
the CMS filetype of the output file. The default is PERFLOG.

fmode
the CMS filemode of the output file. The default is A2. (APPend specifies that the records from the reader file are appended to the specified CMS file if it exists.

Invoking the Performance Log Reblocker Utility in CMS

The easiest way to run this utility in CMS is to execute the following EXEC by entering:

```
EXEC ACS UTIL SLUPERF
```

Execution of the statement produces the ACSCMS EXEC file:

ACSCMS EXEC

```
&TRACE ALL
* EXEC SLUPERF <spoolid> <fname|SLUPERF> <ftype|PERFLOG> <fmode|A1>
```

To execute the Reblocker utility, perform the following steps:

1. Remove the comment indicator (*) on the left, and specify the spoolid of the reader file and the name of the data output file.
2. Enter the command ‘‘FILE.’’

Invoking the Performance Log Reblocker Utility in MVS

To invoke the Performance Log Reblocker utility in MVS, certain steps must occur on VM.

1. The PERFJCL system profile (SYSPROF) parameter must be specified indicating the CMS file that contains the performance log header/trailer data.
2. The SCP SET PERFLOG command must be executed (normally within the SYSPROF file) by specifying one of the following formats:
   - To spool the data to a virtual machine running MVS on the same CPU:

   SET PERFLOG ON (CLASS *class* TO *mvsuserid*

   where:

   ON
   enables performance log recording

   class
   specifies the virtual spool file class to be read by the MVS virtual machine

   mvsuserid
   specifies the MVS virtual machine

- To send the data to a different CPU running MVS:

SET PERFLOG ON (CLASS class TO JOB AT mvsnode

where:

ON
enables performance log recording

class
specifies the virtual spool file class to be used while transferring the spool file

JOB
specifies to transmit the virtual spool file as a job to the MVS system

mvsnode
specifies the node of the MVS system

3. The SMF parameters must be specified by the SCP SET PERFLOG command, which is normally included within the SYSPROF file. (Refer to the SCP command descriptions found in "Commands, Control Statements, and Utilities" in the *HSC Operator's Guide*).

JCL Requirements

To invoke the Performance Log Reblocker utility in MVS, the performance log data must be prefaced by the PERFJCL header data. This process is described in ''Modifying Performance Log Header/Trailer JCL (Optional)'' in the *HSC Installation Guide*.

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 executes as an SCP job with the HSC at the base service level and 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.

Note: Before you execute this utility, run the Volume Report utility (refer to “Volume Report Utility” on page 336) and resolve all errant volumes.

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 Installation 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 the “SET Utility” on page 310 for a description of the SET utility.

Considerations Before Running Reconfiguration

Consider the following items before executing the Reconfiguration function:

- If the HSC control data set is shared with an MVS host, run the reconfiguration from the MVS host. Refer to HSC System Programmer’s Guide for instructions.
- Make sure you are familiar with VM fundamentals and configuring DASD in a VM environment.
- Make sure you are familiar with the following:
  - SCP
  - SCP system files
  - SLIMDISK EXEC
  - old and new control data set minidisks
  - old and new control data set names
  - writing and submitting SLKJCL to the SCP.
- The control data set resides in a new data set when reconfiguration completes, and may also reside on a new virtual address depending on your data center configuration.

DASD Considerations in a VM-only Environment

The following DASD considerations apply to running the Reconfiguration function in a VM-only environment:

- If you are using full-volume minidisks for the HSC control data set, Sun StorageTek recommends using OS-format minidisks to allow allocation of multiple data sets on the same real volume for reconfiguration purposes. Use the same vaddr for SLSCNTL and DBPRMNEW, and the same vaddr for SLSCNTL2 and DBSHDNEW in ACS SYSPROF.
- If you are using partial volume minidisks for the HSC control data set, either OS-format or CMS reserved minidisks may be used for reconfiguration. The old and new control data set must be the same cylinder size and format.

- The old and new control data sets must be on volumes that are configured properly for real reserve/release to all hosts running HSC. (Refer to the IBM documentation for your environment.)
- If it is necessary to copy the control data set to another minidisk, use the BACKup and RESTore utilities to ensure proper reset of database flags.

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:

1. 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.
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 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 Reconfiguration utility is executed as an SCP job 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.

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

Reconfiguration is I/O intensive. For this reason, it is highly recommended that you reduce the number of scratch volumes as much as possible to shorten reconfiguration time. Refer to “Minimizing I/O Time” on page 280 for more information. The following table details I/O requirements for various situations.

Table 15. I/O Requirements

Condition:	Number of I/Os:
For every volume in the old CDS that remains in the new CDS (volumes remain if their home panels have not been changed)	5
For every scratch volume in the old CDS that remains in the new CDS	38-58 additional
For every errant volume in the old configuration that remains in the new configuration	11 additional
For every cell in the old configuration that remains in the new configuration	1 additional
For every panel in the old configuration that remains in the new configuration	5 additional

Note: Shadowing is disabled during the reconfiguration process. If a new secondary CDS is used, the final step of reconfiguration copies the new primary to the new secondary.

The quantities shown above represent most of the I/O done by reconfiguration. Depending on the ratio of cells to volumes, and nonscratch to scratch volumes, the number of scratch volumes can easily be the prime determinant of the number of I/O operations performed by Reconfiguration.

Minimizing I/O Time

Any or all of the following approaches will reduce reconfiguration time:

- Using a solid state disk (SSD) device (such as Sun StorageTek's 4080)
- Having no scratch tapes in the old CDS, rather than many scratch tapes

Note: Reconfiguration to real DASD with many scratch volumes has been known to take hours of wall clock time.

- Minimize I/O to the CDS copies by defining only the new primary CDS copy to RECONFIG. Afterward, copy the new primary CDS copy to the new secondary and standby CDS copies as needed.

A way to minimize I/O time is to copy all CDSs to an SSD device before reconfiguration. To use the SSD, create a multiple-step reconfiguration procedure to:

1. Copy the old and new CDSs to the SSD data set. If shadowing is enabled, both the primary and the secondary must be copied to the SSD data set.

Warning: Do not include CDSDEF or RECDEF statements in the PARMLIB control statements. (If included, they override the statements for the SSD.)

2. Perform the reconfiguration using the SSD data sets as the old and new CDSs.
3. Copy the new SSD CDSs to the real, new CDSs on DASD. The old CDSs need not be copied since they have not been updated.

Running a Successful Reconfiguration

While the Reconfiguration utility is in process, the library is unavailable to the user.

Notes:

1. Deviations to the reconfiguration procedure may be required as determined by the system programmer familiar with the environment.
2. Unless otherwise stated, all operations are on MAINTSTK.

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. It may be necessary to update the RIOGEN (i.e., DMKRIO, HCPRIO) to reflect changes to the hardware addresses.
3. Code the necessary modifications in the LIBGEN macros.

Note: Changing or deleting an ACSid or LSMid in the LIBGEN is not supported by the HSC, except for the last LSMid defined for any ACS or the last ACS defined in the LIBGEN.

4. Assemble the LIBGEN following the procedures in ''Assemble the LIBGEN File'' in the *HSC Installation Guide*.
5. Ensure 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 55.
6. Stop execution of the HSC on all hosts except the one being used to run the Reconfiguration utility.
7. Log on to STKACS.
8. Stop task SLSBINIT on STKACS by issuing the SCP command:

   ```
   STOP taskid
   ```

   This allows the SCP to remain up to run the BACKup utility. Refer to the *HSC Operator's Guide* for explanations of SCP commands.
9. Verify that SLSBINIT and class U job readers are idle by issuing on STKACS the SCP command:

   ```
   QUERY ACTIVE
   ```
10. From MAINTSTK, back up the control data set by issuing the following command:

    ```
    EXEC ACS UTIL BACKUP
    ```

    Wait for successful job completion.
11. Stop the SCP on the remaining VM host by issuing the following command on STKACS:

    ```
    STOPSCP
    ```
12. Issue the following command to purge the service machine's reader on STKACS:

    ```
    CP PURGE READER ALL
    ```

13. Perform the following tasks to prepare for reconfiguration:

    a. Issue the following commands:

    ```
    ACCESS 191 A
    ACCESS 254 B
    ACCESS 255 C
    ```

    The 191-disk is MAINTSTK 191, the 254-disk is the RUN-disk, and the 255-disk is STKACS 191.

    b. Make a backup copy of the ACS SYSPROF by issuing:

    ```
    COPY ACS SYSPROF B ACSOLD SYSPROF A (REPLACE
    ```

    c. Copy ACS SYSPROF from the RUN-disk (B) to the A-disk. This allows you to modify ACS SYSPROF for the Reconfig and ensure it is correct before placing it back on the RUN-disk.

    ```
    COPY ACS SYSPROF B ACS SYSPROF A
    ```

    d. XEDIT ACS SYSPROF A to describe the new data sets and LIBGEN module. In particular, modify the following parameters:

LIBGEN	file name of the LIBGEN load module.
SLSCNTL	DSN of the new primary control data set (for SLICREAT). Comment out the old statement to use later (see step 13n on page 4-95).
SLSCNTL2	DSN of the new secondary control data set (for SLICREAT). Comment out the old statement to use later (see step 13n on page 4-95).
SLSSTBY	DSN of the new standby control data set (for SLICREAT).
SLSJRNxx	DSNs of any new journal data sets (for SLICREAT).
SLSOFFxx	DSNs of new journal off-load data sets.
SLSBKUP	DSN of new backup data set. STATION list of station addresses should be corrected.
DBPRMNEW	DSN of the new primary control data set (for RECONFIG). Copy the unit address and DSN from the new SLSCNTL statement. DBSHDNEW DSN of the new secondary control data set (for RECONFIG). Copy the unit address and DSN from the new SLSCNTL2 statement.

Comment out any AUTOJOB statements.

Note: Virtual device addresses may need to be changed in ACS SYSPROF when adding new data set names.

e. Copy the updated SYSPROF to the RUN-disk.

```
COPY ACS SYSPROF A ACS SYSPROF B (REPLACE
```

f. Allocate the new data sets using SLIMDISK.

Note: Review all the DASD considerations before allocating data sets. Refer to ‘‘Calculating DASD Space’’ in the *HSC Installation Guide*.

g. Issue the following command to create a job to initialize the new library data sets:

```
EXEC ACS UTIL SLICREAT (NOSEND
```

h. Verify that the information is correct and file the job.

Note: Be sure to add /FILE statements for all journals for all hosts.

i. Issue the following command to create a new production startup job file:

```
EXEC ACS UTIL HSCINIT (NOSEND
```

j. Verify that the information is correct and file the job. Modify the data set, volume, and unit information as necessary.

k. Copy the new startup job file to the STKACS ACS191-disk.

```
COPY HSCINIT SLKJCL A HSCINIT SLKJCL C
```

l. Enter the following commands on STKACS. Then, reaccess the RUN-disk to access the new LIBGEN and SYSPROF, load the LIBGEN into memory, and start the SCP.

```
ACCESS 191 A
ACCESS 192 D
NUCXLOAD libgen
ACS INIT (NOJOB
```

libgen is the name of the new LIBGEN module created in step 4 on page 259.

m. Issue the following command from the MAINTSTK machine:

```
EXEC ACS SUBMIT SLICREAT SLKJCL
```

Wait for the job to complete.

n. XEDIT ACS SYSPROF A to restore the SLSCNTL, SLSCNTL2, and SLSSTBY DSNs to the old names by removing the comments from the old

statements and deleting the DSNs created in step 13d on page 260. Do not alter DBPRMNEW or DBSHDNEW.

Note: Virtual device addresses may need to be changed in ACS SYSPROF when adding new data set names.

o. Issue the following command to create a job to reconfigure the new library data sets:

```
EXEC ACS UTIL RECONFIG (NOSEND
```

```
/JOB  jobname SLSBINIT
/PARM E(E086) F(23) MEMBER(XX) RECONFIG
/FILE SLSSYSXX *
/*      DEFINE CONTROL DATA SETS */
 CDSDEF DSN1=<prm.dsname>, VOL1=<vol1>, UNIT1=<unit1>
        DSN2=<sec.dsname>, VOL2=<vol2>, UNIT2=<unit2> -
        DSN3=<stb.dsname>, VOL3=<vol3>, UNIT3=<unit3>
/*      DEFINE RECONFIG DATA SETS #/
 RECDEF DSN1=<prmnew.dsname>, VOL1=<vol1>, UNIT1=<unit1> -
        DSN2=<secnew.dsname>, VOL2=<vol2>, UNIT2=<unit2>
```

p. Verify that the information is correct and file the job. Modify the data set, volume, and unit information as necessary.

q. Issue the following command:

```
COPY ACS SYSPROF A ACS SYSPROF B (REPLACE
```

r. Issue the following commands to recycle the SCP on STKACS:

```
STOPSCP ACCESS 192 D EXEC ACS INIT (NOJOB
```

s. Issue the following command:

```
ERASE ACS SYSPROF A
```

t. Issue the following command to submit the RECONFIG job created earlier:

```
EXEC ACS SUBMIT RECONFIG SLKJCL
```

The reconfiguration job starts the HSC and copies status information from the old to the new control data set. Wait for the job to complete.

Note: If the Reconfig fails, look at the job log for an indication of the cause of the failure.

u. Issue the following command on the STKACS service machine to shut it down:

```
STOPSCP
```

14. Log off the STKACS service machine.
15. Have the CSE make any necessary hardware changes.

16. XEDIT ACS SYSPROF B to remove the comments from the AUTOJOB statements.

Note: Make sure that the AUTOJOB file name matches the new startup job file created earlier.

Modify the SLSCNTL, SLSCNTL2, and SLSSTBY data set names to match the new names.

17. Save ACS SYSPROF on the RUN-disk (B).
18. Issue the following command to restart the ACS service machine:

```
AUTOLOG STKACS
```

19. Change any startup files (SYSPROF, STARTUP JCL, and/or PROCs) for other hosts to reflect the new configuration.

Notes: The MDISK links for other hosts may also need to be changed depending on your configuration.

20. From MAINTSTK, back up the new control data set by issuing the following command:

```
EXEC ACS UTIL BACKUP
```

21. 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.

22. When the reconfiguration completes successfully, issue on MAINTSTK:

```
ERASE ACSOLD SYSPROF A
```

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 53 and “Reassigning Control Data Set Names in Database Heartbeat Record” on page 55 for additional information.

Prerequisites

Warning: The host software must be **stopped on all hosts** and the SCP must be operational 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 Installation 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 “Reassigning Control Data Set Names in Database Heartbeat Record” on page 55 for detailed information on renaming control data sets.

How the RESTore Utility Functions

The RESTore utility is executed in the following phases:

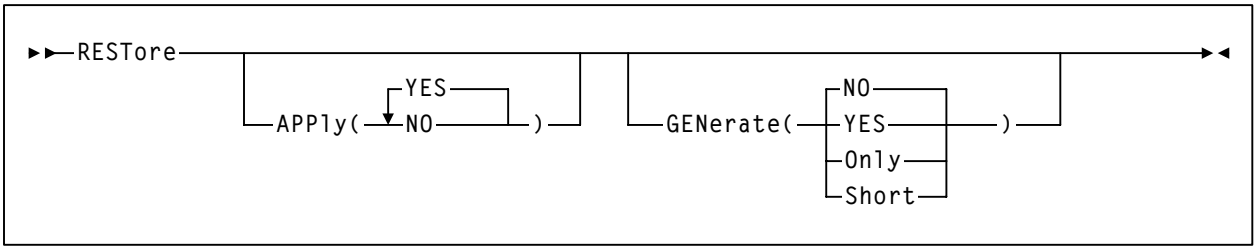
- A hardware reserve is issued against the control data set.
- The library control data set is restored from a previous backup copy.
- If journaling is enabled, the installation optionally can apply journals (up to 99 files per run) to the restored library control data set. It is the user’s responsibility 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 53 for additional information about the control data set recovery scheme.
- 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 resolving any discrepancies, see ‘‘“How to Handle BACKup/RESTore Discrepancies” on page 293.
- 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 Remote-linked Libraries” on page 214 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 /FILE 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).

Note: SLSBKUP the backup data set. SLSSTBY a standby copy of the control data set having only the heartbeat block updated (optional).

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. This is a PUNCH file.

Invoking the Restore Utility

The easiest way to run utilities is to execute the ACS UTIL exec by entering the following command:

```
EXEC ACS UTIL RESTore
```

Execution of the statement results in the ACSUTIL SLKJCL file:

ACSUTIL SLKJCL File

```
/JOB  jobname  SLUADMIN
/PARM MIXED
/FILE SLSPRINT DEV PRNT CLASS A
/FILE SLSAUDIT DEV PNCH CLASS A
/FILE SLSCNTL  DEV <vaddr> DSN <dsname>
/FILE SLSCNTL2 DEV <vaddr> DSN <dsname>
/FILE SLSSTBY  DEV <vaddr> DSN <dsname>
/FILE SLSBKUP  DEV <vaddr> DSN <dsname>
/FILE SLSJRNØ1 DEV <vaddr> DSN <dsname>
/FILE SLSJRNØ2 DEV <vaddr> DSN <dsname>
/FILE SLSIN    *
* RESTORE APPLY(YES) GEN(NO)
```

To execute the utility:

1. Delete the lines in the template that are not required, or leave the comment indicator (*) in column one.
2. Remove the comment indicator from the desired lines.
3. Specify values for the desired parameters.
4. Delete the parameters that are not desired.
5. Enter the command ‘‘FILE.’’

The job file is then submitted to the ACS service machine for execution.

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)

```
/JOB jobname SLUADMIN
/PARM MIXED
/FILE SLSBKUP  DEV vaddr  DSN backup.set.name
/FILE SLSCNTL  DEV vaddr  DSN primary.set.name
/FILE SLSCNTL2 DEV vaddr  DSN secondary.set.name
/FILE SLSSTBY  DEV vaddr  DSN standby.set.name
/FILE SLSJRN#1 DEV vaddr  DSN journal1.set.name
/FILE SLSJRN#2 DEV vaddr  DSN journal2.set.name
/FILE SLSAUDIT DEV PNCH CLASS A
/FILE SLSPRINT DEV PRNT CLASS A
/FILE SLSIN    *
  RESTORE APPLY(YES
```

The second example shows JCL for the RESTore utility using the GENerate(Only) parameter.

JCL for RESTore (with GENerate Only)

```
/JOB jobname   SLUADMIN
/PARM MIXED
/FILE SLSBKUP  DEV vaddr DSN backup.set.name
/FILE SLSAUDIT DEV PNCH CLASS A
/FILE SLSPRINT DEV PRNT CLASS #
/FILE SLSIN    *
  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.

JCL for RESTore (without Journals or Output to SLSAUDIT)

```
/JOB jobname SLUADMIN
/PARM MIXED
/FILE SLSBKUP DEV vaddr DSN backup.set.name
/FILE SLSCNTL DEV vaddr DSN primary.set.name
/FILE SLSCNTL2 DEV vaddr DSN secondary.set.name
/FILE SLSSTBY DEV vaddr DSN standby.set.name
/FILE SLSPRINT DEV PRNT CLASS #
/FILE SLSIN #
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

JCL for RESTore (Journals and Output to SLSAUDIT)

```
/JOB    jobname  SLUADMIN
/PARM   MIXED
/FILE   SLSCNTL  DEV vaddr DSN primary.set.name
/FILE   SLSCNTL2 DEV vaddr DSN secondary.set.name
/FILE   SLSBKUP  DEV vaddr DSN backup.set.name
/FILE   SLSPRINT DEV PRNT CLASS *
/FILE   SLSIN    *
  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 18 on page 292)
- a control card output for CDS discrepancies.

```
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 18. 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 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.

Notes: 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 SL3000 and SL8500 are standalone libraries 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.

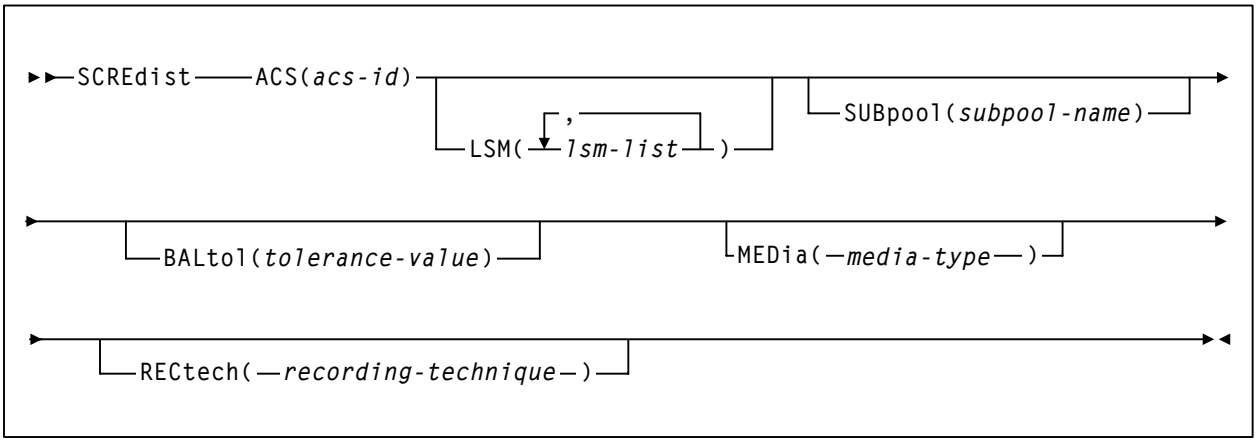
Concurrent redistributions among different ACSs are accomplished by multiple executions of this utility program.

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 the Audit utility is 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.

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 LSMid or a list of LSMids. An LSM range is not allowed. An LSMid (*lsm-id*) is made up of the ACSid (hexadecimal 00-FF) and the LSM number (hexadecimal 00-17) separated by a colon (:).

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.

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 ±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

$$\text{BALtol range} = \text{expnumlsm} \pm \frac{\text{baltol} / 1000 * \text{totscracs}}{2}$$

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.

Notes:

- **The SL8500 library supports the T9840A, T9840B, T9840C, T9840D, T9940B, and T10000 media types and recording techniques.**
- **The SL3000 library supports the T9840C, T9840D, 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 4490, 9490, or 9490EE transports 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 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).

Note: 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), 40GB (T9840C), or 75GB (T9840D).

STK2

indicates any T9940 cartridge. This parameter is the default for all T9940A and T9940B data cartridge types.

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.

Note:

1. **The SL8500 library supports the T9840A, T9840B, T9840C, T9840D, T9940B, and T10000 media types and recording techniques.**
2. **The SL3000 library supports the T9840C, T9840D, and T10000 media types and recording techniques.**

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.

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.

STK1RD
indicates any T9840D transport.

STK1RDE
indicates an encryption-enabled T9840D transport.

STK1RDN
indicates a non-encryption enabled T9840D transport.

STK1RD34
indicates a non-encryption enabled 3490E-image T9840D transport.

STK1RD35
indicates a non-encryption enabled 3590-image T9840D transport.

STK1RDE4
indicates an encryption-enabled 3490E-image T9840D transport.

STK1RDE5
indicates an encryption-enabled 3590-image T9840D 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.

T10K
indicates all T10000 transports.

T10KN
indicates all non-encrypted T10000 transports.

T10KE
indicates all encrypted T10000 transports.

T1A
indicates any T10000A transport.

T1AN
indicates a non-encryption enabled 3490E- or 3590-image T10000A transport.

T1A34
indicates a non-encryption enabled 3490E-image T10000A transport.

T1A35
indicates a non-encryption enabled 3590-image T10000A transport.

T1AE
indicates an encryption-enabled 3490E- or 3590-image T10000A transport.

T1AE34
indicates an encryption-enabled 3490E-image T10000A transport.

T1AE35
indicates an encryption-enabled 3590-image T10000A transport.

Note: If RECtech is not specified, the next scratch cartridge is selected depending on the MEDia type that has been specified.

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.

Invoking the Scratch Redistribution Utility

The easiest way to run utilities is to execute the ACS UTIL exec by entering the following command:

```
EXEC ACS UTIL SCREDIST
```

Execution of the statement results in the ACSUTIL SLKJCL file:

ACSUTIL SLKJCL File

```
/JOB  jobname SLUADMIN
/PARM MIXED
/FILE SLSPRINT DEV PRNT CLASS A
/FILE SLSIN    *
* SCREDIST ACS(acsid) LSM(lsm-list)
```

To execute the utility:

1. Delete the lines in the template that are not required, or leave the comment indicator (*) in column one.
2. Remove the comment indicator from the desired lines.
3. Specify values for the desired parameters.
4. Delete the parameters that are not desired.
5. Enter the command ‘‘FILE.’’

The job file is then submitted to the ACS service machine for execution.

JCL Examples

The following example shows JCL for redistributing scratch volumes within all LSMs in an ACS.

JCL to Perform Scratch Redistribution

```
/JOB  jobname SLUADMIN
/PARM MIXED
/FILE SLSPRINT DEV PRNT CLASS A
/FILE SLSIN    *
  SCREDIST ACS(Ø1)
```

The following example shows JCL for redistributing 36-track scratch volumes within all LSMs in ACS 00.

JCL to Perform Scratch Redistribution

```
/JOB  jobname SLUADMIN
/PARM MIXED
/FILE SLSPRINT DEV PRNT CLASS A
/FILE SLSIN
  SCREDIST ACS(ØØ) MEDIA(STD) RECTECH(36)
```

The following example shows JCL for redistributing helical DD3A (10GB) scratch volumes within LSM 01 in ACS 01.

JCL to Perform Scratch Redistribution

```
/JOB  jobname SLUADMIN
/PARM MIXED
/FILE SLSPRINT DEV PRNT CLASS A
/FILE SLSIN    *
  SCREDIST ACS(Ø1) LSM(Ø1) MEDIA(DD3A)
```

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 19).

```
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 19. Scratch Redistribution Utility Sample Output

Scratch Update Utilities

Scratch Update utilities provide three basic functions:

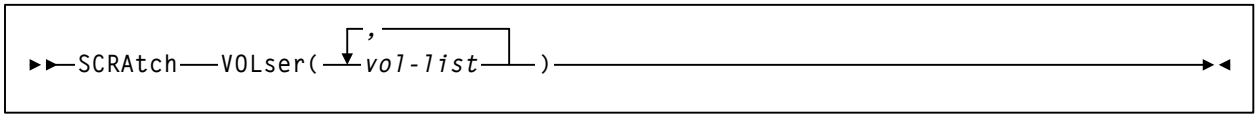
- SCRAtch utility — allows you to scratch a volume, a list of volumes, or a range of volumes
- UNSCratch utility — allows you to unscratch a volume, a list of volumes, or a range of volumes. The entire scratch list in the library control data set can be deleted by using the UNSCratch utility.
- REPLace 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.

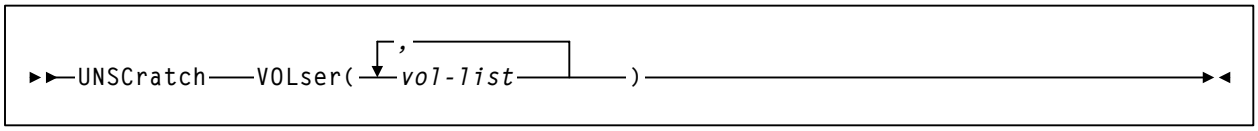
Sun StorageTek customers are responsible for creating HSC scratch utility statements to synchronize TMS and HSC scratch population definitions.

Syntax

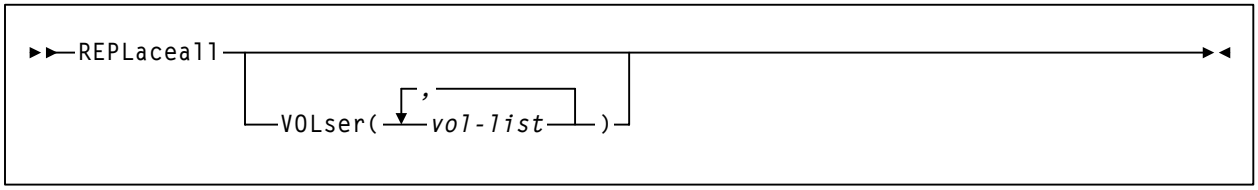
SCRAtch utility



UNSCratch utility



REPLace utility



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.

Invoking the Scratch Update Utilities

The easiest way to run utilities is to execute the ACS UTIL exec by entering one of the following commands:

```
EXEC ACS UTIL SCRAtch

EXEC ACS UTIL UNSCratch

EXEC ACS UTIL REPLaceall

EXEC ACS UTIL SCRAtch UNSCratch REPLaceall
```

Execution of this last statement results in the following ACSUTIL SLKJCL file:

ACSUTIL SLKJCL File

```
/JOB  jobname SLUADMIN
/PARM MIXED
/FILE SLSPRINT DEV PRNT CLASS A
/FILE SLSIN    *
* SCRATCH VOLSER(vol-list)
* UNSCRATCH(vol-list)
* REPLACEALL VOLSER(vol-list)
```

To execute the utility:

1. Delete the lines in the template that are not required, or leave the comment indicator (*) in column one.
2. Remove the comment indicator from the desired lines.
3. Specify values for the desired parameters.
4. Delete the parameters that are not desired.
5. Enter the command ‘‘FILE.’’

The job file is then submitted to the ACS service machine for execution.

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.

JCL to Scratch, Unscratch, and Replace

```
/JOB  jobname SLUADMIN
/PARM MIXED
/FILE SLSPRINT DEV PRNT CLASS A
/FILE SLSIN    *
  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 20 on page 309)
- 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 20. Scratch Update Utilities Sample Output

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 SCP STOP command.

Table 16 on page 311 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 16. 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
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	Down	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 326 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 Sun 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 Sun StorageTek-defined QNAME ‘‘STKENQNM’’
- 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 Sun 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 number of hosts

- 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 the “Database Decompile (LIBGEN) Utility” on page 226).

Access to the SET utility can be restricted by the SCP AUTHorize command. The SET utility must be invoked when the SLUADMIN program is executed by an authorized Job Reader; that is, one STARTed with the program AUTHRDR. The load module invoked by SET is SLUSET.

Summary of SET Utility Options

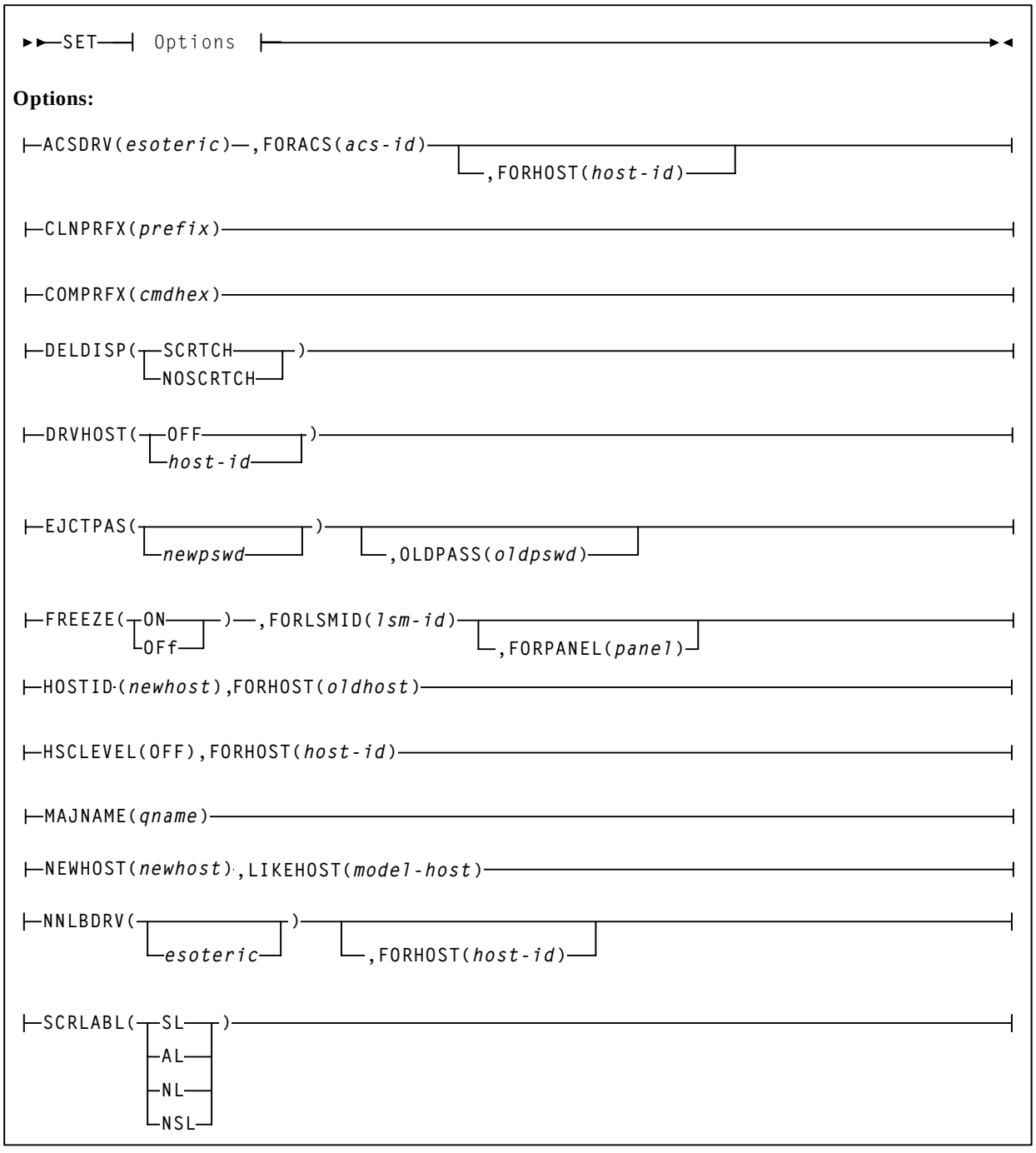
Table 17 provides a summary of the options available for the SET utility.

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 330 for an example showing multiple SET statements.

Table 17. SET Utility Options

SET Option	SET Utility Function and Location of Description
ACSDRV	“SET ACS Esoteric” on page 315
CLNPRFX	“SET Cleaning Prefix” on page 316
COMPRFX	“SET HSC Command Prefix” on page 316
DELDISP	“SET Delete Disposition” on page 318
EJCTPAS	“SET Eject Password” on page 318
FREEZE	“SET Freeze Panel” on page 319
HOSTID	“SET Host ID” on page 404
HSCLEVEL	“SET HSC Level” on page 321
MAJNAME	“SET ENQ/DEQ/RESERVE QNAME” on page 321
NEWHOST	“SET New Host” on page 322
NNLBDRV	“SET Nonlibrary Drive Esoteric” on page 322
SCRLABL	“SET Scratch Label Type” on page 323
SLIDRIVS	“SET Device Numbers for Drives” on page 323
SLISTATN	“SET LMU Station Address Numbers” on page 327
SMF	“SET SMF Record Type” on page 327
TCHNIQE	“SET Recovery Technique” on page 328

Syntax



Note: This syntax 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.

Note: The ACSDRV parameter has no effect in the operation of the VM/HSC. The utility may still be used to set this parameter for MVS systems sharing this CDS.

(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.

(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. The characters associated with each code are shown in Table 18.

Note: Do not assign any characters which could conflict with those in use by CP line edit for any command-authorized virtual machines.

Table 18. 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
7A	:	colon
7B	#	crosshatch
7C	@	at sign
7E	=	equals sign
7F	“	double quote

Table 18. Mapping of Command Prefix Codes to Characters

Hex	Character	Description
Note: Ensure that the prefix character used does not conflict with any of the following: • another subsystem's command prefix character (such as "*" for SCP) • any of the CP line editing symbols in effect (such as "#," "@," "¢," or """"). Issue the CP QUERY TERM command to determine the line editing symbols in effect.		

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: The DELDISP parameter has no effect in the operation of the VM/HSC. The utility may still be used to set this parameter for MVS systems sharing this CDS.

(SCRTCH)

specifies that the volume is to be placed in the scratch pool when the operating system indicates delete disposition.

(NOSCRTCH)

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 NOSCRTCH.

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 Freeze Panel

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 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.

SET Host ID

HOSTID
specifies that the old host ID is being changed to a new name.

(newhost)
specifies a 1- to 4-character host ID which also serves and the SMF system ID. This host ID must also be specified by the LIBSUBSYS parameter in the ACS SYSPROF file. 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” on page 321 for information about resetting operating flags.

Note: You must delimit the HOSTID (newhost or oldhost) with quotes when this ID is in lower case (such as Cray station users).

SET HSC Level

HSCLEVEL
specifies that the HSC active and release level indicators are to be cleared for the designated host.

Notes: 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: Sun 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 MVS 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 JES2 or the main processor name for JES3. *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: The NNLBDRV parameter has no effect in the operation of the VM/HSC. The utility may still be used to set this parameter for MVS systems sharing this CDS.

(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 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.

For the 9310 and 9740 LSMs, the change does not take effect until the affected HSC(s) is recycled. Refer to “Running SET SLIDRIVS With the HSC Active” on page 326 for more information.

For the SL3000 and SL8500 libraries, the changes take effect after you issue a `MODify CONFIG UPDate ACS (xx)` for the ACS that the drives were added to. Near Continuous Operation will add the drives to the configuration, so you do not need to recycle the HSC.

(addr0,...addr31)
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, or 20 for a 9310
   - 16 for an SL8500
   - 8, 16, 24, or 32 for an SL3000.
   - 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 9310 LSMs, drives are defined to the HSC from top to bottom, with *addr0* representing the topmost drive and *addrn* the bottommost drive.

   SL3000 and SL8500 drives are defined left to right, top to bottom as viewed from the front of the library.

   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 i

```
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 containing the drive panel whose addresses are being changed. An LSMid 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 19 defines options for running SET SLIDRIVS. Also, refer to "HSC Support for Near Continuous Operation (NCO)" on page 585 to see the NCO interaction with SET SLIDRIVS.

Table 19. 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. Shutting the HSC down ensures that accurate drive information is written to the CDS.
Active	The HSC can be up on all hosts only if *new drives are being added at new drive locations*. The HSC recognizes the new drive locations when it is recycled on a host.
Active	If unit addresses are changed or deleted for an *existing drive location*, either • the affected LSM must be offline until the HSC has been recycled on all hosts, or • the affected ACS must be offline to all affected hosts that access an HSC that has not been recycled.

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 Sun StorageTek CSE(s) is making the hardware changes.
  3. Vary the affected ACS offline (Vary ACS(acs-id) OFFline) on all hosts running an HSC that has not been recycled.
  4. 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 that are 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(#1),FORHOST(HSCA)
```

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. HSCs brought up before invoking this function still use the old SMF record type; HSCs brought up after using the function use the new record type.

Note: Until all active HSCs have been initialized with the new SMF record type, 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. Because 128 through 255 are reserved for user-defined records, it is recommended that a number from 128 through 255 be selected, 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 Installation 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. 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 /FILE 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.

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.

Invoking the Set Utility

The easiest way to run utilities is to execute the ACS UTIL exec by entering the following command:

```
EXEC ACS UTIL SET
```

Execution of the statement results in the ACSUTIL SLKJCL file:

ACSUTIL SLKJCL File

```
/JOB jobname SLUADMIN
/PARM MIXED
/FILE SLSPRINT DEV PRNT CLASS A
/FILE SLSCNTL  DEV <500>   DSN <dsname>
/FILE SLSCNTL2 DEV <501>   DSN <dsname>
/FILE SLSSTBY  DEV <vaddr> DSN <dsname>
/FILE SLSIN    *
* SET COMPRFX(cmdhex)
```

To execute the utility:

1. Delete the lines in the template that are not required, or leave the comment indicator (*) in column one.
2. Remove the comment indicator from the desired lines.
3. Specify values for the desired parameters.
4. Delete the parameters that are not desired.
5. Enter the command ‘‘FILE.’’

The job file is then submitted to the ACS service machine for execution.

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

```
/JOB   jobname   SLUADMIN
/PARM  MIXED
/FILE  SLSCNTL   DEV vaddr  DSN control.set.name
/FILE  SLSCNTL2  DEV vaddr  DSN secondary.set.name
/FILE  SLSSTBY   DEV vaddr  DSN standby.set.name
/FILE  SLSPRINT  DEV PRNT CLASS A
/FILE  SLSIN     *
/*  List indivual 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.

JCL for Multiple SET Statements

```
/JOB   jobname   SLUADMIN
/PARM  MIXED
/FILE  SLSCNTL   DEV vaddr  DSN control.set.name
/FILE  SLSCNTL2  DEV vaddr  DSN secondary.set.name
/FILE  SLSPRINT  DEV PRNT CLASS A
/FILE  SLSIN     *
  SET HOSTID(HSC2) FORHOST(HSCB)
  SET SLISTATN(ØCD,ØDD) FORACS(ØØ) FORHOST(HSC2)
  SET NNLBDRV(CTAPE) FORHOST(CPUA)
  SET NNLBDRV(CTAPE) FORHOST(CPUB)
```

Note: The last two lines of the JCL example above (SET NNLBDRV...) are not used by VM, but they are valid for setting an MVS host from a VM host.

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 Operator’s Guide*.

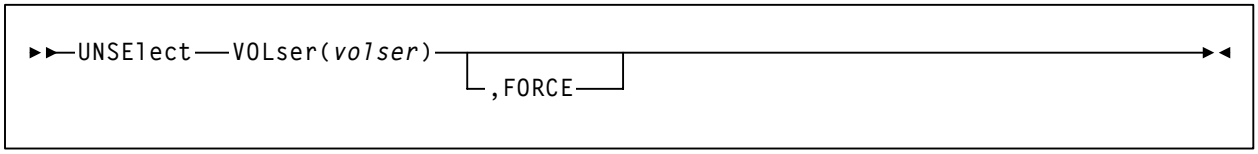
The HSC must be running on the same host that is running the UNSElect utility. If the selected volume is selected by another active (not marked inactive in the CDS) host, the HSC on that host must be running. Both hosts must be connected to the same LMU. In an environment with multiple ACSs, this can 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.

Access to the UNSElect utility can be restricted by the SCP AUTHorize command. The UNSElect utility must be invoked when the SLUADMIN program is executed by an authorized Job Reader; that is, one STARTed with the program AUTHRDR. The load module invoked by UNSElect is SLUNSEL.

Syntax



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.

Invoking the Unselect Utility

The easiest way to run utilities is to execute the ACS UTIL exec by entering the following command:

```
EXEC ACS UTIL UNSElect
```

Execution of the statement results in the ACSUTIL SLKJCL file:

ACSUTIL SLKJCL File

```
/JOB   jobname  SLUADMIN
/PARM  MIXED
/FILE  SLSPRINT DEV PRNT CLASS A
/FILE  SLSIN    *
* UNSELECT VOLser(volser),FORCE
```

To execute the utility:

1. Delete the lines in the template that are not required, or leave the comment indicator (*) in column one.
2. Remove the comment indicator from the desired lines.
3. Specify values for the desired parameters

4. Delete the parameters that are not desired.
5. Enter the command ‘‘FILE.’’ The job file is then submitted to the ACS service machine for execution.

JCL Example

The following example shows JCL for unselecting volume BWX119.

JCL to Unselect a Volume

```
/JOB   jobname  SLUADMIN
/PARM  MIXED
/FILE  SLSPRINT DEV PRNT CLASS A
/FILE  SLSIN    *
  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 21 on page 335)
- an updated control data set indicating the volume is unselected
- a condition code indicating successful or unsuccessful unselection (see Figure 21 on page 335).

```
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 21. Unselect Utility Sample Output

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.

Note: It is recommended that a 2 megabyte region size be used when running the Volume Report utility.

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.

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.

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 Protected 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, one of the following actions will 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.

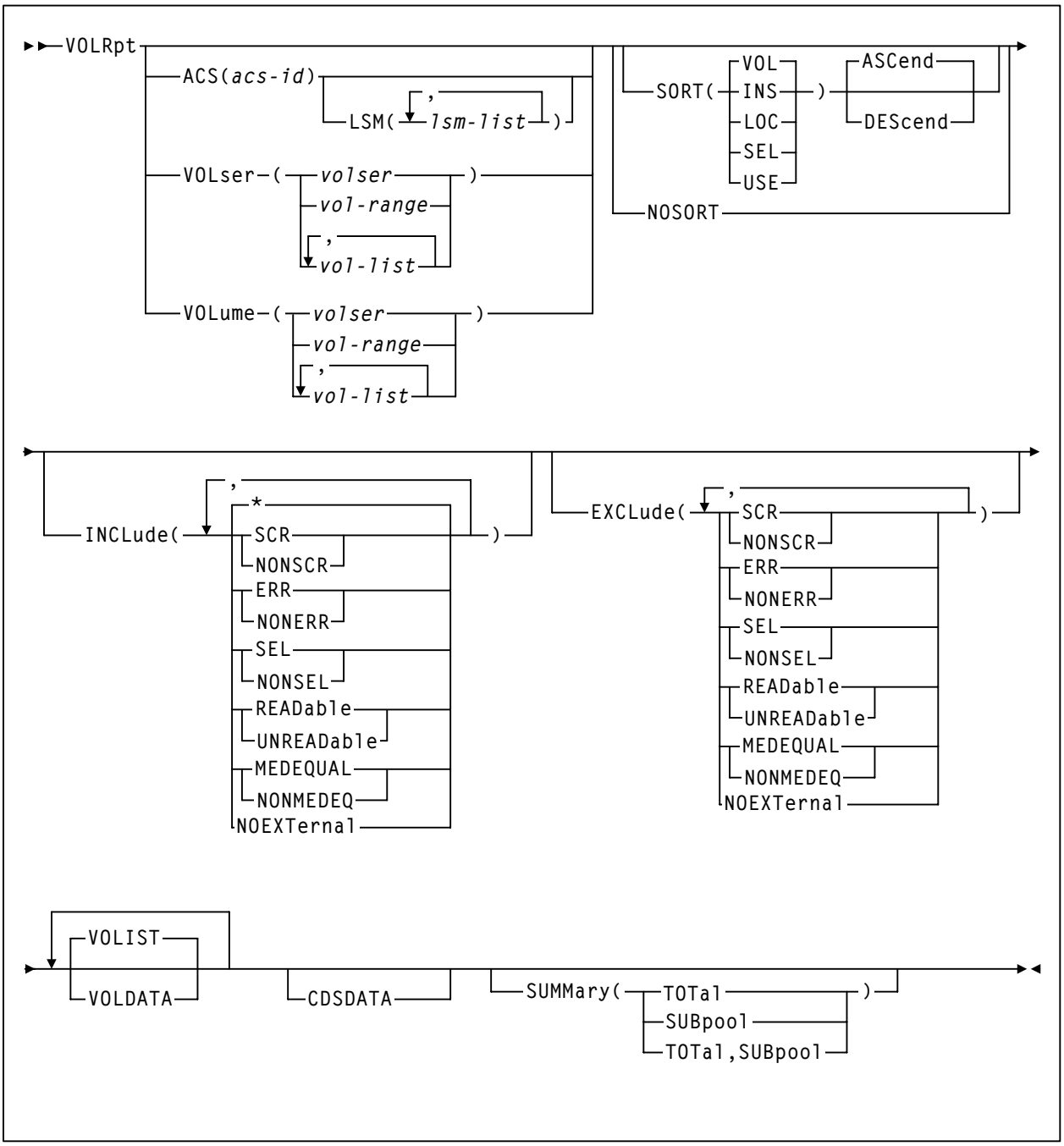
Note: If an external label is not provided for all ECARTs, the volume report may continue to show mismatches.

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.

Syntax

Note: This utility can be run either under CMS or SCP. If the utility is running under SCP, architectural limitations restrict the parameters that can be specified to **ACS**, **LSM**, **VOLser**, and **VOLume**. Parameters relating to sorting and data filtering are not available.

If the utility is running under CMS, however, it is fully functional.



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.

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.**

Note: SORT is not available if Volume Report is running under SCP.

NOSORT
specifies that an unsorted report is to be produced. **NOSORT is mutually exclusive with SORT, ASCend, and DEScend.**

Note: NOSORT is not available if Volume Report is running under SCP.

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.**

Note: ASCend is not available if Volume Report is running under SCP.

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.**

Note: DEScend is not available if Volume Report is running under SCP.

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:

1. **INCLude** parameters are applied before **EXCLude** parameters in volume selection.
2. 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).
3. Positive attributes are applied before negative attributes (for example, **SCR** is applied before **NONSCR**).
4. **INCLude** is not available if Volume Report is running under SCP.

*
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.

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:

1. **INCLude** parameters are applied before **EXCLude** parameters in volume selection.
2. 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).
3. Positive attributes are applied before negative attributes (for example, **SCR** is applied before **NONSCR**).
4. **EXCLude** is not available if Volume Report is running under SCP.

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.

If both **VOLDATA** and **CDSDATA** (see below) are specified, a single flat file is produced that contains volume and non-volume information.

Note: VOLDATA is not available if Volume Report is running under SCP.

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.

Note: VOLIST is not available if Volume Report is running under SCP.

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" on page 345. **CDSDATA** is independent of **VOLDATA** and does not keep a volume report from being produced.

Note: CDSDATA is not available if Volume Report is running under SCP.

SUMMary

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.

Note: SUMMary is not available if Volume Report is running under SCP.

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 22 on page 354.

SUBpool

specifies that subpool totals be provided on an LSM, ACS, and library basis in the report.

Subpool information must be provided through PARMLIB SCRPOol control statements (refer to "Scratch Subpool Control Statement" on page 96). These statements are contained in a data set pointed to by the SLSSCRPL DD statement (refer to "JCL/Parameter File Requirements" on page 345).

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 23 on page 355.

If subpools overlap (i.e., a volume belongs to more than one subpool) then the sum of the subpool totals may be greater than the total number of scratch volumes or the number of volumes in the library.

JCL/Parameter File Requirements

The following definitions apply to Volume Report utility JCL (SCP) and the parameter file (CMS):

SLSCNTL, SLSCNTL2, SLSSTBY
HSC control data set to be processed. SLSCNTL is required if Volume Report is run in a batch job with an active HSC. If the utility is run under CMS on another virtual machine, SLSCNTL, SLSSCRPL, and SLSVA must be included in the Volume Report parameter file.

SLSPRINT
output messages and report from the utility. A message is displayed detailing the data set names being used to produce the report.

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.

Note: The SLSCDATA statement can be specified only under CMS.

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.

Notes: The SLSSCRPL statement can be specified only under CMS.

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 20 describes these situations.

Table 20. 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/Parameter File Syntax

Syntax for JCL (SCP) and parameter file (CMS) definitions differs as follows:

SLSCNTL

For SCP:

```
/FILE SLSCNTL DEV vaddr DSN control.set.name
```

For CMS:

```
SLSCNTL vaddr DSN control.set.name
```

where:

vaddr
virtual address of the disk containing the CDS. For SCP, this is the address of the disk defined for the ACS service machine. For CMS, this is the address of the disk linked to the machine executing the SLUVOLR EXEC.

control.set.name
name of the control data set.

SLSPRINT

For SCP:

```
/FILE SLSPRINT DEV PRNT CLASS C
```

For CMS:

```
SLSPRINT PRINTER | DISK fn ft fm
```

Note: The ‘‘|’’ symbol indicates that the user must choose either PRINTER or DISK.
where:

C
SYSOUT class for the printed report.

PRINTER
report is sent to the virtual printer of the userid executing the utility.

DISK
report is sent to disk.

fn, ft, fm
file name, file type, and file mode used if the report is sent to disk.

SLSIN

For SCP:

```
/FILE SLSIN *
```

For CMS:

```
SLSIN keywords
```

where:

keywords
Volume Report utility keywords.

Note: Input under CMS is restricted to one line only and does not contain the VOLRpt utility indicator. Under SCP, input can span multiple lines, and the first line of any group is preceded by the VOLRpt utility indicator.

SLSCDATA (CMS only)

```
SLSCDATA fn ft fm
```

where:

fn, ft, fm
file name, file type, and file mode which is to receive the data.

SLSSCRPL (CMS only)

```
SLSSCRPL fn ft fm
```

where:

fn, ft, fm
file name, file type, and file mode containing the SCRPOol statements.

SLSVA (CMS only)

```
SLSVA fn ft fm
```

where:

fn, ft, fm
file name, file type, and file mode containing the VOLATTR statements.

PARM

Parameters to pass to the SLUADMIN program.

For SCP:

```
/PARM parameters
```

For CMS:

```
PARM parameters
```

where:

parameters
any parameters acceptable to the SLUADMIN program.

JOB (SCP only)

Specifies the start of the Volume Report utility to SCP.

```
/JOB jobname programname
```

where:

jobname
identifier for the job.

programname
name of the program to be executed.

Invoking the Volume Report Utility

Depending upon the environment in which it is being run, the Volume Report utility can be invoked in one of two ways:

- SLUVOLR EXEC (CMS)
- ACSUTIL SLKJCL file (SCP).

SLUVOLR EXEC (CMS)

The user can invoke the utility under CMS by running the SLUVOLR EXEC.

```
SLUVOLR fn ft fm
```

where:

fn, ft, fm
the parameter file description. If omitted, fn defaults to ‘‘SLUVOLR,’’ ft defaults to ‘‘PARMS,’’ and fm defaults to ‘‘*.’’ No placeholders are allowed for unspecified parameters.

Parameter File

A parameter file for the Volume Report running under CMS contains statements similar to those used to execute the utility under SCP. An example of a parameter file follows.

```
PARM MIXED
* SLSCDATA SLSCDATA DATA A
SLSSCRPL SCRPOOL STMTS A
SLSCNTL 160 DSN SLS200.SLSD.DBASEPRM
SLSPRINT PRINTER
SLSIN VOL(C84107)
```

Under SCP, the user can invoke the utility by entering the following command:

```
EXEC ACS UTIL VOLRpt
```

Execution of the statement results in the ACSUTIL SLKJCL file:

ACSUTIL SLKJCL File

```
/JOB   jobname  SLUADMIN
/PARM  MIXED
/FILE  SLSCNTL  DEV vaddr DSN control.set.name
/FILE  SLSPRINT DEV PRNT CLASS A
/FILE  SLSVA    DEV vaddr DSN <control.set.name> VOL <volume.name>
/FILE  SLSIN    *
* VOLRPT ACS(ascid) LSM(lsmlist)
* VOLRPT VOLSER(vol-list)
```

To execute the utility:

1. Delete the lines in the template that are not required, or leave the comment indicator (*) in column one.
2. Remove the comment indicator from the desired lines.
3. Specify values for the desired parameters.
4. Delete the parameters that are not desired.
5. Enter the command ‘‘FILE.’’

The job file is then submitted to the ACS service machine for execution.

JCL Example

The following example shows JCL to produce a Volume Report for several LSMs.

JCL to Produce a Volume Report

```
/JOB   jobname  SLUADMIN
/PARM NOHDR,MIXED
/FILE  SLSCNTL  DEV 505 DSN SLS.DBASEPARM
/FILE  SLSPRINT DEV PRNT CLASS A
/FILE  SLSIN    *
* VOLRPT ACS(01) LSM(0,1,5)
```

The optional parameter ‘‘NOHDR’’ suppresses page headings on the volume report.

JCL to Produce a Volume Report for an VM or MVS PDS

The following example shows JCL to produce a Volume Report for ACS 00.

```
/JOB   SLSXUTIL  SLUADMIN
/PARM  MIXED
/FILE  SLSCNTL  DEV 501 DSN CDS.PRIM
/FILE  SLSPRINT DEV PRNT CLASS A
/FILE  SLSVA    DEV 520 DSN VOLDEF.VOLATTR VOL HSC20B
/FILE  SLSIN    *
* VOLRPT ACS(00)
```

JCL to Produce a Volume Report for an MVS PDS

The following example shows JCL to produce a Volume Report for ACS 01.

```
/JOB   SLSXUTIL  SLUADMIN
/PARM  MIXED
/FILE  SLSCNTL  DEV 501 DSN CDS.PRIM
/FILE  SLSPRINT DEV PRNT CLASS A
/FILE  SLSVA    DEV 520 DSN SOS600.SPSB.PARMLIB(VOLATTR) VOL HSC20B
/FILE  SLSIN    *
* VOLRPT ACS(01)
```

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.

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:

- **SUMMary(SUBpool)** is specified and
- scratch subpool definitions have been provided by SCRPOol control statements.

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 Appendix F, “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 Appendix F, “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.

```
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 Sel 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

                                    No        Un     External             Non      Not     Over              Free
Type  Loc   Errant  Selected  External  Readable  Readable  Scratch  Scratch  Usuable  MAXclean   All      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 22. Volume Report SUMMary(TOTal) Sample Output

```
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 Cln         |--- Inserted --| |-- Last Used-- |   Times
Serial Media    Rectech  AA:LL:PA:RO:CO Err Scr Sel Lbl Use Subpool ID   Date     Time     Date     Time Selected
EE0000 ZCART    36CTRACK 01:00:02:00:01              R       SUB1   20040214 15:14:39 20040221 10:16:59    5453
EE0001 ZCART    36CTRACK 01:00:03:01:00      Y       R       SUB1   20040210 11:30:51 20040221 16:23:56      28
EE0002 ZCART    36CTRACK 01:00:00:00:00      Y       R       SUB1   20040210 11:30:55 20040221 16:23:56      29
EE0003 ZCART    36CTRACK 01:00:01:36:01  Y   Y   Y   R       SUB1   20040210 11:31:01 20040221 16:23:57      25
EE0004 ZCART    36CTRACK 01:00:02:01:02      Y       R       SUB1   20040210 11:31:07 20040221 16:23:57      27
EE0005 ZCART    36CTRACK 01:00:03:01:01      Y       R       SUB1   20040210 11:31:12 20040221 16:23:57      23
EE0006 ZCART    36CTRACK 02:00:00:00:00      Y       R       SUB1   20040214 14:48:10 20040218 10:33:07       6
EE0007 ZCART    36CTRACK 02:01:00:04:03      Y       R       SUB1   20040214 09:39:53 20040218 10:33:08     100
EE0008 ZCART    36CTRACK 02:00:01:39:01      Y       R       SUB1   20040214 09:40:07 20040218 10:33:08      45
EE0009 ZCART    36CTRACK 02:00:00:02:00          M   R       SUB1   20040214 09:40:19 20040221 16:34:17     676
EE0010 ZCART    36CTRACK 02:01:01:39:02      Y       R       SUB1   20040214 09:40:33 20040221 16:23:58      82
EE0011 ZCART    36CTRACK 02:01:00:08:01      Y       R       SUB1   20040214 14:24:46 20040221 16:24:00      15
EE0012 ZCART    36CTRACK 02:00:01:36:01      Y       R       SUB1   20040214 08:33:30 20040218 10:33:08      19
EE0800 ZCART    36CTRACK 01:01:01:00:04              R       SUB2   20040210 10:58:04 20040221 16:26:39      64
EE0801 ZCART    36CTRACK 01:01:14:00:04      Y       R       SUB2   20040210 10:57:13 20040218 12:44:54      34
EE0802 ZCART    36CTRACK 01:01:03:31:01      Y       R       SUB2   20040210 10:57:20 20040218 10:33:09      30
EE0803 ZCART    36CTRACK 01:01:16:00:06      Y       R       SUB2   20040210 10:57:27 20040218 13:12:31      34
EE0804 ZCART    36CTRACK 01:01:17:00:10      Y       R       SUB2   20040210 10:57:35 20040218 10:33:09      30
EE0805 ZCART    36CTRACK 01:01:18:00:06      Y       R       SUB2   20040210 10:57:43 20040218 10:33:09       7
EE0806 ZCART    36CTRACK 01:01:19:00:05      Y       R       SUB2   20040210 10:57:49 20040218 12:54:17      34
EE0807 ZCART    36CTRACK 01:01:00:00:01      Y       R       SUB2   20040210 10:57:58 20040218 13:08:24      34
EE0808 ZCART    36CTRACK 01:01:13:00:02      Y       R       SUB2   20040210 10:53:06 20040218 13:04:13      34
EE0809 ZCART    36CTRACK 02:01:01:36:00      Y       R       SUB2   20040220 10:33:04 20040218 10:33:10      50
```

Figure 23. Volume Report Utility SUMMary(SUBpool) Sample Output

(1 of 2)

```
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    36CTRACK
                             00:10        0          0
                                    _______    _______
                           ACS Total       5          1

                       02    00:20        3          1    ZCART    36CTRACK
                             00:21        3          0    ZCART    36CTRACK
                                    _______    ________
                           ACS Total       6          1
                        Library Total     11          2
```

Figure 23. Volume Report Utility SUMMary(SUBpool) Sample Output (2 of 2)

Chapter 5. Problem Determination, Diagnostics, and Recovery

Overview

The following indicators and facilities may be used in the determination of the source of a perceived problem.

- Messages
- ABEND codes
- Software trace facilities
- Diagnostic capabilities
- Recovery capabilities
- Dump processing
- Major SCP data relationships.

Messages

HSC Messages

Messages with the prefixes: ‘‘SLSxxxxs’’ are emitted by the HSC, and are documented in the *HSC Messages and Codes Guide*.

SCP Messages

Messages with the prefixes: ‘‘SLKxxxnnns’’ are emitted by the SCP, and are documented in the *SCP Messages and Codes Guide*.

Abend Codes

HSC ABEND Codes

ABEND codes of the form ‘‘U1096-xxxx’’ are emitted by the HSC, and are documented in the *HSC Messages and Codes Guide*.

SCP ABEND Codes

All other ABEND codes are emitted by the SCP, and are documented in the *SCP Messages and Codes Guide*.

Software Trace Facilities

There is a hierarchy of facilities that may be used to trace the activity of the ACS service machine. They range from standard VM services, to SCP and HSC services. Utilities are also provided.

The SCP and the HSC have separate trace facilities. Both have internal and external trace functions. The use of the HSC ‘‘TRACE’’ command (external trace) involves an interaction with the SCP ‘‘TRACE’’ command. The trace facility hierarchy involves the following:

- CP trace table
- CCWTRACE
- VM (CP) debug commands
- SCP SET TRACE command (also, SCP TRACE)
- SCP internal trace table
- IPARML (IUCV parameter list)
- IUCV interrupt buffer
- SCP external trace facility
- SCP Trace Formatter utility
- Supervisor Call (SVC) functions
- SCP GTRACE emulation
- HSC internal trace table
- HSC TRace command.

CP Trace Table

The CP component of VM has its own internal trace table. For the VM/SP, VM/SP HPO, and VM/ESA 370 feature, use the CP ‘‘CPTRAP’’ function to enable and disable event tracing, and the ‘‘TRAPRED’’ function to format entries. For VM/XA and VM/ESA, use ‘‘SET CPTRACE,’’ ‘‘TRSOURCE,’’ and ‘‘TRSAVE’’ to gather trace data and ‘‘TRACERED’’ to format it. These functions require special virtual machine authorization. See the appropriate VM documentation for details.

CCWTRACE

CCWTRACE is a CP command used for I/O tracing in VM/SP, VM/SP HPO and VM/ESA 370.

There are several options that control the operation of CCWTRACE. It is recommended that you contact Sun StorageTek Software Support to insure that the proper CCWTRACE options are specified to capture the necessary data for the particular problem at hand.

Note: For VM/XA and VM/ESA, this function is replaced by ‘‘SET CPTRACE,’’ ‘‘TRSOURCE,’’ ‘‘TRSAVE,’’ and ‘‘TRACERED.’’

VM (CP) Debug Commands

The following CP commands are useful in diagnosing problems in the system. See appropriate VM documentation for details on syntax and use.

ADSTOP	Single address stop (VM/SP, VM/SP HPO, and VM/ESA 370)
BEGIN	Start execution
CPTRACE	Enable and disable event tracing (VM/XA and VM/ESA)
CPTRAP	Enable and disable event tracing (VM/SP, VM/SP HPO, VM/ESA 370)
DISPLAY	Display registers, PSW, storage
STORE	Alter registers, PSW, storage
TRACE/PER	Multiple break-points
TRAPRED	Format CP trace table (VM/SP, VM/SP HPO, and VM/ESA 370)
TRSAVE	Define locations for saving trace data
TRSOURCE	Define I/O, data, and guest traces (VM/XA and VM/ESA)
VMDUMP	Dump the virtual machine's storage.

SCP SET TRACE Command

The SET TRACE command allows the operator to enable and disable the control program execution trace feature. It is also known as the TRACE command. In essence, SET TRACE corresponds to the Generalized Trace Facility (GTF) in MVS. Refer to "SCP External Trace Facility" on page 377 for more information about SCP tracing.

This command interacts with the HSC TRace command. The SCP TRACE command must have event USR enabled, and the HSC TRace command must have some component enabled for tracing for there to be any HSC event tracing.

TRACE Command Syntax

For a detailed description of how to use the TRACE command, refer to the *HSC Operator's Guide*.

SCP Internal Trace Table

The SCP internal trace table is comprised of two data areas:

- MTTH (Master Trace Table Header), and
- trace table entries.

Events for the system TRACE task (SLKTKT) are not traced internally or externally. The internal trace table does NOT contain 'USR' events generated by the GTRACE function.

Master Trace Table Header

A data area, called the Master Trace Table Header (MTTH) is a 32-byte header which describes the actual trace table. The address of the MTTH is in the 4-byte area at absolute address x'54' (label TRCTAB in structure NUCON). The MTTH actually resides in the CVT at offset x'238' (label CVTMTTH).

The format of the MTTH is:

```
       *-----------------------------------------*
x'00'  | MTTCURR  | MTTFIRST | MTTLAST  | reserved |
       *-----------------------------------------*
x'10'  | MTTWRAP  | MTTQCNT  | MTTQLIM  | 'MTT'    |
       *-----------------------------------------*
```

MTTCURR	the address of the current TTE (actually the last entry made)
MTTFIRST	the address of first TTE MTTLAST the address of (byte after) last entry
MTTLAST	the address of (byte after) last entry
MTTWRAP	is the TOD (bytes 3-6) of last wrap (or first entry)
MTTQCNT	is the number of events queued since POSTING (since TRACE task was POSTed)
MTTQLIM	is the number of events to queue before POSTING
MTTEYE	is the eye catcher: c'MTT '

Trace Table Entries

Each trace table entry (TTE) is 32 bytes long. The default trace table size is 8k bytes (256 entries). All SCP events are recorded, regardless of the state of the external trace (SCP 'TRACE command). ''USR'' events (GTRACE) events are never recorded in the SCP internal trace table. Instead, USR events generated by the HSC are recorded in the HSC internal trace table.

The TTE contains common information about every event, and some data specific to each event type.

```
* STANDARD TRACE TABLE ENTRY (TTE)

Offset  *-----------------------------------------------*
 x'00'  | PSW at the time of the event                  |
        *-----------------------------------------------*
 x'08'  | event |      | event  | TTEWORD1  ( 4 bytes of |
        | type  | flag | code   |  event-dependent data) |
        *-----------------------------------------------*
 x'10'  | TTEWORD2 ( 4 bytes of | TTEWORD3  ( 4 bytes of |
        |  event-dependent data)|  event-dependent data) |
        *-----------------------------------------------*
 x'18'  | TBLOK address         | TOD (bytes 3-6)        |
        | of current task       | at time of event       |
        *-----------------------------------------------*
```

DSP Trace Entry

event-type = ‘D’

event-code = dispatch priority
TTEWORD1 = R15
TTEWORD2 = R12
TTEWORD3 = R13

Return from SVC Trace Entry

event-type = ‘W’
event-code = dispatch priority
TTEWORD1 = R15
TTEWORD2 = R0
TTEWORD3 = R1

SIO Trace Entry

event-type = ‘S’
event-code = device address
TTEWORD1 = IOB address
TTEWORD2 = CAW
TTEWORD3 = Reserved

I/O Trace Entry

event-type = ‘I’
event-code = device address
TTEWORD1 = IOB address
TTEWORD2 = CSW (bytes 0-3)
TTEWORD3 = CSW (bytes 4-7)

SVC Trace Entry

event-type = ‘V’
event-code = SVC number
TTEWORD1 = R15
TTEWORD2 = R0
TTEWORD3 = R1

PGM Trace Entry

event-type = ‘P’
event-code = program interrupt code
TTEWORD1 = R15
TTEWORD2 = R12
TTEWORD3 = R1

MCK Trace Entry

event-type = ‘M’
event-code = machine check interrupt code (bytes 0-3)
TTEWORD1 = machine check interrupt code (bytes 4-7)
TTEWORD2 = external damage code
TTEWORD3 = failing storage address

RST Trace Entry

event-type = ‘R’
event-code = (unused)
TTEWORD1 = (unused)
TTEWORD2 = (unused)
TTEWORD3 = (unused)

EXT Trace Entry

event-type = ‘E’
event-code = external interrupt code:
x’0040’ = ‘CP EXT’ (generic external interrupt)
x’1004’ = CLKC (TOD clock comparator)
x’1005’ = CPUT (CPU Timer)
x’2402’ = LDEV interrupt (logical device)
x’4000’ = IUCV interrupt

external interrupt (subtype EXT):

TTEWORD1: unused
TTEWORD2 unused
TTEWORD3 unused

external interrupt (subtype CLKC):

TTEWORD1: unused
TTEWORD2: clock comparator value (bytes 0-3)
TTEWORD3: clock comparator value (bytes 4-7)

external interrupt (subtype CPUT):

TTEWORD1: 0 or JBLNTIM count if task was deferred
TTEWORD2: Task name if deferred
TTEWORD3: Task name if deferred

external interrupt (subtype IUCV):

TTEWORD1: IRT address
TTEWORD2: interrupt buffer IPARML (bytes 0-3) (includes IPTYPE-interrupt subtype)
TTEWORD3: interrupt buffer IPARML (bytes 4-7)

IUC Trace Entry

event-type = ‘C’

event-code = IUCV function performed (only items marked with ‘‘*’’ in Table 5-1 are performed):

Table 21. IUCV Functions

Code	Query
X’00’	QUERY
X’01’	TESTMSG
X’02’	* RTRVBFR

Table 21. IUCV Functions

Code	Query
X’03’	DESCRIBE
X’04’	* SEND
X’05’	* RECEIVE
X’06’	* REPLY
X’07’	TEST COMPLETION
X’08’	* REJECT
X’09’	PURGE
X’0A’	* ACCEPT
X’0B’	* CONNECT
X’0C’	* DECLARE BUFFER
X’0D’	* QUIESCE
X’0E’	RESUME
X’0F’	* SEVER
X’10’	SET MASK
X’11’	SETCMASK

TTEWORD1 = IRT address
TTEWORD2 = IPARML (bytes 0-3)
TTEWORD3 = IPARML (bytes 4-7)

IPARML (IUCV Parameter List)

The IPARML (IUCV Parameter List) is a VM data structure that contains IUCV information passed to and from the user of IUCV services.

At the time a virtual machine executes the IUCV instruction, a register points to an IPARML containing information about the request. The IUCV instruction modifies the caller’s IPARML in storage.

The IPARML is also used to map the ‘‘IUCV external interrupt buffer’’ that is filled in at the time an IUCV external interrupt occurs. It contains information describing the event that just occurred.

The first 8 bytes of the IPARML are saved in the TTE when tracing IUCV events.

IPRCODE is the return code from the IUCV instruction. A list of IPRCODE meanings follows these IPARML samples.

Refer to VM IUCV documentation for details on this and other fields.

The IPARML fields are defined by VM. Examples of some common operations are:

```
IUCV CONNECT to *BLOCKIO
IUCV SEND to *BLOCKIO
IUCV RECEIVE
IUCV REPLY
IUCV SEVER
```

IPARML for IUCV CONNECT to *BLOCKIO

```
      *-------------------------------------------------------*
x'00' |  Path ID    |flags 1|IPRCODE|   IPMSGLIM   |  xx  |  xx  |
      *------+------+-------+-------+--------+-----+------+------+
x'08' |                      IPVMID= '*BLOCKIO'                 |
      *------+------+-------+-------+--------+-----+------+------+
x'10' |    Block size               |      Block Offset          |
      *------+------+-------+-------+-------+------+------+------+
x'18' |  Vdevaddr   |  xx   |  xx   |  xx   |  xx  |  xx  |  xx  |
      *------+------+-------+-------+--------+-----+------+------+
x'20' |    Buffer Length            |  xx   |  xx  |  xx  |  xx  |
      *-------------------------------------------------------+
```

Inputs:

IPVMID	= userid to connect to = '*BLOCKIO'
Block size	= data set block size
Block offset	= number of blocks from beginning of device to data set beginning
Vdevaddr	= virtual device address

Outputs:

IPPATHID	= IUCV pathid
IPRCODE	= IUCV return code
IPMSGLIM	= max. # of concurrent messages on the path
flags1	= IPFLAGS1 = path status & privilege flags

IPARML for IUCV SEND to *BLOCKIO

```
      *-------------------------------------------------------*
x'00' |  Path ID    |flags 1|IPRCODE|   IPMSGID     = message id |
      *------+------+-------+-------+--------+-----+------+------+
x'08' |  IPTRGCLS = target class    |  IPRMMSG1 = block number   |
      |    (1-write) (2=read)       |                            |
      *------+------+-------+-------+------+------+------+-------+
x'10' |  IPRMMSG2 = bufffer address |  xx  |  xx  |  xx  |  xx   |
      *------+------+-------+-------+------+------+------+-------+
x'18' |  xx  |  xx  |  xx   |  xx   |  xx  |  xx  |  xx  |  xx   |
      *------+------+-------+-------+------+------+------+-------+
x'20' |  xx  |  xx  |  xx   |  xx   |  xx  |  xx  |  xx  |  xx   |
      *-------------------------------------------------------+
```

Inputs:

IPPATHID	= IUCV path id
IPTRGCLS	= target class (1=write; 2=read)
IPFLAGS1	= flags (type=2way)
Block number	= relative block number
Buffer addr	= data buffer address

Outputs:

IPMSGID	= IUCV message id
IPRCODE	= IUCV return code

IPARML for IUCV RECEIVE

```
      *-----------------------------------------------------*
x'00' |  Path ID    |flags 1|IPRCODE|   IPMSGID     = message id |
      *------+------+-------+-------+--------+-----+------+------+
x'08' |  IPTRGCLS = target class    |  IPBFADR1 = buffer address |
      *------+------+-------+-------+------+------+------+-------+
x'10' |  IPBFLN1F = bufffer length  |  xx  |  xx  |  xx  |  xx   |
      *------+------+-------+-------+------+------+------+-------+
x'18' |  xx  |  xx  |  xx   |  xx   |  xx  |  xx  |  xx  |  xx   |
      *------+------+-------+-------+------+------+------+-------+
x'20' | IPBFLN2F = reply length     |  xx  |  xx  |  xx  |  xx   |
      *-----------------------------------------------------------+
```

Inputs:

IPPATHID	= IUCV path id
IPTRGCLS	= target class
IPFLAGS1	= flags
IPBFRADR1	= data buffer address
IPBFLN1F	= data buffer length

Outputs:

IPMSGID	= IUCV message id
IPRCODE	= IUCV return code
IPBFLN2F	= length of allowable reply (if any)
IPFLAGS1	= flag bits
IPBFADR1	= address of last byte RECEIVEd + 1
IPBFLN1F	= length of remaining message text

IPARML for IUCV REPLY

```
      *-------------------------------------------------------*
x'00' |  Path ID    |flags 1|IPRCODE|     IPMSGID= message id    |
      *------+------+-------+-------+--------+-----+------+------+
x'08' |  IPTRGCLS = target class    |  xx  |  xx  |  xx  |  xx   |
      *------+------+-------+-------+------+------+------+-------+
x'10' |  xx  |  xx  |  xx   |  xx   |  xx  |  xx  |  xx  |  xx   |
      *------+------+-------+-------+------+------+------+-------+
x'18' |  xx  |  xx  |  xx   |  xx   |IPBFADR2= reply buffer addr |
      *------+------+-------+-------+------+------+------+-------+
x'20' | IPBFLN2F = reply length     |  xx  |  xx  |  xx  |  xx   |
      *-------------------------------------------------------+
```

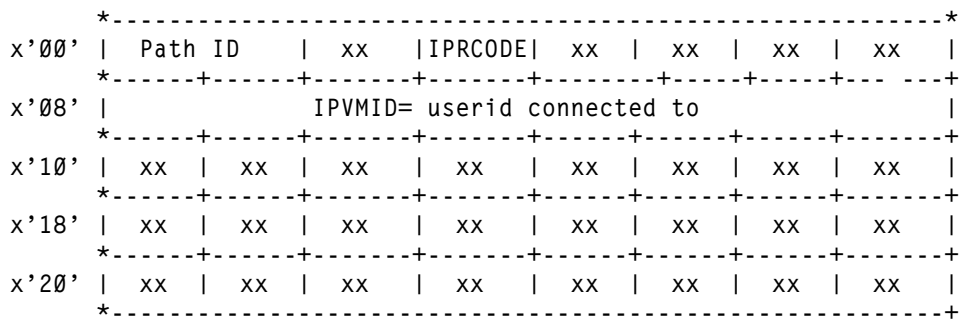
Inputs:

IPPATHID	= IUCV path id
IPMSGID	= IUCV message id
IPTRGCLS	= target class
IPFLAGS1	= flags
IPBFRADR2	= reply buffer address
IPBFLN2F	=reply buffer length

Outputs:

IPRCODE	= IUCV return code
IPBFLN2F	= length of residual reply text
IPFLAGS1	= flag bits
IPBFADR2	= address of last byte REPLYd + 1

IPARML for IUCV SEVER



Inputs:

IPPATHID	= IUCV path id
IPVMID	= name of virtual machine connected to

Outputs:

IPRCODE	= IUCV return code

IPRCODE

The following is a list of IPRCODE values and meanings from DMKSP MACLIB member IUCVBLOK for VM/SP, VM/SP HPO and VM/ESA 370. For VM/XA and VM/ESA, the codes are defined in CPLIB MACLIB member IPARML. The codes are also documented in the *IBM VM/SP System Programmer's Guide and System Facilities for Programming* documents.

1	invalid path id
2	path quiesced - no sends allowed
3	message limit exceeded
4	priority messages not allowed on path
5	buffer too short for message
6	fetch protection exception
7	addressing exception
8	msgid found, but class/path invalid
9	message has been purged
10	message length negative
11	target is not logged on
12	target has not declared a buffer
13	invoker max connections exceeded
14	target max connections exceeded
15	not authorized to connect to target
16	invalid cp system service name
17	invalid function code
18	invalid msglimit
19	already has declared a buffer
20	path has been severed
21	parameter list message not allowed
22	send list invalid
23	negative length in list
24	invalid total list length
25	prmmsg and buflist/anslist not allowed
26	buffer list not d-word aligned
27	answer list not d-word aligned

28	no control buffer exists
48	function not supported for CSS

IUCV Interrupt Buffer

As an IUCV-type external interrupt occurs, CP places data in the IUCV external interrupt buffer. The data describes the type of IUCV event, and data specific to each event subtype.

For a full description, see the appropriate VM documentation.

The external interrupt is traced in the internal trace table, and the first 8 bytes of the IPARML are saved in the TTE.

The following is a list of possible IUCV interrupt codes.

IPTYPE	**Interrupt Type**
X’01’	-- Pending Connection
X’02’	-- Connection Complete
X’03’	-- Path has been Severed
X’04’	-- Path has been Quiesced
X’05’	-- Path has been Resumed
X’06’	-- Pending Priority Message Completion
X’07’	-- Pending Non-priority Message Completion
X’08’	-- Pending Priority Message
X’09’	-- Pending Non-priority Message

IPARML for Pending Connection Interrupt

```
      *-------------------------------------------------------*
x'00' |  IPPATHID   | Flag 1|  01   |  IPMSGLIM    | xx  |  xx   |
      *------+------+-------+-------+--------+-----+-----+--- ---+
x'08' |    IPVMID= userid wishing to establish the connection    |
      *------+------+-------+-------+------+------+------+-------+
x'10' |  IPUSER                                                  |
      *------+------+-------+-------+------+------+------+-------+
x'18' |  IPUSER                                                  |
      *------+------+-------+-------+------+------+------+-------+
x'20' |  xx  |  xx  |  xx   |  xx   |  xx  |  xx  |  xx  |  xx   |
      *-------------------------------------------------------+
```

where:

IPPATHID	= IUCV pathid
Flag 1	= IPFLAGS1 = privilege flags
IPMSGLIM	= max. number of concurrent messages allowed on path
IPVMID	= user ID wishing to establish the connection
IPUSER	= 16 bytes of application-dependent data For the SCP, the first 8 bytes are the 'ddname' of the file to communicate with: 'SLSTLMS' = tape management interface 'CMDIUCV' = operator commands

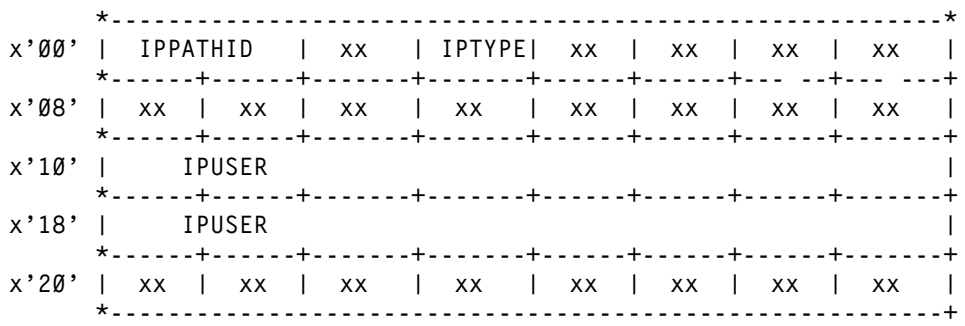
IPARML for Connection Complete Interrupt

```
      *-------------------------------------------------------*
x'00' |  IPPATHID   | Flag 1|  02   |  IPMSGLIM    | xx  |  xx   |
      *------+------+-------+-------+------+-------+-----+--- ---+
x'08' |  xx  +  xx  +  xx   +  xx   +  xx  +  xx  +  xx  +  xx   |
      *------+------+-------+-------+------+------+------+-------+
x'10' |  IPUSER                                                  |
      *------+------+-------+-------+------+------+------+-------+
x'18' |  IPUSER                                                  |
      *------+------+-------+-------+------+------+------+-------+
x'20' |  xx  |  xx  |  xx   |  xx   |  xx  |  xx  |  xx  |  xx   |
      *-------------------------------------------------------+
```

where:

IPPATHID	= IUCV pathid
Flag 1	= IPFLAGS1 = privilege flags
IPMSGLIM	= max. number of concurrent messages allowed on path
IPUSER	= 16 bytes of application-dependent data (perhaps) modified by the user ID that ACCEPTed the path For *BLOCKIO: IPUSER+0: DS F start block number IPUSER+0: DS F end block number IPUSER+0: DS H flags

IPARML for Path Severed/REsumed/Quiesced Interrupt



Inputs:

IPPATHID	= IUCV path id
IPTYPE	= 03=severed, 04=quiesced, 05=resumed
IPUSER	= 16 bytes of application-dependent data. The SCP itself, does not use this data.

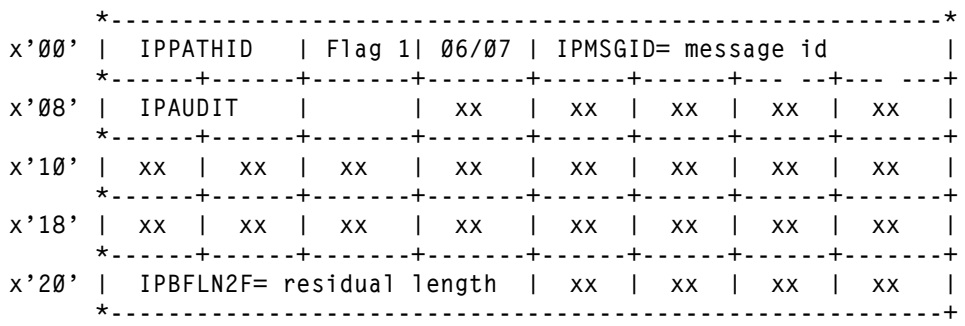
IPARML for Incoming Message Interrupt

```
      *-------------------------------------------------------*
x'00' |  IPPATHID   | Flag 1| 08/09 | IPMSGID= message id       |
      *------+------+-------+-------+------+------+--- --+--- ---+
x'08' |  IPTRBCLS= target class     |  xx  |  xx  |  xx  |  xx   |
      *------+------+-------+-------+------+------+------+-------+
x'10' |  IPBFLN1F= message length   |  xx  |  xx  |  xx  |  xx   |
      *------+------+-------+-------+------+------+------+-------+
x'18' |  xx  |  xx  |  xx   |  xx   |  xx  |  xx  |  xx  |  xx   |
      *------+------+-------+-------+------+------+------+-------+
x'20' |  IPBFLN2F= reply length     |  xx  |  xx  |  xx  |  xx   |
      *-------------------------------------------------------+
```

where:

IPPATHID	= IUCV path id
Flag 1	= IPFLAGS1
	= message characteristic flags
IPMSGID	= IUCV message id
IPBFLN1F	= length of message
IPBFLN2F	= length of allowable reply

IPARML for Message Complete Interrupt



where:

IPPATHID	= IUCV pathid
Flag 1	= IPFLAGS1
	= privilege flags
IPMSGID	= IUCV message id
IPAUDIT	= completion status flags
IPBFLN2F	= residual reply length

Diagnostic Capabilities

This section describes the overall diagnostic capabilities supported by all components of the HSC. Diagnostic capabilities include:

- **SCP Trace Facility.** 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. They appear as VMDUMPS.
- **Error Recording Data Sets (ERDS)**. Software failures are logged into these error recording data sets.

These diagnostic tools can be helpful to you in diagnosing software problems and helpful when discussing any problems with Sun StorageTek Support Services.

SCP Trace Facility

The SCP Trace Facility provides a low level history of the recent past. The SCP emulates many of the functions of the MVS GTF. The HSC issues GTRACE requests for significant events during operation. Format ID and Event ID (FID and EID) are specified as parameters on the /PARM statement of the HSC startup SLKJCL file (refer to “Creating an SLKJCL File for Starting the HSC” on page 155 for more information).

Supervisor Call and Abnormal End Dumps

SVC and ABEND dumps are taken where appropriate to diagnose software failures.

Error Recording Data Set Records

4480 Cartridge Subsystem and 3278 Terminal Subsystem Error Recording Dataset (ERDS) records are written by VM 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.

SCP External Trace Facility

The SCP can trace interrupt, IUCV, I/O, dispatch, and GTRACE events as they occur and send the trace records to a designated virtual machine for later analysis. The target may be any virtual machine in an RSCS network.

The system TRACE task (SLKTKT) is responsible for writing the trace records to a VM punch spool file. The records are written in a special format, where a logical record may span multiple physical records. The system TRACE task is not traced. When the external trace function is first enabled, additional storage is obtained which is never released. This storage is used for queued trace records.

The SCP Trace Formatter utility (SLUETRAC) is used to format the records into a readable format (“SCP Trace Formatter Utility” on page 378).

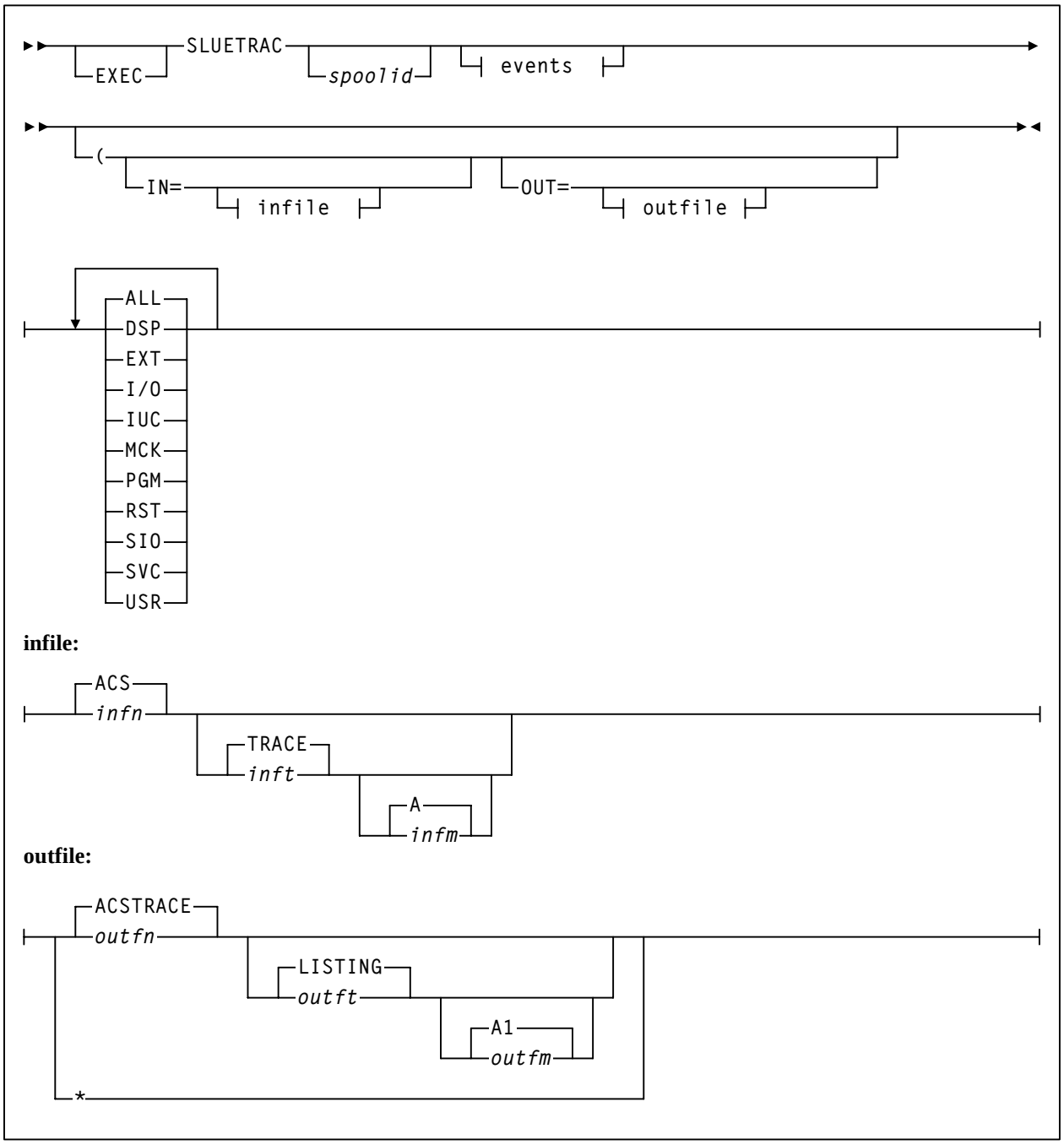
Tracing parameters are altered by SCP SET TRACE command. Refer to ‘‘SET TRACE Command’’ in the *HSC Operator’s Guide* for a complete description of the SET TRACE command.

The traced data includes the following SCP data structures:

1. TTE (Trace Table Entry)
   - for all events
2. IPARML (VM IUCV Parameter List)
   - for all external IUCV interrupts
   - for IUCV SEVER, ACCEPT, REJECT
3. IUB (IUCV Request Block)
   - for IUCV CONNECT, SEND, RECEIVE, REPLY

Note: Refer to Appendix F, “Record Formats” for the IUB record layout.

SCP Trace Formatter Utility



EXEC
optionally specified to invoke the EXEC.

SLUETRAC
initiates the SLUETRAC EXEC.

spoolid

indicates the VM spool id of the reader spool file containing the trace data. If neither spoolid nor IN= is specified, the first non-held reader spool file of type PUN is processed.

Note: IN= overrides specification of a reader spool file.

events

indicates which events are to be traced:

ALL	- all of the following events (this is the default)
DSP	- task dispatched EXT - external interrupt
I/O	- I/O interrupt IUC - IUCV instruction
MCK	- machine check interrupt
PGM	- program check interrupt
RST	- restart interrupt
SIO	- Start I/O and Start I/O Fast
SVC	- SVC interrupt
USR	- user (GTRACE) invocation

IN=

indicates input is from a CMS file. If IN= is not specified, a reader spool file is assumed.

Note: This overrides the specification of a spoolid.

infn

the CMS filename of the input file. The default is ACS.

inft

the CMS filetype of the input file. The default is TRACE.

infm

the CMS filemode of the input file. The default is A.

OUT=

indicates the output file. If OUT= is not specified, a printer spool file is created.

outfn

the CMS filename of the output file. The default is ACSTRACE.

outft

the CMS filetype of the output file. The default is LISTING.

outfm

the CMS filemode of the output file. The default is A1.

***

indicates to direct the output to the terminal.

Supervisor Call (SVC) Functions

The SCP partially supports the following SVC functions. They are included here for use when reading trace output. Documentation of the actual subfunctions supported is for Sun StorageTek internal purposes only.

Table 22. SVC Functions

Refer to Table Note	Hex	Decimal	Function
	00	0	EXCP
	01	1	WAIT
	02	2	POST
(1)	03	3	EXIT
	04	4	LIST GETMAIN
	06	6	LINK
	08	8	LOAD
	09	9	DELETE
	0A	10	GET/FREEMAIN R
	0B	11	TIME
	0C	12	SYNCH
	0D	13	ABEND
	0F	15	ERROR EXCP
	10	16	PURGE I/O
(2)	13	19	OPEN
(2)	14	20	CLOSE
(2)	18	24	DEVTYPE
(2)	1B	27	OBTAIN
	21	33	IOHALT
	22	34	QEDIT/MGCR
	23	35	WTO/WTOR
	24	36	WTL
	28	40	EXTRACT
	29	41	IDENTIFY
	2A	42	ATTACH
	2B	43	CIRB
	2C	44	CHAP
	2E	46	TTIMER
	2F	47	STIMER
(1)	30	48	DEQ
	33	51	SDUMP
	37	55	EOV
(1)	38	56	ENQ
	3C	60	ESTAE
	3E	62	DETACH
(2)	40	64	RDJFCB
	4C	76	ERDS
	53	83	SMFWTM
	57	87	DOM
	63	99	DYNALLOC
	6B	107	MODESET
	77	119	TESTAUTH
	78	120	GET/FREEMAIN
	7A	122	ESR2 (LOAD)
	7F	127	SCPROUTE

Note:

- May cause SVRB to run (extra RQBLOK).
- Always causes SVRB to run (extra RQBLOK).

SCP GTRACE Emulation

The SCP emulates the following MVS GTRACE features:

1. The MVS GTRACE macro is supported, without alteration.
2. A Monitor Call (MC) program interrupt occurs when the GTRACE function is invoked. The SCP program check handler recognizes and handles the Monitor Call as a GTRACE event.
3. Up to 256 bytes of user data may be traced.
4. With most interrupts, the SCP dispatcher does not return to the interrupted task immediately, but dispatches the next task in the priority queue. However, after a monitor call program interrupt the interrupted task IS returned to immediately. If this were not done, program flow would be artificially altered by the act of tracing.
5. The Format Id (FID) parameter is supported. It describes the internal format of the trace record. The valid (decimal) FID ranges are:

```
  1 <= user  FID <= 80
 81 <= system FID <= 255
```

   Actual FIDs used by the SCP are:

Table 23. FIDs Used by SCP

Decimal	Hex	Char	Meaning
195	x'C3'	c'C'	IUCV event
196	x'C4'	c'D'	Dispatcher event
197	x'C5'	c'E'	External interrupt
201	x'C9'	c'T'	I/O interrupt
212	x'D4'	c'M'	Machine check interrupt
215	x'D7'	c'P'	Program interrupt
217	x'D9'	c'R'	Restart interrupt
226	x'E2'	c'S'	Start I/O
229	x'E5'	c'V'	Supervicor call interrupt
230	x'E6'	c'W'	Return from SVC

   The actual FID used by the HSC is passed to the HSC initialization routine (SLSBINIT), and is recorded in the ACS SYSPROF file. The default FID is 23.

6. The Event ID (EID) parameter is supported. It describes the event as a subtype of the Format ID.

   It is specified as a 4-digit hexadecimal number, of which the left-most digit is the monitor call class.

The valid EID ranges are:

```
     Ø <= user EID <= x'3FF'
x'4ØØ' <= system EID <= x'FFF'
```

The actual EID used by the SCP is x'400', for all FIDs.

The actual EID used by the HSC is passed to the HSC initialization routine (SLSBINIT), and is recorded in the ACS SYSPROF file. The default EID is x'E086', corresponding to user event x'086'.

HSC Internal Trace Table

The HSC itself has an internal trace table. It is pointed to by the contents of the 4-byte field at offset x'40' from the start of the LVT (LVTTBLK).

It is a wrap-around table, recording the last 256 events that occurred in the HSC subsystem. There are more than 90 different types of events. Trace entries are 108 bytes long. The data traced will be truncated in order to fit into the table entry.

Programs issue an SLSTRACE macro at important trace points. The routine that is called by the macro checks to see if tracing of the caller's software component has been enabled. The internal trace table is always updated. If the caller's component has been enabled (by the HSC 'TRACE' command), then GTRACE will also be invoked to produce an external trace record for later analysis.

Table 24. Format of HSC Internal Trace Table

	Offset	Length	Description
Header - 16 bytes long:			
	+0	4	Identifier - 'BTRC'
	+4	4	Length of trace table
	+8	1	Subpool number
	+9	1	Protection key
	+A	6	Reserved for future use
ENTRIES - 108 bytes long:			
	+0	2	Trace identifier
	+2	5	Name of module cutting the record
	+7	1	*Length of data area used
	+8	2	Trace module offset
	+A	1	*Flag bits
	+B	1	*Sequence number of this record
	+C	4	Trace TBLOK address
	+10	4	Reserved
	+14	88	Trace data from component
Note: These fields (*) do not apply to internal trace records.			

```
00B613F0.  C2E3D9C3  00006C10  F1300000  00000000 | BTRC..%.1....... |
00B61400.  6550D3D9  E2D740BC  00DA0000  009DB6B8 | .&LRSP ......... |
00B61410.  00000000  4DF1F8F6  F0F1F1F5  F7F2D2F1 | ....(186011572K1 |
00B61420.  F1F1F8F1  F1F0F0F3  40404040  4040F340 | 11811003      3  |
00B61430.  40404040  40F34040  40404040  F3404040 |       3     3    |
00B61440.  404040F3  40404040  4040F340  40404040 |     3     3      |
00B61450.  40F34040  40404040  F3404040  404040F3 |   3     3      3 |
00B61460.  40404040  4040F340  40404040  6551D3D9 |       3     ..LR |
00B61470.  E2D740EC  01BC8000  009DB6B8  00000000 | SP .............. |
00B61480.  D3D9D840  00000104  00300000  00000000 | LRQ ............. |
00B61490.  00000000  8CF0F0F1  F1F8F0F0  F0F0F0F0 | .....00118000000 |
00B614A0.  F1F1F8F0  F0F0F000  9CD84DF9  621A1C20 | 1180000..Q(9.... |
00B614B0.  TO 00B614BF. (X'00000010' bytes)-All bytes contain X'00'
00B614C0.  00045F18  00000000  00045D28  0000009D | ..¬.......)..... |
00B614D0.  00000098  00000000  6552D3D9  E2D740E0 | ...q......LRSP \ |
00B614E0.  05920000  009DB6B8  00000000  D3D9E2C5 | .k..........LRSE |
00B614F0.  000000E0  00300000  00000000  02055240 | ...\...........  |
00B61500.  000000BC  0000000B  4DF1F8F6  F0F1F1F5 | ........(1860115 |
00B61510.  F7F2D2F1  F1F1F8F1  F1F0F0F3  40404040 | 72K111811003     |
00B61520.  4040F340  40404040  40F34040  40404040 |   3      3       |
00B61530.  F3404040  404040F3  40404040  4040F340 | 3      3      3  |
00B61540.  40404040  6550D3D9  E2D740BC  00DA0000 |     .&LRSP ..... |
00B61550.  009DB6B8  00000000  4DF1F8F6  F0F1F1F5 | ........(1860115 |
00B61560.  F7F2D2F1  F2F1F8F1  F2F0F0F3  40404040 | 72K121812003     |
00B61570.  4040F340  40404040  40F34040  40404040 |   3      3       |
00B61580.  F3404040  404040F3  40404040  4040F340 | 3      3       3 |
00B61590.  40404040  40F34040  40404040  F3404040 |      3       3   |
00B615A0.  404040F3  40404040  4040F340  40404040 |    3       3     |
00B615B0.  6551D3D9  E2D740EC  01BC8000  009DB6B8 | ..LRSP ......... |
00B615C0.  00000000  D3D9D840  00000104  00300000 | ....LRQ ........ |
00B615D0.  00000000  00000000  8CF0F0F1  F1F8F0F0 | .........0011800 |
00B615E0.  F0F0F0F0  F1F1F8F0  F0F0F000  9CD84DF9 | 00001180000..Q(9 |
00B615F0.  621A1C20  00000000  00000000  00000000 | ................ |
00B61600.  00000000  00045F18  00000000  00045D28 | ......¬.......). |
00B61610.  0000009D  00000098  00000000  6552D3D9 | .......q......LR |
00B61620.  E2D740E0  05920000  009DB6B8  00000000 | SP \.k.......... |
00B61630.  D3D9E2C5  000000E0  00300000  00000000 | LRSE...\........ |
00B61640.  02055160  000000BC  0000000C  4DF1F8F6 | ...-........(186  |
00B61650.  F0F1F1F5  F7F2D2F1  F2F1F8F1  F2F0F0F3 | 011572K121812003 |
00B61660.  40404040  4040F340  40404040  40F34040 |       3      3   |
00B61670.  40404040  F3404040  404040F3  40404040 |     3      3     |
00B61680.  4040F340  40404040  6550D3D9  E2D740BC |   3     .&LRSP . |
00B61690.  00DA0000  009DB6B8  00000000  4DF1F8F6 | ............(186 |
00B616A0.  F0F1F1F5  F7F2D2F1  F3F1F8F1  F3F0F0F3 | 011572K131813003 |
```

Figure 24. HSC Internal Trace Table Example

HSC TRACE Command

The HSC TRace command enables or disables tracing of events in selected HSC components.

It uses GTRACE to perform the actual tracing. The SCP TRACE command must have the "USR" event enabled for any trace output to result.

For a detailed description of how to use the HSC TRACE command, refer to the *HSC Operator's Guide.*

Format of HSC GTRACE USR Records

Table 25. HSC GTRACE USR Records

Offset	Length	Description
+C	2	Trace identifier
+E	5	Name of module issuing SLSTRACE macro
+13	1	Length of data area used
+14	2	Trace module offset
+16	1	Flag bits **X'80'** Data truncated **X'40'** Allow GTRACE recording **X'20'** First pass
+17	1	Sequence number of this record
+18	4	Trace TBLOK address
+1C	4	Reserved
+20	1-224	Trace data from component

Notes:

- GTF REcord size = 256 Bytes
- HSC Record size may be larger than 256 Bytes
- One HSC record may require more than one GTF record.

Diagnostic Commands

VM (CP) Commands

The CP commands listed in “VM (CP) Debug Commands” on page 359 are very useful in diagnosing a problem. For maximum effectiveness, they should be used in conjunction with the SCP’s diagnostic subsystem commands.

SCP Debug Mode

The SCP may operate in a special ‘‘debug’’ mode, initiated by some of the commands of the SCP diagnostic subsystem.

The debug mode is special in the following ways:

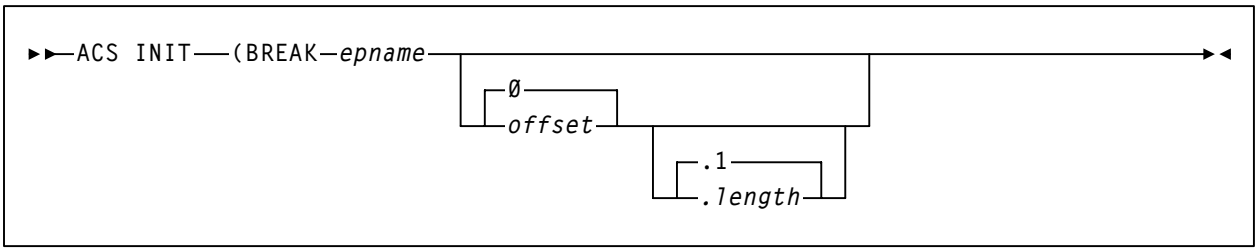
- When entering debug mode, the SCP issues the CP command SET RUN OFF. After this, when the virtual machine enters a CP READ state, the virtual machine stops and does not proceed until a CP BEGIN command is issued.
- A flag is set in the CVT to indicate that debug mode is active.
- If the SCP command STOPSCP is issued, control will return to CMS without a re-IPL.
- Debug mode is terminated by the diagnostic command ‘=NODEBUG’.

Setting Initialization Sequence Break-Points

Sometimes, it is useful to setup program break-points that would be reached before the command interface is enabled.

After the ACS EXEC loads the program modules into storage, the locations of the break-points will be determined, and the CP PER command will be used to set stops for those locations. After all break-points have been set, the CP QUERY PER command is issued to display what has been set. When the SCP is initialized, it will be in the special ‘‘debug’’ mode.

To set such break-points, start the SCP with the following command:



epname
the name of a known entry point. It is either named in the map within any SLKNUCxx module or there is a CDE structure for the name.

If the name is known, it will be located in storage. It will be brought into storage if it was not there before.

If *epname* is not specified, the current traces are displayed.

offset

the optional offset from the address of epname at which to set a breakpoint using CP PER. The default is 0.

.length

the optional length of the breakpoint. The default is 1.

Note: length must be preceded by a period with no space between offset and the period.

An example of setting break-points follows:

```
ACS INIT (BREAK SLKDMOP 5E.1C
```

SCP Diagnostic Subsystem Commands

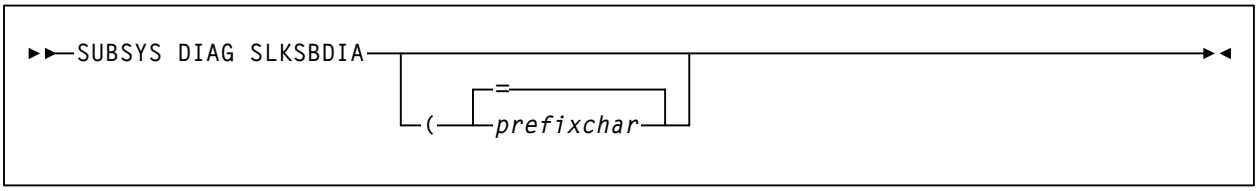
These commands are provided for use when diagnosing a problem with a ‘‘live’’ system. Any other use may result in indeterminate conditions.

Note: It is recommended that Sun StorageTek support personnel be contacted before using diagnostic subsystem commands.

These commands are only valid when entered from the ACS service machine’s virtual console.

Enabling the Diagnostic Subsystem

Issue the following SCP operator command:



This command activates the diagnostic subsystem and enables the use of some special commands.

prefixchar is a command prefix indicating that the command is to be handled by the diagnostic subsystem. The default prefix is ‘‘=’’ (equal sign), but may be set to any character that does not conflict with use by other subsystems (for example, the HSC).

Note: The prefix character cannot be changed during a session. The SCP must be recycled and the new prefix character specified with the subsequent SUBSYS command.

The commands below are part of the diagnostic subsystem. The prefix character should be that described above.

=DEBUG	- enter the ‘‘debug’’ mode.
=NODEBUG	- exit the ‘‘debug’’ mode.
=DDICT	- return the data dictionary definition of a field.
=HPER	- set multiple break-points using the CP PER command.
=WHERE	- display the storage location for a given program module.

=DEBUG

This diagnostic command initiates the special ‘‘debug’’ mode. ‘CP SET RUN OFF’ is also executed.

=

the command character for the DIAG subsystem. The default is ‘‘=’’, but may be set to any character by the SUBSYS command that started the subsystem.

=NODEBUG

This diagnostic command terminates the special ‘‘debug’’ mode. ‘CP SET RUN ON’ is also executed.

=
: the command character for the DIAG subsystem. The default is ‘‘=’’, but may be set to any character by the SUBSYS command that started the subsystem.

=DDICT

This diagnostic command displays data dictionary information describing an SCP or HSC data area fieldname.

The information returned is the assembler definition of the field with the DSECT name and the offset from the DSECT.

‘CP SET RUN OFF’ is executed, and the SCP debug mode is entered. The diagnostic command ‘=NODEBUG’ terminates the debug mode.

=
: the command character for the DIAG subsystem. The default is ‘‘=,’’ but may be set to any character by the SUBSYS command that started the subsystem.

fieldname
: the name of a field in an SCP or HSC data structure.

Examples:

Issuing the command:

```
=DDICT LVTSSCVT
```

Results in:

```
LVT: LVTSSCVT+000C DS A
```

Issuing the command:

```
=DD ATPARM
```

Results in:

```
ATNAME: ATPARM +0018 DS (16)A
```

Issuing the command:

```
=DD CMDTOKS
```

Results in:

```
CMDTOKS: CMDPLIST+00CC DS (32)XL(4)
```

=HPER

This diagnostic command sets one or more break-points for a list of named modules and offsets. The CP QUERY PER command is then issued to display the current program traps in effect.

Note: In the VM/XA environment, CP PER and QUERY PER are synonyms for the CP TRACE and QUERY TRACE commands.

'CP SET RUN OFF' is executed, and the SCP debug environment is entered. The diagnostic command '=NODEBUG' terminates the debug environment.

=

the command character for the DIAG subsystem. The default is ''=,'' but may be set to any character by the SUBSYS command that started the subsystem.

epname

the name of a known entry point. It is either named in the map within any SLKNUCxx module or there is a CDE structure for the name.

If the name is known, it will be located in storage. It will be brought into storage if it was not there before.

If epname is not specified, the current traces are displayed.

offset

the optional offset from the address of epname at which to set a breakpoint using CP PER. The default is 0.

.length

the optional length of the breakpoint. The default is .1.

Note: length must be preceded by a period with no space between offset and the period.

For example, issuing the command:

```
=HPER slsbinit slkode 54.8
```

Results in CP QUERY PER output. The following output is for VM/SP, VM/SP HPO, and VM/ESA 370.

```
1 INSTRUCT RANGE addr TERMINAL NORUN CMD * FUNC=SLSBINIT OFFSET=000000
2 INSTRUCT RANGE addr-addr TERMINAL NORUN CMD * FUNC=SLKODE OFFSET=000054
```

The following output is for VM/XA and VM/ESA.

```
NAME  INITIAL      (ACTIVE)

  1     INSTR   PSWA  addr
        TERM    NOPRINT  NORUN  SIM
        SKIP 00000  PASS 00000  STOP 00000  STEP 00000
        CMD  * FUNC=SLSBINIT OFFSET=00000000

  2     INSTR   PSWA  addr-addr
        TERM    NOPRINT  NORUN  SIM
        SKIP 00000  PASS 00000  STOP 00000  STEP 00000
        CMD  * FUNC=SLKODE   OFFSET=00000054
```

=WHERE

This diagnostic command displays the module location of a named program module (and the date/time of last assembly), or the module name which contains a given address.

'CP SET RUN OFF' is executed, and the SCP debug environment is entered. The diagnostic command '=NODEBUG' terminates the debug environment.

=

the command character for the DIAG subsystem. The default is ''=,'' but may be set to any character by the SUBSYS command that started the subsystem.

epname

the name of a known entry point. It is either named in the map within any 'SLKNUCxx' module or there is a CDE structure for the name.

If the name is known, it will be located in storage. It will be LOADed into storage if it was not there before.

address

any storage address. If it is within a known module, the module and entry point names and the offsets from each will be returned.

Examples:

Issuing the command:

```
=WHERE SLSBINIT 23FDF0
```

Results in the messages:

```
SLKOWH671I Module SLSBINIT at address 23FD50 compiled 09/20/88 14.20
SLKOWH674I Address 23FDF0 = EP   : SLSBINIT +0000A0
SLKOWH674I Address 23FDF0 = CSECT: SLSBINIT +0000A0
```

HSC Diagnostic Commands

The following HSC diagnostic commands are provided:

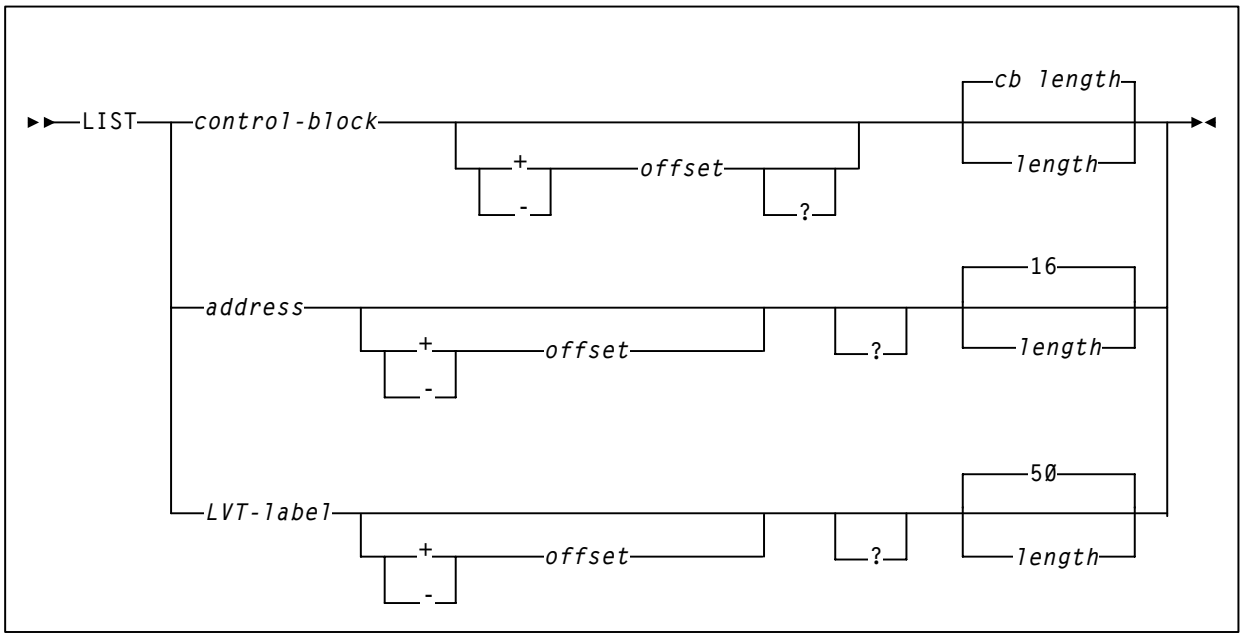
- LIst command
- Display command.

The HSC LIst command is provided for diagnostic support for the HSC. **Use this command under the direction of Sun StorageTek support personnel.**

LIst Command

The LIst 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 Sun StorageTek support personnel.**

Syntax



Command Name

LIst
initiates the LIst command.

Parameters

control-block
specifies the name of a single HSC data structure. It may be any one of the following:

BCVT
Initialization/Termination Communication Vector Table

CCV
CAP Communication Vector Table

DCV
Database Server Communications Vector Table

DHB (Primary copy pointed from DCVDIOB2)
Database Heartbeat Block

DHBE (1748 bytes into DHB pointed from DCVDIOB2)
Database Heartbeat Extension Block

FCVT
Configuration Control Communication Vector Table

HCVT
Host Communication Vector Table

JCVT
Job Processing Communication Vector Table

LCB (first LCB in the chain)
LMU Control Block

LCVT
LMU Communication Vector Table

LOOK (LOOKSECT)
Table LOOK-up DSECT for SLSSLOO

LVT
Library Vector Table (large output produced)

MCVT
Mount/Dismount Vector Table

OCVT
Operator Command Vector Table

QVT
Ascomm Vector Table

RCVT
Recovery Communication Vector Table

SSST
Services CVT Pointer

TDEF (first TDEF in LOOKSECT)
Table Definition for SLSSLOO

UCT
Utilities Communication Vector Table

VCT
Volume Cell Communication Table

address
A hexadecimal address. If the address is not available in the address space, you will get a "Storage Not Available" message.

LVT-label
The assembler label in the LVT macro used to find where many HSC programs are loaded into memory.

offset
An offset to be added (+) or subtracted (-) from the address. This allows you to specify an offset from an address or an offset into a control block. **This parameter is optional.**

?
A question mark (?) is used for indirect addressing. It will take the fullword target and use it as the new target, dumping storage from that location. There is no space before the question mark (?). **This parameter is optional.**

A question mark will be ignored if used with a control block unless you also specify an offset.

cb length
specifies the length of the control block. **This parameter is optional.**

If you do not specify a length with a control block, it will take the second fullword of the control block as the length.

length

decimal number of bytes of storage to dump.**This parameter is optional.**

The default length is 16 bytes for an address and for any combination if you specify an offset and/or a question mark (?).

If you specify an offset or an offset and question mark with a control block, and do not specify a length, the default is 16 bytes. It will not use the length found in the control block.

The maximum length to be dumped is 4096 (X'1000') bytes. If you attempt to dump more, or the length found in the control block is greater then 4K, you will get an error message and the storage will not be dumped. This is to prevent excessive output to the system console.

If the storage being dumped has duplicate lines (example: a lot of hex zeros), duplicate lines will be grouped together. A single line will be output showing the offset range and a message “SAME AS ABOVE.”

DISPLAY Command

The HSC 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 the *HSC 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 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.

When access to a failing data set is restored, you must run the BACKup and RESTore utilities to restore the integrity of the failed data set. An alternative method is to use the CDs command, specifying the Enable parameter to append the data set again to the end of the Active CDS List.

Figure 25 illustrates the built-in recovery scheme for the control data sets.

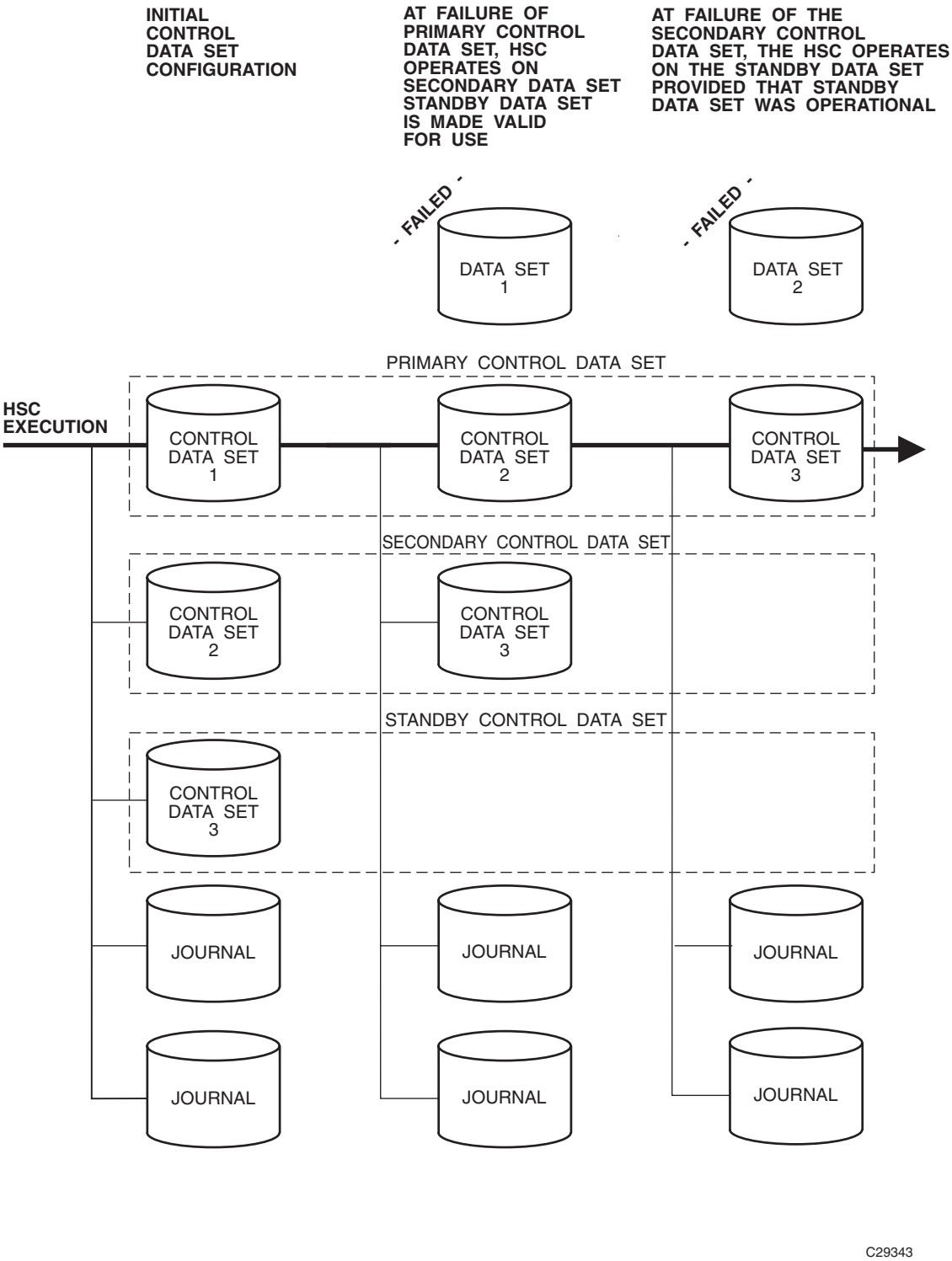


Figure 25. Control Data Set Recovery Scheme

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 212 for detailed information about running the BACKup utility. Refer to “Restore Utility” on page 286 for detailed information about running the RESTore utility.

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 Messages and Codes Guide* 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 multi-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 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 any of the backup control data sets are brought online; the HSC continues to run the the library installation during the switch. When a new control data set is brought online, all work within a library complex needing the control data set 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 multi-host environment.

Operator commands are available to display the status of current control data sets or to enable/disable/autoenable any copy of the control data set. Refer to the *HSC Operator's Guide* for detailed information about the commands.

Switching the Control Data Set in a Multi-Host Environment

In a multi-host environment, the HSC automatically provides communications to all hosts when a control data set switch has occurred. For this communications performance to occur, the proper hardware and software must exist in the library installation and the parameter data set must specify parameters invoking utilization of the hardware and software.

Control Data Set Integrity During Restore

To take advantage of the recovery capabilities of the HSC during the restore operations, it is necessary to ensure that you have initialized a standby control data set.

Refer to "Allocating and Initializing Control Data Sets" in the *HSC Installation Guide* for detailed information about installing the HSC and initializing control data sets.

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 Remote-linked Libraries" on page 214 for some special considerations concerning control data sets.

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 Sun StorageTek Software Support.

Information Required for Sun 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.

Dump Processing

The following dump processing topics are discussed below:

- Type of dumps supported
- How to request a dump
- What to do when a dump occurs
- Dump analysis using SLUIPCS
- Major SCP data relationships
- Diagnostic techniques
- Common dump analysis tasks.

Type of Dumps Supported

In order to use IPCS for dump analysis, dumps must be produced via the CP ‘VMDUMP’ command (or diagnose code x’94’).

The dump ‘‘format’’ for this product is ‘SLK’.

Printed dumps produced by the CP DUMP command are of limited benefit, and consume too much spool space and paper.

How to Request a Dump

Dumps may be produced in several ways:

- The ‘SDUMP’ function may be invoked by any program in the SCP or the HSC. This is usually done in an ESTAE recovery routine that was called after an error occurred.

  The dump title supplied to the SDUMP becomes the dump title passed to the CP diagnose (x’94’) function that actually creates the dump spool file.

- The SCP operator command ‘DUMP’ may be used to produce a dump at any time. The comments supplied to the command become the dump title passed to the CP diagnose (x’94’) function that actually creates the dump spool file.

- The ‘CP VMDUMP’ command may be used from the connected console of the ACS service machine to create a dump.

Caution: If this technique is used, you MUST USE THE FOLLOWING PARAMETERS. Any other FORMAT will result in a dump that cannot be processed by the special dump analysis tools provided with the product.

(Get into CP READ state by pressing the PA1 key)

```
VMDUMP Ø.END TO userid FORMAT SLK *your-comments-go-here
```

The comments may be anything you choose.

What to do When a Dump Occurs

When a VM HSC dump occurs, it is sent as a CLASS V spool file to the virtual machine defined by the current DUMPOPTS setting. Dump files are large and can have a negative impact on system spool space; they should be processed as soon as possible after they occur.

The following steps should be taken when a dump occurs:

1. Move the CONSLOG and dump spool files to the dump processing machine's virtual reader.
2. Note the reason for the dump.
3. Load the CONSLOG and dump onto MAINTSTK's IPCS disk.
4. Call Sun StorageTek Software Support.
5. Move requested material to tape and ship to Sun StorageTek.

Move Dump and CONSLOG to Dump Processing Machine's Virtual Reader

If no DUMPOPTS command had been issued, then the dump will be found in STKACS's virtual reader.

Move it to the appropriate machine's virtual reader by issuing the following command from STKACS's virtual console:

```
CP TRANSFER RDR CLASS V TO userid
```

If the initial settings of CONSLOG were in effect, then the CONSLOG will be found in STKACS's virtual reader as a class C PRT file with the name SLS.CONSOLE.LOG. Move it to the same machine's virtual reader by issuing the following command from STKACS's virtual console:

```
CP TRANSFER RDR CLASS C TO userid
```

Note Reason For Dump

Make a note of the reason the dump was created. If the dump was due to an ABEND, then the ABEND code and reason code are kept in the spool file's NAME and TYPE fields. Issue the following command from MAINTSTK's virtual console to display this information:

```
QUERY RDR CLASS V ALL
```

Below is an example of the response for a dump taken due to an ABEND with a user ABEND code of 1096 and a reason code of 4500450.

```
ORIGINID FILE CLASS RECORDS CPY HOLD DATE  TIME    NAME        TYPE
STKACS    0074 V DMP 00001285 001 NONE 02/27 18:23:46 U1096-4500450
```

Load Dump and CONSLOG Onto Disk

Load the dump spool file onto MAINTSTK's IPCS disk. Ensure that MAINT's 193 disk is ACCESSed. MAINTSTK normally has a LINK to this disk in its directory entry.

To access the disk, issue the following command from MAINTSTK's virtual console:

```
ACCESS 193 B
```

Issue the following command to load the first dump spool file onto disk:

```
SLUIPCS LOAD
```

A message is issued providing the name of the disk file created. This disk file has a name of the form PRBnnnnn DUMP.

Load the related CONSLOG file onto MAINTSTK's IPCS disk (normally accessed as the ''K'' disk). The example below loads the CONSLOG, whose spool file number is 70, onto MAINTSTK's IPCS disk:

```
RECEIVE 7Ø PRBnnnnn CONSLOG K
```

Call Sun StorageTek Software Support

Call Sun StorageTek Software Support using the telephone number provided in the *Requesting Help from Software Support guide*. The remote diagnostician will request the following information:

- Your Sun StorageTek site location ID
- ABEND code and reason code
- Dump title
- Maintenance level of the VM HSC (for example, PUT 9301)
- Operating system name, release, and maintenance level (for example, VM/ESA, Release 2, Service Level 0000). This information can be obtained by issuing the CP command:

  ```
  QUERY CPLEVEL
  ```

Move Problem Materials to Tape

Sun StorageTek Software Support may require that the problem materials be copied to tape and shipped to them for detailed analysis. Copy the materials to tape using the VMFPLC2 CMS command. Details on using VMFPLC2 can be found in the *IBM Service Guide for VM/SP* and VM/SP HPO, Release 6, or the IBM *Installation and Service* manual for VM/XA SP, VM/ESA, and VM/ESA 370.

Normally, Software Support requires the following materials:

- The dump (PRBnnnnn DUMP)
- The related CONSLOG (PRBnnnnn CONSLOG)
- The software maintenance log (SMS2000 VMFSVLOG)

Below is an example of the VMFPLC2 commands normally used to copy the problem materials onto a tape mounted at virtual address 181:

```
VMFPLC2 DUMP PRBnnnnn * *
VMFPLC2 DUMP SMS2000 VMFSVLOG *
VMFPLC2 WTM 2
```

Dump Analysis Using SLUIPCS

Normally, dump analysis is performed by a Sun StorageTek Software Support Representative. However, the facilities described in this section are available to all users.

The SLUIPCS CMS command supplied by Sun StorageTek utilizes the dump processing facilities native to the VM release on which it executes. Under VM/SP, VM/SP HPO, and VM/ESA 370, SLUIPCS uses Interactive Problem Control System (IPCS) facilities; under VM/XA SP and VM/ESA, SLUIPCS uses the Dump Viewing Facility (DVF).

When SLUIPCS SCAN is specified, one of the following interactive dump analysis (SCAN) environments is established:

- DUMPSCAN - VM/XA SP and VM/ESA
- IPCSSCAN - VM/SP and VM/SP HPO, Release 6, and VM/ESA 370

After entering the SCAN environment, you may invoke any of the environment's IBM or Sun StorageTek supplied subcommands. The following IBM manuals describe the IBM subcommands that may be used in the SCAN environment:

- *VM/SP and VM/SP HPO Release 6 -- IPCS Guide and Reference*
- *VM/ESA 370 Release 1 -- IPCS Guide and Reference*
- *VM/XA SP and VM/ESA -- Dump Viewing Facility Operation Guide and Reference*

Sun StorageTek provides the following specialized subcommands for the SCAN environment:

Table 26. Subcommands for the SCAN Environment

Subcommand	Function
EX	Execute CMS command
FIND	Display address of a named data structure
PSW	Display PSW
STAT	Display PSW, regs, clocks, and dump title
TASK	Display TBLOK address(es) for a named task
TRB	Display register save area traceback
TTE	Display a trace table entry
VIEW	Display a named data structure
WA	Display module name at specified address

Table 26. Subcommands for the SCAN Environment

Subcommand	Function
WN	Display starting address of specified module name

To terminate the SCAN environment, use the END subcommand.

To format and print data areas and control blocks, issue the SLUIPCS PRINT command. The user is prompted for Sun StorageTek-defined print options.

SLUIPCS SCAN Subcommands

These Sun StorageTek-supplied SCAN subcommands ‘‘know’’ about SCP and HSC data structures and module locations.

VIEW

The VIEW subcommand displays a data structure, and saves its last resolved dump address.

After supplying or otherwise resolving a structure address, the VIEW subcommand may be issued with just a structure name. In this case, the address that was last used for that structure will be used.

```
VIEW CVT
VIEW CCVT
VIEW NUCON
VIEW MTT
VIEW STORMAN
VIEW LVT
VIEW struct-name
VIEW struct-name address
VIEW struct-name label-name
VIEW struct-name @ label-name
VIEW struct-name in label-name
VIEW struct-name
```

Table 27. VIEW-able SCP Data Structures

Data Structures				
ATTPARM	*CCVT	CDE	CHANCELL	CIB
CMDPLIST	CPIB	CSWORD	CUCELL	*CVT
DAB	DECB	DEVBLOK	ECB	ERREC
EXDAT	EXTDESC	FREANC	GRFA	IEZCOM
IHADCB	IOBLOK	IQE	IRT	IUB
JBLOK	JFCB	JWA	MCBLOK	MSGEL
*MTT	NEWTQE	*NUCON	ORIGID	PSWORD
QSGET	RQBLOK	RTM1PARM	RTM1WA	RTM2WA
SCB	SFCB	SMFHDR	*STORMAN	STQENT
SVC006	SVC011	SVC012	SVC034	SVC036
SVC046	SVC046M	SVC047	SVC047M	SVC060
SVC107	SVC119	SVICB	SYSTIOT	TBLOK
TIMECONV	TQE	TRELAT	TSEL	TTE
XINT				

Table 28. VIEW-able HSC Data Structures

Data Structures				
ACSINT	ACT	AEDL	AEDT	ALDL
ALRB	AOPTP	ASRQWA	AVOLU	BCPTAB
BCV	BITE	BLOG	BLOS	BPRMLST
BSVT	BUXVT	CCV	CESETPL	CJCOMM
CJSMF	CNCOMM	CNSMF	CRB	CSNTR
CTR	CVT	DAC	DBB	DBPARAM
DCE	DCH	DCV	DELTAWK	DES
DHB	DIT	DJB	DJLR	DPV
DVT	EACT	ECVT	EJRB	EJST
ELCVT	ELMT	ELRB	EMSG	ESEPWA
EWRPY	EWTO	FCVT	FDRVT	FESTAEPL
FH2HB	FSTNT	HCVT	HST	IEESMCA
IEFJESCT	IEFJSCVT	IEFUCBOB	IEZDEB	IHAASCB

Table 28. VIEW-able HSC Data Structures

IHAASCB	IHAPSA	IKJTCB	ILLT	ITCA
JCVT	JPIAL	JPIB	JPMESG	LASP
LBM	LBR	LCB	LCCD	LCCW
LCF	LCS	LCT	LCVT	LDBK
LDW	LEPL	LHB	LHQ	LHRQ
LIQE	LITC	LLG1	LLG2	LLG3
LLG4	LLSB	LMDT	LME	LPVL
LPVS	LQC	LRPL	LRSE	LRSP
LRT	LSB	LSL	LSLM	LSR
LSSE	LST	LSTB	LSWT	LTAB
LTCB	LTEB	LURB	*LVT	MAIL
MCVT	MDQE	MEPL	MFCR	MHIB
MHTH	OCDE	OCRE	OCVT	ODACS
ODCAP	ODLSM	ODSFT	OFFLDWK	OLHDR
ONLSTP	ONTAB	ORQD	ORQL	ORQS
ORQX	OSHDR	OSMLSM	OSVSTA	PSWIT
QEPL	QFCE	QFCT	QMTB	QRWK
QTIP	QUAB	QVT	RACB	RCVT
REPL	RITC	RITO	RITP	RITT
RL00	RL01	RPAURE	RPCLPL	RPEMAT
RPITSK	RPRESV	RRPL	RT00	RT01
RWPLIST	SCPOOLWK	SCPOOLX	SDEBUG	SLSID
SLX	TMSIB	TRCB	VAR	VAT
VCAM	VCMASK	VCSCNIWK	VCT	VITT
VPLCFRE	VPLCGET	VPLCSCN	VPLCSTA	VPLLSEL
VPLSDEL	VPLSPRE	VPLSREF	VPLSSEL	VPLSSTA
VPLVERT	VPLVINS	VPLVREF	VPLVSEL	VSLB
VSSP	VTQB	VTQE	VUESTAE	WMLIST
Note: “*” indicates that “VIEW” implicitly knows the structure’s location.				

FIND

FIND is identical to the VIEW command, except that only the address of the found structure is displayed. It is useful when following pointer chains to a structure. It is especially useful when analyzing a dump over a slow communications line.

EX (EXECUTE CMS COMMAND)

This subcommand executes any CMS command in subset mode.

```
EX token token .....
```

TRB (SAVE AREA TRACEBACK)

The TRB subcommand displays register save areas. The traceback starts from the current R13 contents, an explicit address, or the contents of a named field in the SCP structure last VIEWed.

```
TRB
TRB label-name
TRB  address
```

TTE (TRACE TABLE ENTRY)

The TTE subcommand displays one trace table entry (TTE). The first time ‘‘TTE’’ (with no parameter) is invoked, the last (current) TTE is displayed. Subsequent invocations ‘‘walk back in time,’’ one step at a time.

```
TTE       Previous TTE entry
TTE  B    Previous TTE entry

TTE  F    Next TTE entry
TTE  N    Next TTE entry

TTE  R    Reset to current
```

PSW

The PSW subcommand displays the PSW at time of the VMDUMP.

```
PSW
```

STAT (STATUS)

The STAT subcommand displays status of the system at the time of the problem that caused the dump:

- general and control registers
- the PSW
- TOD clock
- TOD clock comparator
- dump id

```
STAT
```

TASK (FIND TASK)

This subcommand displays a list of addresses of all tasks with a given name. The data displayed is the TBLOK address for each task that matches.

```
TASK taskname
```

WA (WHERE ADDRESS)

The WA subcommand finds the program module that contains the given address. It then displays the module name and the offset from the module beginning.

```
WA address
```

WN (WHERE NAME)

The WN subcommand finds the program module of the given name. It then displays the address where the module is located.

```
WN name
```

SLUIPCS PRINT Options

The options listed in the following table are supported for SLK-type dumps.

Table 29. SLLUIPCS Print Options

Option	Function
COMM	Print console and WTO buffers
ENQ	Print formatted ENQ/DEQ blocks
IOS	Print formatted I/O supervisor blocks
MAIN	Print registers, PSW, and ALL of dumped storage
SLKM	Print SCP-managed storage
SLKP	Print NUCXLOADed modules
STOR	Print formatted storage management blocks
TASK	Print formatted task management blocks
PTTE	Produce file TEMP TRACE A containing trace table entries (TTE) from the SCP internal trace table.

Major SCP Data Relationships

The following data structures are referenced below:

NUCON	Nucleus constants = PSA = low storage
CVT	Communications Vector Table
CCVT	Communications Control Vector Table
CMDPLIST	Command Parameter List
MSGEL	Message Element
MTT	Master Trace Table
TTE	Trace Table Entry
JBLOK	Job Block (analog to MVS' ASCB)
TBLOK	Task Block (analog to MVS' TCB)
RQBLOK	Request Block (analog to MVS' RB)

The following HSC data structure is referenced below:

LVT	Library Vector Table

The following MVS data structures are referenced below:

JESCT	JES Communciations Table (macro IEFJESCT)
SSCT	SubSystem Control Table (macro IEFJSCVT)
SSVT	SubSystem Vector Table (macro IEFJSSVT)

Command, Message, Trace Processing

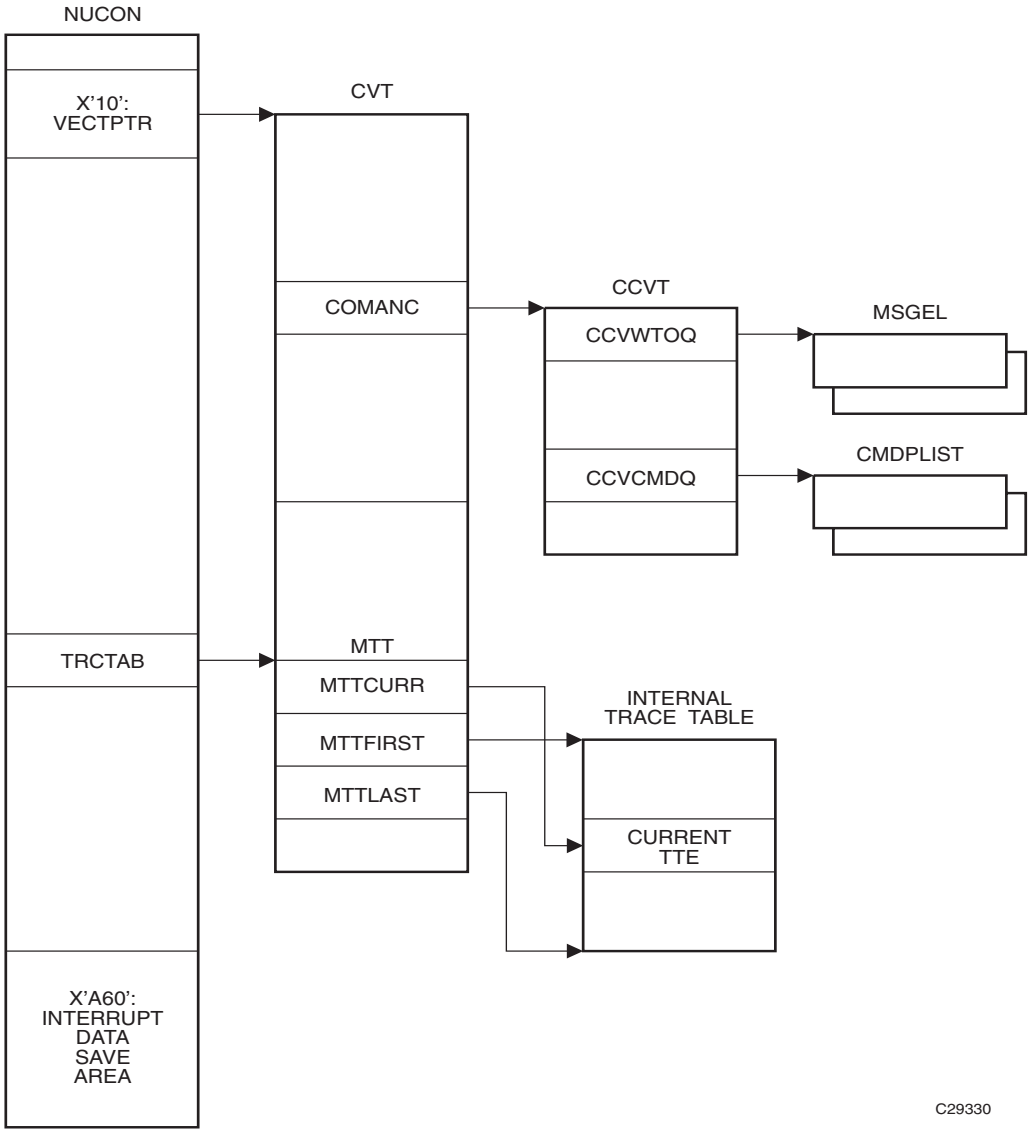


Figure 26. Command, Message and Trace Processing

SCP Task/Job Data Relationships

Refer to Figure 27 on page 415 for a description of these relationships.

Subsystem Data Relationships

Refer to Figure 28 on page 416 for a description of these relationships.

Diagnostic Techniques

The user must be logged on the ACS virtual console.

1. Loops:
   a. Disabled loops:
      1. Press **PA1**. Enter:

         ```
         SET RUN OFF
         ```

      2. Press **PA1**. Enter:

         ```
         VMDUMP Ø.END FORMAT SLK * comments
         ```

         The PSW will be within the loop.

   b. Enabled loops:

      These will be detected by the dispatcher. The logging task will be ‘‘DEFERRED’’ and TTEs for CPU timer interrupts will be produced. SLUETRAC will indicate the name of the ‘‘DEFERRED’’ task.

      When viewing a dump, RQBLOKs which have ‘‘100S’’ in the RQLIC field and ‘‘E’’ in th*e RQITYPE field, may be looping.*

2. Waits:
   a. Disabled Waits:

      Probably during CMS processing.

      1. Press **PA1**. Enter:

         ```
         SET RUN OFF
         ```

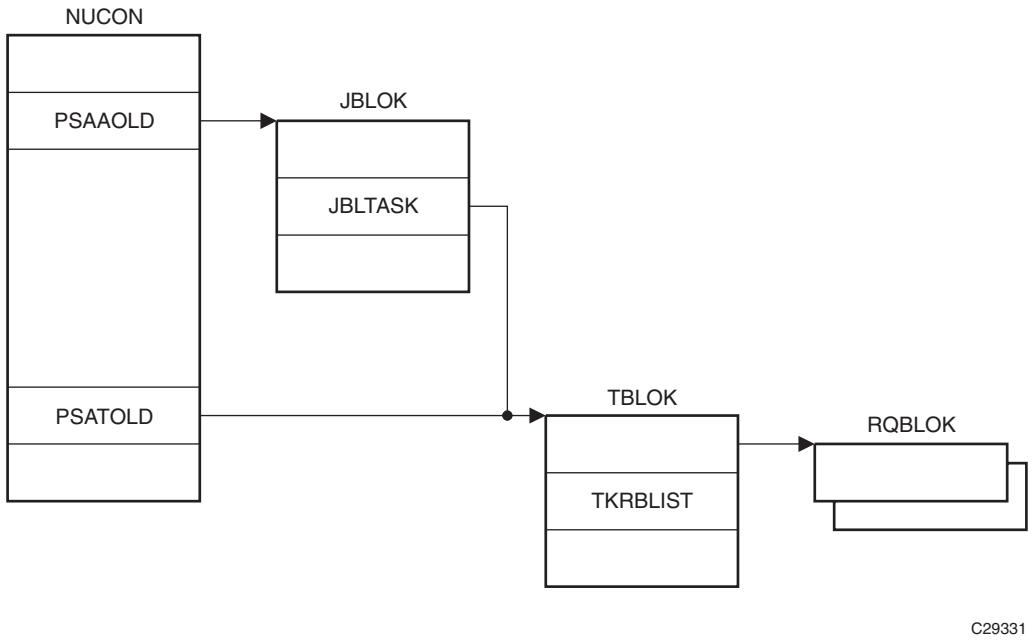


Figure 27. SCP Task/Job Data Relationship

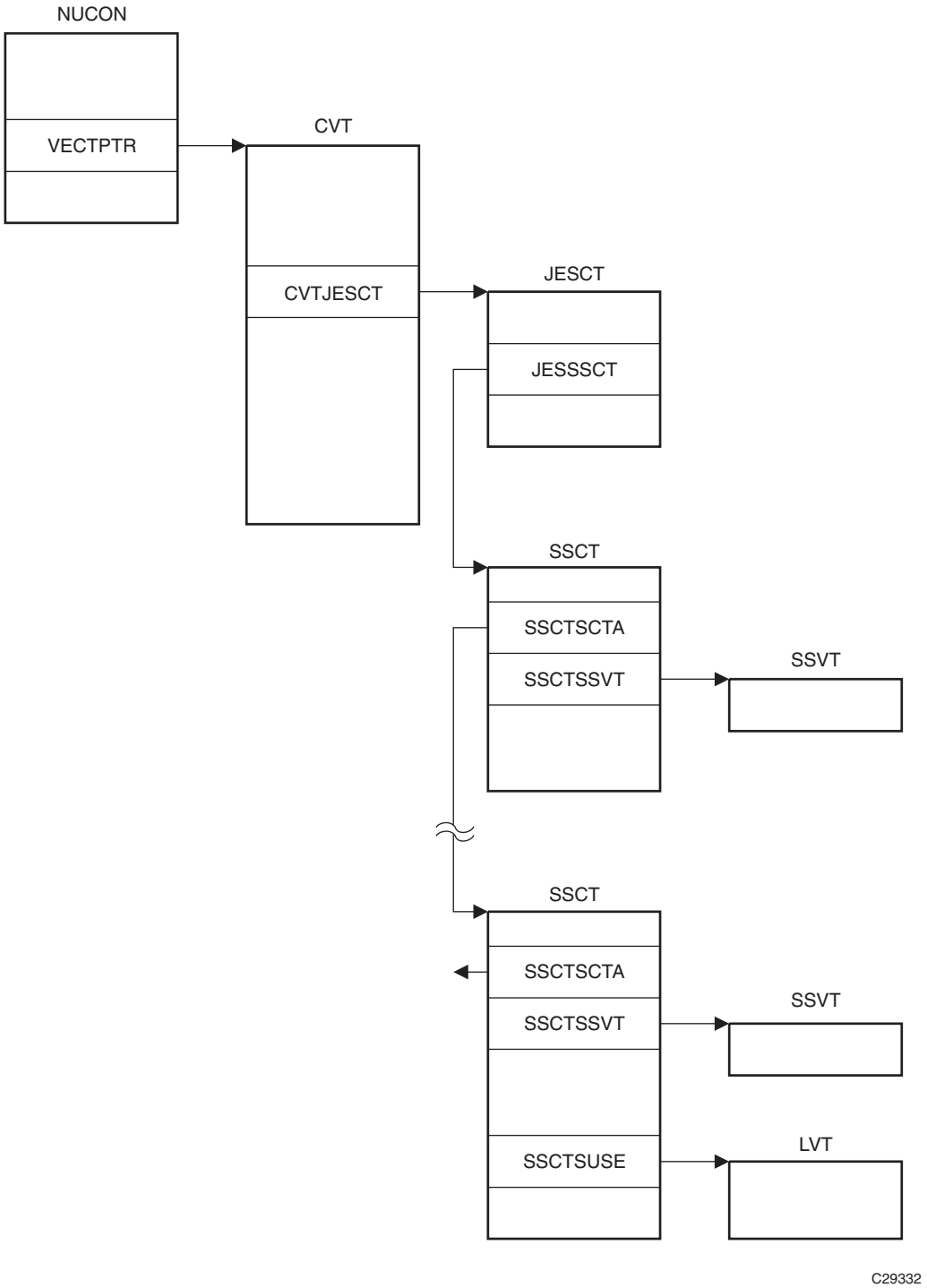


Figure 28. Subsystem Data Relationships

2. Enter:

```
D PSW
```

3. PSW is BC mode if Bit 12 is 0 (high bit in the fourth nibble). If PSW is BC mode, then enter:

```
VMDUMP Ø.END FORMAT CMS * comments
```

else enter:

```
VMDUMP Ø.END FORMAT SLK Ø comments
```

b. Enabled Waits:

These are difficult at best. Whatever failed to happen has already been obscured. Take a ‘‘FORMAT SLK’’ dump via PA1, or cancel the job that is hung up with ‘‘DUMP’’. Use the SLUIPCS PRINT command with the ‘‘COMM TASK PTTE IOS’’ options to see what was happening in each job/task when the system went into the wait. Check the SLUIPCS PRINT listing for devices with outstanding requests (Count field in DEURQST is not equal to 0).

Common Dump Analysis Tasks

Here are some common dump analysis tasks and the SLUIPCS SCAN subcommands to perform them.

Find a Module Plus Offset, Given an Address

```
WA address
```

Find a Module Address, Given a Name

```
WN name
```

View an HSC or SCP Data Area

```
VIEW data-area
```

Identify the Status at ABEND

```
STAT
```

Identify the ABEND Code

Look in the PRBxxxxx REPORT file

(or)

STAT

(or)

VIEW NUCON

- If ABEND was the result of an ‘ABEND’ SVC:
  - NUCICODE = x’000D’
  - NUCIGR1 = ABEND code (system and user)
  - NUCIGRF = optional ABEND reason code
- If ABEND was the result of a ‘CALLRTM’:
  - NUCICODE = (not) x’000D’
  - RTM1FLG1 = has bit x’40’ set
  - RTM1SR1 = ABEND code (system and user)
  - RTM1SR15 = optional ABEND reason code

Identify the Failing Routine

Look in the ‘PRBxxxxx REPORT’ file

(or)

STAT
WA xx
(xx = address in ‘INSTAD’)

(or)

VIEW NUCON
WA xx
(xx = address in ‘NUCIOPSW’)

Find the Failing Task

VIEW TBLOK PSATOLD

Find the Failing Request Block

VIEW TBLOK PSATOLD
VIEW RQBLOK TKRBLIST

If the third word of TKRBLIST is 00000001 (meaning only 1 RQBLOK on the queue) then this is the failing request block. Otherwise:

Repeat
Let xx = address in RQPSW
Issue cmd: ‘WA xx’ to find the PSW location
If the module name is ‘SLKRTMxx’ then issue cmd: ‘VIEW RQBLOK RQBQ’ to get the next one else this is the failing request block until failing request block is found

Save Area Trace Back

Find an R13 value (for example, RQGPR13, NUCIGRD, etc.) TRB address

Find the LVT

VIEW LVT

(or)

Find LVT

(or)

Register 11 usually contains the LVT address for HSC modules (for example, SLS* or SLU*).

Find the LCT, LST, HST

First, find the LVT (see instructions above)

VIEW LCT LVTLCT
VIEW LST LVTLST
VIEW HST LVTHST

Identify the Last Interrupt Event

TTE R

(or)

VIEW MTT

D xx

(or)

VIEW TTE xx (xx = address in MTTCURR)

Examine the Master Trace Table Header

VIEW MTT

Display Queued WTO Messages

VIEW CCVT
VIEW MSGEL CCVWTOQ
Repeat
VIEW MSGEL MSGQ
until end-of-queue

Examine an SDWA

Find the failing TBLOK (see instructions above)

```
VIEW RTM2WA TKRTM2WA
Display xx
(xx = address in RT2RSDWA)
```

Find IUCV Path Descriptors

```
VIEW CVT
VIEW IRT IRTANC
repeat
  VIEW IRT IRTLNK
until end-of-queue
```

Find IUCV Interrupt Blocks

Find an IRT

```
VIEW XINT IRTINQ
repeat
  VIEW XINT XINTLNK
until end-of-queue
```

Find IUCV Request Blocks

Find an IRT

```
VIEW IUB IRTOUTQ
repeat
  VIEW IUB IUBQ
until end-of-queue
```

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:

- all incidents
  - STKACS CONSLOG (requires SET CONSLOG ON)
  - HSC level and PUT level
  - system software levels

    - details of problem circumstances

- STKACS abend

    - VMDUMP (process with SLUIPCS), CONSLOG, VMFSVLOG (refer to ‘‘Dump Processing’’ on page 5-35)

- problems relating to HSC utilities

    - utility SLKJCL
    - utility output (SLSPRINT)
    - dump data if applicable
    - STKACS CONSLOG

- problems relating to CP

    - VM operator console log
    - STKACS CONSLOG
    - EREP or PM2 reports for failing period
    - trace data may be required (virtual and real)
    - system configuration information
    - dump data may be required

- problems relating to PROP message intercept

    - PROP console log
    - STKACS CONSLOG
    - copy of execs and action table

- problems relating to HSC control data set

    - copy of CDS
    - DASD configuration information (VM directory, ACS SYSPROF, ACS SLKJCL)
    - STKACS CONSLOG (from all hosts if sharing DASD)
    - LIBGEN
    - CP and SCP trace data (virtual and real)

- problems relating to TMI (TMS interface)

    - STKACS CONSLOG
    - TMS console log (if VMTAPE, ensure that TMSG is on)
    - VM/HSC SCP trace

- problems relating to installation

    - console log of virtual machine
    - STKACS CONSLOG, VMFSVLOG
    - ACS SYSPROF, ACS SYSDEF, ACS SLKJCL
    - VM directory entries
    - DASD configuration
    - additional information as needed.

Tape Format

Software Support prefers that diagnostic data be sent in machine-readable format on tape in the following format:

- VMFPLC2 format
- for VM dump processing, refer to “Dump Processing” on page 403
- if possible, DO NOT use SPTAPE format.

Tape Return

When requested, Software Support will return any tapes which the sending party has labeled with a return address.

Chapter 6. Performance Considerations

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, dismounting, tape drive cleaning, and pass-thru ports 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 Systems 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 Sun 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 cartridge exchanges.

Refer to Chapter 4, “Utility Functions” on page 167 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 Sun 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 the *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 Chapter 4, “Utility Functions” on page 167 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 the *HSC 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 *HSC Operator's Guide* for information about the CAPPref command.

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 SCP SET PERFLOG command is used to enable or disable recording of SMF data and to close the data file (and reopen if enabled). The command also allows specifying which SMF record subtypes are to be collected. Refer to the *HSC Operator's Guide* for additional details.

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 performance log data file 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.

Refer to Appendix F, "Record Formats" for detailed information about SMF record subtypes. Refer to "SET Utility" on page 310 for information about the SET utility, syntax, and parameters.

Use PARMLIB to Define Static Parameters

PARMLIB control statements can be specified to the HSC startup SLKJCL file. At HSC installation, the various performance criteria specified by the control statements are statically established. 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 30 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.

Table 30. Performance Parameters Controlled by PARMLIB Control Statements

Performance Parameter	Control Statement	Operator Command
CAP Preference	CAPPref	CAPPref
Control Data Set Definition	CDSDEF	
Host-to-Host Communications Path	COMMPath	COMMPath
Control Message Prefix, Eid, Fid, and Hostid	EXECPARM	

Table 30. Performance Parameters Controlled by PARMLIB Control Statements

Performance Parameter	Control Statement	Operator Command
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)

Refer to “PARMLIB Control Statements” on page 79 for detailed information about using PARMLIB control statements.

Define High Dispatching Priority for the HSC

The VM dispatch priority and SHARE settings of the ACS service machine may be altered to improve overall HSC performance for a VM host system.

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 three performance levels of communications, ranked as follows:

- ACF/VTAM
- the LMU(s)
- the CDS.

The high-performance telecommunications method is through VTAM. **Sun StorageTek recommends using VTAM because it does not place a performance burden on HSC components.**

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 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” on page 74 and to ‘‘Communications Path (COMMPath) Command and Control Statement’’ in the *HSC Operator’s Guide* for a general description of communication functions.

Refer to “PARMLIB Control Statements” on page 79 for how to define communication functions in a PARMLIB control statement.

The *HSC 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, VTAM, LMU, CDS. Initially, all 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.

The system may switch from a method of VTAM to LMU, selecting the first LMU available from a list of defined LMUs. If the current method is LMU, the system attempts to find the next LMU available from the list, or switches from LMU to CDS. If a list of LMUs has not been defined by the PARMLIB statement, or if no LMUs are available, the system switches directly from VTAM 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, CDS to VTAM, or LMU to VTAM).

Figure 9 on page 75 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 "Allocating and Initializing Control Data Sets" in the *HSC Installation Guide* for information about defining control data set requirements at HSC installation.

The *HSC Operator's Guide* contains 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 VIew 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. Excessive use of the VIew 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.

Note: The SL8500 library does not contain a camera, so the VIew command is not useful in that environment.

Though the VIew command is primarily used by operators, it is important for systems programmers to know that excessive use of the VIew command for extended periods of time can impact the performance of an LSM and your library. However, you should use the VIew 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 command's Viewtime parameter. The system default for view time is 10 seconds. However, you can change this default value to fit your needs.

Refer to "OPTion control statement" in Appendix D, "Macros, Control Statements, Utilities, and Commands Syntax Reference" or to "Commands, Control Statements, and Utilities" in the *HSC Operator's Guide* for detailed information about the OPTion command's syntax and parameters.

Excessive Use of VIew Command Affects Performance

Each time the VIew 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 VIew Command

There are two facilities available for monitoring use of the VIew 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 VIew 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 ‘‘Adding SMF Parameters’’ in the *HSC 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 VIew command is to run the Activities Report utility and to thoroughly analyze the resulting report. Heavy use of the VIew 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 VIew command is counted as one robotic motion for reliability measuring (R+) purposes. Refer to Appendix G, “Logging ACS Robotics Motion” for information on robotic statistics logging.

Advantages of Using the VIew Command

There are definite advantages for using the VIew command as opposed to other alternatives. Obvious benefits for using the command include:

- The VIew 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 using the ENter command or ENTEr utility to enter cartridges through the CAP.

Refer to “Enter Cartridges Utility” on page 256 for information about the ENTEr Cartridges utility, the syntax, and parameters. Refer to the ‘‘CAP Preference (CAPPref) Command and Control Statement’’ in the *HSC Operator’s Guide* for information about how to set the CAP in automatic mode. Refer to the *HSC Operator’s Guide* for information about the ENter command.

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.

Provide 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 (that is, CAP(000,001,002)), the desired effect (that is, 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 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.

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

ACSPROP EXEC

Utility ACSPROP EXEC is provided for use as a programmable operator (PROP) action routine to process all

```
TAPE raddr DETACHED...
```

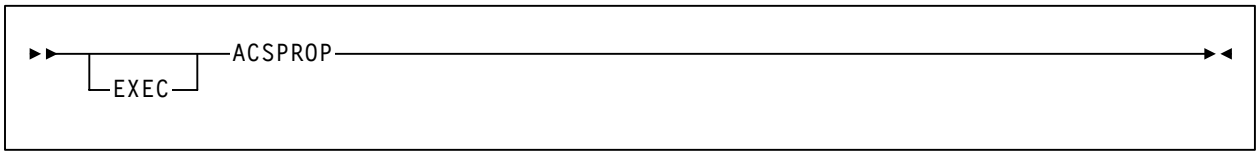
messages which CP sends to the system console.

It issues library DISMount commands for the given tape drive (raddr). The dismount is honored if the HSC did a mount to that device for the same host. VM (CP) causes a ‘Rewind Unload’ command to be executed on any tape drive DETACHed by the CP commands LOGOFF, FORCE, or DETACH. This would leave a library volume in a ‘selected’ state physically sitting in a library transport. The volume is unavailable to any requestor until it is removed from the drive and placed back in a storage cell of an LSM.

ACSPROP EXEC is an ‘‘action routine’’ which may be invoked by the VM PRogrammable OPerator service to issue HSC DISMount commands when a tape drive is DETACHed from a virtual machine. This enables the volume to be available (that is, unselected) earlier than would otherwise be possible.

ACSPROP EXEC can also be used with VMOPERATOR to trap MOUNT messages for VMTAPE. LOGTABLE SAMPLE contains sample VMOPERATOR LOGTABLE statements to assist you. Consult VMOPERATOR documentation for information about tailoring the samples to your needs.

Syntax



Parameters

There are no external parameters required. The PROP interface to an EXEC action routine provides parameters in the program stack. These are documented in the VM description of PROP.

Usage Requirements

The only requirement is that the PROP ‘logical operator’ have a link to the MAINTSTK RUN-disk.

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 through-put, 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
- Enter Cartridges
- 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, an operator's time can also be optimized.

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 MVS and VM environments, for which different versions of the utility are produced.

In the VM environment, SLUPERF reads an SCP performance log spool file into a CMS file, preserving the internal record format. There should be no header or trailer data in the file.

Additional information on this utility can be found in “Performance Log Reblocker Utility” on page 273.

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 command:

   ```
   MNTD SCRDISM(ARCHIVE)
   ```

2. Run scratch redistribution frequently.
3. Eject cartridges when necessary from the archive device (4410 or 9310).

Figure 29 shows a 9360 used as a scratch loader.

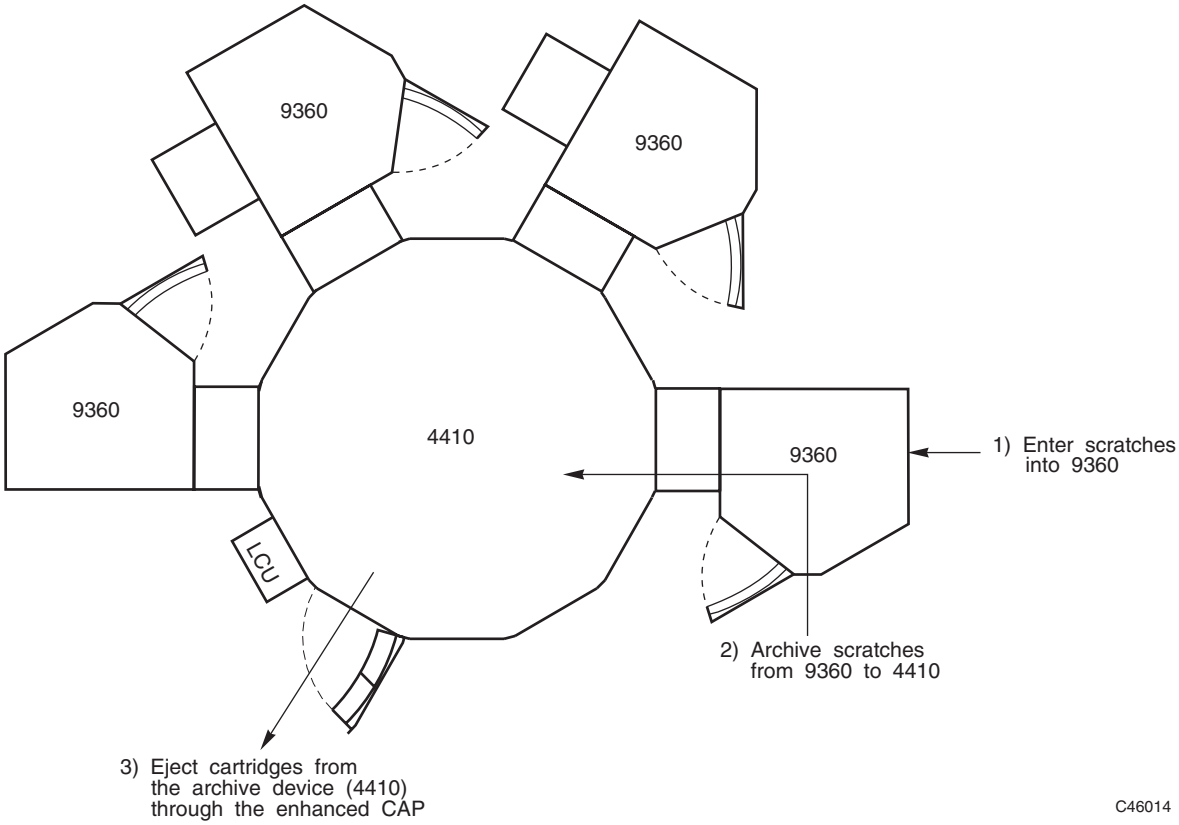


Figure 29. Using LSMs as Scratch Loaders

Appendix A. HSC Support for the SL8500

Overview

This appendix discusses:

- considerations before you configure the HSC for the SL8500 (page 444)
- connecting the SL8500 to the HSC (page 445)
- how the HSC handles differences between SL8500 internal addresses and other library addresses (page 446)
- SL8500 CAP behavior (page 448)
- merging ACSs (page 449)
- removing PTPs and splitting ACSs (page 455)
- partitioning LSMs (page 460)
- TCP/IP communications - important considerations (page 498)
- dual IP connections to an SL8500 library (page 499)
- multiple SL8500 library connections (page 518)
- HSC requirements before powering down the SL8500 (page 520).

Additionally, information about dynamic hardware reconfiguration for the SL8500 can be found in Appendix C, “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`.

- 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.
- 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*). 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.

LSMs

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 from previous libraries. From top to bottom, SL8500 rails are numbered 1-4. HSC LSMs (rails) are numbered from 0-3. For example, in Table 31, SL8500 rail 1 is HSC LSM 0.

Table 31. 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

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 **if the CDS is in a shared VM/MVS environment.** 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 30 and Figure 31 illustrate merging three ACSs numbered right to left, as you face them from the CAP side.

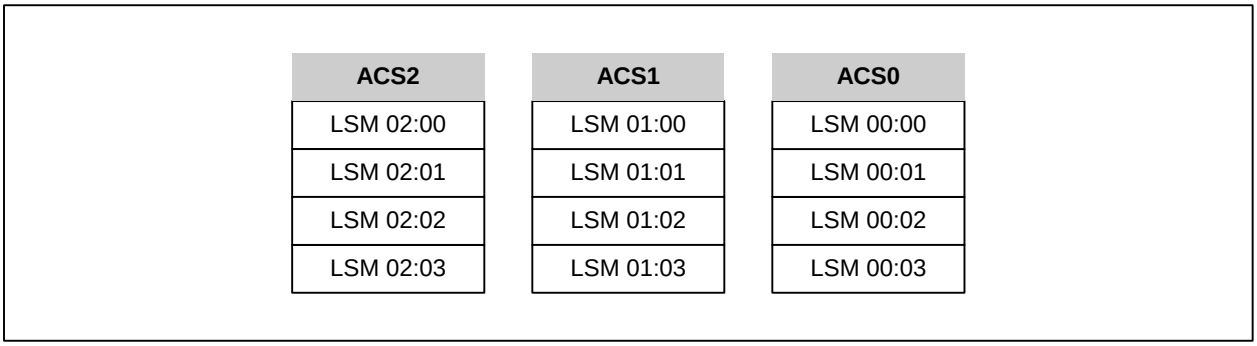


Figure 30. Existing Right to Left Configuration - Three Separate ACSs

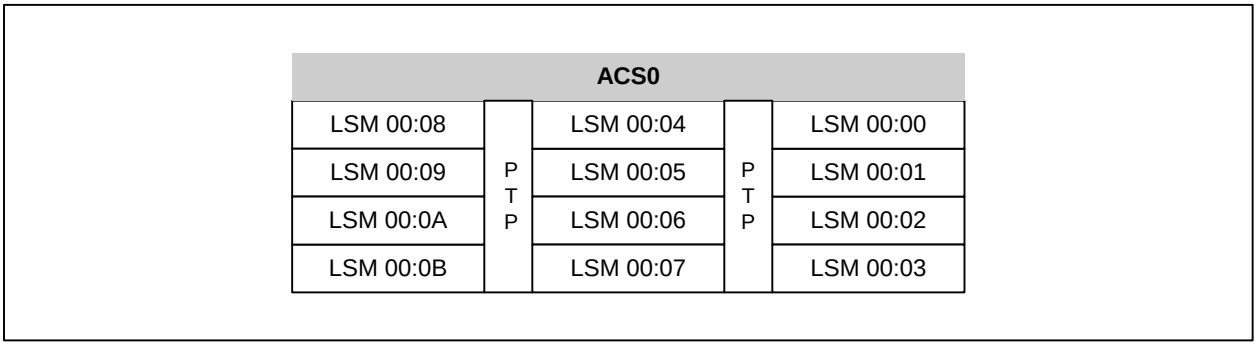


Figure 31. Desired Configuration - Single ACS

Configurations for ACSs Numbered Left to Right

Figure 32 and Figure 33 illustrate merging three ACSs numbered left to right, as you face them from the CAP side.

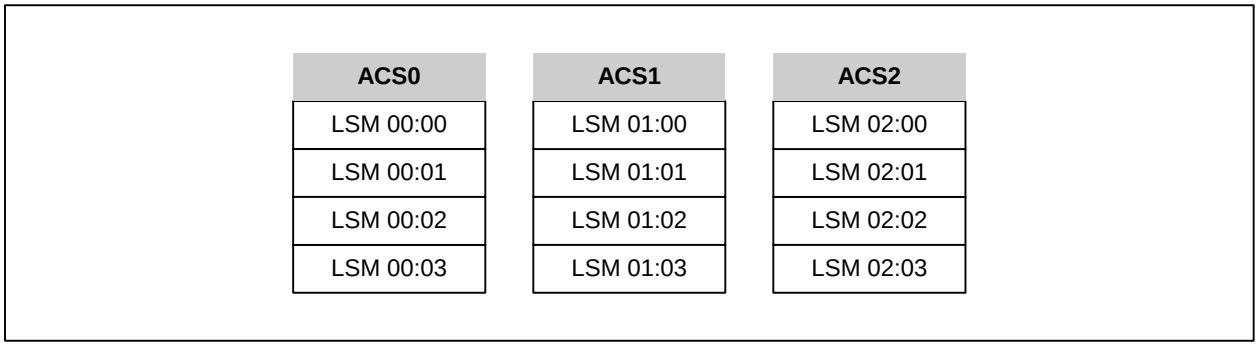


Figure 32. Existing Left to Right Configuration - Three Separate ACSs

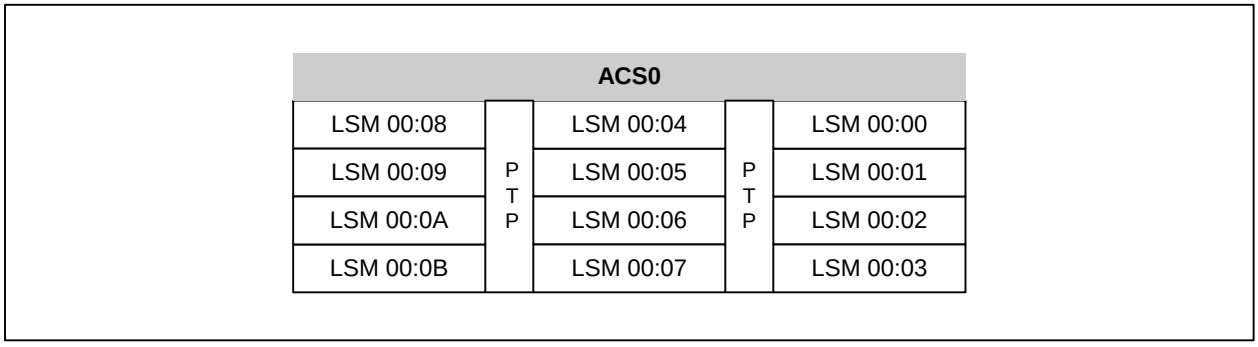


Figure 33. Desired Configuration - Single ACS

Merging ACSs using MERGEcds

Note: Run the MERGEcds utility if the CDS is in a shared VM/MVS environment.

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 597 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)
//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,
   - 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
/*
//
```

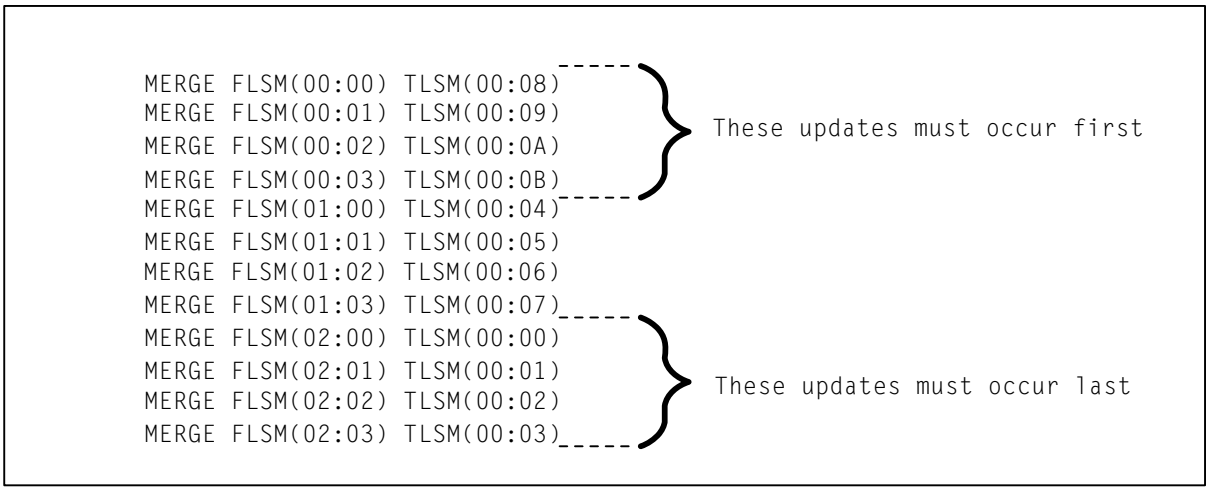
SLSMERGE Statements - ACSs Numbered Right to Left

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 VM, 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 VM.
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 34 shows an existing one ACS configuration.

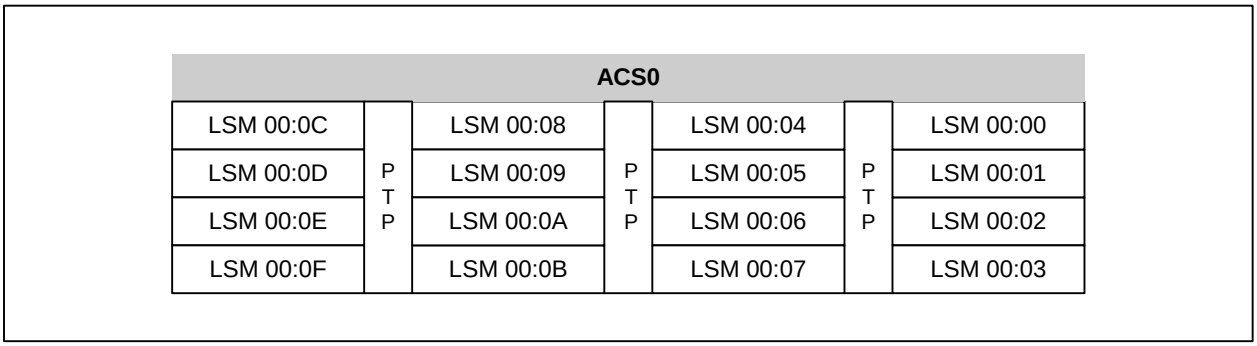


Figure 34. Existing One ACS Configuration

Figure 35 shows the desired configuration, with ACS 0 split into two ACSs.

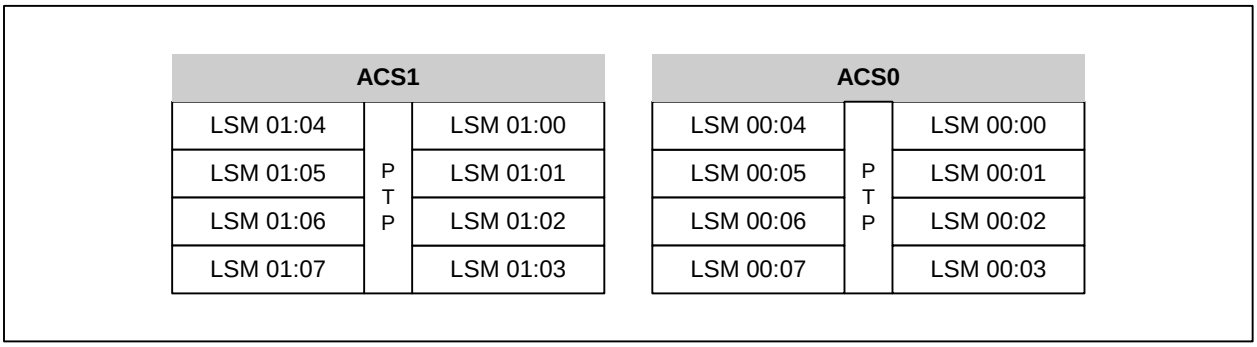


Figure 35. Desired Two ACS Configuration

Positioning a New ACS

Sun 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 (MVS only). 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

Run the MERGEcds utility if the CDS is in a shared VM/MVS environment.

MERGEcds is the preferred method to split an ACS, since it preserves volume information and runs quickly. However, 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.

```
//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
/*
//
```

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 VM, 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 VM.
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 for 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 Principles of Operation* document.
- 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 3.7*x* or higher **and** SLConsole version FRS 3.25 or higher.

Note: Customers **MUST** be current on maintenance:

- 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/AUDIt 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 “Removing the Last LSM from an ACS Partition” procedure shown on page 477.
- 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 MVS 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 Principles of Operation* document.

VM Considerations

For the most part, this document applies to both VM and MVS, with some specific references to the MVS environment. In references to the MVS 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 MVS. 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 adding 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, the recycle 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 deleting 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 drive definitions. MVS/CSC loads these updated parameters the next time it is initialized. Failure to update these parameters prevents MVS/CSC from initializing.

LibraryStation Considerations

When adding or deleting drives, LibraryStation must be recycled to pick up the new drive configuration.

Note: Library Station does not support Near Continuous Operation (NCO). If LibraryStation is running during NCO, results will be unpredictable.

Library Station should not be running when NCO is started or is anticipated to start, for example, when you are varying a newly reconfigured library online. This includes changes to drives that are configured to LibraryStation.

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 36 illustrates a partition and host group configuration.

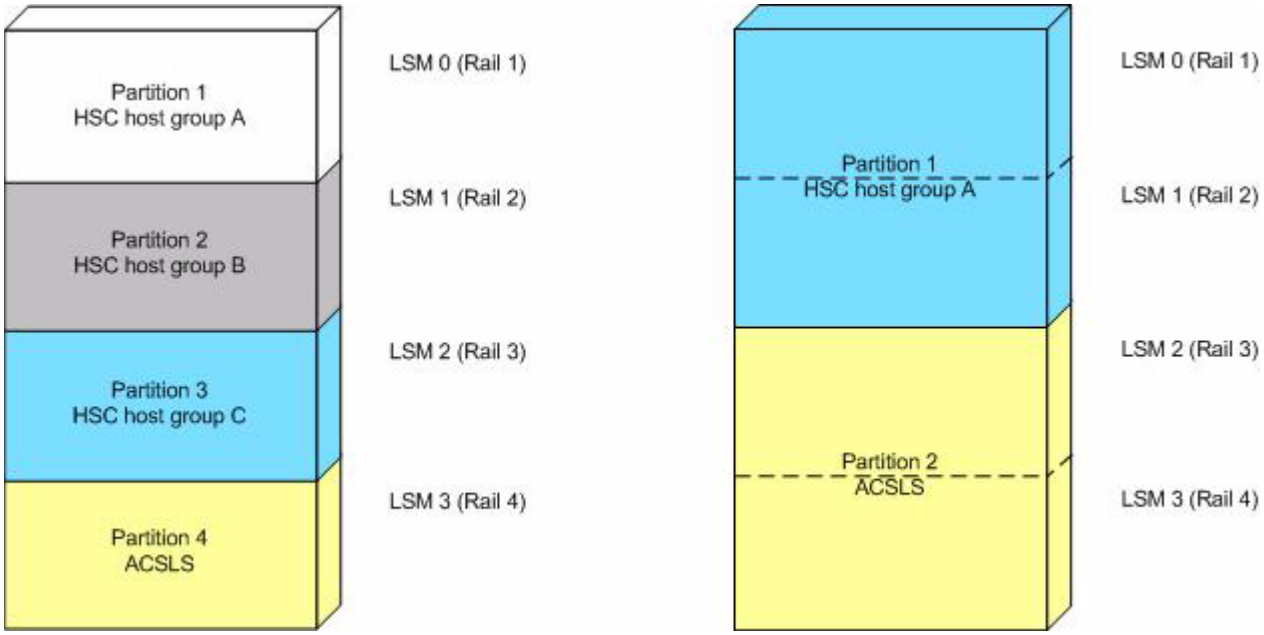


Figure 36. Partition and Host Group Example

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

Starting 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 "Converting a Non-partitioned ACS to a Partitioned ACS" procedure shown on page 465 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 "Removing an LSM from a Partition" procedure shown on page 469 to remove one to three LSMs from that partition.

Converting 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 "Removing an LSM from a Partition" procedure shown on page 469.

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 Near Continuous Operation (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 MVS. 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(00n)`

Note: Refer to the "LMUPATH Control Statement" on page 104 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 MVS.

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.

Converting 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 MVS. 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 104 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 MVS.

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.

Removing 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 "Removing the Last LSM from an ACS Partition" procedure shown on page 477.

Also, to move an LSM from one partition to another and to **retain volume history** (usage counts, encryption state, etc.), use the "Moving the Last Allocated LSM to Another ACS Partition" procedure shown on page 482.

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** MVS hosts that will no longer have access to the drives. From the MVS 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 MVS. If not, vary the drives offline with the MVS 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 MVS. 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 “Moving the Last Allocated LSM to Another ACS Partition” procedure shown on page 482.

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 MVS.

- **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.

Adding 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 "Converting a Non-partitioned ACS to a Partitioned ACS" procedure shown on page 465 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 "Moving the Last Allocated LSM to Another ACS Partition" procedure shown on page 482.

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** MVS hosts that will no longer have access to the drives. From the MVS 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 MVS. If not, vary the drives offline with the MVS 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 MVS. 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 "Removing an LSM from a Partition" procedure on page 469 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 MVS.
- 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 MVS (if necessary).**

    From the MVS 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 MVS. If they are not, bring them online with the MVS command:

    ```
    VARY xxx-yyy ONLINE
    ```

12. **Vary RTDs online to VTCS (if necessary).**

    From the MVS 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.

Removing the Last LSM from an ACS Partition

Normally, use the “Removing an LSM from a Partition” procedure shown on page 469 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 37 on page 481 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** MVS hosts that will no longer have access to the drives. From the MVS 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 MVS. If not, vary the drives offline with the MVS 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 MVS. 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 MVS.

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.

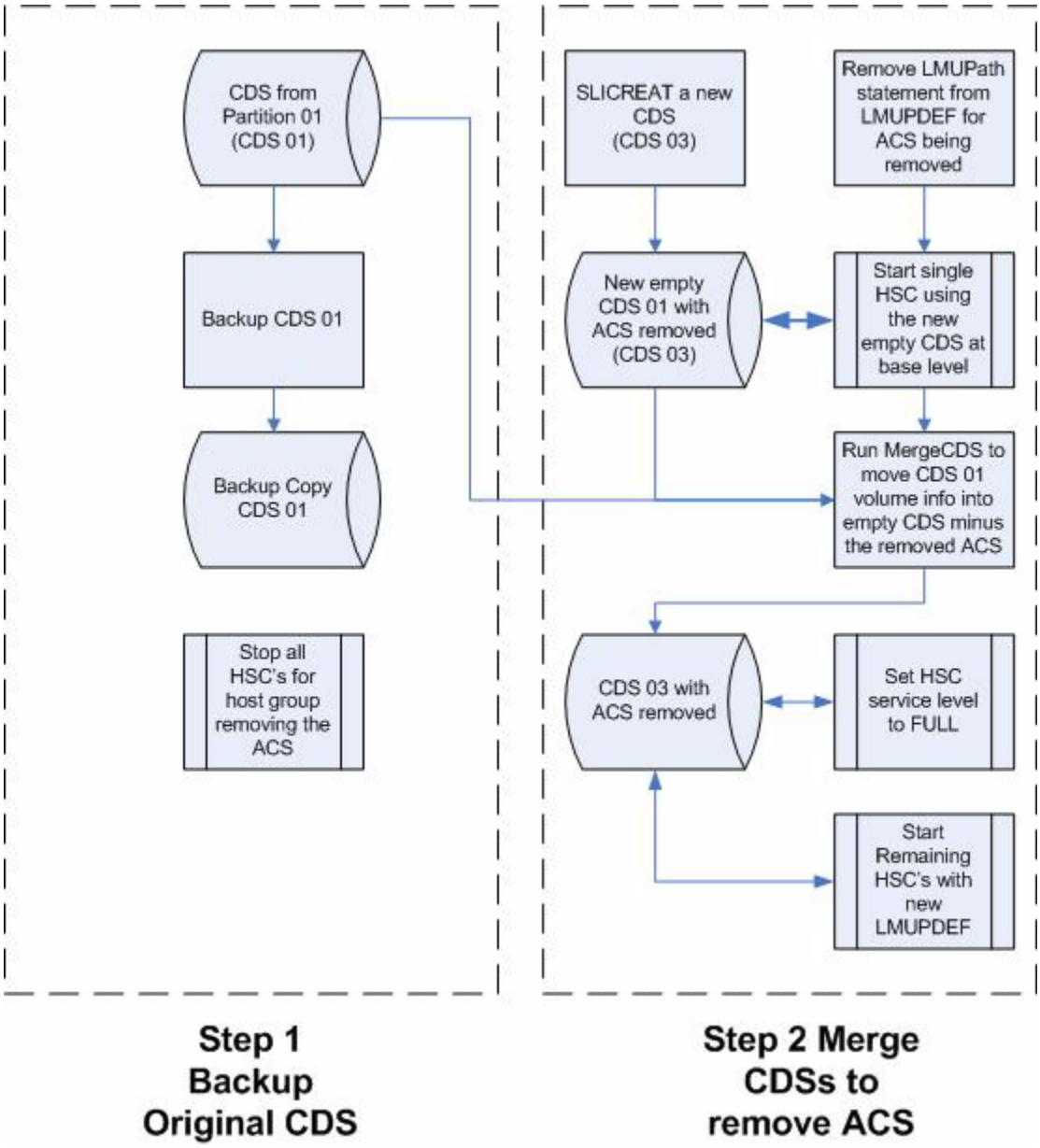


Figure 37. Process Flow to Remove the Last LSM in an ACS

Moving 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 38 on page 486 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 "Removing the Last LSM from an ACS Partition" procedure shown on page 477.**

   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 MVS. 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 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 MVS.

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 MVS (if necessary).**

   From the MVS 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 MVS. If they are not, bring them online with the MVS command:

   ```
   VARY xxx-yyy ONLINE
   ```

10. **Vary RTDs online to VTCS (if necessary).**

    From the MVS 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.

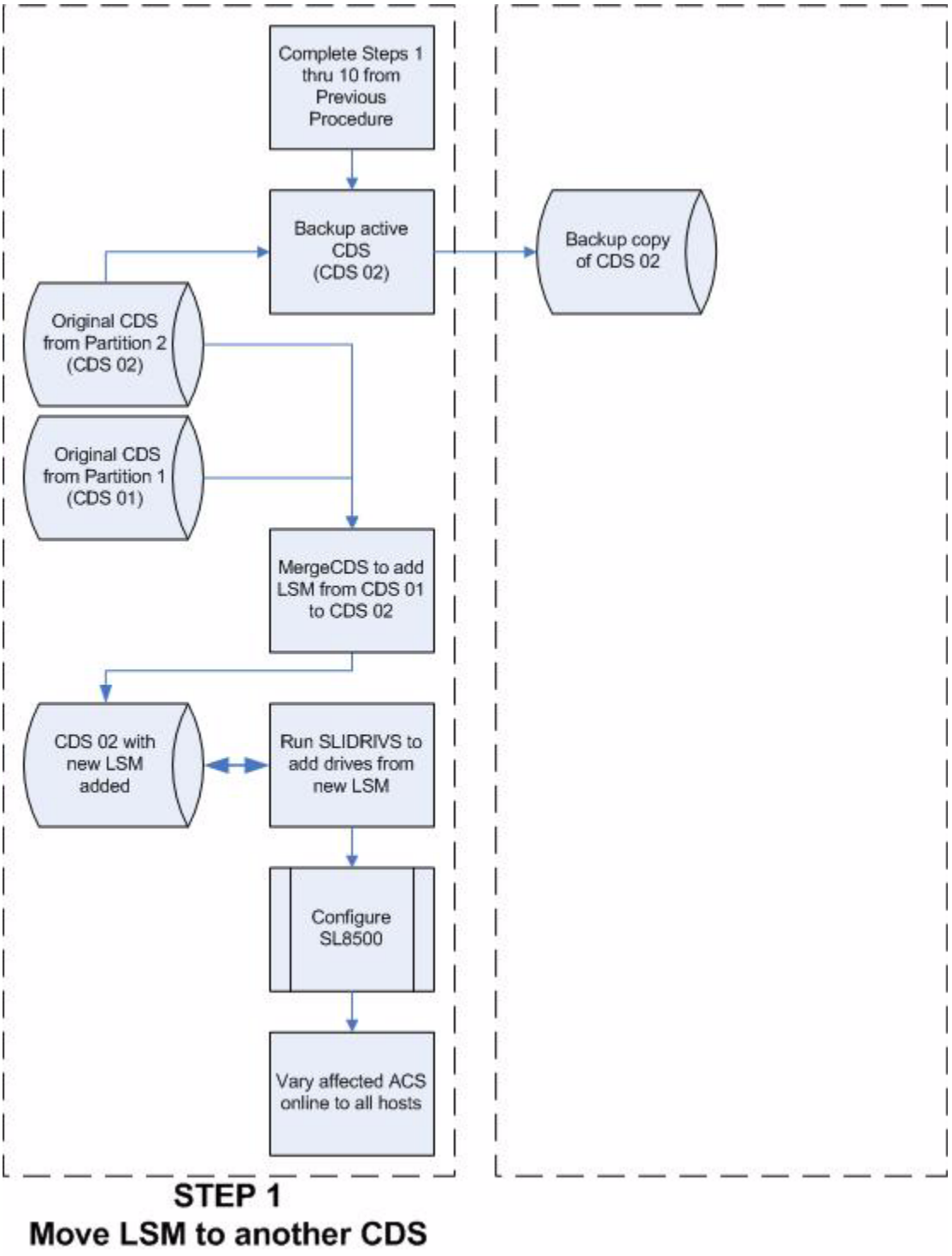


Figure 38. Process Flow to Move the Last LSM to Another ACS Partition

Moving 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 39 on page 492 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** MVS hosts that will no longer have access to the drives. From the MVS 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 MVS. If they are not, bring them offline with the MVS 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 to vary these drives offline from MVS 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 MVS. 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 MVS. 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 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 MVS.

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 MVS (if necessary).**

    From the MVS 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 MVS. If they are not, bring them online with the MVS command:

    ```
    VARY xxx-yyy ONLINE
    ```

12. **Vary RTDs online to VTCS (if necessary).**

    From the MVS 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.

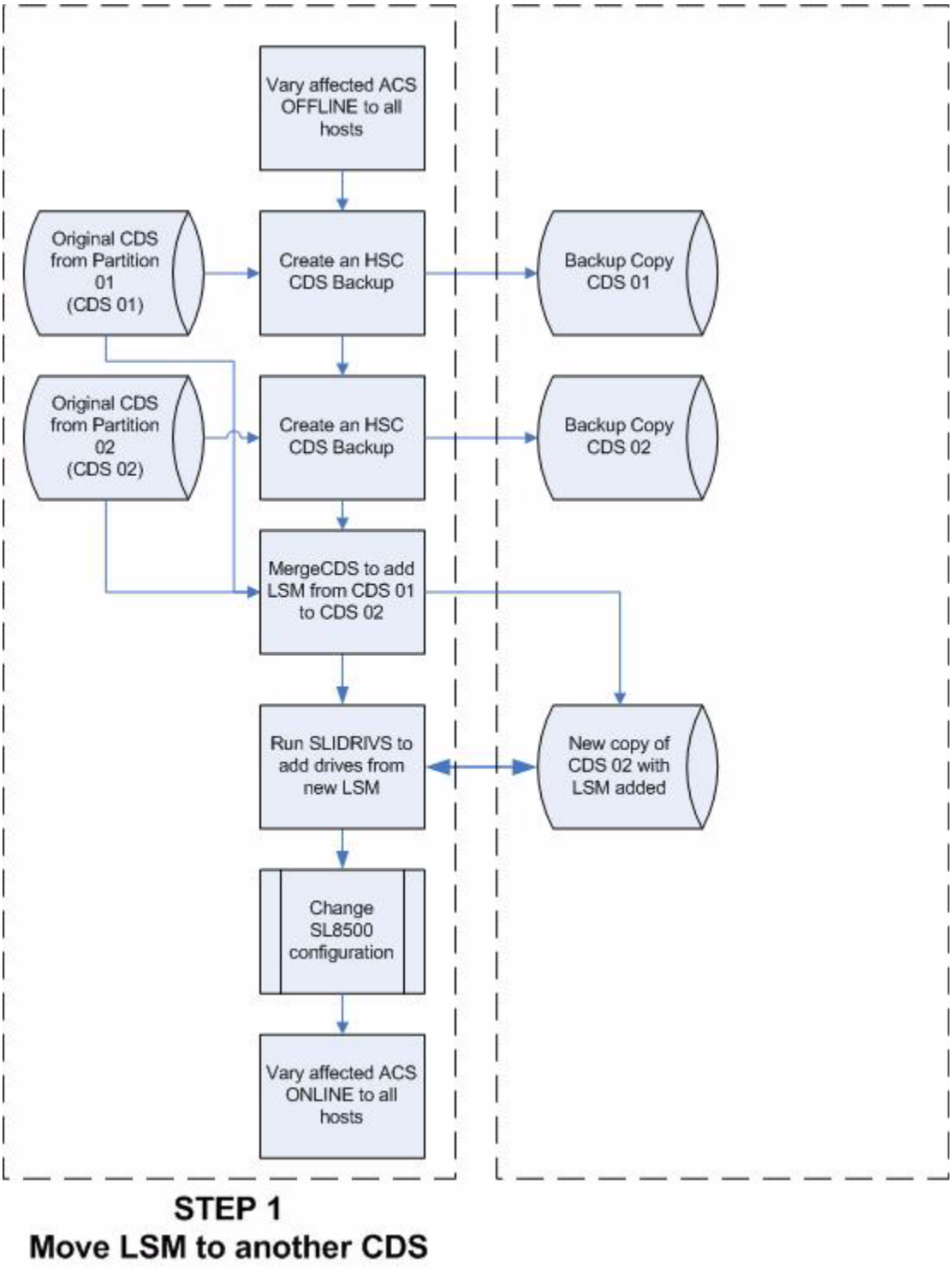


Figure 39. Process Flow to Move an Allocated LSM to Another ACS Partition

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 “LMUPATH Control Statement” on page 104 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 Panel” on page 319 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

For the complex, there are the following types of TCP/IP connections for the SL8500 library:

- Dual TCP/IP — A redundancy feature that allows up to two connections to the first library in a complex.
- Multiple TCP/IP — Starting with the SL8500 3.9*x* firmware release only, an SL8500 complex is capable of a network connecting up to four libraries to the HSC. This enhances redundancy in the complex compared to dual TCP/IP. Refer to “Multiple SL8500 Library Connections” on page 518.

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 to 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 Connections

The LMUPATH control statement allows users to define network LMU attachments (see “LMUPATH Control Statement” on page 104). 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 40 on page 500 and Figure 41 on page 504 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 40 on page 500 shows dual IP connections with two SL8500 network connections.

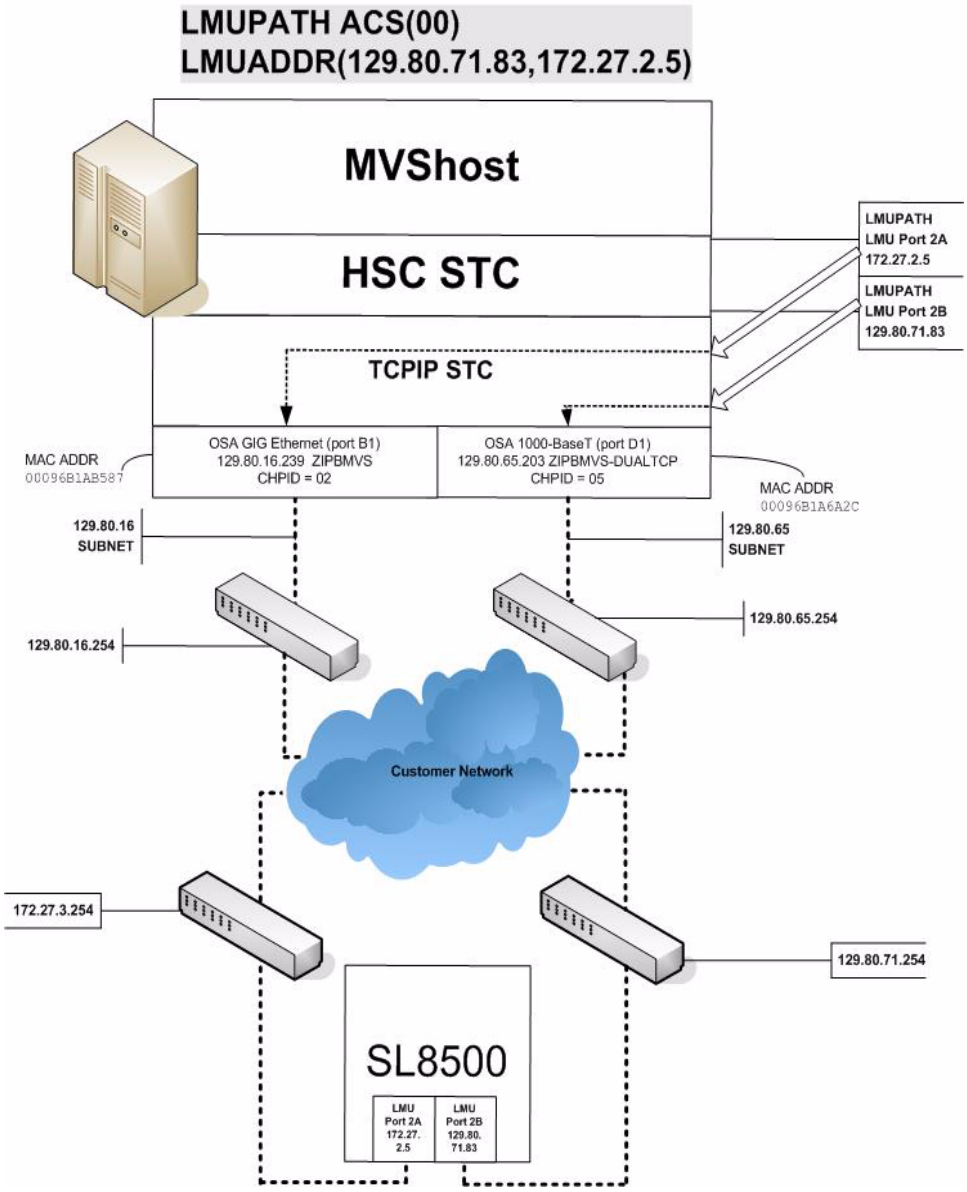


Figure 40. Dual IP with Two SL8500 Network Connections - Different Subnetworks

In the following examples, the entries *in italics* represent the second connection.

1. Create and complete the Network Entries Worksheet (see Table 32 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 32. Network Entries Worksheet

Description		IP Address
Port 2A	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
Port 2B	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:

```
; OSA CARD #1
DEVICE ECCQDØ1 MPCIPA   NONROUTER AUTORESTART
LINK   ZIPBMVS IPAQENET ECCQDØ1

; OSA CARD #2
DEVICE ECCQA01  MPCIPA   NONROUTER AUTORESTART
LINK   ZIPB2MVS IPAQENET ECCQA01
```

3. Define a second home address in your TCP/IP profile data set.

   Example:

```
HOME

129.80.16.239 ZIPBMVS
129.80.65.203 ZIPB2MVS
```

4. Define a second router on the second subnetwork in the routing paragraph of your TCP/IP profile data set. **Remember that you must also configure the SL8500 routing tables according to the instructions described in the *StreamLine SL8500 Modular Library System Dual TCP/IP Feature* document.**

   Example:

```
BEGINROUTES

;    NETWORK MASK                 FIRSTHOP       LINKNAME  PACKETSIZE

ROUTE 129.80.16.0/24              =              ZIPBMVS   MTU 1492
ROUTE 129.80.65.0/24              =              ZIPB2MVS  MTU 1492
ROUTE 172.27.2.5 HOST             129.80.16.254  ZIPBMVS   MTU 1492
ROUTE 129.80.71.83 HOST           129.80.65.254  ZIPB2MVS  MTU 1492
ROUTE DEFAULT 129.80.16.254                      ZIPBMVS   MTU 1492
ROUTE DEFAULT 129.80.65.254                      ZIPB2MVS  MTU 1492
ENDROUTES
```

5. Optionally, define two dedicated static routes to the SL8500 destination port (2A and 2B) IP addresses over two different routers.

   Example:

```
;                               NETWORK MASK  ROUTER        LINKNAME   PACKETSIZE
ROUTE SL8500-port-2A-IP-Address HOST          129.80.16.254 MVSHOST1   MTU 1492
ROUTE SL8500-port-2B-IP-Address HOST          129.80.64.254 MVSHOST2   MTU 1492

BEGINROUTES
;                           NETWORK MASK      FIRSTHOP      LINKNAME   PACKETSIZE
ROUTE 129.80.16.0/24                          =             ZIPBMVS    MTU 1492
ROUTE 129.80.65.0/24                          =             ZIPB2MVS   MTU 1492
ROUTE 172.27.2.5            HOST              129.80.16.254 ZIPBMVS    MTU 1492
ROUTE 129.80.71.83          HOST              129.80.65.254 ZIPB2MVS   MTU 1492
ROUTE DEFAULT 129.80.16.254                                 ZIPBMVS    MTU 1492
ROUTE DEFAULT 129.80.65.254                                 ZIPB2MVS   MTU 1492
ENDROUTES
```

6. Start the second mainframe network connection device.

```
V TCPIP,tcp-stc-name,START,device_name
```

7. 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)
```

8. 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)')
```

9. Allow the trained SL8500 service representative to enter the network connections to the SL8500 library for either port 2A and 2B, whichever is applicable.
10. 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 41 shows a sample configuration with two dedicated routes, followed by the statements that apply to it.

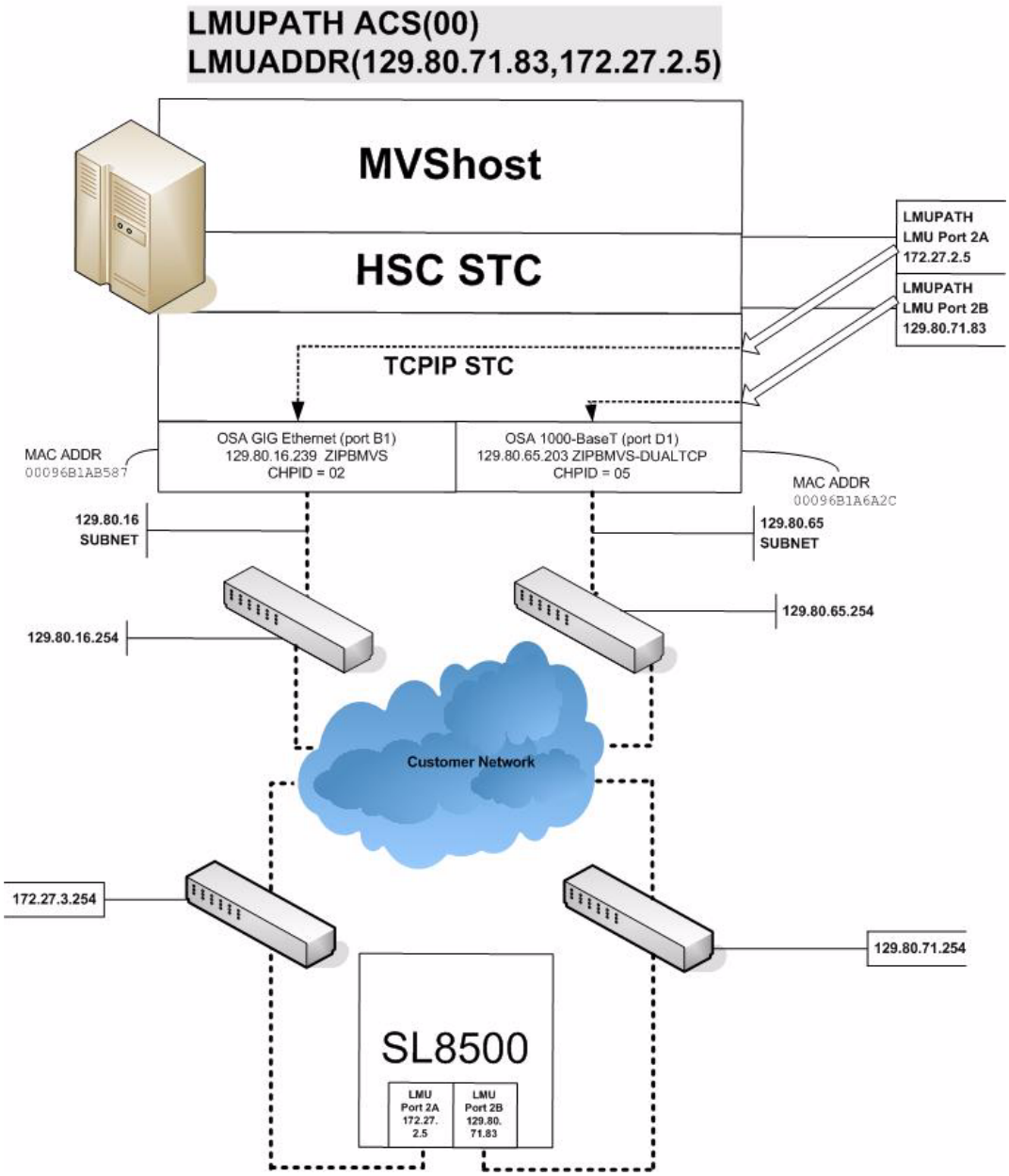


Figure 41. Dual IP Configuration Sample - Different Subnetworks

Setup Statements and Displays

The following information shows the statements and displays used in Figure 41.

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

```
; OSA CARD #1
DEVICE ECCQD01 MPCIPA   NONROUTER AUTORESTART
LINK   ZIPBMVS IPAQENET ECCQD01

; OSA CARD #2
DEVICE ECCQA01 MPCIPA   NONROUTER AUTORESTART
LINK   ZIPB2MVS IPAQENET ECCQA01

HOME
   129.80.16.239 ZIPBMVS
   129.80.65.203 ZIPB2MVS

BEGINROUTES
;                NETWORK MASK   FIRSTHOP      LINKNAME       PACKETSIZE
ROUTE 129.80.16.0/24              =             ZIPBMVS   MTU 1492
ROUTE 129.80.65.0/24              =             ZIPB2MVS  MTU 1492
ROUTE 172.27.2.5   HOST           129.80.16.254 ZIPBMVS   MTU 1492
ROUTE 129.80.71.83 HOST           129.80.65.254 ZIPB2MVS  MTU 1492
ROUTE DEFAULT 129.80.16.254                     ZIPBMVS   MTU 1492
ROUTE DEFAULT 129.80.65.254                     ZIPB2MVS  MTU 1492

ENDROUTES

INCLUDE ZIP.TCPIP.PROFILES(COMMON)

START ECCQD01
START ECCQA01
```

TCP/IP Console Displays

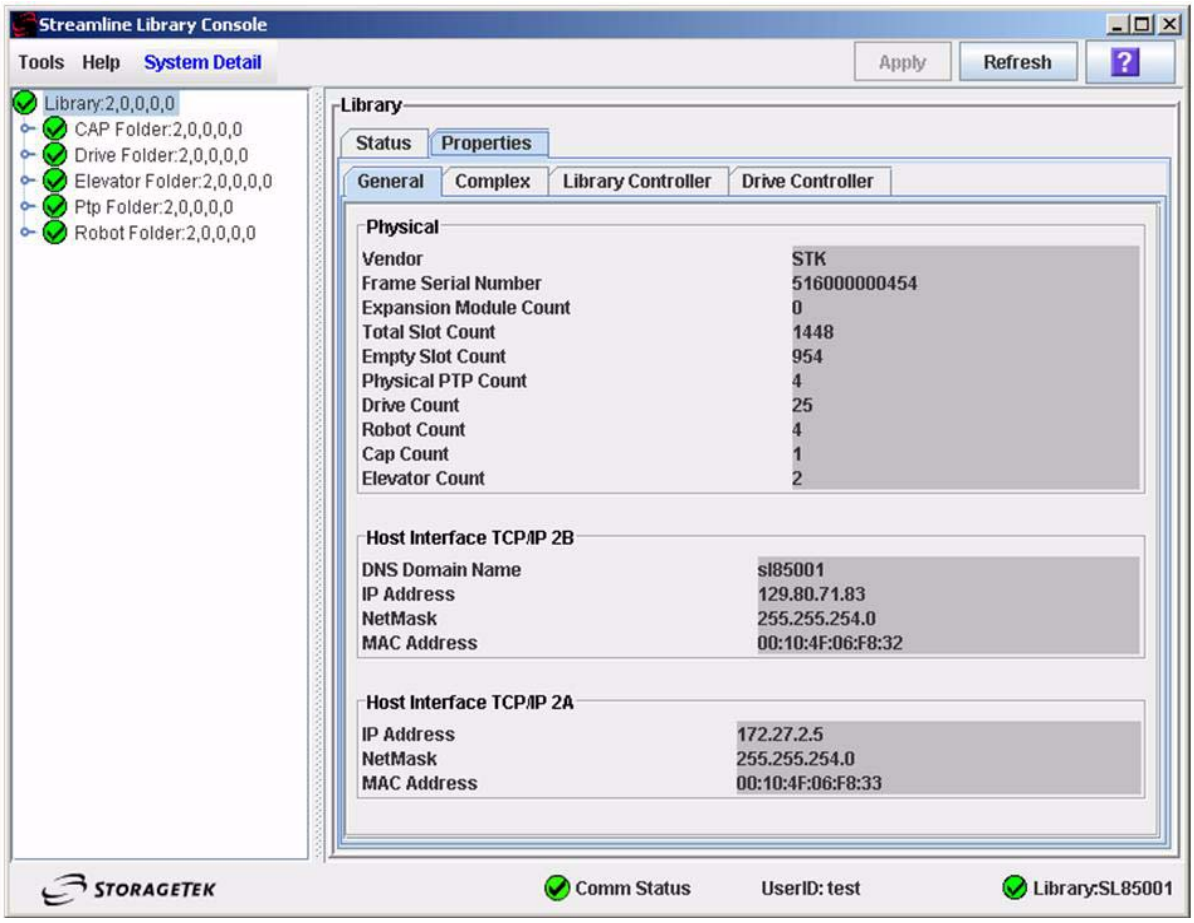
```
D TCPIP,TCPIP,NETSTAT,DEV
EZZ2500I NETSTAT CS V1R4 TCPIP 229
DEVNAME: LOOPBACK          DEVTYPE: LOOPBACK
  DEVSTATUS: READY
  LNKNAME: LOOPBACK          LNKTYPE: LOOPBACK    LNKSTATUS: READY
    NETNUM:  0   QUESIZE: 0
    BYTESIN: 1781074              BYTESOUT: 1781074
    ACTMTU:  65535
  BSD ROUTING PARAMETERS:
    MTU SIZE: 00000             METRIC: 00
    DESTADDR: 0.0.0.0           SUBNETMASK: 0.0.0.0
  MULTICAST SPECIFIC:
    MULTICAST CAPABILITY: NO


DEVNAME: ECCQD01           DEVTYPE: MPCIPA
  DEVSTATUS: READY         CFGROUTER: NON  ACTROUTER: NON
  LNKNAME: ZIPBMVS           LNKTYPE: IPAQENET    LNKSTATUS: READY
    NETNUM:  0   QUESIZE: 0   SPEED: 0000001000
    BYTESIN: 34704496             BYTESOUT: 11207410
    IPBROADCASTCAPABILITY: NO
    ARPOFFLOAD: YES  ARPOFFLOADINFO: YES
    ACTMTU:  8992
   INBPERF: BALANCED
  BSD ROUTING PARAMETERS:
    MTU SIZE: 00000             METRIC: 00
    DESTADDR: 0.0.0.0           SUBNETMASK: 255.255.255.0
  MULTICAST SPECIFIC:
    MULTICAST CAPABILITY: YES
    GROUP             REFCNT
    -----             ------
    224.0.0.1         0000000001

DEVNAME: ECCQA01           DEVTYPE: MPCIPA
  DEVSTATUS: READY         CFGROUTER: NON  ACTROUTER: NON
  LNKNAME: ZIPB2MVS          LNKTYPE: IPAQENET    LNKSTATUS: READY
    NETNUM:  0   QUESIZE: 0   SPEED: 0000000100
    BYTESIN: 147508801            BYTESOUT: 2188246
    IPBROADCASTCAPABILITY: NO
    ARPOFFLOAD: YES  ARPOFFLOADINFO: YES
    ACTMTU:  1492
   INBPERF: BALANCED
  BSD ROUTING PARAMETERS:
    MTU SIZE: 00000             METRIC: 00
    DESTADDR: 0.0.0.0           SUBNETMASK: 255.255.255.0
  MULTICAST SPECIFIC:
    MULTICAST CAPABILITY: YES
    GROUP             REFCNT
    -----             ------
    224.0.0.1         0000000001
3 OF 3 RECORDS DISPLAYED
```

```
D TCPIP,TCPIP,NETSTAT,ROUTE
EZZ2500I NETSTAT CS V1R4 TCPIP 250
DESTINATION      GATEWAY          FLAGS     REFCNT  INTERFACE
DEFAULT          129.80.16.254    UGS       000003  ZIPBMVS
DEFAULT          129.80.65.254    UGS       000002  ZIPB2MVS
127.0.0.1        0.0.0.0          UH        000003  LOOPBACK
129.80.16.0      0.0.0.0          US        000002  ZIPBMVS
129.80.16.239    0.0.0.0          UH        000000  ZIPBMVS
129.80.65.0      0.0.0.0          US        000000  ZIPB2MVS
129.80.65.203    0.0.0.0          UH        000000  ZIPB2MVS
129.80.71.83     129.80.65.254    UGHS      000001  ZIPB2MVS
172.27.2.5       129.80.16.254    UGHS      000001  ZIPBMVS
9 OF 9 RECORDS DISPLAYED
```

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    ZIPBMVS          P
129.80.65.203    ZIPB2MVS
127.0.0.1        LOOPBACK
3 OF 3 RECORDS DISPLAYED
```

SLConsole Display of SL8500 Ports 2A/2B IP Addresses



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 42 on page 510 shows dual IP (one host IP) with two SL8500 network connections.

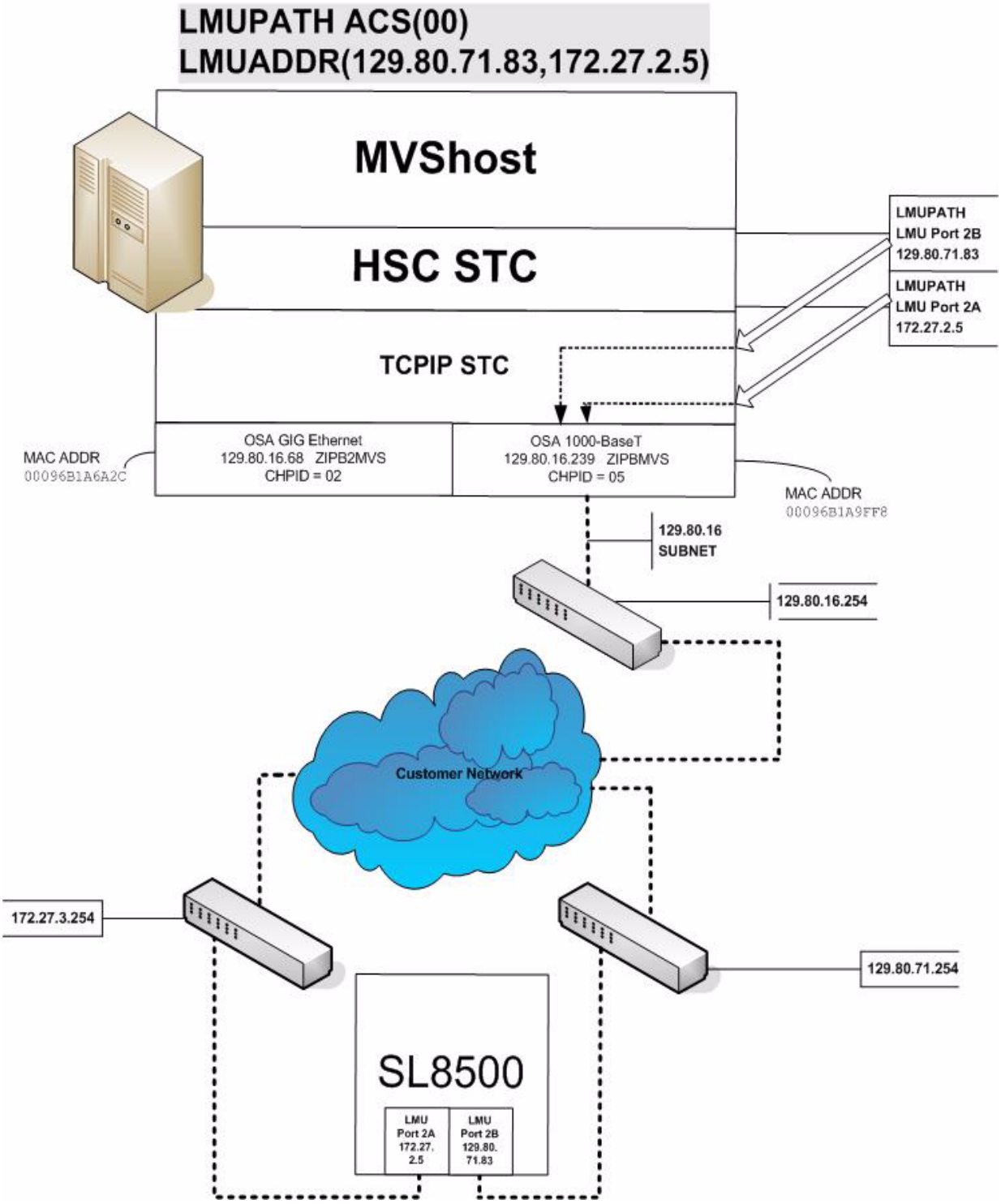


Figure 42. Dual IP (one host IP) with Two SL8500 Network Connections

In the following examples, the entries *in italics* represent the second connection.

1. Complete the Network Entries Worksheet (see Table 33 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 33. Network Entries Worksheet

Description		IP Address
Port 2A	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
Port 2B	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. Optionally, define two dedicated static routes to the SL8500 destination port (2A and 2B) IP addresses over one router.

   Example:

```
BEGINROUTES
;     DESTINATION                FIRSTHOP      LINKNAME       PACKETSIZE
ROUTE 129.80.16.0/24             =             &SYSNAME.MVS   MTU 1492
ROUTE 172.27.2.5 HOST            129.80.16.254 &SYSNAME.MVS   MTU 1492
ROUTE 129.80.71.83 HOST          129.80.16.254 &SYSNAME.MVS   MTU 1492
ROUTE DEFAULT                    129.80.16.254 &SYSNAME.MVS   MTU 1492

ENDROUTES
```

3. 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)
```

4. 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)')
```

5. Allow the trained SL8500 service representative to enter the network connections to the SL8500 library for either port 2A and 2B, whichever is applicable.
6. 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 SL8500 Network Connections

Figure 43 shows a sample dual IP (one host IP) configuration with two SL8500 network connections, followed by the statements that apply to it.

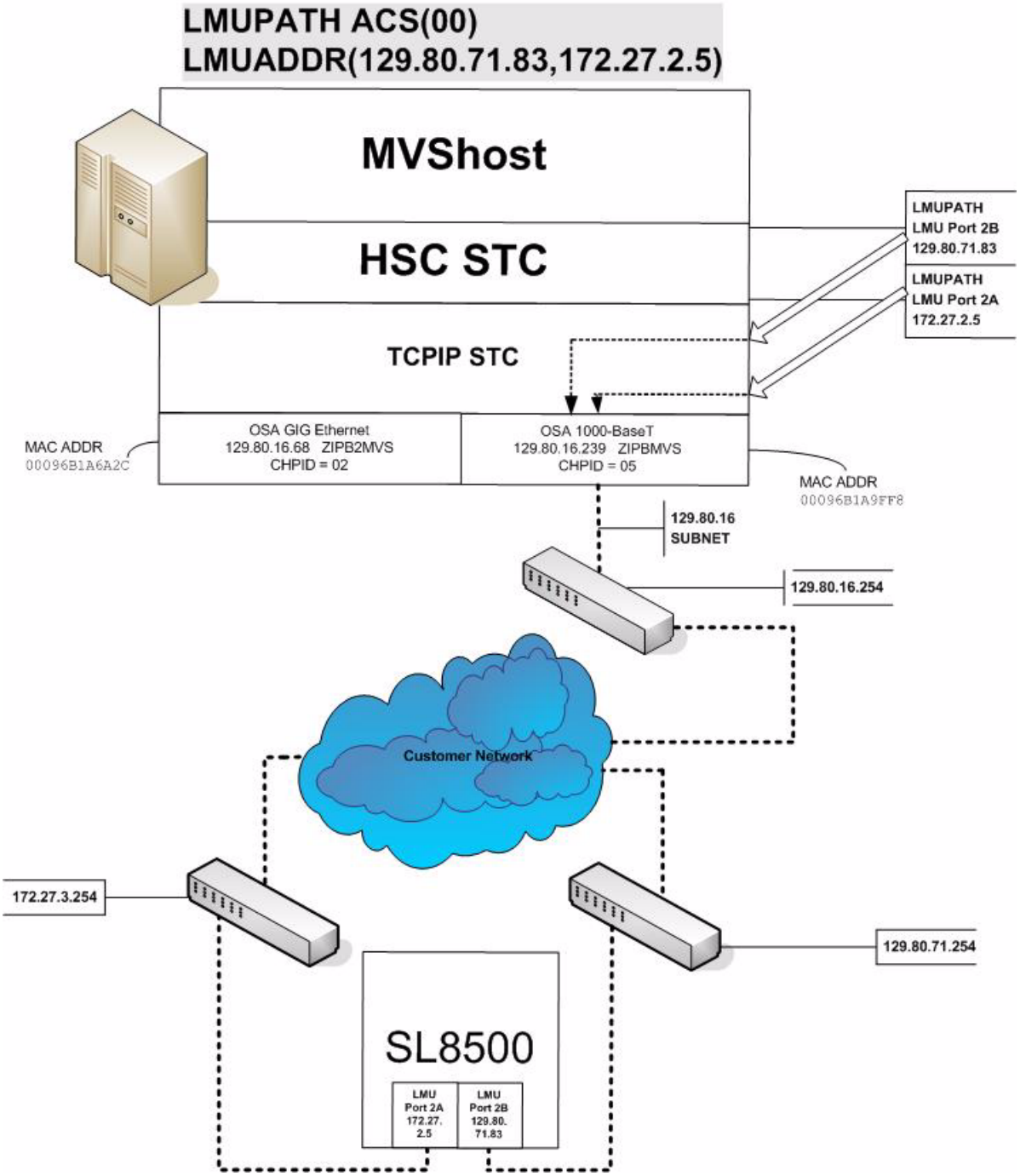


Figure 43. Dual IP (one host IP) with Two SL8500 Network Connections

Setup Statements and Displays

The following information shows the statements and displays used in Figure 43.

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

```
; OSA CARD #1
DEVICE ECCQD01 MPCIPA   NONROUTER AUTORESTART
LINK   ZIPBMVS IPAQENET ECCQD01

HOME
   129.80.&IPADDR1 &SYSNAME.MVS

BEGINROUTES
;                 NETWORK MASK   FIRSTHOP      LINKNAME       PACKETSIZE
ROUTE 129.80.16.0/24            =             &SYSNAME.MVS  MTU 1492
ROUTE 172.27.2.5 HOST           129.80.16.254 &SYSNAME.MVS  MTU 1492
ROUTE 129.80.71.83 HOST         129.80.16.254 &SYSNAME.MVS  MTU 1492
ROUTE DEFAULT

ENDROUTES

INCLUDE ZIP.TCPIP.PROFILES(COMMON)

START ECCQD01
```

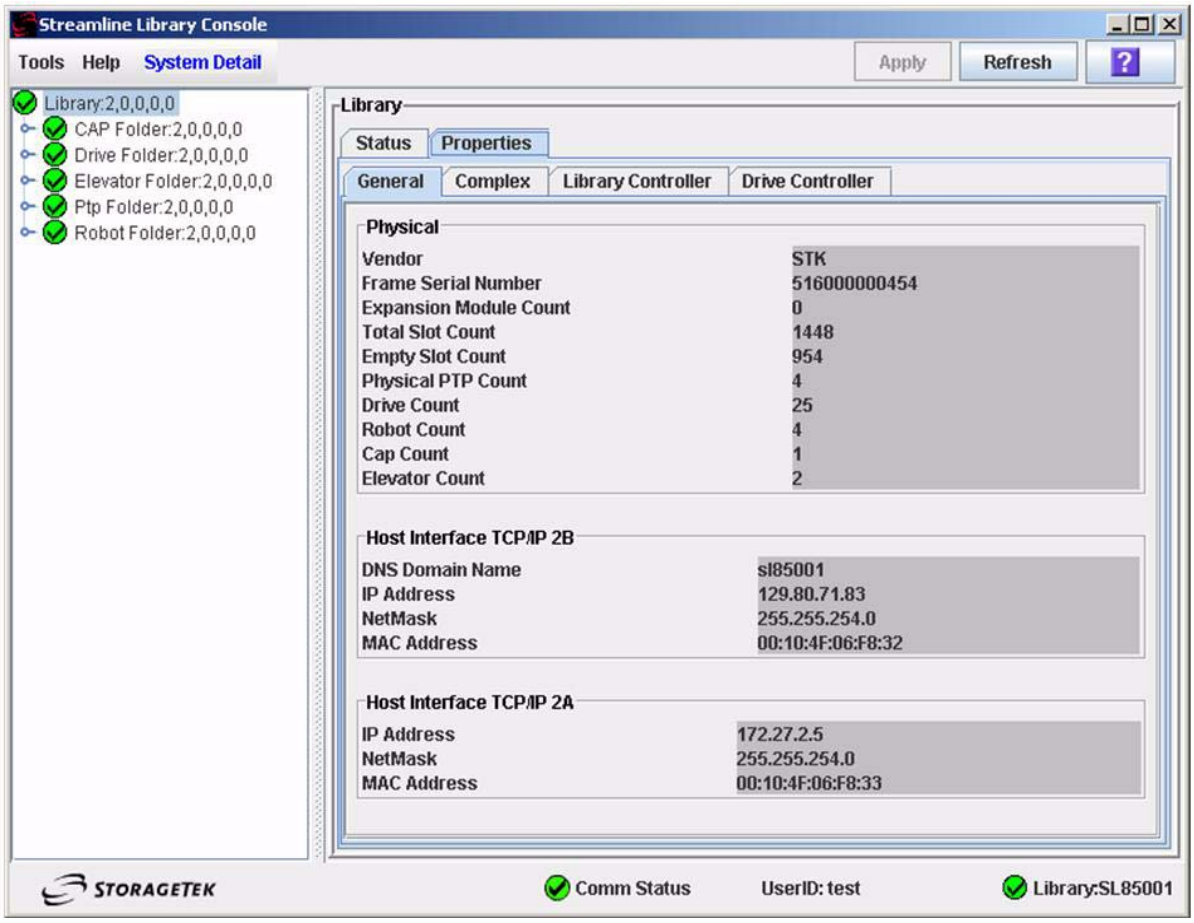
TCP/IP Console Displays

```
D TCPIP,,N,DEV
EZZ2500I NETSTAT CS V1R4 TCPIP 931
DEVNAME: LOOPBACK          DEVTYPE: LOOPBACK
  DEVSTATUS: READY
  LNKNAME: LOOPBACK          LNKTYPE: LOOPBACK    LNKSTATUS: READY
    NETNUM:  0   QUESIZE: 0
    BYTESIN: 2136824              BYTESOUT: 2136824
    ACTMTU:  65535
  BSD ROUTING PARAMETERS:
    MTU SIZE: 00000             METRIC: 00
    DESTADDR: 0.0.0.0           SUBNETMASK: 0.0.0.0
  MULTICAST SPECIFIC:
    MULTICAST CAPABILITY: NO
DEVNAME: ECCQD01           DEVTYPE: MPCIPA
  DEVSTATUS: READY         CFGROUTER: NON  ACTROUTER: NON
  LNKNAME: ZIPBMVS           LNKTYPE: IPAQENET    LNKSTATUS: READY
    NETNUM:  0   QUESIZE: 0   SPEED: 0000001000
    BYTESIN: 48605838             BYTESOUT: 9790950
    IPBROADCASTCAPABILITY: NO
    ARPOFFLOAD: YES  ARPOFFLOADINFO: YES
    ACTMTU:  8992
   INBPERF: BALANCED
  BSD ROUTING PARAMETERS:
    MTU SIZE: 00000             METRIC: 00
    DESTADDR: 0.0.0.0           SUBNETMASK: 255.255.255.0
  MULTICAST SPECIFIC:
    MULTICAST CAPABILITY: YES
    GROUP             REFCNT
    -----             ------
    224.0.0.1         0000000001
2 OF 2 RECORDS DISPLAYED

D TCPIP,,N,ROUTE
EZZ2500I NETSTAT CS V1R4 TCPIP 933
DESTINATION      GATEWAY          FLAGS     REFCNT  INTERFACE
DEFAULT          129.80.16.254    UGS       000001  ZIPBMVS
127.0.0.1        0.0.0.0          UH        000004  LOOPBACK
129.80.16.0      0.0.0.0          US        000000  ZIPBMVS
129.80.16.239    0.0.0.0          UH        000000  ZIPBMVS
129.80.71.83     129.80.16.254    UGHS      000001  ZIPBMVS
172.27.2.5       129.80.16.254    UGHS      000001  ZIPBMVS
6 OF 6 RECORDS DISPLAYED

D TCPIP,,N,HOME
EZZ2500I NETSTAT CS V1R4 TCPIP 935
HOME ADDRESS LIST:
ADDRESS          LINK             FLG
129.80.16.239    ZIPBMVS          P
127.0.0.1        LOOPBACK
2 OF 2 RECORDS DISPLAYED
```

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



Multiple SL8500 Library Connections

Connecting to Multiple SL8500 Libraries in an ACS

When SL8500 3.9*x* or higher firmware is installed, the HSC can connect to more than one SL8500 in an ACS (library complex).

The HSC supports up to four connections to an ACS. Some *possible* connections are:

- four connections to four SL8500s
- two connections to each of two SL8500s
- two connections to one SL8500 and two connections to two other SL8500s.

When the HSC establishes two connections to one SL8500, the HSC provides dual TCP/IP or multiple TCP/IP connectivity. Refer to “Connections” on page 498 for more information.

Notes:

- To optimize library performance and minimize inter-library communication among SL8500s, connect to the libraries with the most activity. The HSC distributes communications to the libraries evenly.
- LMUPATH control statements are used to define network LMU attachments.

The following example shows multiple LMUADDR parameters consisting of four IP addresses. In this case, the first, second, third, and fourth IP addresses indicate a TCP/IP connection to each of four separate SL8500 libraries connected in ACS 00.

```
LMUPATH ACS(ØØ)+
LMUADDR(123.456.789.Ø12,123.456.789.Ø13,123.456.789.Ø14,123.456.789.Ø15)
```

Sample Configuration - Four SL8500 Network Connections, Four Mainframe IP Addresses

Figure 44 on page 519 shows a sample of a four IP (four host IPs) configuration with four SL8500 network connections. This configuration applies to SL8500 3.9*x* or higher firmware.

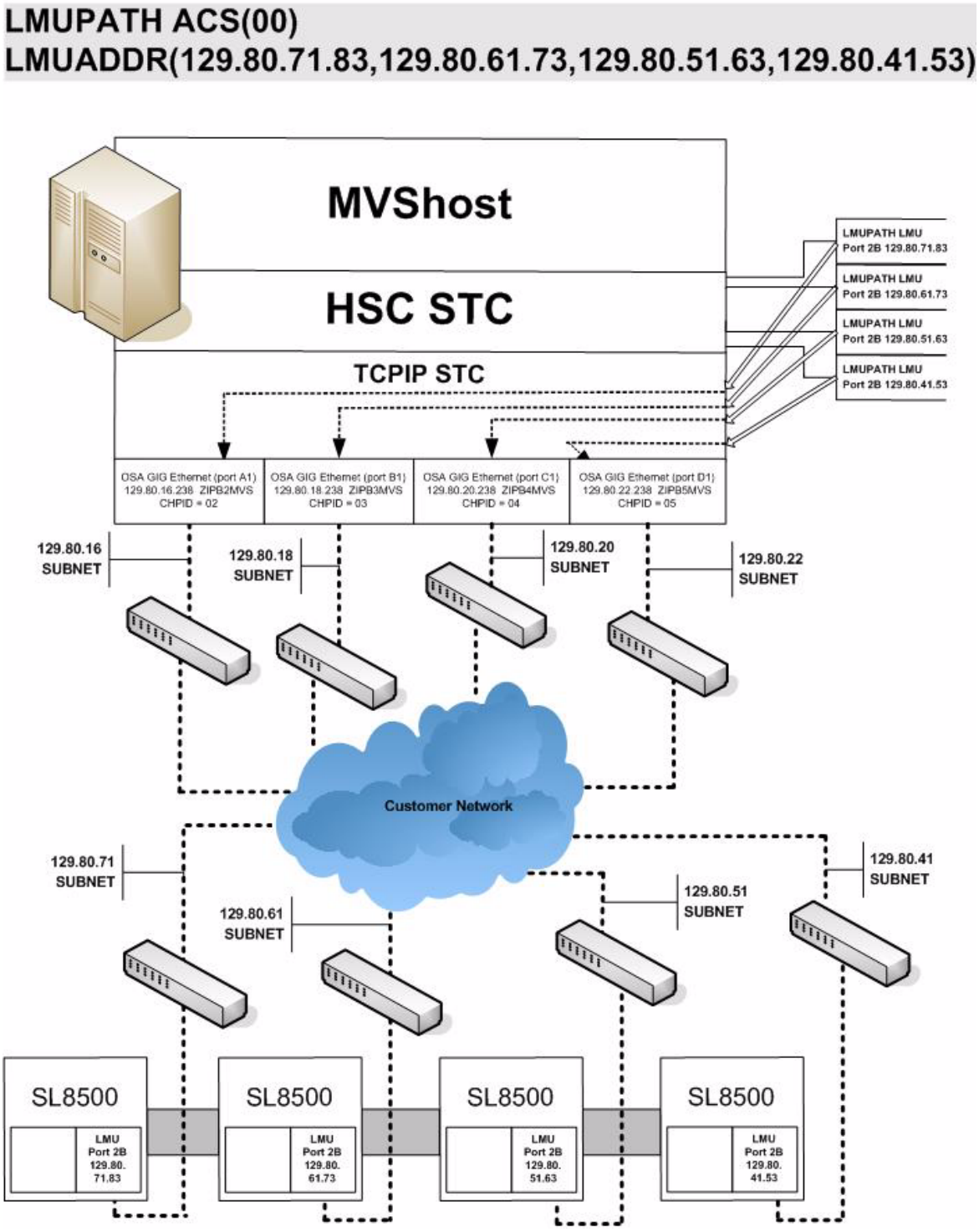


Figure 44. Four IP Addresses (four host IPs) with Four SL8500 Network Connections

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 VM host level.
2. Modify the LSM(s) offline (see the MODify Command in the *HSC Operator's Guide*).

For specific information about powering off the SL8500, refer to the *SL8500 Modular Library System User's Guide*.

Appendix B. HSC Support for the SL3000 Library

Overview

This appendix discusses topics that pertain only to the SL3000 library:

- partitioning support for the SL3000 library (page 522)
- TCP/IP communications - important considerations (page 563)
- dual IP connections to an SL3000 library (page 564)

Partitioning Support for the SL3000 Library

This section describes a variety of partitioning-related procedures that apply to the SL3000 library. There are many advantages to partitioning your library, including:

- enabling service centers to keep a client from accessing another client's tapes
- keeping separate various departments within the same company
- dividing a library between production and test environments.

The SL3000 can be configured with one to eight partitions with cell, drive, and CAP assignments established by the customer using the StreamLine Library Console (SLC).

The following procedures are discussed:

Basic Procedures:

- setting up the HSC to configure an SL3000 library (page 529)
- converting a non-partitioned library to partitioned library (page 532)
- adding partitions (page 535)
- removing partitions (page 539)
- converting a partitioned library to non-partitioned library (page 543)
- moving a partition from one HSC host group to another (page 548).

Library Resource Procedures:

- adding resources to a library (page 553)
- removing resources from a library (page 557).

Partitioning Requirements and Prerequisites

Address these items before partitioning a library:

- Read the *SL3000 Principles of Operation* document.
- Call Sun Software Support to schedule a CSE to configure the SL3000. **This is mandatory.**
- Verify the HSC is version 6.1 or higher.
- Verify firmware is version 2.00 or higher, and the SLConsole version is FRS 4.00 or higher.

Note: Customers **MUST** be current on maintenance.

- HSC 6.1 (MVS) – L1H149V and subsequent PTFs
- HSC 6.1 (VM) – L1H149U and subsequent PTFs
- LibraryStation 6.1 - L1S1072
- MVS-CSC 6.1 - L1C109B

Restrictions

- Hosts prior to HSC 6.1 do not support the SL3000 library.
- 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 a partition is moving from host group to another, an ADD on one side implies a DELETE must be run on the other.
  - A DELETE on this side implies nothing; the partition is available for future use and any cartridges not removed before the delete are orphaned.
- Volumes remaining in a partition being removed from one host group will be deleted from that CDS when the ACS is deleted using the HSC command Modify Config Delete *acs-id*.
- Volumes located in a partition that is added to a host group will be available to that CDS after an AUDIt or MERGEcds.

  Volume history will only be preserved if MERGEcds is run.
- When converting a partitioned library to non-partitioned library, a MERGEcds is possible to retain volume history from previously defined partitions.
- If a volume is mounted on a drive in a partition that is removed before the drive goes OFFLINE, the volume will be deleted from the CDS, and any future MOUNT activity to that drive will end in an error.
- When moving volumes from one partition to another, neither the HSC CDS nor the library support duplicate volumes. This is a restriction in the HSC and not the library.

- Prior to backing up the CDS described in the procedures below, NCS and VTCS systems must be in an idle state. This means draining all batch tape initiators, varying all automated MVS 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.
- If an HSC group owns multiple partitions within a SL3000 (or SL8500) library, anything done to that partition is considered disruptive and will affect all partitions connected to an HSC group. For any changes that involve adding or removing partitions or adding or removing partition resources, all activity (i.e., drive(s), cap(s), etc.) must be stopped for all ACSs connected to the library. All ACSs connected to the library must be varied offline. Perform the specific activity and then vary the ACSs online. Activity can now be started for all ACSs.

LIBGEN Considerations

Please refer to chapter 4, "Creating the Library Configuration File (LIBGEN)," in the *HSC 6.1 Configuration Guide* for information about configuring an SL3000 library in LIBGEN.

CAP Considerations

Partitioning affects CAP usage. Consider two situations that can be a common occurrence:

- AUTO CAP – In partitioning mode, AUTO CAP can be enabled only for CAPs assigned to that partition only. CAPs assigned to multiple partitions cannot be enabled to AUTO CAP.
- Release CAP – A CAP can only be released from the owning host.
- Overriding the CAP Reserve – Consult the *SL3000 Principles of Operation* document.

VM Considerations

For the most part, this document applies to both VM and MVS, with some specific references to the MVS environment. In references to the MVS environment, it must be discerned 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 MVS. The 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 regard to the VTCS product, references to tape activity include both real and virtual tape processing.

MVS/CSC Considerations

When you add drives, the LIBUNIT and UNITMAP parameters must be updated with the new drives and drive locations. Be advised that MVS/CSC requires each ACS to have its drives defined in a unique esoteric. Refer to the LIBDEV parameter in the *MVS/CSC Configuration Guide* for a more detailed description.

MVS/CSC must then be recycled. To make use of these new drives, the recycle must take place after the drives have been added to LibraryStation and LibraryStation has been recycled. Devices can now be varied online to MVS to be eligible for allocation.

ATTENTION: In all cases, LibraryStation must be stopped before MVS/CSC is stopped, and LibraryStation must not be started until MVS/CSC is started.

When you delete drives, to prevent further allocations, issue the SMC UNITATTR command with the deleted drives and specify MODEL(IGNORE). The LIBUNIT and UNITMAP parameters must be updated to remove these drive definitions. MVS/CSC must then be recycled. MVS/CSC will load these updated parameters when it is initialized. Failure to update these parameters will prevent MVS/CSC from initializing.

LibraryStation Considerations

LibraryStation must be recycled to pick up the new drive configuration for the following conditions:

- adding ACSs
- deleting ACSs
- adding LSMs
- deleting LSMs
- adding drives
- deleting drives.

Note: LibraryStation does not support Near Continuous Operation (NCO). If LibraryStation is running during NCO, results will be unpredictable.

LibraryStation should not be running when NCO is started or is anticipated to start, for example, when you are varying a newly reconfigured library online. This includes changes to drives that are configured to LibraryStation.

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

For an SL3000 library, a partition is a segment of one SL3000 unit consisting of cells with a minimum of 200 to *n* increments, CAPs, and drives for a maximum of 8 partitions. **A partition is an ACS.** A partition has exclusive control of cells and drives. Installed CAPs may be assigned to one partition (exclusive), assigned to multiple partitions (shared), or unassigned.

Figure 45 on page 527 and Figure 46 on page 528 illustrate an SL3000 divided into 4 partitions:

- Partition 1 assigned to ACSLS:
  - 200 cells
  - 1st and 2nd CAPs shared
  - 24 drives
- Partitions 2 and 3 assigned to HSC Host Group A:
  - 200 cells each
  - 1st and 2nd CAPs shared for each
  - 6 drives each
- Partition 4 assigned to HSC Host Group B:
  - 200 cells
  - 1st and 2nd CAPs shared, 3rd and 4th CAPs exclusively assigned
  - 12 drives

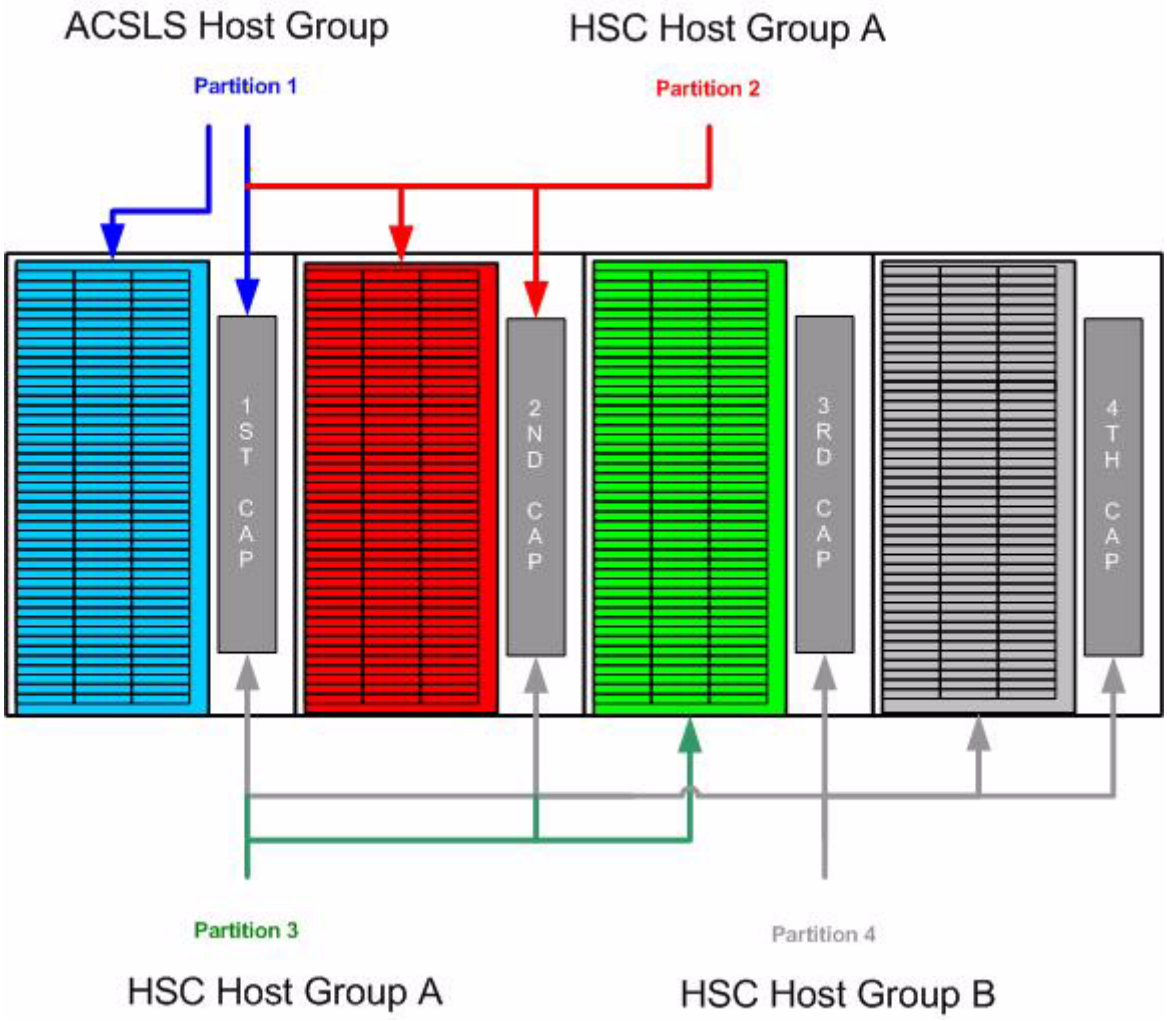


Figure 45. Partition and Host Group Example for Cells and CAPs

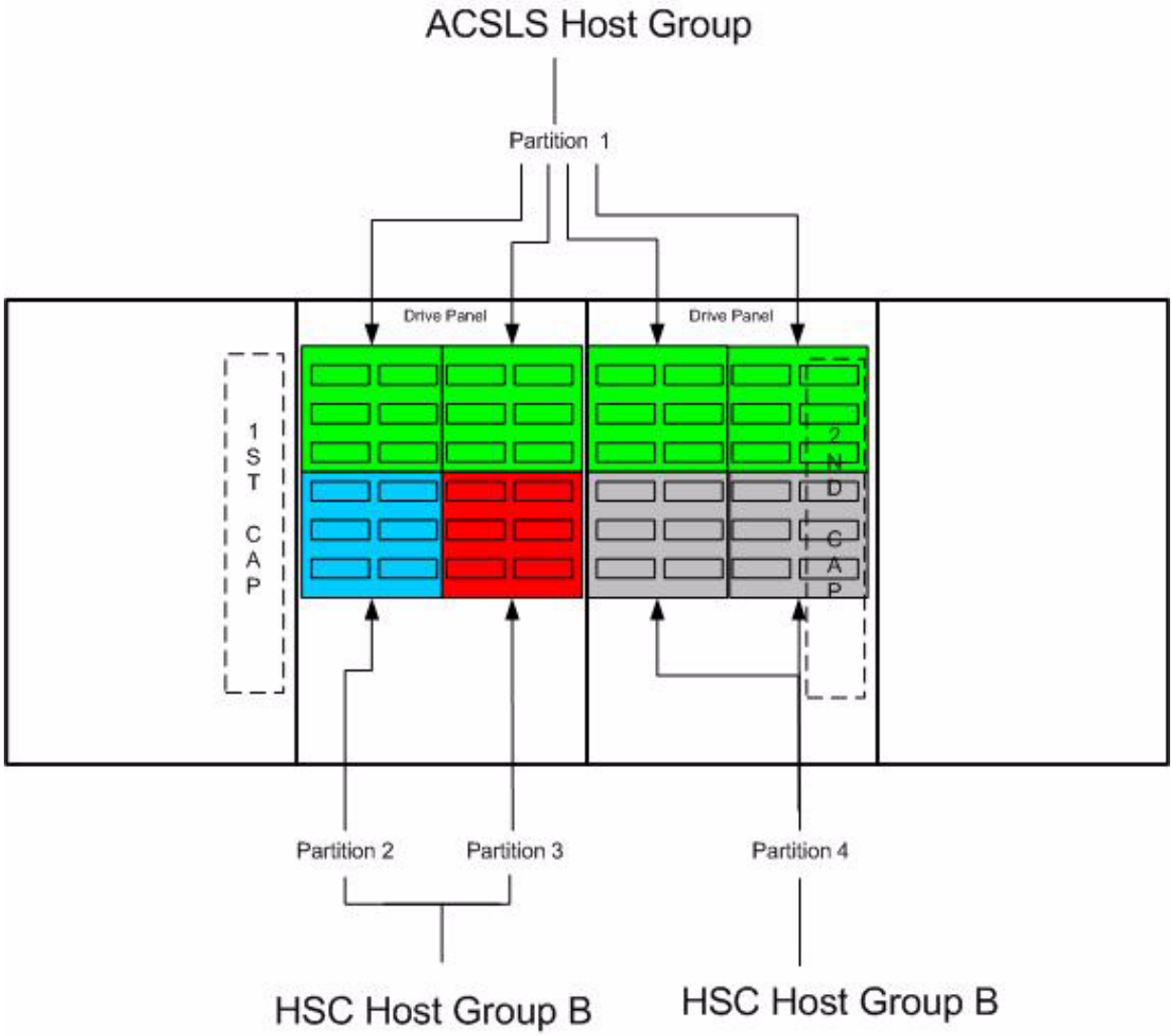


Figure 46. Partition and Host Group Example for Drives

Basic Procedures

Starting from Scratch – LIBGEN, SLICREAT

This procedure creates a SL3000 ACS from scratch. Please refer to chapter 4, "Creating the Library Configuration File (LIBGEN)," the *HSC 6.1 Configuration Guide* to see how to configure a LIBGEN with a SL3000 library.

1. **Run an HSC 6.1 or higher LIBGEN assemble and SLICREAT.**

   Create a new CDS using the procedures found 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.

   Below is a sample LIBGEN for an SL3000 library defined with one ACS and seven future ACSs for adding partitions/ACSs to the HSC:

```
LIBGEN   SLIRCVRY TCHNIQE=SHADOW
*
         SLILIBRY SMF=245,                                          X
               ACSLIST=ACSLIST,                                     X
               HOSTID=(HST1,HST2),                                  X
               DELDISP=SCRTCH,                                      X
               MAJNAME=STKSBADD,                                    X
               CLNPRFX=CLN,                                         X
               COMPRFX=/,                                           X
               FUTRACS=(7),                                         X
               SCRLABL=SL
*
ACSLIST  SLIALIST ACS00
*
ACS00    SLIACS ACSDRV=(TACS0,TACS0),                               X
               LSM=(LSM0000)
*
LSM0000  SLILSM TYPE=3000
*
*
         SLIENDGN ,
```

Note: If virtual tape is being implemented, VTCS CONFIG must be run to define the configuration to VTCS.

2. **Add the HSC LMUPATH statement in LMUPDEF in PARMLIB.**

   Add an HSC LMUPATH statement in LMUPDEF in PARMLIB to define the new SL3000 library.

   Example: `LMUPATH ACS(acs-id) LMUADDR(ip-address)`

   Notes:

   - Refer to the "LMUPATH Control Statement" on page 104.
   - Future ACSs cannot be defined to LMUPDEF. Refer to "Adding a Partition to the Library" on page 535 for further information.

3. **Run the SET SLIDRIVS utility on the host group (optional).**

   If the drives were not specified for the ACS in the LIBGEN, optionally add drives to the new LSM of the ACS by running the SLUADMIN utility for SET SLIDRIVS.

```
SET SLIDRIVS(drv1,drv2,drv3,,,,,,,,,,,,) +
FORLSMID(lsm_id),FORPANEL(12)
```

   Note: If VTCS is involved, any RTDs moving into the CDS will require a VTCS CONFIG RESET to be run to add the specific RTDs to the VTCS configuration.

4. **Start the HSC.**

   Start HSC using the new CDS defined from the LIBGEN and the SL3000 library defined in LMUPDEF.

5. **Display the ACS.**

   Issue the Display ACS command to verify that the SL3000 library is properly defined. Issue the HSC command:

```
DISPLAY ACS acs-id
```

6. **Modify the LSMs ONLINE.**

   Issue the Modify LSM command to bring the LSMs online. Issue the HSC command

```
F LSM acs-id:lsm-id ONLINE
```

7. **Display detail for each LSM.**

   Issue the Display LSM command to verify the LSMs for the ACS are properly defined. Issue the HSC command:

   ```
   D LSM acs-id:lsm-id
   ```

8. **Audit the LSM(s) (optional).**

   If the LSM contains frozen panels, this indicates that the CDS configuration does not match the library configuration and the LSM needs to be audited. To audit the LSM, run the HSC SLUADMIN AUDIt utility as follows:

   ```
   AUDIT ACS(acs-id) LSM(lsm-id) PANEL(panel-id)
   ```

9. **Unfreeze the LSM (optional).**

   Unfreeze the panels that are frozen as displayed in step 7. To unfreeze the panels, run the HSC SLUADMIN SET FREEZE utility as follows:

   ```
   SET FREEZE (OFF) FORLSMID(lsm-id) FORPANEL(panel-id)
   ```

The SL3000 ACS is now defined to the HSC. Next, follow the procedure "Adding a Partition to the Library" on page 535 to divide the library into partitions.

ATTENTION: All subsequent procedures are based on the requirement that the HSCs are active.

Converting a Non-Partitioned Library to a Partitioned Library

This procedure converts an existing non-partitioned library to a partitioned library. It assumes that the existing ACS number for a non-partitioned library will be reused for the partitioned one.

If more partitions are added to HSC, refer to "Adding a Partition to the Library" on page 535.

1. **Stop activity for the ACS connected to the library.**

   In preparation for reconfiguring the partition, stop all CAP and tape activity (both real and virtual) from all active hosts in that library, including RTD tape processing. **Failure to do this will result in lost cartridges and errors on dismount.**

   Vary drives offline to ALL MVS hosts that will no longer have access to the drives. From the MVS console, issue the following command to see if the drives in the affected LSM are offline to MVS:

   ```
   D U,,,xxx-yyy
   ```

   where *xxx-yyy* is the drive ID or UCB range. If the drives are not offline to MVS, vary the drives offline with the MVS command:

   ```
   VARY xxx-yyy OFFLINE
   ```

   Additionally, any RTDs that reside on the affected LSM will need to be varied offline. To do this, issue the VTCS command:

   ```
   .VT V RTD(rtd_id) OFF
   ```

   Note: If VTCS is involved, any RTDs moving out of the CDS of the host groups affected will require a VTCS CONFIG RESET to be run to remove the specific RTDs from the VTCS configuration.

2. **Vary the 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
   ```

3. **Back up all CDSs.**

   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 (see "Backup Utility" on page 212) to create the backup CDS copies.

   Note: If VTCS is involved, **ALL tape activity (real and virtual) must be stopped**. All virtual tape drives must be varied offline to MVS, and all RTDs defined in the VTCS configuration must be varied offline to VTCS. Sun recommends 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. **Change the SL3000 configuration to partition the library.**

   The internal configuration file in the SL3000 must be changed to partition the LSM, assign cell, drive, and CAP resources to that partition. This change is made through the SLConsole.

5. **Run the SET SLIDRIVS utility on the host group (optional).**

   If not all the drives need to be configured to the partitioned ACS, modify drives to the LSM of the ACS by running the SLUADMIN utility for SET SLIDRIVS.

```
SET SLIDRIVS(drv1,drv2,drv3,,,,,,,,,,,,) +
FORLSMID(lsm-id),FORPANEL(12)
```

6. **Modify the HSC LMUPATH parameter in PARMLIB.**

   Add the PARTID(00*n*) keyword to the LMUPATH HSC parameter in PARMLIB. The partition ID is obtained from the SLConsole.

   Example:`LMUPATH ACS(03) LMUADDR(ip-address) PARTID(00n)`

7. **Issue the HSC LMUPDEF command on all host groups.**

   To activate the modified HSC LMUPATH statement, issue the HSC command:

```
LMUPDEF DATASET(dataset.name)
```

8. **Vary the affected ACS ONLINE to the host.**

   Issue the HSC command for the host group taking ownership of the library:

   ```
   VARY ACS acs-id ONLINE
   ```

   The HSC retains the online/offline status of each pre-existing LSM. If the LSM does not modify online when the ACS is varied online, issue the HSC command:

   ```
   MODIFY LSM lsm-id ONLINE
   ```

   No additional mounts will occur to the ACS until the ACS is varied online. All other hosts will complete their configuration process when the ACS is varied online.

Notes:

- Virtual tape environments will be required to vary any RTDs online to VTCS.
- Refer to "Varying the ACS Online After a Configuration Change" on page 561 for further details of this process.

9. **Vary drives ONLINE to MVS (if necessary).**

   From the MVS console, issue the following command to see if the new drives are online to MVS:

   ```
   D U,,,xxx-yyy
   ```

   where *xxx-yyy* is the drive ID range (both real and virtual). If they are not, bring the real drives online with the MVS command:

   ```
   VARY xxx-yyy ONLINE
   ```

10. **Vary RTDs ONLINE to VTCS (if necessary).**

    From the MVS console, issue

    ```
    .VT V RTD(rtd_id) ON
    ```

    for the RTDs that reside on the LSMs being allocated.

11. **Re-synchronize the SMC.**

    To add drives for the SMC, issue the SMC RESYNCHRONIZE command.

The library is now partitioned and available for use.

Adding a Partition to the Library

This procedure adds a partition to the library for either an existing or new configuration.

After completing the following steps, a partitioned SL3000 with up to eight partitions may be created. At a later time, remove any partitions from this library using "Removing a Partition from the Library" on page 539.

If you are adding more partitions to an ACS than what currently exist, the FUTRACS parameter in the SLILIBRY macro must be coded in the LIBGEN with enough ACSs to accommodate the total number of partitions being accessed within a SL3000 library.

1. **Stop activity for all ACSs connected to the library.**

   In preparation for adding a partition to the library, stop all CAP and tape activity (both real and virtual) from all active hosts, including RTD tape processing, in that ACS. **Failure to do so will result in lost cartridges and errors on dismount.**

   Vary drives (both real and virtual) offline to all MVS hosts that will no longer have access to the drives. From the MVS console, issue the following command to see if the drives in the affected ACS are offline to MVS:

   ```
   D U,,,xxx-yyy
   ```

   where *xxx-yyy* is the drive ID or UCB range. If they are not, vary the drives offline with the MVS command:

   ```
   VARY xxx-yyy OFFLINE
   ```

   Additionally, any RTDs that reside on the affected ACS will need to be varied offline. To do this, issue the VTCS command:

   ```
   .VT V RTD(rtd_id) OFF
   ```

   Notes:

   - This step is necessary if you are adding partitions other than the first time.
   - If VTCS is involved, any RTDs moving out of the CDS will require a VTCS CONFIG RESET to be run to remove the specific RTDs from the VTCS configuration.

2. **Vary all ACSs connected to the library OFFLINE to all hosts.**

   ALL ACSs connected to the library must be offline to all hosts. Issue the HSC command:

   ```
   VARY ACS acs-id OFFLINE
   ```

3. **Back up the CDS (if necessary).**

   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 (see "Backup Utility" on page 212) to create the backup CDS copy.

   Notes:

   - This step is necessary if you are adding partitions other than the first time.
   - If VTCS is involved, **ALL tape activity (real and virtual) must be stopped**. All virtual tape drives must be varied offline to MVS. 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. **Change the SL3000 configuration to add the partition and assign resources to the partition.**

   The internal configuration file in the SL3000 must be changed to show the newly added partition(s) to a library. This change is made through the SLConsole.

   ATTENTION: If scratch volumes exist, update and reload SCRPDEF, VOLDEF, and TAPEREQ PARMLIB members accordingly. This must be done prior to executing step 5.

5. **Issue the** `HSC F CONFIG ADD ACSType` **command (optional).**

   If you are adding more partitions to an ACS than currently exist, issue the HSC command as in the examples below:

```
F CONFIG ADD ACST(SL3000)
F CONFIG ADD ACST(SL8500)
```

6. **Change or add the HSC LMUPATH statement in PARMLIB.**

   If an LMUPATH statement was defined for an SL3000 using "Starting from Scratch – LIBGEN, SLICREAT", change the HSC LMUPATH statement to add the PARTID keyword in LMUPDEF in PARMLIB. Verify the partition ID defined from the SLConsole is the same as the PARTID in the HSC LMUPDEF. For a new partition, add an HSC LMUPATH statement in LMUPDEF in PARMLIB.

   Example: `LMUPATH ACS(`*`acs-id`*`) LMUADDR(`*`ip-address`*`) PARTID(`*`nnn`*`)`

   Note: Refer to "LMUPATH Control Statement" on page 104.

7. **Issue the HSC LMUPDEF command on all hosts.**

   To activate the modified HSC LMUPATH statement, issue the HSC command:

   ```
   LMUPDEF DATASET(dataset.name)
   ```

8. **Run the SET SLIDRIVS utility (match CDS drive configuration to the library).**

   Add drives to an LSM of an added ACS by running the SLUADMIN utility or command for SET SLIDRIVS.

   ```
   SET SLIDRIVS(drv1,drv2,drv3,,,,,,,,,,,,) +
   FORLSMID(lsm-id),FORPANEL(12)
   ```

Note: If VTCS is involved, any RTDs moving into the CDS will require a VTCS CONFIG RESET to be run to add the specific RTDs to the VTCS configuration.

9. **Vary all ACSs connected to the library 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 LSM is not modified online when the ACS is varied online, issue the HSC command:

   ```
   MODIFY LSM lsm-id ONLINE
   ```

   No additional mounts will occur to the ACS until the ACS is varied online. All other hosts will complete their configuration process when the ACS is varied online.

10. **Audit LSM of ACS (optional).**

    From step 9, when an SLS4416E message is displayed, some panels are populated with cartridges that are not cataloged to HSC. These panels must be audited for the HSC to be aware of these cartridges. To audit the panel, run the HSC AUDIt utility as follows:

    ```
    AUDIT ACS(xx) LSM(yy) PANEL(zz)
    ```

11. **Unfreeze panels/LSM (optional).**

    If the panels were audited in step 10, the panels can now be unfrozen. To unfreeze the panels/LSM, run the HSC SLUADMIN SET FREEZE utility as follows:

    ```
    SET FREEZE (OFF) FORLSMID(lsm-id) FORPANEL(panel-id)
    ```

12. **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.

13. **Vary drives ONLINE to MVS (if necessary).**

    From the MVS console, issue the following command to see if the new drives are online to MVS:

    ```
    D U,,,xxx-yyy
    ```

    where *xxx-yyy* is the drive ID range (both real and virtual). If they are not, bring the real drives online with the MVS command:

    ```
    VARY xxx-yyy ONLINE
    ```

14. **Vary RTDs ONLINE to VTCS (if necessary).**

    From the MVS console, issue

    ```
    .VT V RTD(rtd_id) ON
    ```

    for the RTDs that reside on the LSMs being allocated.

Notes:

- Virtual tape environments will be required to vary any RTDs online to VTCS. Additionally, any virtual tape drives varied offline will need to be varied online to MVS.
- Prior to performing this step, ensure that SET SLIDRIVS (step 8) is performed so that the CDS drive configuration matches EXACTLY to the new drive configuration on the SL3000 library.

15. **Re-synchronize the SMC.**

    To add drives for the SMC, issue the SMC RESYNCHRONIZE command.

The partition is now added to the library and is available for use. If running multiple HSC hosts, the new configuration will be propagated automatically to all hosts.

Removing a Partition from the Library

ATTENTION: If this is the last ACS in the HSC host group, only steps 1 through 6 may apply. At this time, the HSC can be stopped.

This procedure removes a partition from an existing library.

1. **Stop activity for all ACSs connected to the library.**

   In preparation for removing a partition from the library, stop all CAP and tape activity (both real and virtual) from all active hosts, including RTD tape processing, in that ACS. **Failure to do so will result in lost cartridges and errors on dismount.**

   Vary drives (both real and virtual) offline to all MVS hosts that will no longer have access to the drives. From the MVS console, issue the following command to see if the drives in the affected ACS are offline to MVS:

   ```
   D U,,,xxx-yyy
   ```

   where *xxx-yyy* is the drive ID or UCB range. If they are not, vary the drives offline with the MVS command:

   ```
   VARY xxx-yyy OFFLINE
   ```

   Additionally, any RTDs that reside on the affected ACS will 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.

Note: If VTCS is involved, any RTDs moving out of the CDS will require a VTCS CONFIG RESET to be run to remove the specific RTDs from the VTCS configuration.

2. **Run the SET Freeze utility to freeze affected LSM.**

   To stop cartridges from migrating to the LSM of the partition being removed, run the HSC SLUADMIN SET FREEZE utility:

   ```
   SET FREEZE(ON) FORLSMID(lsm-id)
   ```

Notes:

- When an LSM is frozen, no new cell allocations will occur, however, any cartridge from the LSM that is currently mounted on a drive will return to its home cell.
- Since there is one LSM in an SL3000 library, freezing the LSM is freezing the ACS.

3. **Run the Volume Report utility.**

   Run a volume report on the affected ACS and keep the output. This data can be used later to verify where volumes were in the ACS before it was removed.

Note: Systems with VTCS should run an MVC report for cross reference purposes.

4. **Eject cartridges out of the affected ACS (optional).**

   Eject all cartridges from the affected ACS.

5. **Vary all of the affected ACSs connected to the library OFFLINE to all hosts.**

   All ACSs connected to the library must be offline to **all** hosts. Issue the HSC command:

   ```
   VARY ACS acs-id OFFLINE
   ```

6. **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 MVS. 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.

7. **Issue the HSC F CONFIG DELete ACS command.**

   To delete a partition(s) in an HSC Host Group, issue the HSC command as the examples below show:

   ```
   F CONFIG DELETE ACS(Ø3)
   F CONFIG DELETE ACS(Ø4)
   F CONFIG DELETE ACS(Ø5)
   ```

Notes:

- If running multiple HSC hosts, the new configuration will be propagated automatically to all hosts.
- **Deleting an ACS deletes its volumes from the CDS.**

8. **Remove the HSC LMUPATH parameter in PARMLIB.**

   Remove the LMUPATH statements referencing the ACS previously defined to the LMUPDEF HSC parameter file of the affected host group.

9. **Issue the HSC LMUPDEF command on all hosts.**

   To refresh the modified HSC LMUPDEF HSC parameter file within a host group, issue the HSC command to all hosts:

   ```
   LMUPDEF DATASET(dataset.name)
   ```

10. **Change the SL3000 configuration to remove the affected partition from the library (optional).**

    The internal configuration file in the SL3000 may be changed to remove the partition. This change happens through the SLConsole.

11. **Vary all ACSs connected to the library 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 LSM is not modified online when the ACS is varied online, issue the HSC command:

    ```
    MODIFY LSM lsm-id ONLINE
    ```

    No additional mounts will occur to the ACS until the ACS is varied online. All other hosts will complete their configuration process when the ACS is varied online.

12. **Vary drives ONLINE to MVS (if necessary).**

    From the MVS console, issue the following command to see if the new drives are online to MVS:

    ```
    D U,,,xxx-yyy
    ```

    where *xxx-yyy* is the drive ID range (both real and virtual). If they are not, bring the real drives online with the MVS command:

    ```
    VARY xxx-yyy ONLINE
    ```

13. **Vary RTDs ONLINE to VTCS (if necessary).**

    From the MVS console, issue

    ```
    .VT V RTD(rtd_id) ON
    ```

    for the RTDs that reside on the LSMs being allocated.

Note: Virtual tape environments will be required to vary any RTDs online to VTCS. Additionally, any virtual tape drives varied offline will need to be varied online to MVS

14. **Re-synchronize the SMC.**

    Issue the SMC RESYNCHRONIZE command.

The partition is removed from the library, and the remaining library resources are available for use.

Converting a Partitioned Library to a Non-partitioned Library

This procedure converts an existing partitioned library to a non-partitioned library. In this procedure, all defined partitions will be removed and the library will be left un-partitioned.

1. **Stop activity for all ACSs connected to the library.**

   In preparation for reconfiguring the partition, stop all CAP and tape activity (both real and virtual) from all active hosts in that library, including RTD tape processing. **Failure to do this will result in lost cartridges and errors on dismount.**

   Vary drives offline to ALL MVS hosts that will no longer have access to the drives. From the MVS console, issue the following command to see if the drives in the affected LSM are offline to MVS:

   ```
   D U,,,xxx-yyy
   ```

   where *xxx-yyy* is the drive ID or UCB range. If they are not, vary the drives offline with the MVS command:

   ```
   VARY xxx-yyy OFFLINE
   ```

   Additionally, any RTDs that reside on the affected LSM will 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 non-partitioning.

   Note: If VTCS is involved, any RTDs moving out of the CDS of the host groups affected will require a VTCS CONFIG RESET to be run to remove the specific RTDs from the VTCS configuration.

2. **Run the Volume Report utility.**

   Run a volume report on the affected ACS(s) and keep the output. This data can be used later to verify where volumes were in the ACS(s) before it was removed.

   Note: Systems with VTCS should run an MVC report for cross reference purposes.

3. **Back up all CDSs.**

   Before making changes to the CDSs affected, it is best practice to create backup copies for recovery purposes. These backup copies can be restored, if problems are encountered, to recover to a known CDSs state using documented HSC recovery procedures.

   Use the HSC BACKup utility to create the backup CDS copies.

   Note: If VTCS is involved, ALL tape activity (real and virtual) must be stopped. All virtual tape drives must be varied offline to MVS. 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. **Vary all ACSs connected to the library OFFLINE to all host groups.**

   The ACS(s) to be un-partitioned must be offline to all hosts. Issue the HSC command:

```
VARY ACS acs-id OFFLINE
```

5. **Change the SL3000 configuration to un-partition the library.**

   The internal configuration file in the SL3000 must be changed to delete all partitions. This change is made through the SLConsole.

6. **Issue the HSC F CONFIG DELete ACS command.**

   To delete an ACS from an HSC host group, issue the HSC command as in the examples below:

```
F CONFIG DELETE ACS(Ø3)
F CONFIG DELETE ACS(Ø4)
F CONFIG DELETE ACS(Ø5)
```

   Notes:

   - If running multiple HSC hosts, the new configuration will be propagated automatically to all hosts.
   - **Deleting an ACS deletes its volumes from the CDS.**
   - If this is the last ACS in the HSC host group, the following steps may apply. At this time, the HSC can be stopped.
     - Run a volume report on the affected ACS and keep the output. This data can be used later to verify where volumes were in the ACS before it was removed.
     - Eject all cartridges from the affected ACS.

7. **Run the SET SLIDRIVS utility on the remaining host group.**

   Add drives to the new LSM of the ACS by running the SLUADMIN utility or command for SET SLIDRIVS.

   ```
   SET SLIDRIVS(drv1,drv2,drv3,,,,,,,,,,,,) +
   FORLSMID(lsm-id),FORPANEL(12)
   ```

Note: If VTCS is involved, any RTDs moving into the CDS will require a VTCS CONFIG RESET to be run to add the specific RTDs to the VTCS configuration.

8. **Modify LMUPDEF in PARMLIB for all host groups.**

   Remove all the LMUPATH statements referencing the ACSs previously defined to all LMUPDEF HSC parameter files of all affected host groups. If a particular host group will have ownership of the library after it becomes un-partitioned, add or change the LMUPATH statement using the following example:

   ```
   Example:LMUPATH ACS(03) LMUADDR(ip-address)
   ```

9. **Issue the HSC LMUPDEF command on all host groups.**

   To activate the modified HSC LMUPATH statement, issue the HSC command:

   ```
   LMUPDEF DATASET(dataset.name)
   ```

10. **Vary the ACS ONLINE to the remaining host group.**

    Issue the HSC command for the host group taking ownership of library:

    ```
    VARY ACS acs-id ONLINE
    ```

    The HSC retains the online/offline status of each pre-existing LSM. If the LSM does not modify online when the ACS is varied online, issue the HSC command:

    ```
    MODIFY LSM lsm-id ONLINE
    ```

    No additional mounts will occur to the ACS until the ACS is varied online. All other hosts will complete their configuration process when the ACS is varied online.

Note: When an ACS is varied online, the panels are discovered to complete the configuration process. During this time, if any cartridges are discovered, an SLS4416E message will be displayed. It is important to follow the user response section of this message before proceeding to the next step. This section will instruct the user to perform the following step in the order listed:

- Run the HSC SLUADMIN Audit utility with APPLY(NO) for the panels indicated to discover and resolve issues.
- Run the HSC SLUADMIN Volume Report utility if necessary to gather volume information.
- Run the HSC SLUADMIN Audit utility with APPLY(YES) to apply updates to the CDS.
- Run the HSC SLUADMIN SET Utility specifying FREEZE OFF for any panels in the frozen state.

Refer to "Varying the ACS Online After a Configuration Change" on page 561 for further details of this process.

Note: Virtual tape environments will be required to vary any RTDs online to VTCS.

11. Vary drives ONLINE to MVS (if necessary).

From the MVS console, issue the following command to see if the new drives are online to MVS:

```
D U,,,xxx-yyy
```

where *xxx-yyy* is the drive ID range (both real and virtual). If they are not, bring the real drives online with the MVS command:

```
VARY xxx-yyy ONLINE
```

12. Vary RTDs ONLINE to VTCS (if necessary).

From the MVS console, issue

```
.VT V RTD(rtd_id) ON
```

for the RTDs that reside on the LSMs being allocated.

13. 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. It must be run if new LSMs have been added to the configuration.

14. **Re-synchronize the SMC.**

    To add drives for the SMC, issue the SMC RESYNCHRONIZE command.

The library is now non-partitioned and available for use.

Moving a Partition from One Host Group to another Host Group

This procedure moves a partition from one host group to another and preserves the history of the partition volumes being allocated.

ATTENTION: If this is the last ACS in the "from" HSC host group, only steps 1 through 4 may apply. At this time, the "from" HSC can be stopped. Proceed with steps 9 through 20.

"From" Host Group:

1. Stop activity for all ACSs connected to the library.

   In preparation for moving the partition, you must stop all CAP and tape activity (both real and virtual), from all active hosts, including virtual tape processing, in that ACS of the host group of where the partition is moving from. **Failure to do this will result in lost cartridges and errors on dismount.**

   Vary drives offline to all MVS hosts that will no longer have access to the drives. From the MVS console, issue the following command to see if the drives in the affected LSM are offline to MVS:

   ```
   D U,,,xxx-yyy
   ```

   where *xxx-yyy* is the drive ID or UCB range. If they are not, bring them offline with the MVS command:

   ```
   VARY xxx-yyy OFFLINE
   ```

   Additionally, any RTDs that reside on the affected LSM will need to be varied offline. To do this issue the VTCS command:

   ```
   .VT V RTD(rtd_id) OFF
   ```

Warning: Failure to perform this step to vary these drives offline from MVS will result 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.

Note: If VTCS is involved, any RTDs moving out of the CDS of the "from host group" will require a VTCS CONFIG RESET to be run to remove the specific RTDs from the VTCS configuration.

2. **Run the Volume Report utility.**

   Run a volume report on the affected ACS and keep the output. This data can be used later to verify where volumes were in the ACS before it was relocated.

Note: Systems with VTCS should run an MVC report for cross reference purposes.

3. **Vary the ACS being removed OFFLINE to all hosts.**

   The ACS must be offline to all hosts. Issue the HSC command:

   ```
   VARY ACS acs-id OFFLINE
   ```

4. **Back up the CDS (CDS01).**

   Use the HSC BACKup utility to create the backup CDS copy as CDS01.

5. **Remove the HSC LMUPATH parameter in PARMLIB.**

   Remove the LMUPATH statements referencing the partition previously defined to the LMUPDEF HSC parameter file.

6. **Issue the HSC LMUPDEF command on all hosts.**

   To refresh the modified HSC LMUPDEF HSC parameter file within a host group, issue the HSC command to all hosts:

   ```
   LMUPDEF DATASET(dataset.name)
   ```

7. **Issue the HSC F CONFIG DELete ACS command.**

   To delete a partition from a HSC Host Group, issue the HSC command as in the examples below:

   ```
   F CONFIG DELETE ACS(Ø3)
   F CONFIG DELETE ACS(Ø4)
   F CONFIG DELETE ACS(Ø5)
   ```

Notes:

- If you are running multiple HSC hosts, the new configuration will be propagated automatically to all hosts.
- **Deleting an ACS deletes its volumes from the CDS.**

8. **Re-synchronize the SMC.**

   To add drives for the SMC, issue the SMC RESYNCHRONIZE command.

"To" Host Group:

9. **Back up the CDS (CDS02).**

   Use the HSC BACKup utility to create the backup CDS copy as CDS02.

10. **Issue the HSC F CONFIG ADD ACSType command.**

    To add a partition to an HSC Host Group, issue the HSC command as in the examples below:

    ```
    F CONFIG ADD ACST(SL3000)
    F CONFIG ADD ACST(SL8500)
    ```

If running multiple HSC hosts, the new configuration will be propagated automatically to all hosts.

11. **Add the HSC LMUPATH statement in PARMLIB.**

    Add an HSC LMUPATH statement in LMUPDEF in PARMLIB.

    Example:`LMUPATH ACS(acs-id) LMUADDR(ip-address) PARTID(nnn)`

Note: Refer to "LMUPATH Control Statement" on page 104.

12. **Issue the HSC LMUPDEF command on all hosts.**

    To activate the modified HSC LMUPATH statement, issue the HSC command:

    ```
    LMUPDEF DATASET(dataset.name)
    ```

13. **Set the Service Level to BASE for all hosts.**

    Set the service level to BASE for the host group to allow a MERGEcds to be started. Issue the HSC command:

    ```
    SRVLEV BASE
    ```

14. **Run the MERGEcds utility if the CDS is in a shared VM/MVS environment.**

    Input will be CDS01. Output will be an updated CDS02. This example will move the ACS volume history from ACS 00 (CDS01) to ACS 04. For other examples, refer to the "" on page 263.

Notes:

- If merging a non-VTCS ACS into a VTCS ACS, the REALonly parameter is necessary on the MERGEcds.
- After MERGEcds, if scratch volumes exist, update and reload the SCRPDEF, VOLDEF, and TAPEREQ PARMLIB members accordingly.

```
//jobcard
//STEP1    EXEC PGM=SLUADMIN,PARM='MIXED'
//STEPLIB  DD  DISP=SHR,DSN=dataset.name
//*
//SLSPRINT DD  SYSOUT=*
//*
//SLSFCNTL  DD DSN=CDSØ1.primary,DISP=SHR
//*
//SLSIN    DD  *
  MERGECDS
//SLSMERGE DD  *
  MERGE FACS(ØØ) TACS(Ø4)
/*
//
```

15. Run the SET SLIDRIVS utility.

Add drives to the new ACS of the “to host group” by running the SLUADMIN utility or command for SET SLIDRIVS.

```
SET SLIDRIVS(drv1,drv2,drv3,,,,,,,,,,,,) +
FORLSMID(lsm-id),FORPANEL(12)
```

Note: If VTCS is involved, any RTDs moving into the CDS will require a VTCS CONFIG RESET to be run to add the specific RTDs to the VTCS configuration.

16. Set the Service Level to FULL for all hosts.

Set the service level to FULL for the host group after the MERGEcds has completed. Issue the HSC command:

```
SRVLEV FULL
```

17. 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.

18. **Vary drives ONLINE to MVS (if necessary).**

    From the MVS console of all hosts within the to host group, issue the following command to see if the new drives are online to MVS:

    ```
    D U,,,xxx-yyy
    ```

    where *xxx-yyy* is the drive ID range (both real and virtual). If they are not, bring the real drives online with the MVS command:

    ```
    VARY xxx-yyy ONLINE
    ```

19. **Vary RTDs ONLINE to VTCS (if necessary).**

    From the MVS console of the to host group, issue

    ```
    .VT V RTD(rtd_id) ON
    ```

    for the RTDs that reside on the LSMs being allocated.

20. **Re-synchronize the SMC.**

To add drives for the SMC, issue the SMC RESYNCHRONIZE command.

Adding Resources to a Library

This procedure allows resources to be added to an existing library. Resource additions can consist of cells, drives, drive bays, CAPs, expansion modules, and dual Tallbot.

Warning: If you are changing the library configuration, for example, changing UPC labels, the cartridges in the cells being removed must be ejected or moved, and the cells being removed must be unassigned to all partitions using the SLConsole prior to physically adding the library resources.

1. **Stop activity for all ACSs connected to the library.**

   In preparation for adding resources to the library, stop all CAP and tape activity (both real and virtual) from all active hosts in that library, including RTD tape processing. **Failure to do this will result in lost cartridges and errors on dismount.**

   Vary drives offline to ALL MVS hosts that will no longer have access to the drives. From the MVS console, issue the following command to see if the drives in the affected LSM are offline to MVS:

   ```
   D U,,,xxx-yyy
   ```

   where *xxx-yyy* is the drive ID or UCB range. If they are not, vary the drives offline with the MVS command:

   ```
   VARY xxx-yyy OFFLINE
   ```

   Additionally, any RTDs that reside on the affected LSM will 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 non-partitioning.

Note: If VTCS is involved, any RTDs moving out of the CDS of the host groups affected will require a VTCS CONFIG RESET to be run to remove the specific RTDs from the VTCS configuration.

2. **Back up the CDS containing the ACS to be changed.**

   Use the HSC BACKup utility to create the backup CDS copy.

3. **Vary all ACSs connected to the library OFFLINE to all hosts.**

   ALL ACSs connected to the library must be offline to all hosts. Issue the HSC command:

   ```
   VARY ACS acs-id OFFLINE
   ```

4. **Change the SL3000 configuration to the affected partition.**

   The internal configuration file in the SL3000 is changed to reconfigure a partition, i.e., adding or deleting cell allocations or changing the exclusivity status of a CAP. This change is accomplished through the SLConsole.

   - CAPs
     - If assigning a CAP, use the SLConsole to assign the CAP to only one partition (dedicated) or a set of partitions (shared).

       Notes:

       - Only dedicated CAPs can be set to auto.
       - Prior to reassigning a CAP, it must be set to manual.

     - If installing a CAP, verify the cells that occupied the CAP space are unassigned to any partition. Assign the CAP as described in the previous bullet.
   - Drives – If installing or assigning a drive, use the SLConsole to assign the drive to a partition.
   - Drive Bays – If installing a drive bay, after verifying the cells are unassigned to any partition, use the SLConsole to assign the drive slots to a partition.
   - Cells – If assigning cells, use the SLConsole to assign cells to a partition.
   - Dual Tallbots – If installing a second robot, verify the outermost three columns (front and back) of each outermost Cartridge Expansion Module (CEM) are unassigned to any partition.

     Note: Outermost CEMs must be transformed into Parking Expansion Modules (PEMs) when installing the second robot.

   - Expansion Modules
     - If installing a Drive Expansion Module (DEM) no additional setup is needed.
     - If installing a CEM to either end, no additional setup is needed.
     - **ATTENTION:** Prior to installing a CEM to a location other than to either end of the library (i.e., between a PEM and either a CEM, DEM, or Base Drive Module) the volumes in the PEM **must** be either moved to available space within the partition or ejected if no space is available. After the volumes are removed from the PEM, the partitions need to unassign the cell locations.

5. **Run the SET SLIDRIVS utility if adding drives (optional).**

   Add drives to the changed ACS by running the SLUADMIN utility or command for SET SLIDRIVS

   ```
   SET SLIDRIVS(drv1,drv2,drv3,,,,,,,,,,,,) +
   FORLSMID(lsm-id),FORPANEL(12)
   ```

Note: If VTCS is involved, any RTDs moving into the CDS will require a VTCS CONFIG RESET to be run to add the specific RTDs to the VTCS configuration.

6. **Vary all ACSs connected to the library 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 will occur to the ACS until the ACS is varied online.

   All other hosts will complete their configuration process when the ACS is varied online.

Notes:

- When an ACS is varied online, the panels are discovered to complete the configuration process. During this time, if any cartridges are discovered, an SLS4416E message will be displayed. It is important to follow the user response section of this message before proceeding to the next step. This section will instruct the user to perform the following step in the order listed:
  - Run the HSC SLUADMIN Audit utility with APPLY(NO) for the panels indicated to discover and resolve issues.
  - Run the HSC SLUADMIN Volume Report utility if necessary to gather volume information.
  - Run the HSC SLUADMIN Audit utility with APPLY(YES) to apply updates to the CDS.
  - Run the HSC SLUADMIN SET Utility specifying FREEZE OFF for any panels in the frozen state.

  Refer to “Varying the ACS Online After a Configuration Change” on page 561 for further details of this process.

- Virtual tape environments will be required to vary any RTDs online to VTCS. Additionally, any virtual tape drives varied offline will need to be varied online to MVS.

7. **Vary drives ONLINE to MVS if adding drives (optional).**

   From the MVS console, issue the following command to see if the new drives are online to MVS:

   ```
   D U,,,xxx-yyy
   ```

   where *xxx-yyy* is the drive ID range (both real and virtual). If they are not, bring the real drives online with the MVS command:

   ```
   VARY xxx-yyy ONLINE
   ```

8. **Vary drives ONLINE to VTCS if adding RTDs (optional).**

   From the MVS console, issue

   ```
   .VT V RTD(rtd_id) ON
   ```

   for the RTDs that reside on the LSMs being allocated.

9. **Re-synchronize the SMC.**

   Issue the SMC RESYNCHRONIZE command.

If you are running multiple HSC hosts, the new configuration will be propagated automatically to all hosts in the affected host group

Removing Resources from a Library

This procedure allows resources to be removed from an existing library. Resource removal can consist of cells, drives, drive bays, CAPs, expansion modules and dual Tallbot.

1. **Back up the CDS containing the ACS to be changed.**

   Use the HSC BACKup utility to create the backup CDS copy.

   Note: If VTCS is involved, ALL CAP and tape activity (real and virtual) must be stopped. All virtual tape drives must be varied offline to MVS. 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.

2. **Stop activity for all ACSs connected to the library.**

   In preparation for removing resources from the library, stop all CAP and tape activity (both real and virtual) from all active hosts in that ACS, including RTD tape processing. **Failure to do this will result in lost cartridges and errors on dismount.**

   Vary drives offline to ALL MVS hosts that will no longer have access to the drives. From the MVS console, issue the following command to see if the drives in the affected LSM are offline to MVS:

   ```
   D U,,,xxx-yyy
   ```

   where *xxx-yyy* is the drive ID or UCB range. If they are not, vary the drives offline with the MVS command:

   ```
   VARY xxx-yyy OFFLINE
   ```

   Additionally, any RTDs that reside on the affected LSM will 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.

   Note: If VTCS is involved, any RTDs moving out of the CDS will require a VTCS CONFIG RESET to be run to add the specific RTDs from the VTCS configuration.

3. **Eject cartridges out of the affected cells to be removed (optional).**

   If cells to be removed contain cartridges, optionally eject all cartridges from the affected ACS.

4. **Vary drives OFFLINE to MVS if removing drives (optional).**

   From the MVS console, issue the following command to see if the new drives are offline to MVS:

   ```
   D U,,,xxx-yyy
   ```

   where *xxx-yyy* is the drive ID range (both real and virtual). If they are not, vary the real drives offline with the MVS command:

   ```
   VARY xxx-yyy OFFLINE
   ```

5. **Vary drives OFFLINE to VTCS if removing RTDs (optional).**

   From the MVS console, issue

   ```
   .VT V RTD(rtd_id) OFF
   ```

   for the RTDs that reside in the LSMs being unallocated.

6. **Vary all ACSs connected to the library OFFLINE to all hosts.**

   All ACSs must be offline to all hosts. Issue the HSC command:

   ```
   VARY ACS acs-id OFFLINE
   ```

7. **Run the SET SLIDRIVS utility if deleting drives (optional).**

   Delete drives to the changed partition (ACS) by running the SLUADMIN utility or command for SET SLIDRIVS

   ```
   SET SLIDRIVS(,,,,,,,,,,,,,,,,) +
   FORLSMID(lsm-id),FORPANEL(12)
   ```

Note: If VTCS is involved, any RTDs moving out of the CDS will require a VTCS CONFIG RESET to be run to remove the specific RTDs from the VTCS configuration.

8. Change the SL3000 configuration.

The internal configuration file in the SL3000 must be changed to reconfigure a partition. This change is made through the SLConsole.

- CAPs
  - If removing a CAP, use the SLConsole to unassign the CAP from all partitions.
  - If unassigning a CAP,verify the CAP is in manual mode. Use the SLConsole to unassign the CAP from one or more partitions.
- Drives – If removing or unassigning a drive, use the SLConsole to unassign the drive from the partition.
- Drive Bays – If removing a drive bay, use the SLConsole to unassign the drive slots from their partition.
- Cells – If unassigning cells, use the SLConsole to unassign cells from the partition.

Note: Cartridges left in unassigned cells will become orphaned.

- Dual Tallbots – If removing a second robot, no additional setup is needed.

Note: Outermost PEMs must be transformed into CEMs when removing the second robot.

- Expansion Modules
  - **ATTENTION:** Prior to removing a DEM, cartridges must be either moved to available space or ejected if space is not available. After the volumes are removed from the DEM, the partitions need to unassign the cell locations.
  - **ATTENTION:** Prior to removing a CEM from the library, cartridges must be either moved to available space or ejected if space is not available. After the volumes are removed from the CEM, the partitions need to unassign the cell locations.

Note: Prior to removing a CEM from a location other than from either end of the library (i.e., between a PEM and either a CEM, DEM or Base Drive Module) the volumes in the PEM **must** be either moved to available space within the partition or ejected if no space is available. After the volumes are removed from the PEM, the partitions need to unassign the cell locations.

9. **Vary all ACSs connected to the library 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 will occur to the ACS until the ACS is varied online.

   All other hosts will complete their configuration process when the ACS is varied online.

Notes:

- Virtual tape environments will be required to vary any RTDs online to VTCS. Additionally, any virtual tape drives varied offline will need to be varied online to MVS.
- Refer to the Vary ACS Online after Configuration Change section in Appendix A for further details of this process.

10. **Re-synchronize the SMC.**

    Issue the SMC RESYNCHRONIZE command.

If you are running multiple HSC hosts, the new configuration will be propagated automatically to all hosts.

Varying the ACS Online After a Configuration Change

In several partitioning procedures, there is a “vary ACS online” step that needs to be performed when a hardware configuration change is completed for an SL3000 library. When this step is executed, the HSC will run a reconfiguration for the ACS that is affected. During Reconfiguration of an ACS, the following occurs:

- The ACS configuration containing details of the LSM is read from the library.
- CAP and drive configuration information are read from the library.
- Library configuration information (LSM, CAP, and drive) is then synchronized with the equivalent information in the HSC database.
- LSM cell geography is discovered and updated in the HSC database.

Below is an HSC log example of an SL3000 ACS that change from a library with a Basic Expansion Module (BEM) to a library with a BEM, a DEM, and 2 CEMs:

```
/SLS0000I V ACS 00 ONLINE
/SLS4459I Library configuration changes started
/SLS4400I HSC dynamic reconfiguration initiated
/SLS0668I LSM 00:00 READY; TEMP OUTAGE QUEUE WILL BE RE-DRIVEN.
/SLS0054I ACS 00 now ONLINE
/SLS4415I Configuration change for LSM 00:00, total cells increased by
          1,148, free cells increased by 748
/SLS4419I CAP 00:00:04 status changed from UNALLOCATED to OFFLINE
/SLS4419I CAP 00:00:05 status changed from UNALLOCATED to OFFLINE
/SLS4419I CAP 00:00:07 status changed from UNALLOCATED to OFFLINE
/SLS1969I User exit 06 module SLSUX06 INACTIVE
/SLS4407I HSC dynamic reconfiguration processing has ended.
/SLS4460I Library configuration changes complete on ECCL
```

Error Recovery

Deviation from the preceding procedures can result in unpredictable behavior. Although the SL3000 partitioning process uses Near Continuous Operation (NCO) to minimize or eliminate down time, failure to follow these procedures may result in unplanned down time.

Volumes physically remaining in an ACS that is being removed from the CDS will be logically deleted.

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 HSC RESTore utility and perform an audit using the HSC AUDIt utility to ensure the CDS matches the library. Once the cause of the problem is determined and fixed, start the procedures again.

The following manuals are available for reference:

- *HSC Messages and Code Guide*
- *HSC System Programmer's Guide*
- *VTCS Installation and Configuration Guide*
- *VTCS Command and Utility Reference*

TCP/IP Communications - Important Considerations

Connections

For the complex, the dual TCP/IP connection provides a redundancy feature that allows up to two connections to the first library in a complex.

Shared Networks

The following are some examples of issues that can arise when you connect the SL3000 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 to 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 Connections

The LMUPATH control statement allows users to define network LMU attachments (see “LMUPATH Control Statement” on page 104). In a dual IP connection environment for an SL3000, 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 47 on page 565 and Figure 48 on page 570 show examples of a dual IP connection for the HSC.

Two SL3000 Network Connections - Two Mainframe IP Addresses

To establish two dedicated routes on different subnetworks from the HSC to two dedicated routes to the SL3000, use the process described in this section. **To configure the SL3000 dual TCP/IP feature, refer to chapter 4 of the *StreamLine SL3000 Modular Library System Installation Guide*.**

Figure 47 on page 565 shows dual IP connections with two SL3000 network connections.

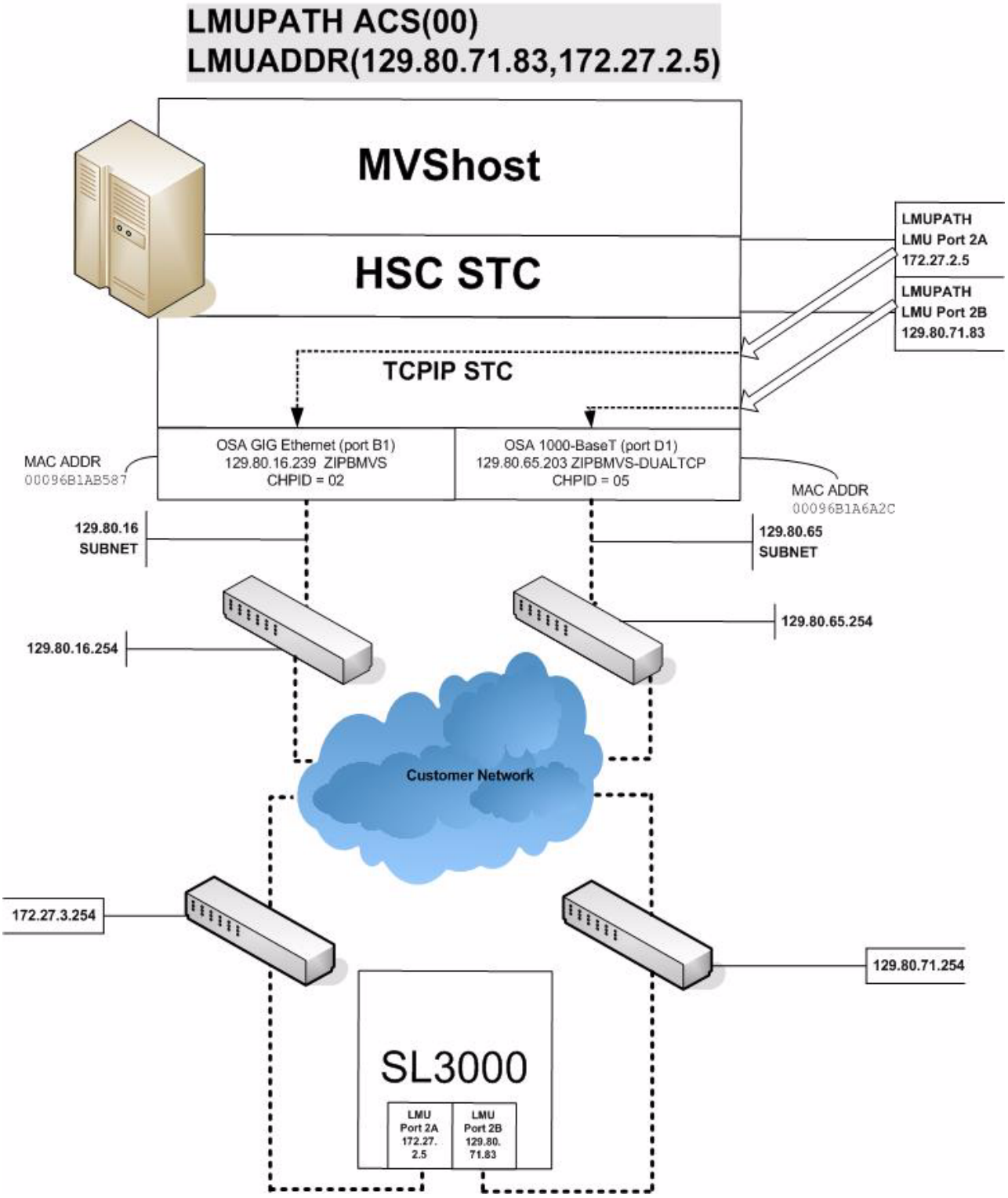


Figure 47. Dual IP with Two SL3000 Network Connections - Different Subnetworks

In the following examples, the entries *in italics* represent the second connection.

1. Create and complete the Network Entries Worksheet (see Table 34 for a sample) for each set of two dedicated routes to the SL3000. The worksheet can be found in chapter 4 of the *SL3000 Modular Library System Installation Guide*.

Table 34. Network Entries Worksheet

Description		IP Address
Port 2A	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
Port 2B	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:

```
; OSA CARD #1
DEVICE ECCQDØ1 MPCIPA   NONROUTER AUTORESTART
LINK   ZIPBMVS IPAQENET ECCQDØ1

; OSA CARD #2
DEVICE ECCQAO1  MPCIPA   NONROUTER AUTORESTART
LINK   ZIPB2MVS IPAQENET ECCQAO1
```

3. Define a second home address in your TCP/IP profile data set.

   Example:

```
HOME

129.8Ø.16.239 ZIPBMVS
129.80.65.203 ZIPB2MVS
```

4. Define a second router on the second subnetwork in the routing paragraph of your TCP/IP profile data set. **Remember that you must also configure the SL3000 routing tables according to the instructions described in chapter 4 of the *SL3000 Modular Library System Installation Guide*.**

   Example:

```
BEGINROUTES

;    NETWORK MASK                 FIRSTHOP       LINKNAME  PACKETSIZE

ROUTE 129.80.16.0/24              =              ZIPBMVS   MTU 1492
ROUTE 129.80.65.0/24              =              ZIPB2MVS  MTU 1492
ROUTE 172.27.2.5 HOST             129.80.16.254  ZIPBMVS   MTU 1492
ROUTE 129.80.71.83 HOST           129.80.65.254  ZIPB2MVS  MTU 1492
ROUTE DEFAULT 129.80.16.254                      ZIPBMVS   MTU 1492
ROUTE DEFAULT 129.80.65.254                      ZIPB2MVS  MTU 1492
ENDROUTES
```

5. Optionally, define two dedicated static routes to the SL3000 destination port (2A and 2B) IP addresses over two different routers.

   Example:

```
;                               NETWORK MASK  ROUTER        LINKNAME   PACKETSIZE
ROUTE S13000-port-2A-IP-Address HOST          129.80.16.254 MVSHOST1   MTU 1492
ROUTE S13000-port-2B-IP-Address HOST          129.80.64.254 MVSHOST2   MTU 1492

BEGINROUTES
;                           NETWORK MASK      FIRSTHOP       LINKNAME   PACKETSIZE
ROUTE 129.80.16.0/24                          =              ZIPBMVS    MTU 1492
ROUTE 129.80.65.0/24                          =              ZIPB2MVS   MTU 1492
ROUTE 172.27.2.5            HOST              129.80.16.254  ZIPBMVS    MTU 1492
ROUTE 129.80.71.83          HOST              129.80.65.254  ZIPB2MVS   MTU 1492
ROUTE DEFAULT 129.80.16.254                                  ZIPBMVS    MTU 1492
ROUTE DEFAULT 129.80.65.254                                  ZIPB2MVS   MTU 1492
ENDROUTES
```

6. Start the second mainframe network connection device.

```
V TCPIP,tcp-stc-name,START,device_name
```

7. Define a second LMUADDR parameter for the port 2A IP address on the SL3000.

   Example:

```
LMUPATH ACS(00) LMUADDR(129.80.71.83,172.27.2.5)
```

8. 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)')
```

9. Allow the trained SL3000 service representative to enter the network connections to the SL3000 library for either port 2A and 2B, whichever is applicable.
10. 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 48 on page 570 shows a sample configuration with two dedicated routes, followed by the statements that apply to it.

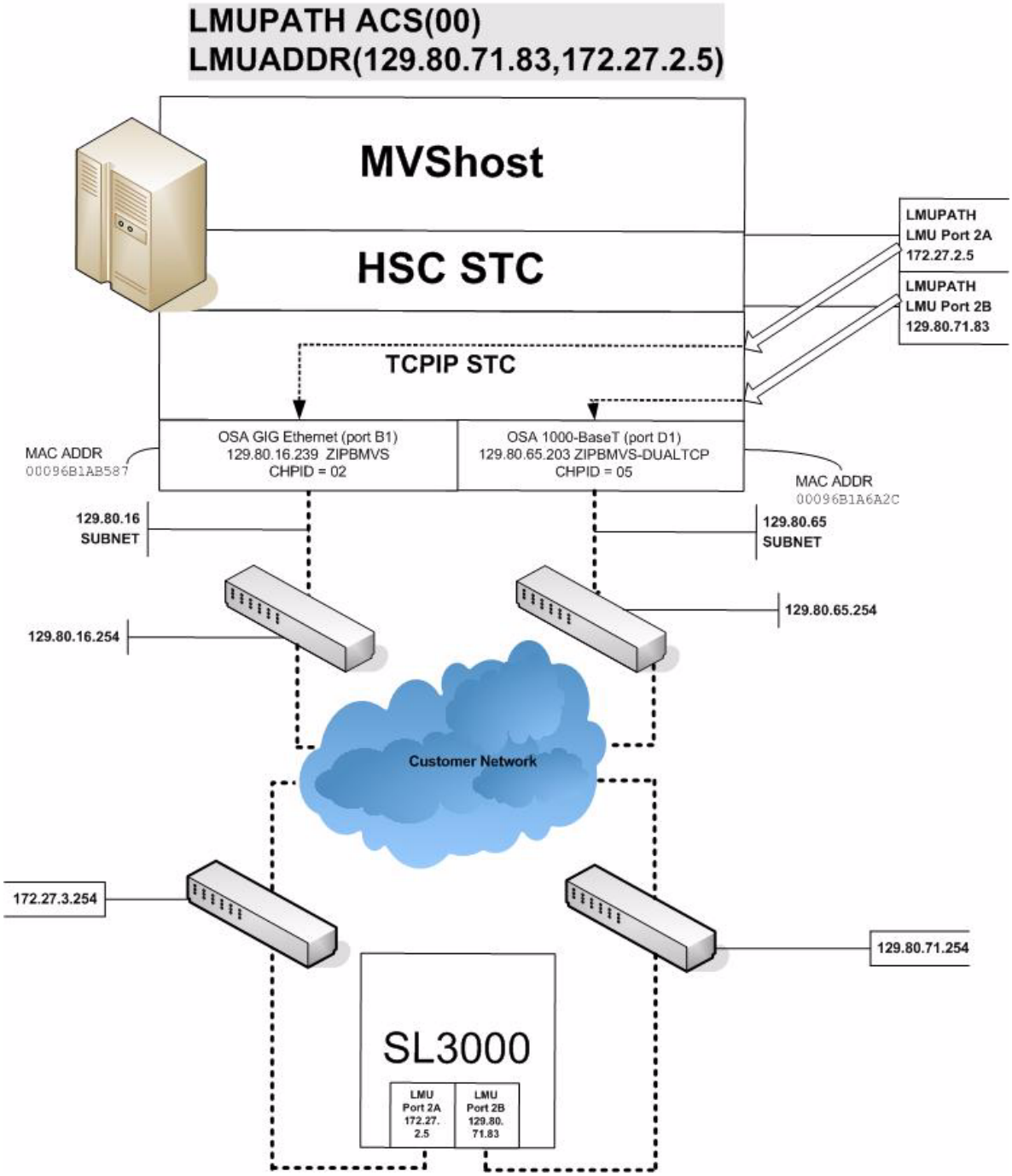


Figure 48. Dual IP Configuration Sample - Different Subnetworks

Setup Statements and Displays

The following information shows the statements and displays used in Figure 48.

HSC LMUPDEF PARMLIB Member

```
OPTION TITLE('DUAL TCPIP CONNECTING TO SL3000')
LMUPATH ACS(00) LMUADDR(129.80.71.83,172.27.2.5)
```

TCP/IP Profile Data Set

```
; OSA CARD #1
DEVICE ECCQD01 MPCIPA   NONROUTER AUTORESTART
LINK   ZIPBMVS IPAQENET ECCQD01

; OSA CARD #2
DEVICE ECCQA01 MPCIPA   NONROUTER AUTORESTART
LINK   ZIPB2MVS IPAQENET ECCQA01

HOME
   129.80.16.239 ZIPBMVS
   129.80.65.203 ZIPB2MVS

BEGINROUTES
;                NETWORK MASK   FIRSTHOP      LINKNAME       PACKETSIZE
ROUTE 129.80.16.0/24              =             ZIPBMVS   MTU 1492
ROUTE 129.80.65.0/24              =             ZIPB2MVS  MTU 1492
ROUTE 172.27.2.5   HOST           129.80.16.254 ZIPBMVS   MTU 1492
ROUTE 129.80.71.83 HOST           129.80.65.254 ZIPB2MVS  MTU 1492
ROUTE DEFAULT 129.80.16.254                     ZIPBMVS   MTU 1492
ROUTE DEFAULT 129.80.65.254                     ZIPB2MVS  MTU 1492

ENDROUTES

INCLUDE ZIP.TCPIP.PROFILES(COMMON)

START ECCQD01
START ECCQA01
```

TCP/IP Console Displays

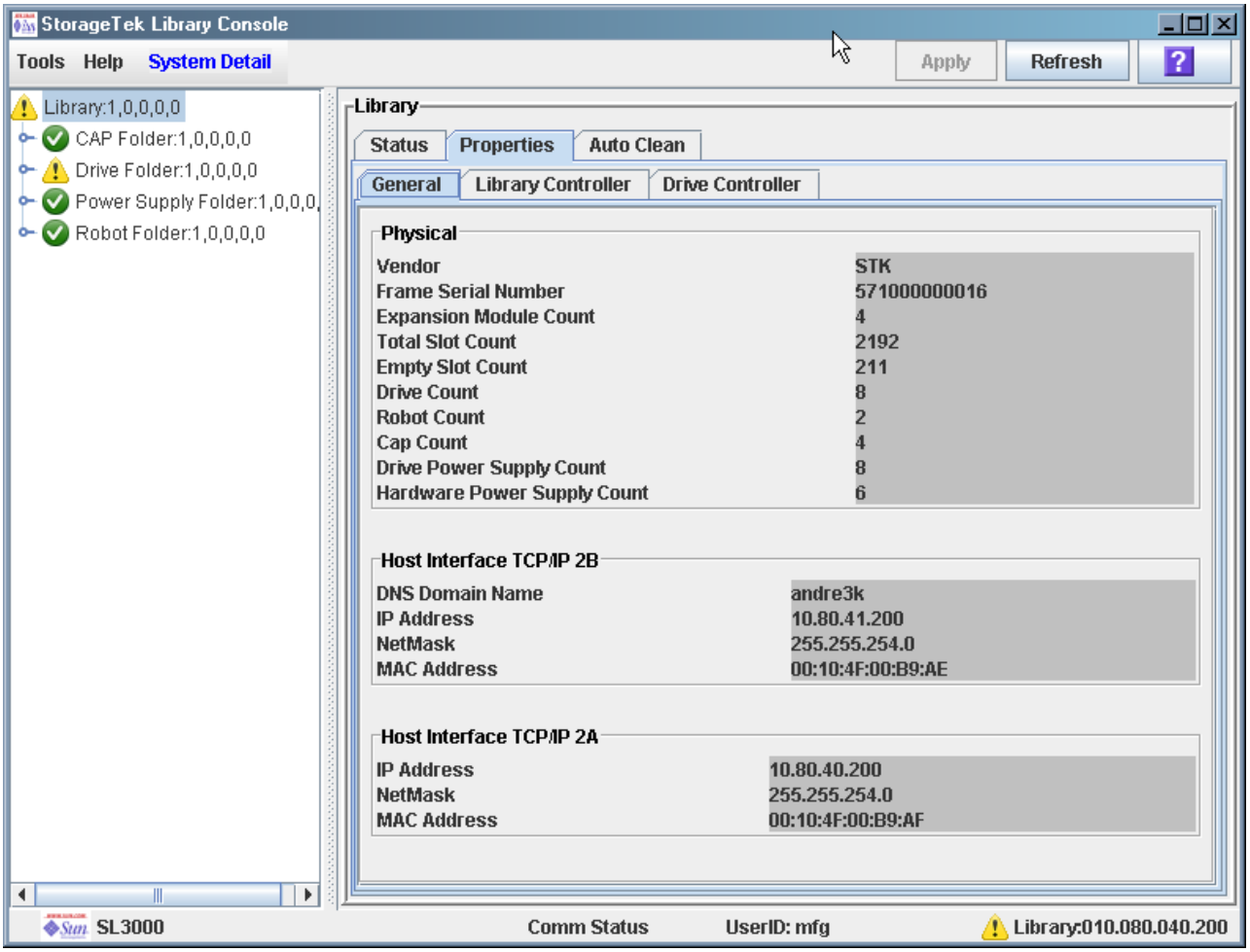
```
D TCPIP,TCPIP,NETSTAT,DEV
EZZ2500I NETSTAT CS V1R4 TCPIP 229
DEVNAME: LOOPBACK          DEVTYPE: LOOPBACK
  DEVSTATUS: READY
  LNKNAME: LOOPBACK          LNKTYPE: LOOPBACK    LNKSTATUS: READY
    NETNUM:  0   QUESIZE: 0
    BYTESIN: 1781074              BYTESOUT: 1781074
    ACTMTU:  65535
  BSD ROUTING PARAMETERS:
    MTU SIZE: 00000             METRIC: 00
    DESTADDR: 0.0.0.0           SUBNETMASK: 0.0.0.0
  MULTICAST SPECIFIC:
    MULTICAST CAPABILITY: NO


DEVNAME: ECCQD01           DEVTYPE: MPCIPA
  DEVSTATUS: READY         CFGROUTER: NON  ACTROUTER: NON
  LNKNAME: ZIPBMVS           LNKTYPE: IPAQENET    LNKSTATUS: READY
    NETNUM:  0   QUESIZE: 0   SPEED: 0000001000
    BYTESIN: 34704496             BYTESOUT: 11207410
    IPBROADCASTCAPABILITY: NO
    ARPOFFLOAD: YES  ARPOFFLOADINFO: YES
    ACTMTU:  8992
   INBPERF: BALANCED
  BSD ROUTING PARAMETERS:
    MTU SIZE: 00000             METRIC: 00
    DESTADDR: 0.0.0.0           SUBNETMASK: 255.255.255.0
  MULTICAST SPECIFIC:
    MULTICAST CAPABILITY: YES
    GROUP             REFCNT
    -----             ------
    224.0.0.1         0000000001

DEVNAME: ECCQA01           DEVTYPE: MPCIPA
  DEVSTATUS: READY         CFGROUTER: NON  ACTROUTER: NON
  LNKNAME: ZIPB2MVS          LNKTYPE: IPAQENET    LNKSTATUS: READY
    NETNUM:  0   QUESIZE: 0   SPEED: 0000000100
    BYTESIN: 147508801            BYTESOUT: 2188246
    IPBROADCASTCAPABILITY: NO
    ARPOFFLOAD: YES  ARPOFFLOADINFO: YES
    ACTMTU:  1492
   INBPERF: BALANCED
  BSD ROUTING PARAMETERS:
    MTU SIZE: 00000             METRIC: 00
    DESTADDR: 0.0.0.0           SUBNETMASK: 255.255.255.0
  MULTICAST SPECIFIC:
    MULTICAST CAPABILITY: YES
    GROUP             REFCNT
    -----             ------
    224.0.0.1         0000000001
3 OF 3 RECORDS DISPLAYED
```

```
D TCPIP,TCPIP,NETSTAT,ROUTE
EZZ2500I NETSTAT CS V1R4 TCPIP 250
DESTINATION      GATEWAY          FLAGS     REFCNT  INTERFACE
DEFAULT          129.80.16.254    UGS       000003  ZIPBMVS
DEFAULT          129.80.65.254    UGS       000002  ZIPB2MVS
127.0.0.1        0.0.0.0          UH        000003  LOOPBACK
129.80.16.0      0.0.0.0          US        000002  ZIPBMVS
129.80.16.239    0.0.0.0          UH        000000  ZIPBMVS
129.80.65.0      0.0.0.0          US        000000  ZIPB2MVS
129.80.65.203    0.0.0.0          UH        000000  ZIPB2MVS
129.80.71.83     129.80.65.254    UGHS      000001  ZIPB2MVS
172.27.2.5       129.80.16.254    UGHS      000001  ZIPBMVS
9 OF 9 RECORDS DISPLAYED
```

HSC Display Showing SL3000 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    ZIPBMVS          P
129.80.65.203    ZIPB2MVS
127.0.0.1        LOOPBACK
3 OF 3 RECORDS DISPLAYED
```

SLConsole Display of SL3000 Ports 2A/2B IP Addresses



Two SL3000 Network Connections - One Mainframe IP Address

To establish one host IP route from the HSC to two routes to the SL3000, use the process described in this section. **To configure the SL3000 dual TCP/IP feature, refer to chapter 4 of the *SL3000 Modular Library System Installation Guide*.**

Figure 50 on page 579 shows dual IP (one host IP) with two SL3000 network connections.

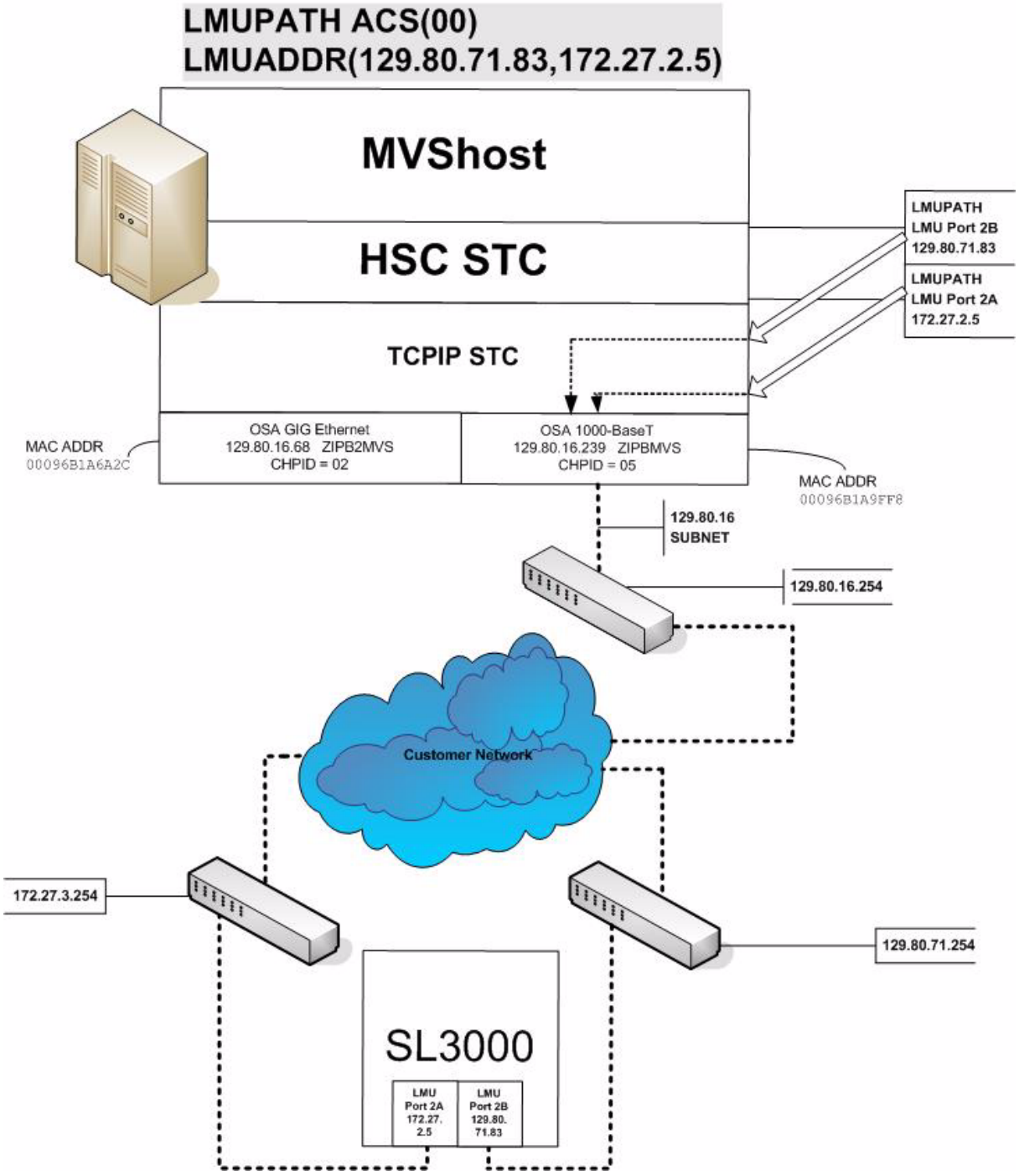


Figure 49. Dual IP (one host IP) with Two SL3000 Network Connections

In the following examples, the entries *in italics* represent the second connection.

1. Complete the Network Entries Worksheet (see Table 35 for a sample) for each set of routes to the SL3000. The worksheet can be found in chapter 4 of the *SL3000 Modular Library System Installation Guide*.

Table 35. Network Entries Worksheet

Description		IP Address
Port 2A	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
Port 2B	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. Optionally, define two dedicated static routes to the SL3000 destination port (2A and 2B) IP addresses over one router.

   Example:

```
BEGINROUTES
;     DESTINATION                FIRSTHOP      LINKNAME       PACKETSIZE
ROUTE 129.80.16.0/24             =             &SYSNAME.MVS   MTU 1492
ROUTE 172.27.2.5 HOST            129.80.16.254 &SYSNAME.MVS   MTU 1492
ROUTE 129.80.71.83 HOST          129.80.16.254 &SYSNAME.MVS   MTU 1492
ROUTE DEFAULT                    129.80.16.254 &SYSNAME.MVS   MTU 1492

ENDROUTES
```

3. Define a second LMUADDR parameter for the port 2A IP address on the SL3000.

   Example:

```
LMUPATH ACS(00) LMUADDR(129.80.71.83,172.27.2.5)
```

4. 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)')
```

5. Allow the trained SL3000 service representative to enter the network connections to the SL3000 library for either port 2A and 2B, whichever is applicable.
6. 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 SL3000 Network Connections

Figure 50 shows a sample dual IP (one host IP) configuration with two SL3000 network connections, followed by the statements that apply to it.

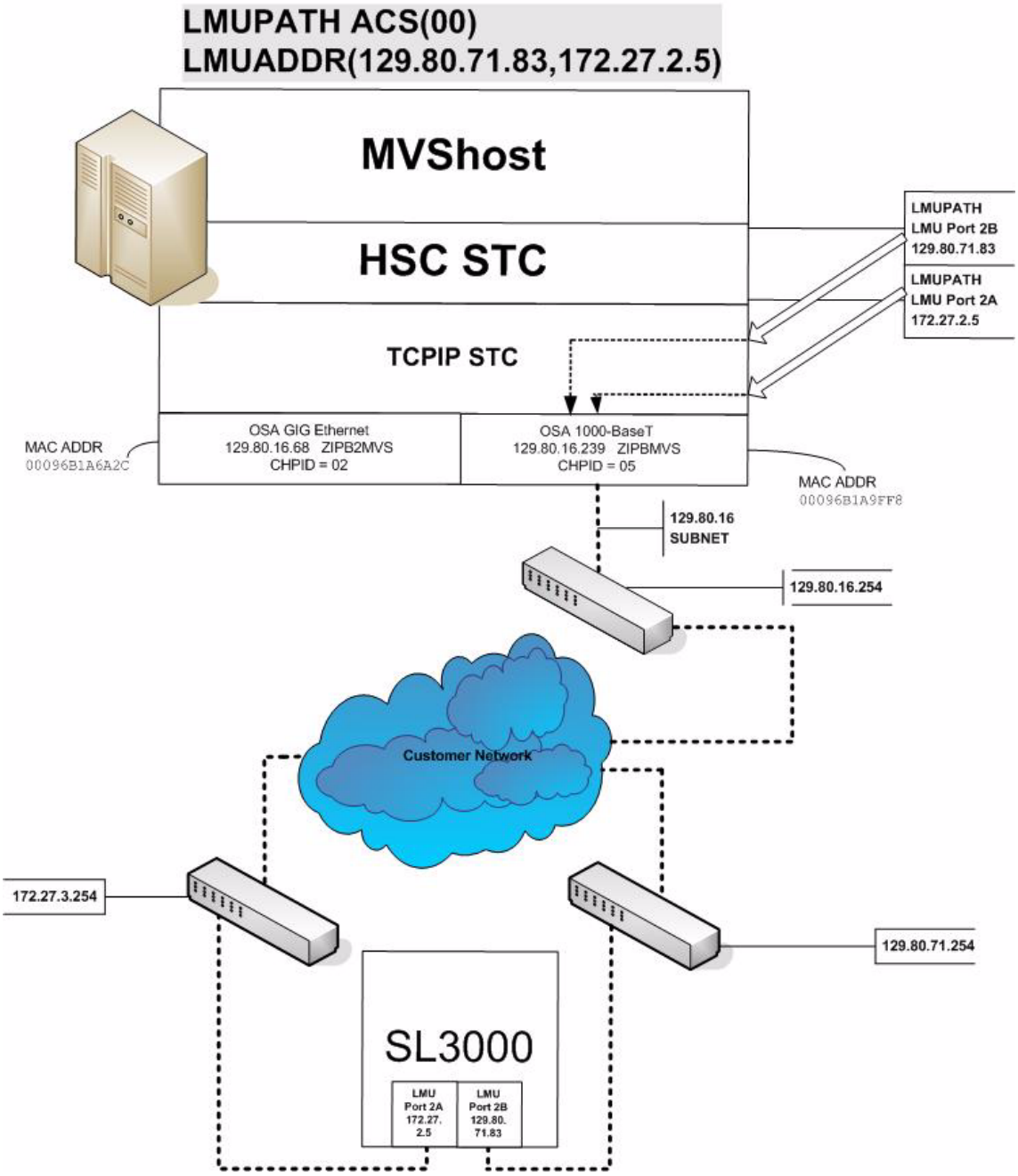


Figure 50. Dual IP (one host IP) with Two SL3000 Network Connections

Setup Statements and Displays

The following information shows the statements and displays used in Figure 50.

HSC LMUPDEF PARMLIB Member

```
OPTION TITLE('DUAL TCPIP CONNECTING TO SL30001')
LMUPATH ACS(00) LMUADDR(129.80.71.83,172.27.2.5)
```

TCP/IP Profile Data Set

```
; OSA CARD #1
DEVICE ECCQD01 MPCIPA   NONROUTER AUTORESTART
LINK   ZIPBMVS IPAQENET ECCQD01

HOME
   129.80.&IPADDR1 &SYSNAME.MVS

BEGINROUTES
;                 NETWORK MASK   FIRSTHOP      LINKNAME       PACKETSIZE
ROUTE 129.80.16.0/24            =              &SYSNAME.MVS  MTU 1492
ROUTE 172.27.2.5 HOST           129.80.16.254 &SYSNAME.MVS  MTU 1492
ROUTE 129.80.71.83 HOST         129.80.16.254 &SYSNAME.MVS  MTU 1492
ROUTE DEFAULT

ENDROUTES

INCLUDE ZIP.TCPIP.PROFILES(COMMON)

START ECCQD01
```

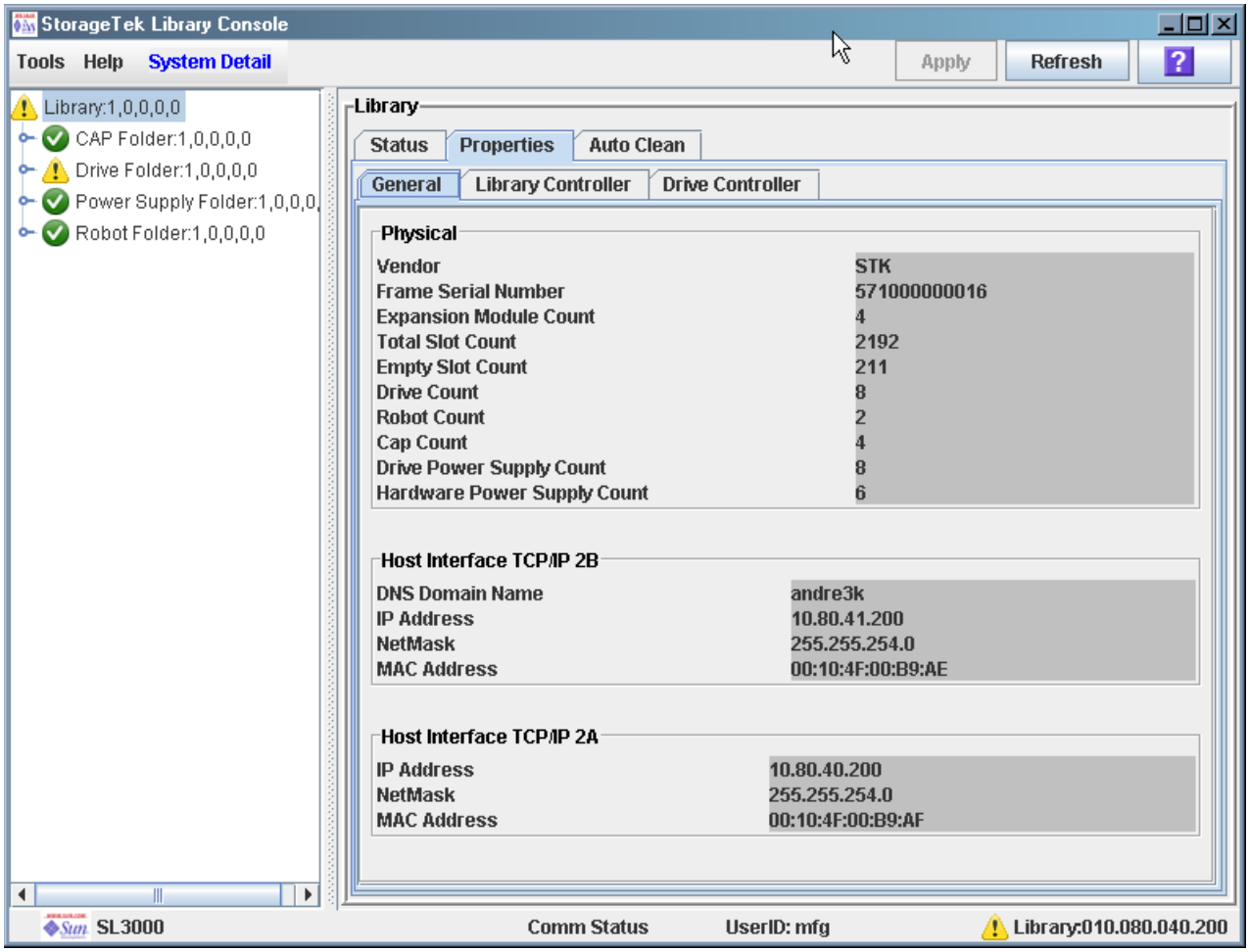
TCP/IP Console Displays

```
D TCPIP,,N,DEV
EZZ2500I NETSTAT CS V1R4 TCPIP 931
DEVNAME: LOOPBACK          DEVTYPE: LOOPBACK
  DEVSTATUS: READY
  LNKNAME: LOOPBACK          LNKTYPE: LOOPBACK    LNKSTATUS: READY
    NETNUM:  0   QUESIZE: 0
    BYTESIN: 2136824              BYTESOUT: 2136824
    ACTMTU:  65535
  BSD ROUTING PARAMETERS:
    MTU SIZE: 00000             METRIC: 00
    DESTADDR: 0.0.0.0           SUBNETMASK: 0.0.0.0
  MULTICAST SPECIFIC:
    MULTICAST CAPABILITY: NO
DEVNAME: ECCQD01           DEVTYPE: MPCIPA
  DEVSTATUS: READY         CFGROUTER: NON  ACTROUTER: NON
  LNKNAME: ZIPBMVS           LNKTYPE: IPAQENET    LNKSTATUS: READY
    NETNUM:  0   QUESIZE: 0   SPEED: 0000001000
    BYTESIN: 48605838             BYTESOUT: 9790950
    IPBROADCASTCAPABILITY: NO
    ARPOFFLOAD: YES  ARPOFFLOADINFO: YES
    ACTMTU:  8992
   INBPERF: BALANCED
  BSD ROUTING PARAMETERS:
    MTU SIZE: 00000             METRIC: 00
    DESTADDR: 0.0.0.0           SUBNETMASK: 255.255.255.0
  MULTICAST SPECIFIC:
    MULTICAST CAPABILITY: YES
    GROUP             REFCNT
    -----             ------
    224.0.0.1         0000000001
2 OF 2 RECORDS DISPLAYED

D TCPIP,,N,ROUTE
EZZ2500I NETSTAT CS V1R4 TCPIP 933
DESTINATION      GATEWAY          FLAGS     REFCNT  INTERFACE
DEFAULT          129.80.16.254    UGS       000001  ZIPBMVS
127.0.0.1        0.0.0.0          UH        000004  LOOPBACK
129.80.16.0      0.0.0.0          US        000000  ZIPBMVS
129.80.16.239    0.0.0.0          UH        000000  ZIPBMVS
129.80.71.83     129.80.16.254    UGHS      000001  ZIPBMVS
172.27.2.5       129.80.16.254    UGHS      000001  ZIPBMVS
6 OF 6 RECORDS DISPLAYED

D TCPIP,,N,HOME
EZZ2500I NETSTAT CS V1R4 TCPIP 935
HOME ADDRESS LIST:
ADDRESS          LINK             FLG
129.80.16.239    ZIPBMVS          P
127.0.0.1        LOOPBACK
2 OF 2 RECORDS DISPLAYED
```

HSC Display Showing SL3000 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 SL3000 Ports 2A/2B IP Addresses



Appendix C. 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 Sun StorageTek libraries (page 586)
- common NCO (page 607).

Dynamic Hardware Reconfiguration for Sun StorageTek Libraries

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 (page 589)
  - removing tape drives (page 590)
  - replacing tape drives (page 591)
  - changing unit addresses for tape drives (page 592).
- expansion panels:
  - adding or removing (page 593)
  - auditing after expansion (page 595)
- SL8500s only:
  - adding and configuring (page 597)

Related SL8500 procedures that require you to terminate the HSC are discussed in Appendix A, “HSC Support for the SL8500”. 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 6.1, the optional second CAP is planned for a future release.

SL3000 Library

SL3000 procedures that require you to terminate the HSC are discussed in Appendix B, "HSC Support for the SL3000 Library" on page 521. The following procedures are described:

- expansion modules for the SL3000 library:
  - adding or removing (page 594)
  - auditing after expansion (page 606)

Notes:

- Adding SL3000 expansion modules is a hardware-disruptive change that requires you to vary the LSM offline and back online.
- CAPs are detected automatically when modules are added to an SL3000 library.

Additional Considerations

- It is possible to add or remove LSMs from the SL8500 or expansion modules from the SL3000 configuration without performing a LIBGEN, MERGEcds, and recycle of the HSC. However, **this operation requires assistance from Sun**.
- 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 "AddingTape Drives" on page 589 for more information.

Requirements/Recommendations

Caution: Do not run any CDS-related commands or utilities while dynamic hardware changes are being implemented.

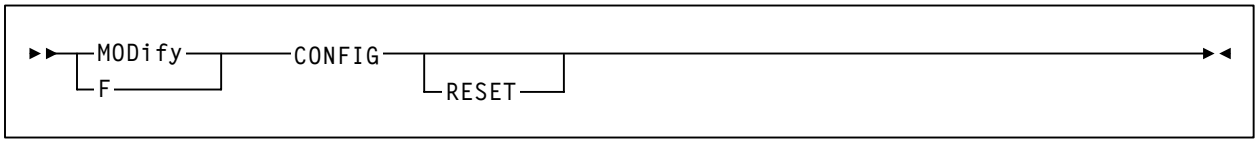
- Back up the CDS before and after you perform a hardware reconfiguration.
- For any active HSC that accesses the CDS being modified by dynamic reconfiguration, **all ACSs and LSMs must be varied online** to maintain configuration integrity across hosts. An inactive HSC can be started after dynamic reconfiguration 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, Sun StorageTek recommends that **all active hosts run HSC 6.1-level software**. Any hosts not at 6.1 level **must** be brought down before initiating dynamic hardware reconfiguration and brought back up after the hardware reconfiguration is complete. The non-6.1 hosts recognize the hardware changes at this time.

Starting Dynamic Hardware Reconfiguration

Enter the MODify CONFIG command (see the MODify Command in the *HSC 6.1 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:



AddingTape 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 VM 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 51. 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.

Notes:

- Follow this example for the SL3000 library.
- Panel 01 is the only drive panel within an SL8500 library; panels 10 and 12 are the only valid drive panels in the SL3000 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 VM 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 52. 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 53. 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.

Note: Follow the same example for the SL3000 library.

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 - SL8500 Library

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 6.1 Operator's Guide* for syntax information. All drives and cartridges in that SL8500 are now unavailable to the complex.
2. Allow Sun 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**.

Adding/Removing Expansion Modules - SL3000 Library

Adding or removing SL3000 expansion modules 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.

SL3000 expansion modules can be any of the following:

- Drive Expansion Module (DEM) – only one allowed, and if present, must be immediately to the left of the Base Drive Module (BDM).
- Cartridge Expansion Module (CEM) – from 1 to 8 modules can be added, with up to 4 on either side of the BDM (or DEM).
- Parking Expansion Module (PEM) – a larger section which acts as a garage for the robots. There are a limited number of cells in the PEM.
- Access Expansion Module (AEM) – a larger section for future expansion. At this time, it is not available, and it will contain no cartridge cells.

The following procedure describes how to add or remove SL3000 expansion modules. The HSC remains active during this time.

1. **RUN A BACKUP OF THE CDS**.
2. Enter the `MODify LSM OFFline` command to modify the SL3000 offline to all HSC hosts in the affected library. See the MODify command in the *HSC Operator's Guide* for syntax information. All drives and cartridges in the library are now unavailable to the complex.
3. Allow Sun service technicians to physically add or remove the expansion frame(s).
4. Enter the `MODify LSM ONline` command to modify the library 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.

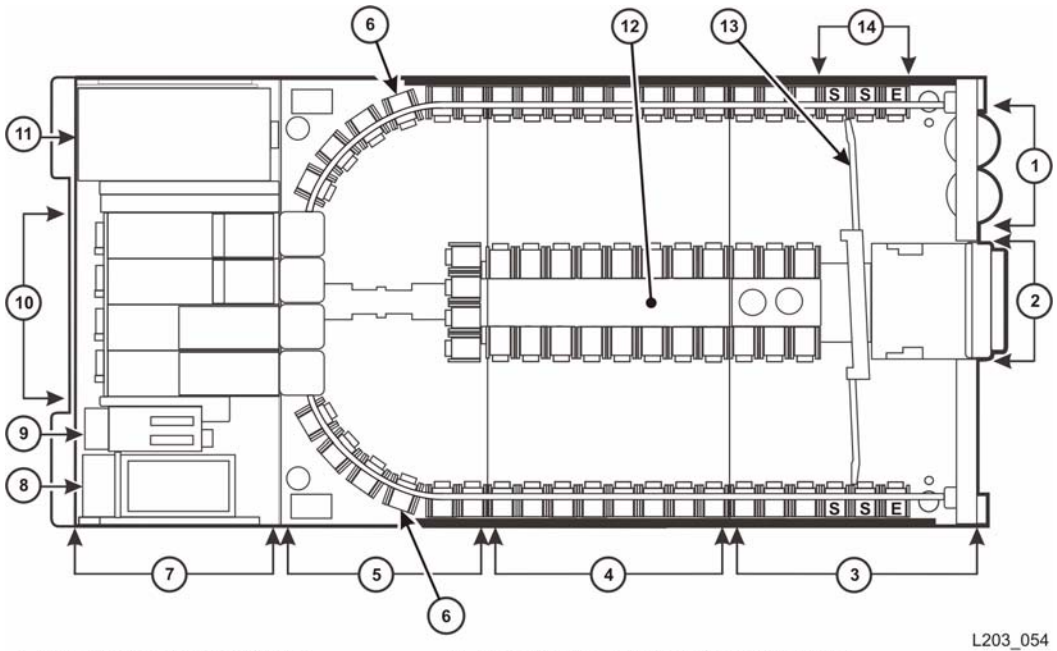
     Note: A problem can occur if an attempt is made to access a cell that has been removed. New cells are not recognized.

   - 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.
5. **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 54 shows an SL8500 library that includes a Storage Expansion Module.



1. Cartridge Access Ports (2) Caps
2. Facade Operator Panel (Optional) Icey Pad
3. Customer Interface Module
4. Storage Expansion Module
5. Robotics Interface Module
6. PTP (Pass Through Port)
7. Drive Electronics Module
8. AC Power Supplies Electronic Control Module
9. DC Power Supplies
10. Tape Drives
11. Accessory Racks
12. Inner Wall
13. Service Door
14. Reserved Columns
    E= End Stop
    S= System Cell

Figure 54. 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

Sun 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 55 demonstrates this numbering pattern.

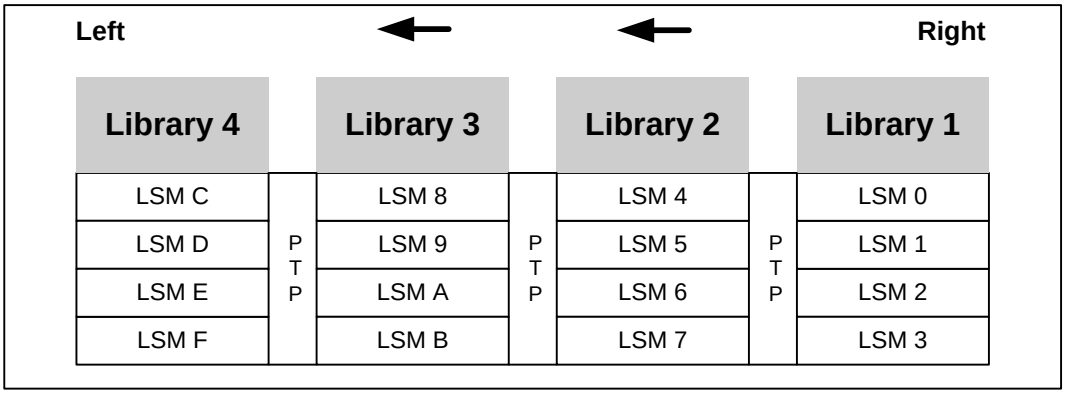


Figure 55. LSM Numbering for Four Connected SL8500s

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. **Sun 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 599.

- 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 600.

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 `MODify CONFIG` command.

   After dynamically updating the ACS and LSM configurations, you must update the VM 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.
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 VM (VM 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 VM 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 VM and volumes in them can be mounted on tape drives.

Figure 56 shows an SL8500 configuration before adding a new SL8500 to the right.

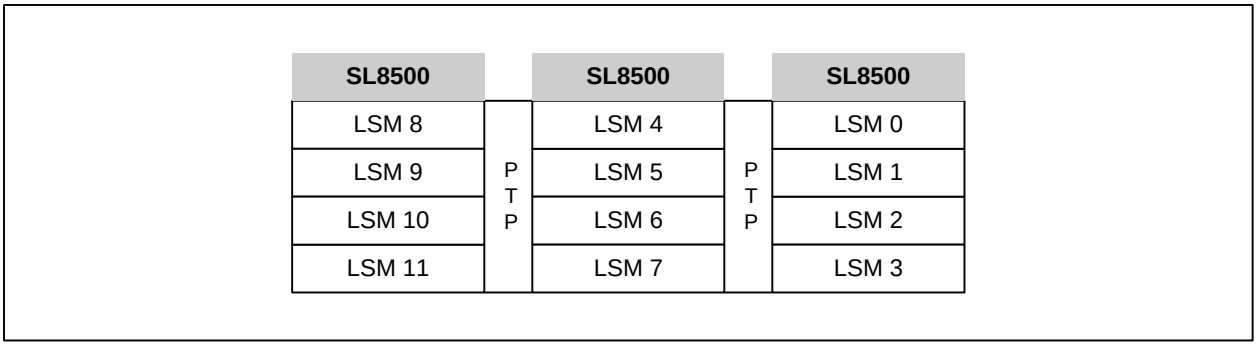


Figure 56. Original SL8500 Configuration

Figure 57 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.

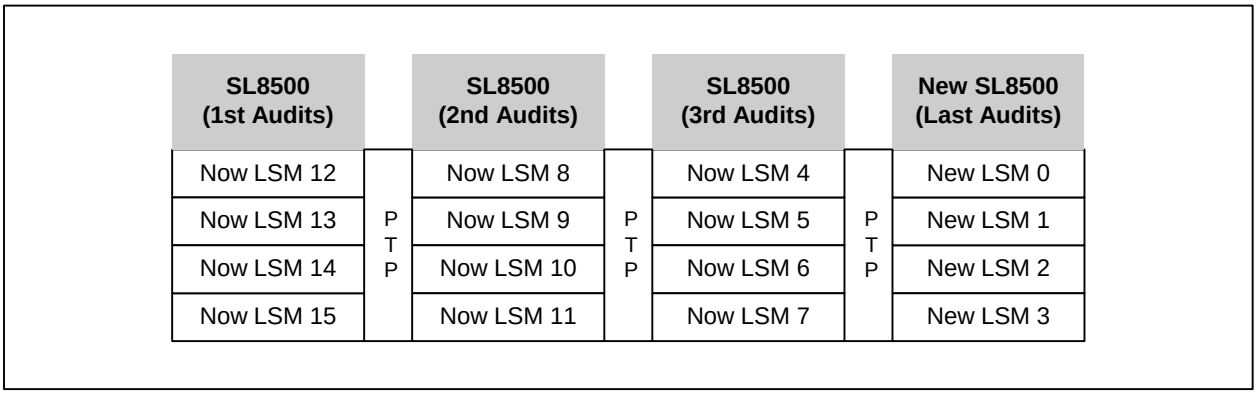


Figure 57. Updated Configuration - New SL8500 Added to Right

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 VM 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

Run the MERGEcds utility if the CDS is in a shared VM/MVS environment.

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 VM (VM 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 `MODify CONFIG` command.

   After dynamically updating the ACS and LSM configurations, you must update the VM 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. 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
/*
//
```

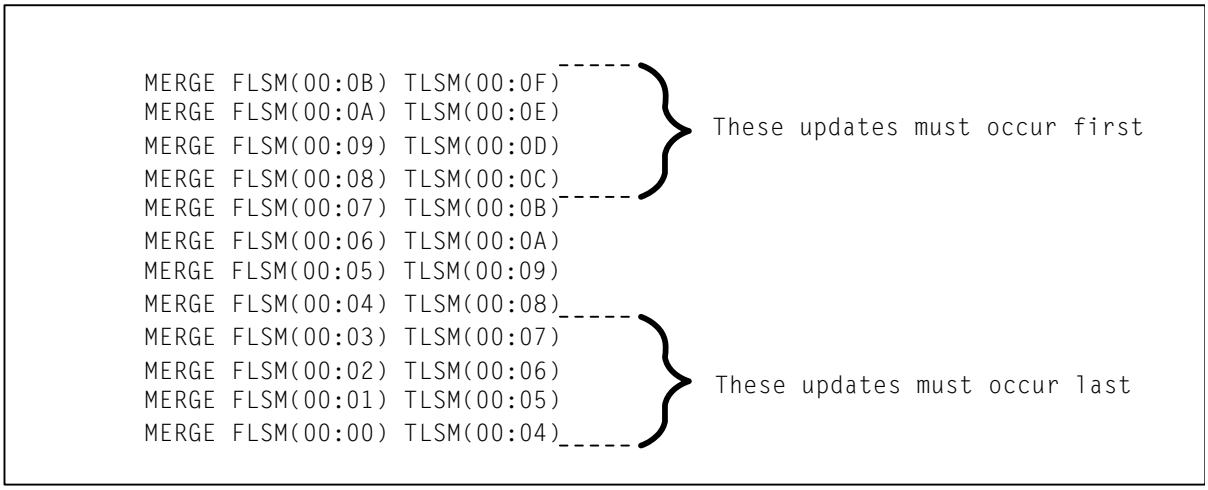
   c. Run the MERGEcds utility to update the volume addresses in the new CDS. MERGEcds uses the volume addresses from the old CDS.

      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.



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 VM 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.

Auditing the SL3000 After Expansion

You can increase cartridge capacity in SL3000 libraries by installing additional expansion modules to the left or right of the Base Drive Module (BDM).

Figure 58 shows an SL3000 library with all expansion modules.

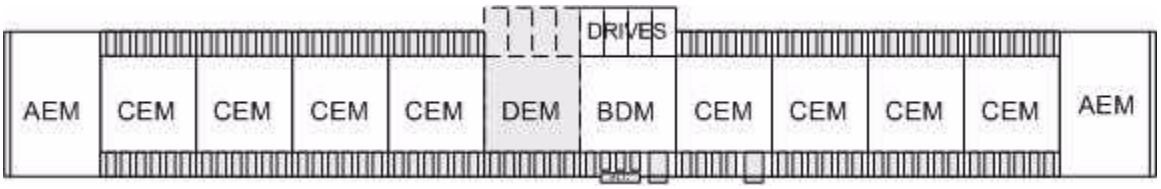


Figure 58. SL3000 Library Expansion Modules

When an expansion module is added to the SL3000, it assumesthe physical posiiton of previously unallocated or place holder, panels. The panel numbers do not change.

Running an Audit After Expansion

There are no special issues with the SL3000. Run the normal HSC audit.

Common Near Continuous Operation

This section discusses topics that are not specific to the SL3000 or SL8500 libraries 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 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, Sun 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 SLILIBRY 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 then the minimum amount of space. The free blocks can be used later when additional drives are added.
- The FUTRACS parameter can be added to the SLILIBRY macro to define ACSs to be added at a future time.
- The FUTRLSM parameter can be added to an SLILSM macro to define additional LSMs to be added at a future time. **This does not apply to the SL3000 library.**

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

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 panels 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(aall),FORPANEL(pp)
```

  2. Use the MOVe utility or the MOVe or EJect commands to move all cartridges off the panel being changed

```
MOVe Flsm(aall) Panel(pp) TLsm(aall)
```

     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:

- Sun 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(aall),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(aall),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(aall) Panel(pp) TLsm(aall)
```

Because the panel has been frozen, cartridges cannot be moved to it, and the rows will remain empty. The Sun 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(aall),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 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 TSO 3.2 Data Set Utility facility.

Note: TSO 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
```

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(HSCØØ1),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: Sun 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 VOLRPT `SLS1203I MISSING OR INVALID SLSCNTL DD STATEMENT`
- 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 D. 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

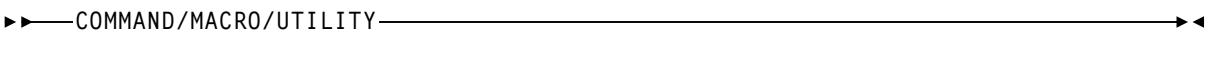
Variables are italicized.

Delimiters

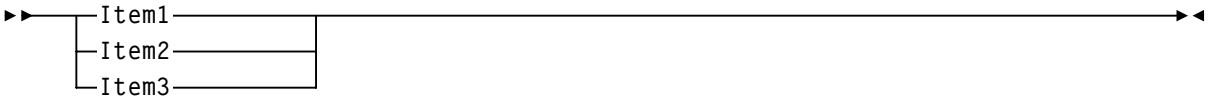
If a comma (,), a semicolon (;), or other delimiter is shown with an element of the syntax diagram, it must be entered as part of the statement or command.

Flow Lines

Syntax diagrams consist of horizontal and vertical lines and the text of a command, control statement, macro, or utility.

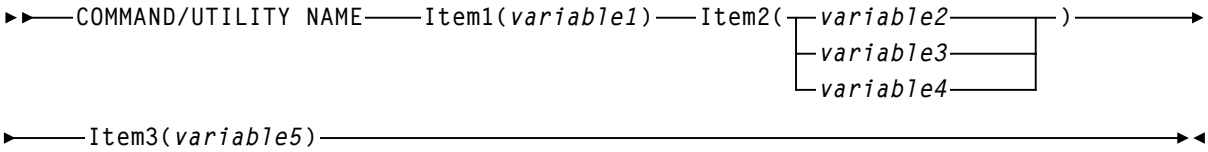


or



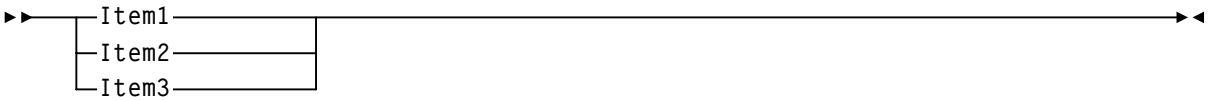
Diagrams are read left to right and top to bottom. Arrows indicate flow and direction.

- 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.

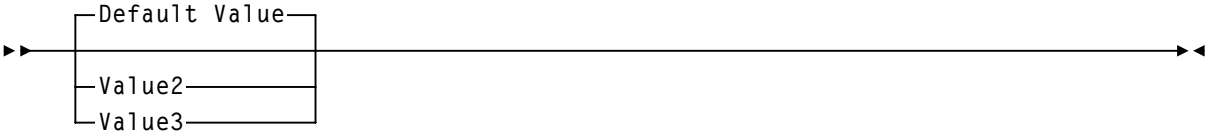


Single Optional Choice

If the first item is on the line below the base line, a single choice of items in the stack is optional.

Defaults

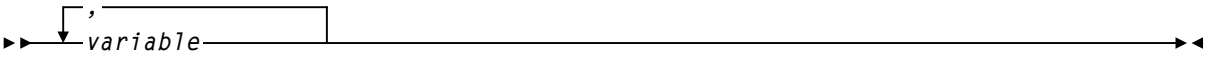
Default values and parameters appear above the syntax diagram line. In the following example, if a value is not specified with the command, Default Value is used by the HSC.



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.

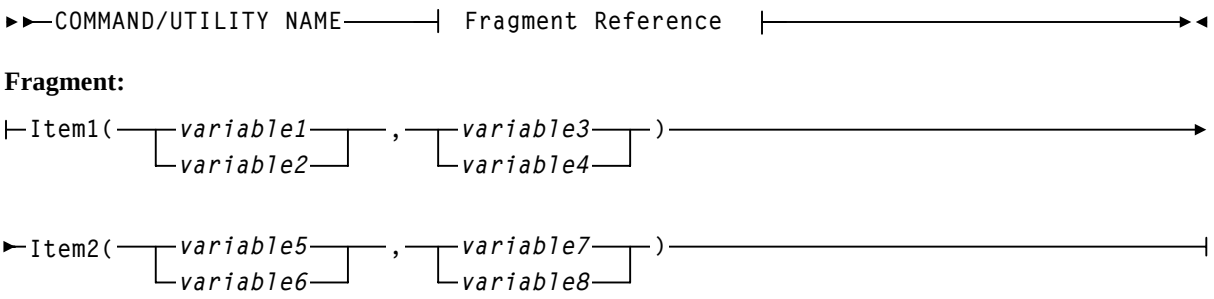
Repeat Symbol

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.



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 parameter. 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 for all existing libraries, except for SL3000 libraries; the CAP number is a hexadecimal value from 00 to 0B. 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 622 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. 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)

This LSM is 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)

This LSM is 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)

This LSM is configured with either a 14-cell permanent rack or a 10-cell removable magazine.

StreamLine Library (Model SL3000)

The library is configured with 2, 13-cell removable magazines in each CAP. This library can contain up to 12 CAPs (00-0B). CAP addresses 00 and 0B, located in the Access Expansion Modules (AEMs), are unused in the initial release of the library.

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 VM 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
  - an unused SL3000 AEM 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
  - an optional SL3000 CEM CAP consisting of 2, 13-cell removable magazines
  - the 3, 13-cell removable magazines for an optional SL8500 CAP.

  02 indicates one of the following:

  - PCAP in either an enhanced CAP or a WolfCreek CAP.
  - an optional SL3000 CEM CAP consisting of 2, 13-cell removable magazines.

03, 04, 05 indicates the following:

- optional SL3000 CEM/DEM CAPs each consisting of 2, 13-cell removable magazines.

06 indicates the following:

- the only required SL3000 BDM CAP consisting of 2, 13-cell removable magazines.

07, 08, 09, 0A indicates the following:

- optional SL3000 CEM CAPs each consisting of 2, 13-cell removable magazines.

0B indicates the following:

- an optional SL3000 AEM CAP.

Notes:

1. If SL3000 library CAPs are not present, the HSC reports them as “not installed” This keeps CAP addresses from changing as new CAPs are added.
2. Refer to the individual command explanations for additional information on specifying CAPids.
3. SL3000 and SL8500 libraries do not contain a PCAP.

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.

A-Z	26^1	26
AA-ZZ	26^2	676
AAA-ZZZ	26^3	17,576
AAAA-ZZZZ	26^4	456,976
AAAAA-ZZZZZ	26^5	11,881,376
AAAAAA-ZZZZZZ	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 2 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. 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.

  In contrast to utility control statements, PARMLIB control statements may begin in column 1. Columns 73-80 are ignored.

  To allow for continuation, comments in the job stream must start with /* and end with */. 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)
```

- Users must enter a nonblank character in column 72 (e.g., an X).
- PARMLIB control statements can be continued using the preceding continuation rules **only** if they are new format control statements.

- 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 36 describes the HSC commands and control statements that accept MEDia, MODel, and RECtech parameters.

Table 36. 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	*acs-id*, *lsm-id*, 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	*acs-id*, *lsm-id*, 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 36. MEDia, RECtech, and MODel Cross-reference (Continued)

Name	Type	Related Parameters	MEDia	RECtech	MODel	Description
Mount	Command	SUBpool, SCRTCH, 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*	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. 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. Sometimes incompatibilities occur because of improper control statement definitions. When this happens, messages or unexpected results can occur.
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 36. MEDia, RECtech, and MODel Cross-reference (Continued)

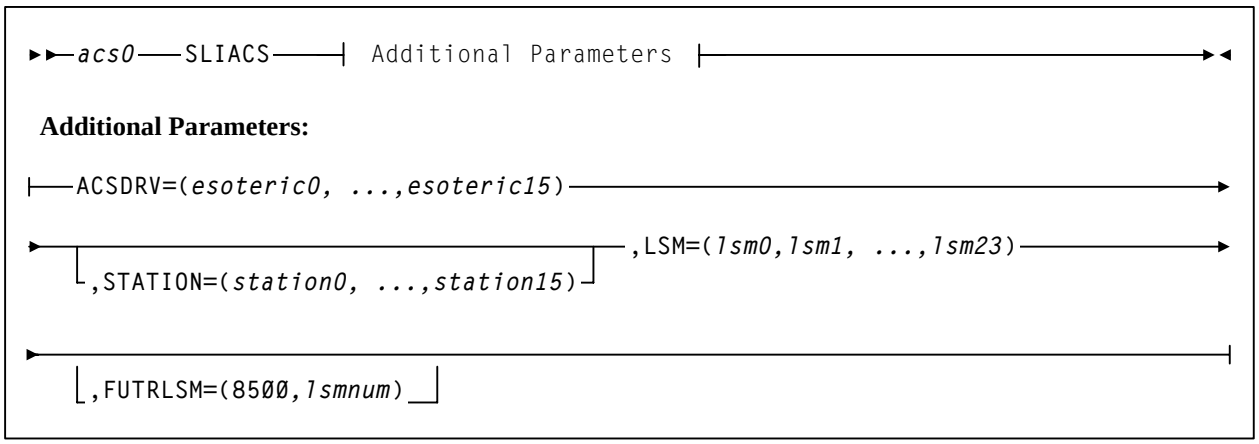
Name	Type	Related Parameters	MEDia	RECtech	MODel	Description
VOLATTR	Control Statement	N/A	Yes	Yes	No	The MEDia of a given volume must be defined here and the desired RECtech to be used on this volume may also be expressed. Lists are used to define a pool of volumes from which to select. If VOLATTR is 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.
WARN	Command	*acs-id*, *lsm-id*, SUBpool	Yes	Yes*	No	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.

* Notes: Yes = Parameter exists. No = Parameter does not exist. * = Parameter can be a list.

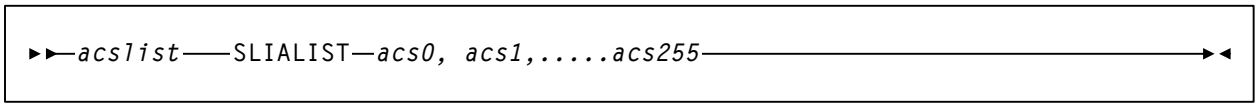
LIBGEN Macros

The LIBGEN macros are shown below in alphabetical order. Refer to ‘‘Syntax Flow Diagrams’’ in the *HSC Installation Guide* for complete explanations of macro syntax and parameters, and the order in which they must be specified.

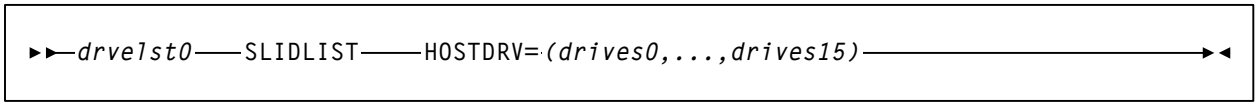
SLIACS macro



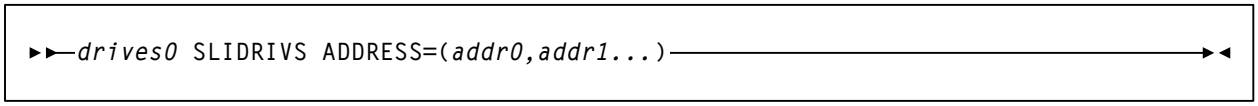
SLIALIST macro



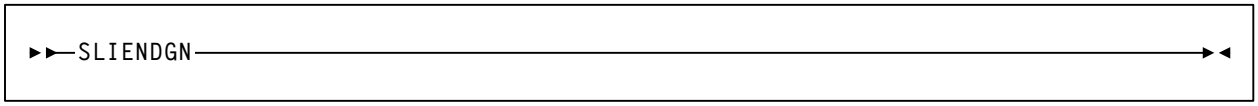
SLIDLIST macro



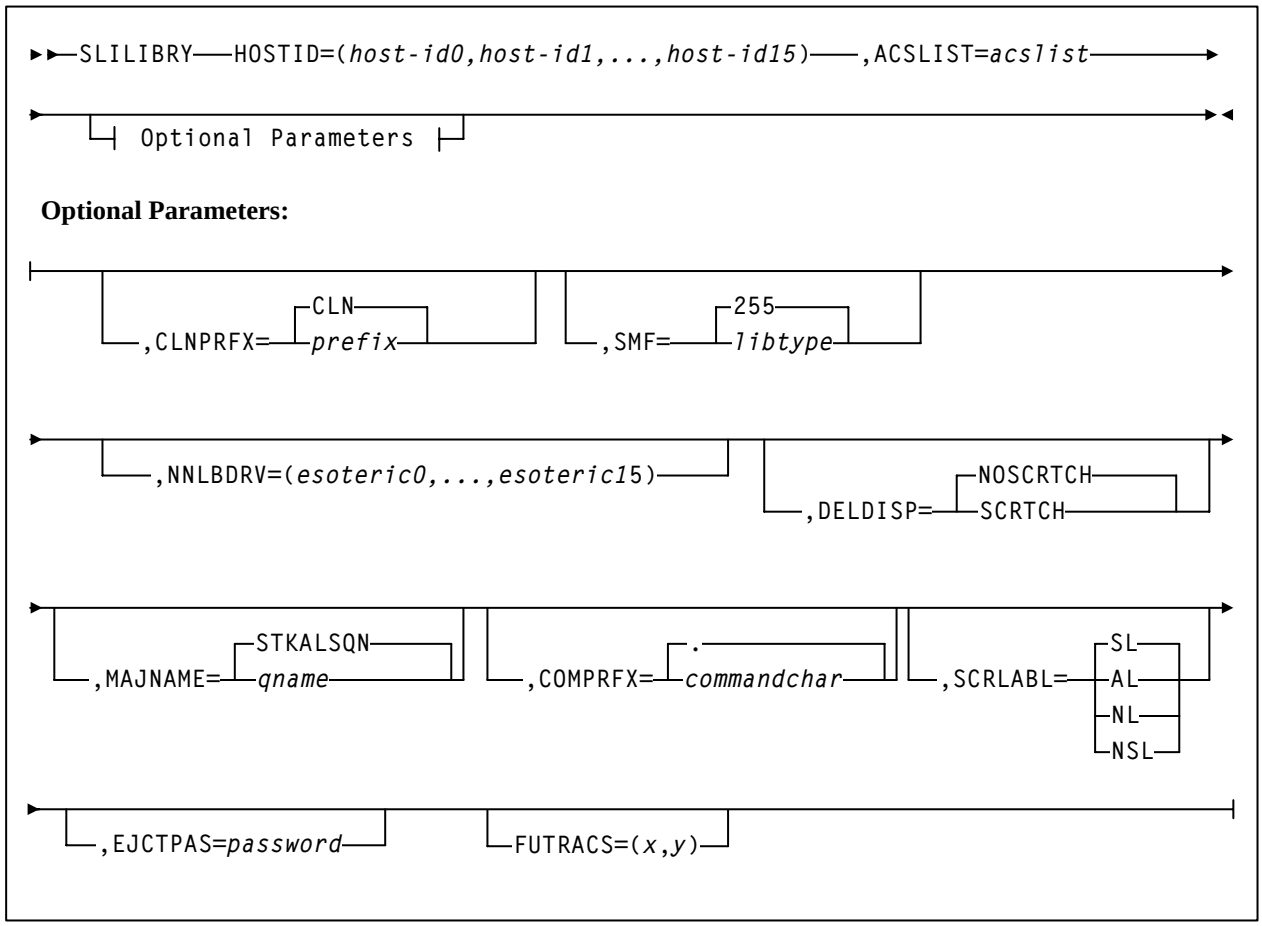
SLIDRIVS macros



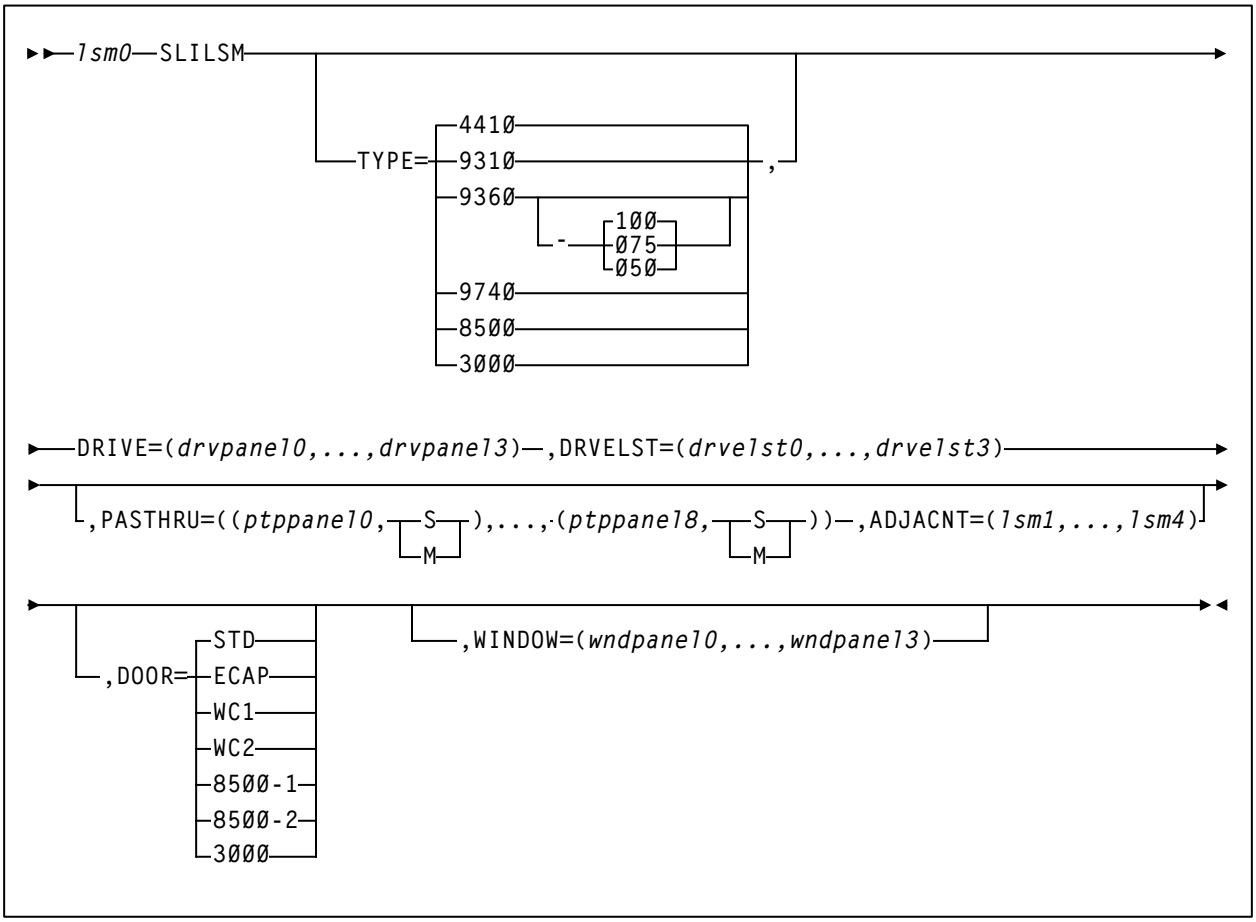
SLIENDGN macro



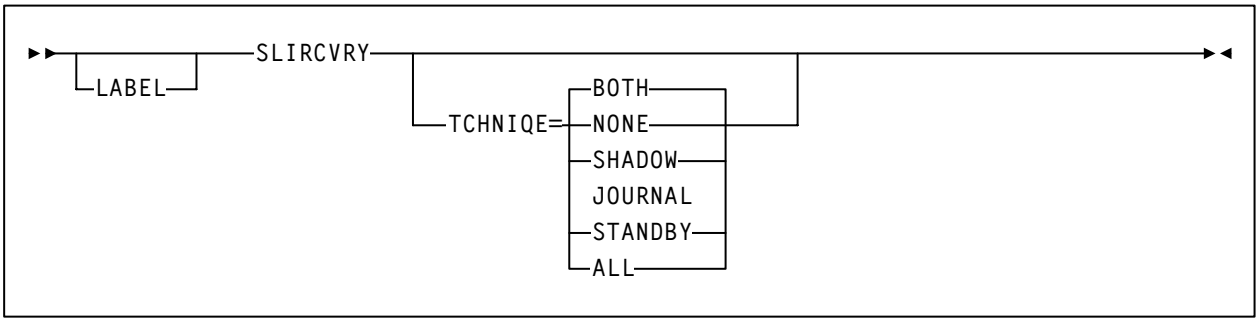
SLILIBRY macro



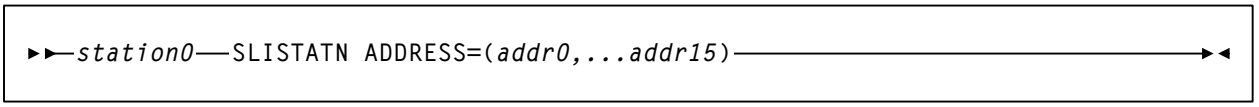
SLILSM macro



SLIRCVRY macro



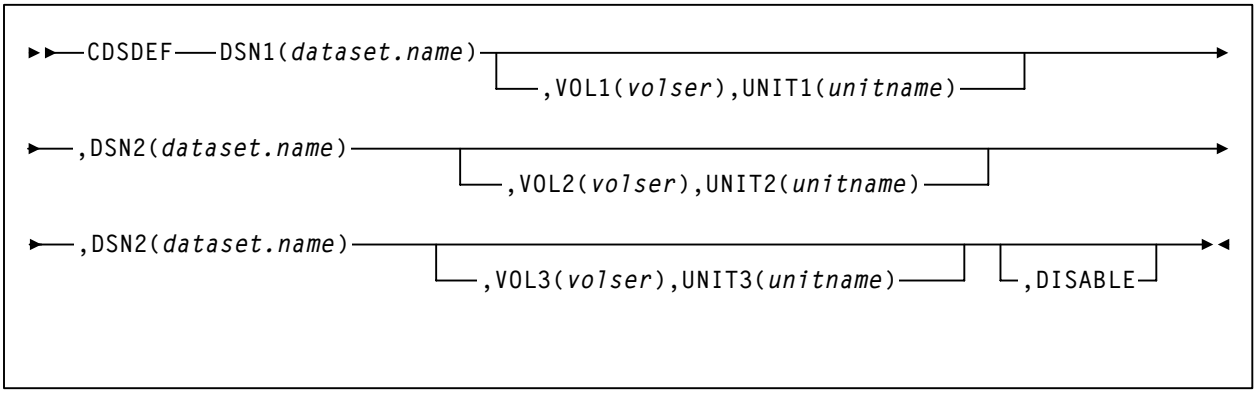
SLISTATN macro



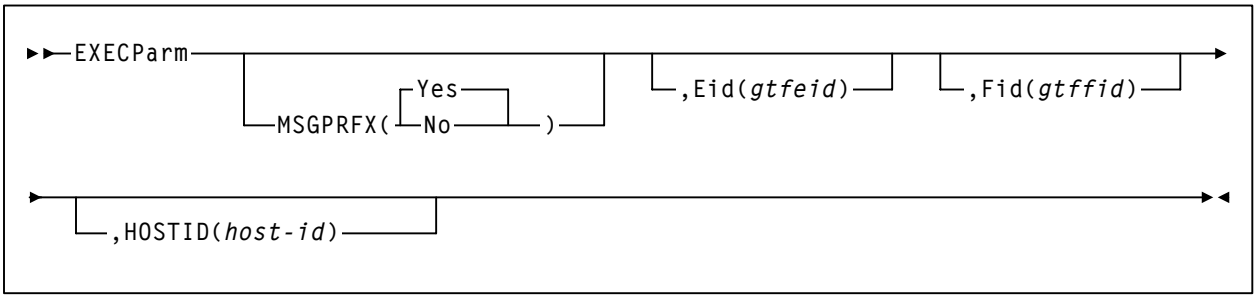
HSC Control Statements

Refer to Chapter 3, “HSC Control Statements and HSC Start Procedure” on page 79 for more information on control statement syntax and parameters.

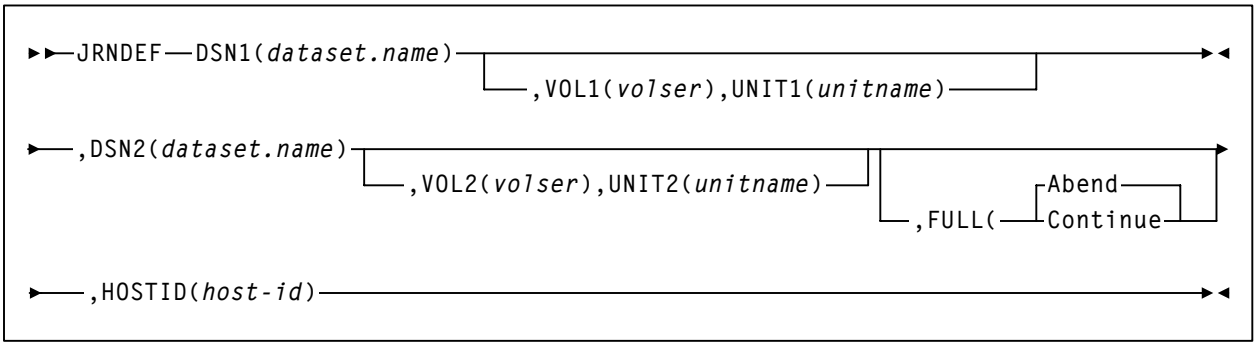
Control Data Set Definition (CDSDEF) control statement



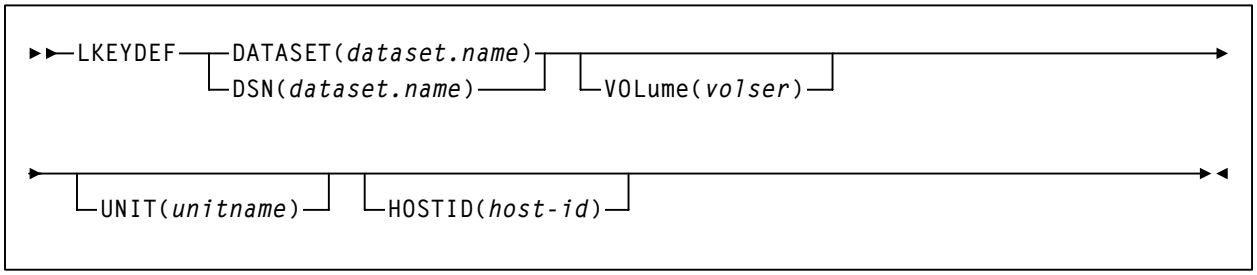
EXECParm control statement



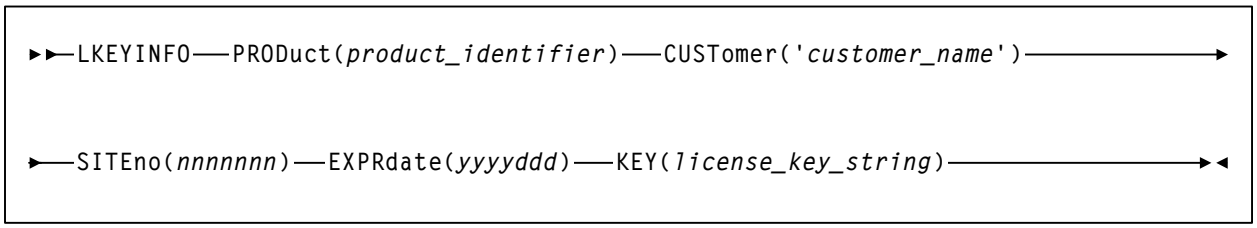
Journal Definition (JRNDEF) control statement



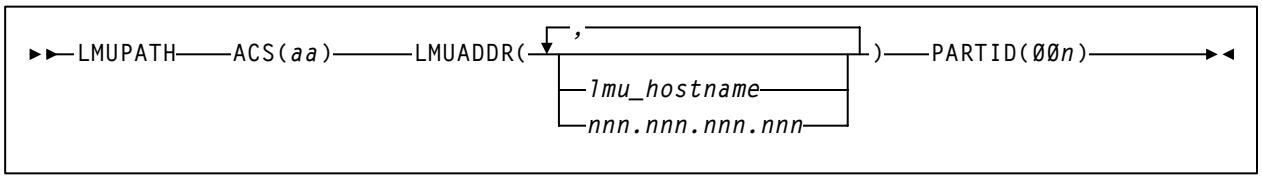
LKEYDEF command and control statement



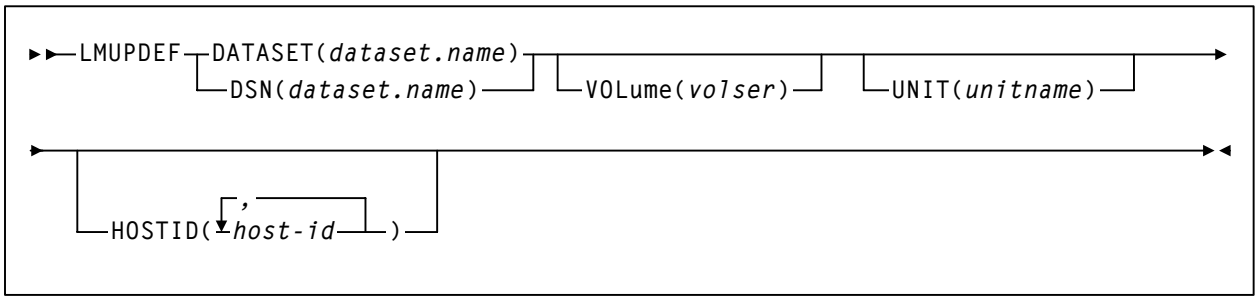
LKEYINFO control statement



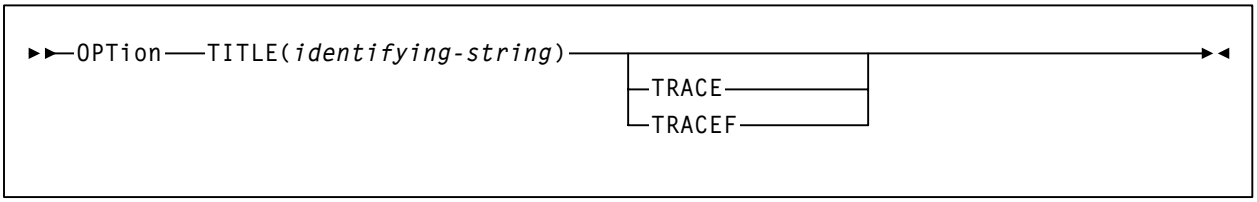
LMUPATH control statement



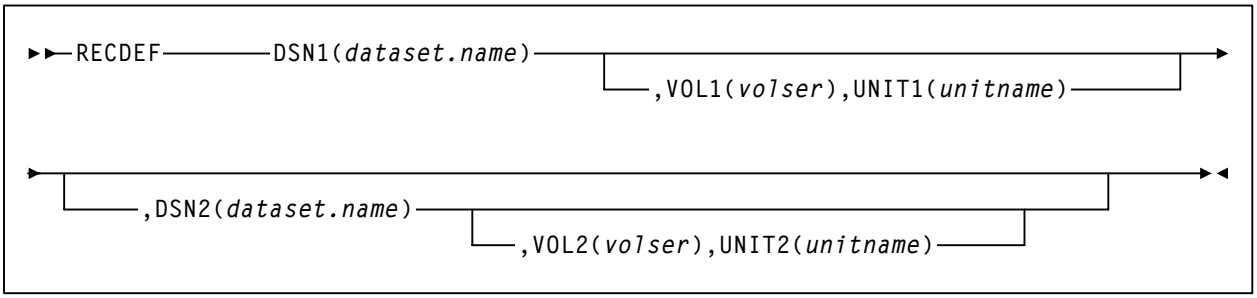
LMU Path Definition (LMUPDEF) command and control statement



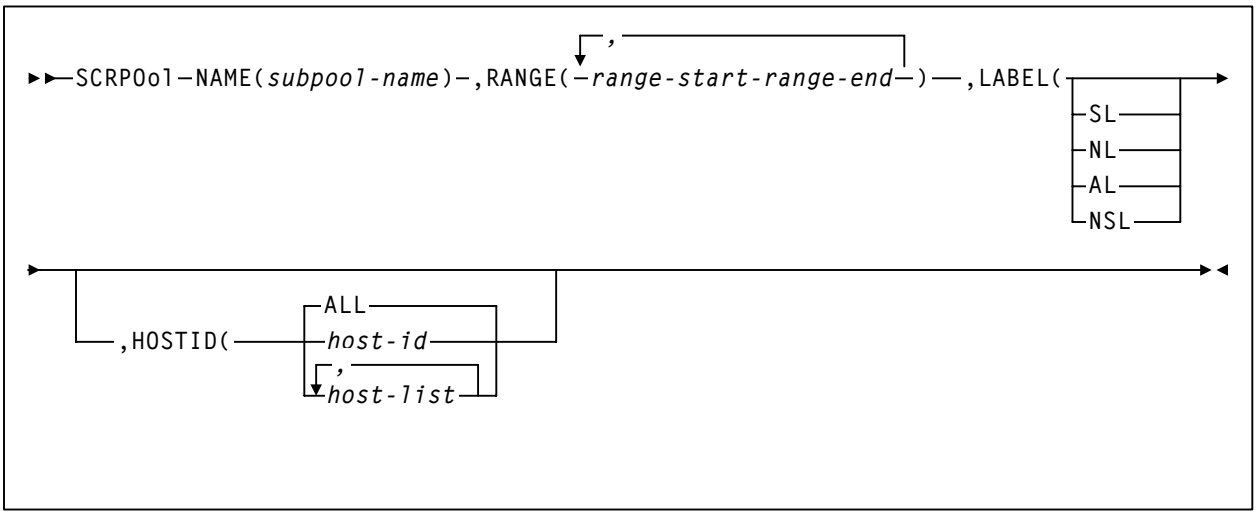
OPTion control statement



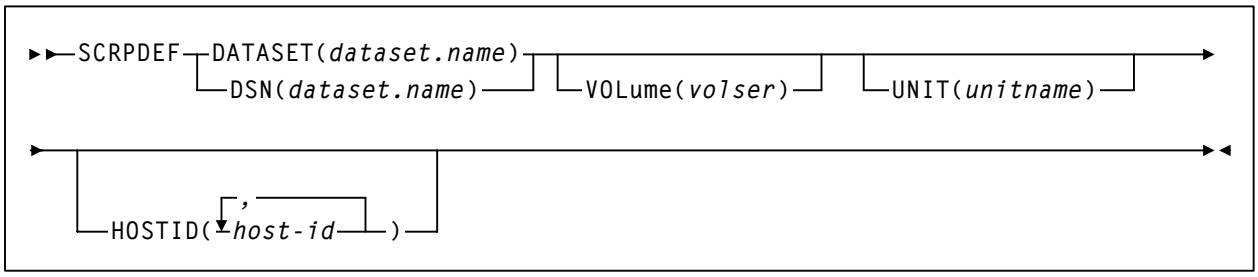
Reconfiguration Definition (RECDEF) control statement



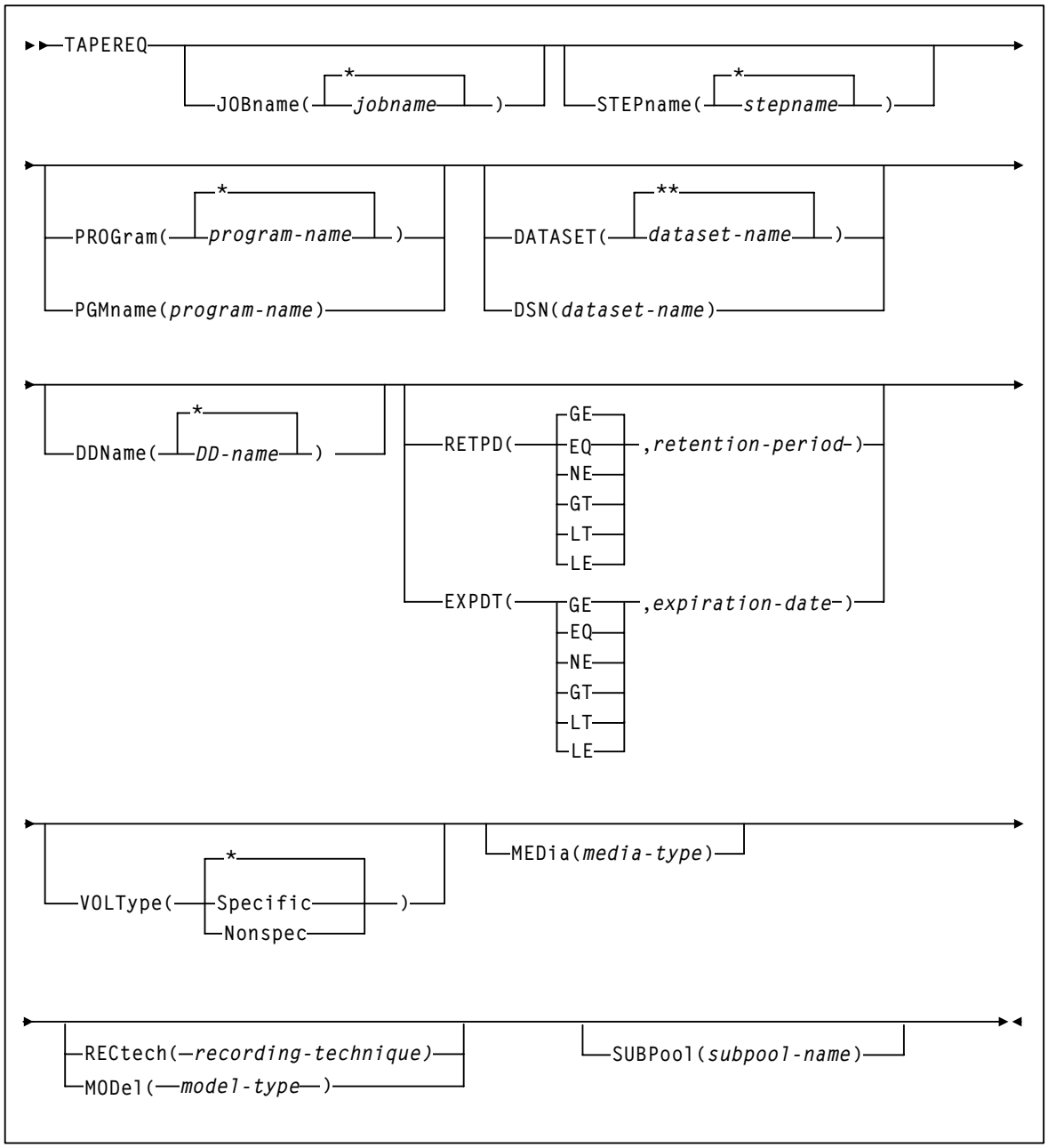
Scratch Subpool (SCRPOol) control statement



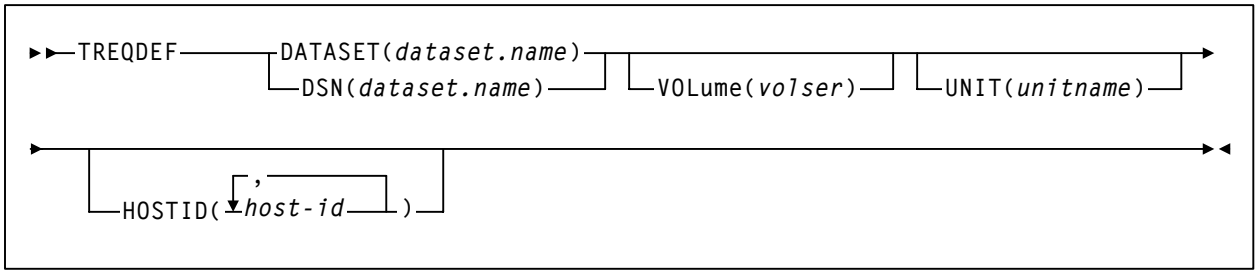
Scratch Subpool Definition (SCRPDEF) command and control statement



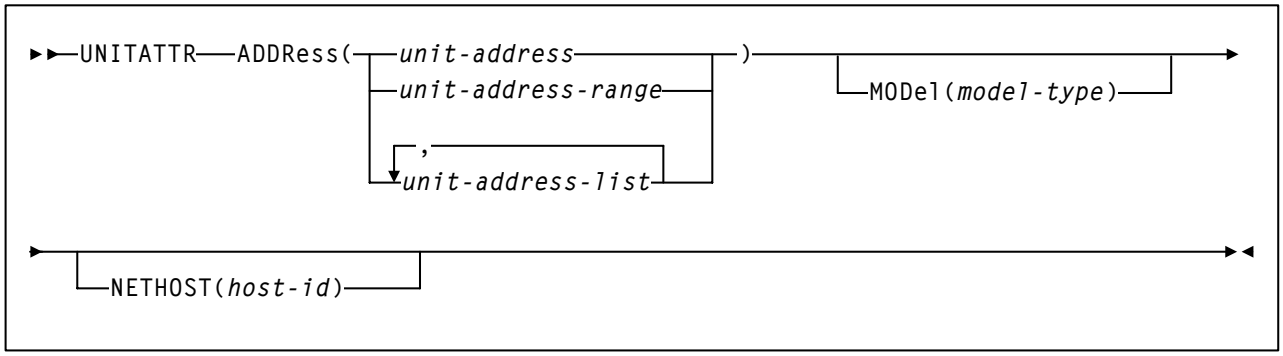
Tape Request (TAPEREQ) control statement



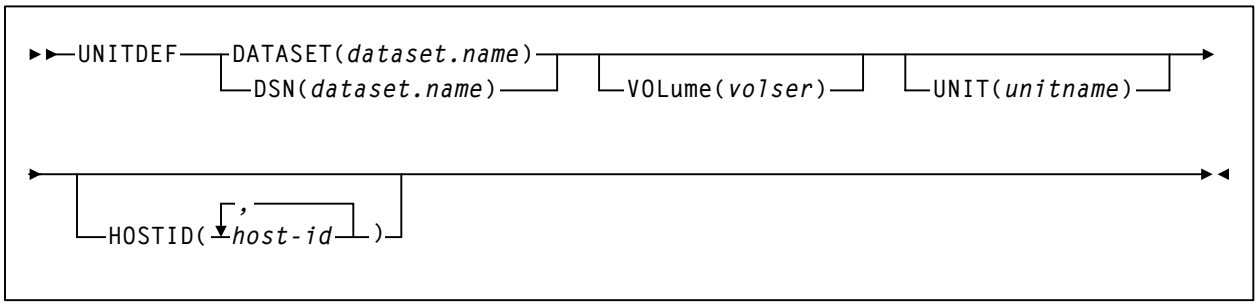
Tape Request Definition (TREQDEF) command/control statement



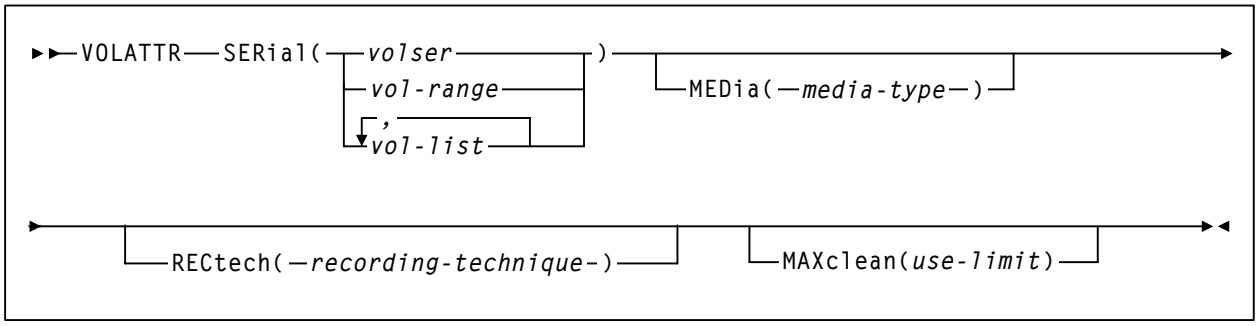
Unit Attribute (UNITATTR) control statement



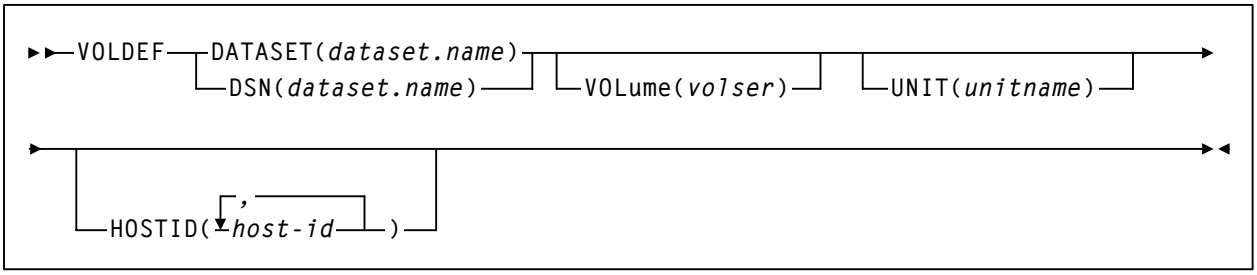
Unit Attribute Definition (UNITDEF) command/control statement



Volume Attribute (VOLATTR) control statement



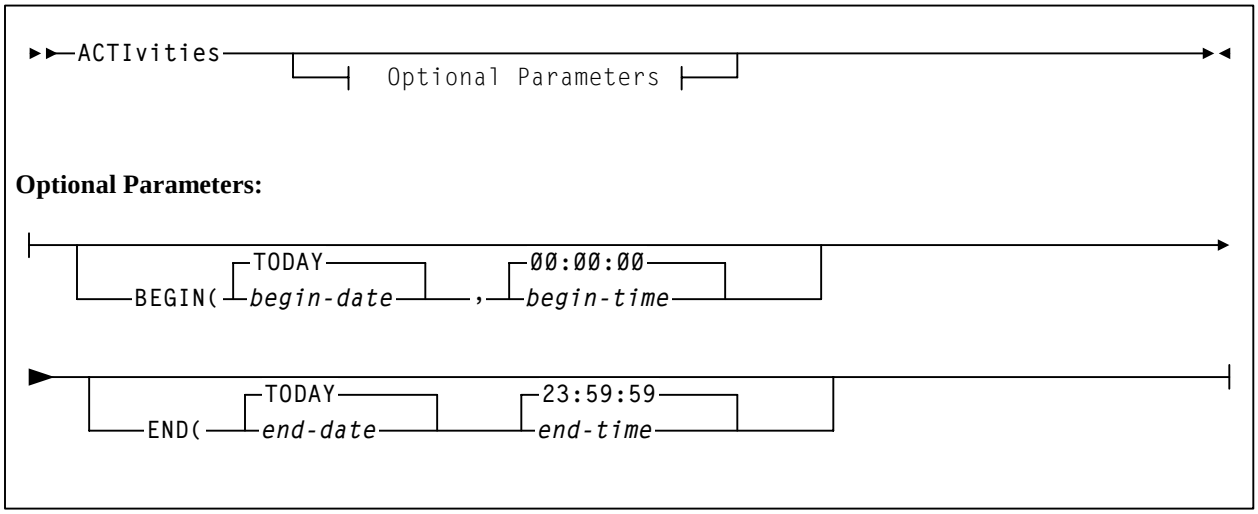
Volume Attribute Definition (VOLDEF) command/control statement



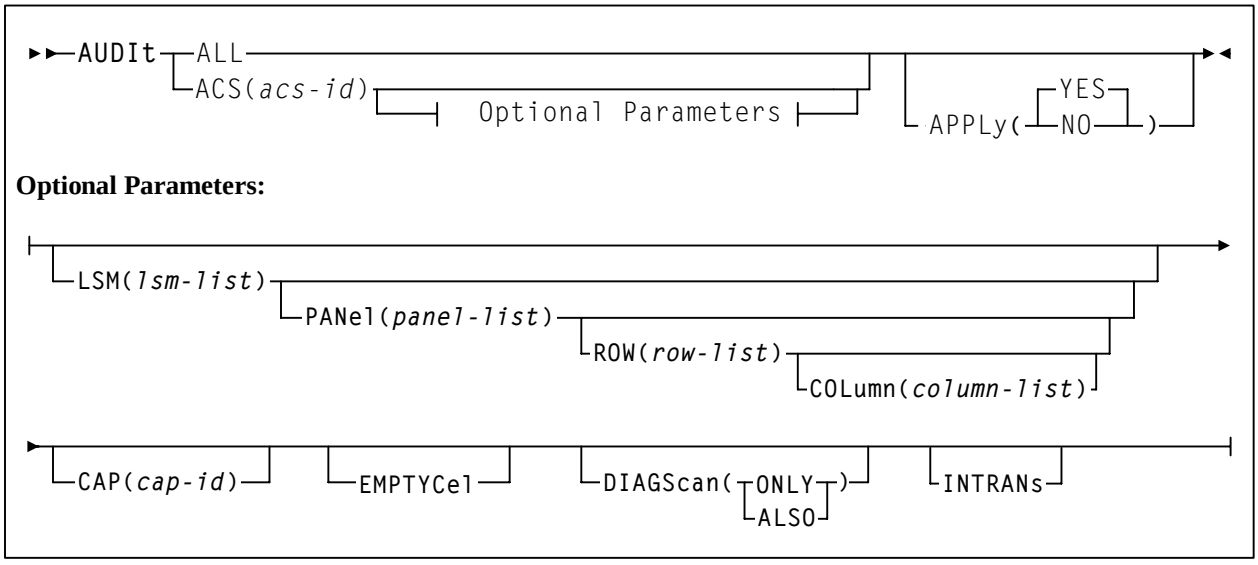
Utilities

Refer to Chapter 4, “Utility Functions” on page 167 for more information on utility syntax and parameters.

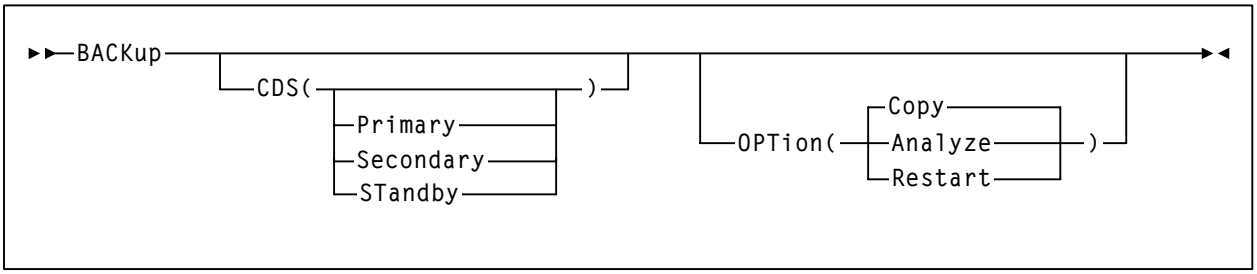
ACTIvities Report utility



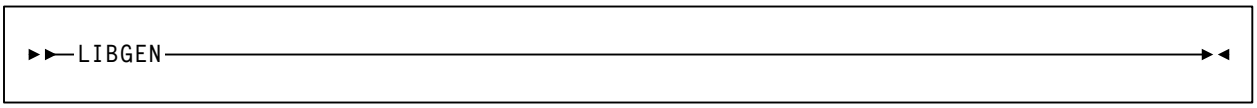
AUDIt utility



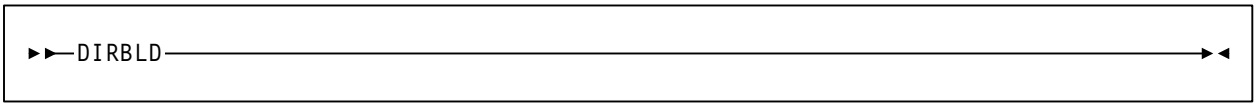
BACKup utility



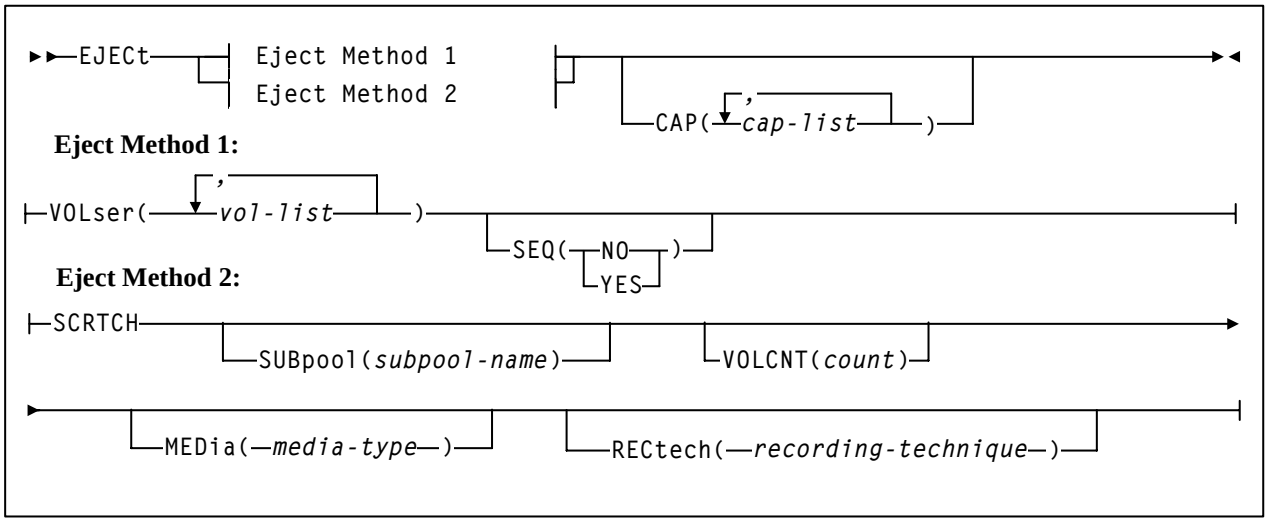
Database Decompile (LIBGEN) utility



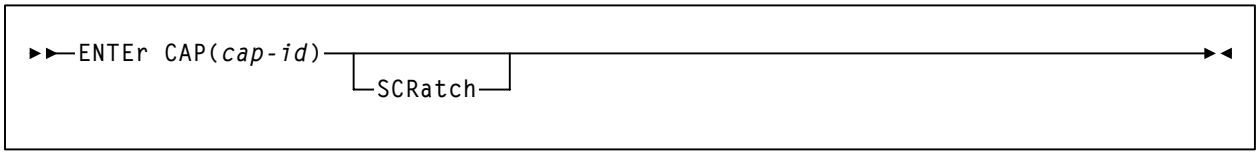
Directory Rebuild (DIRBLD) utility



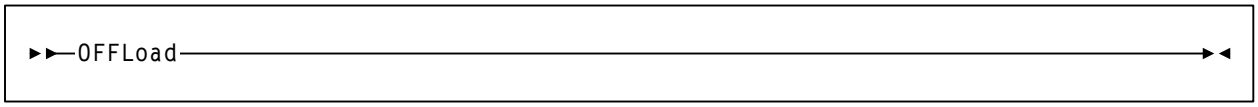
EJECt utility



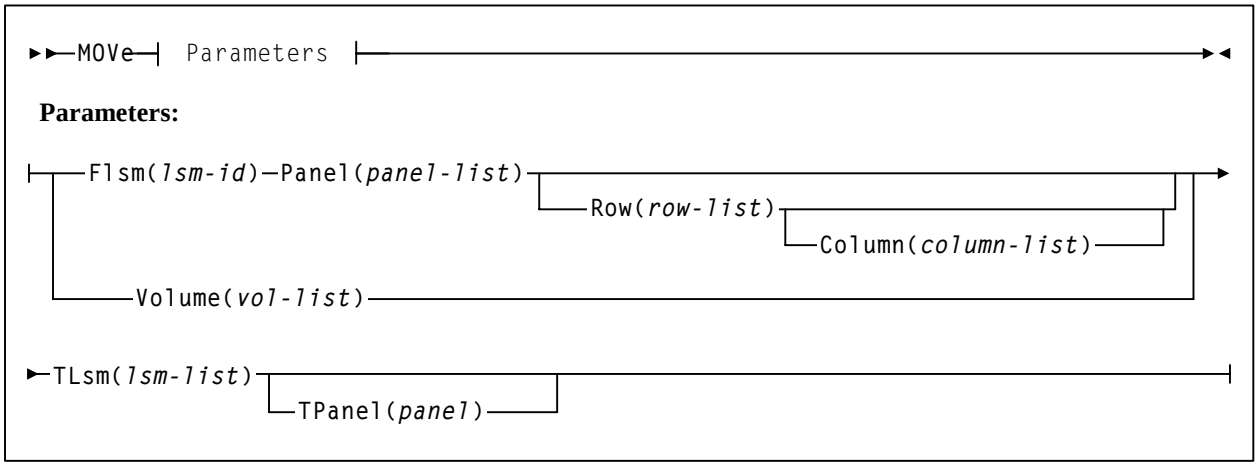
Enter Cartridges utility



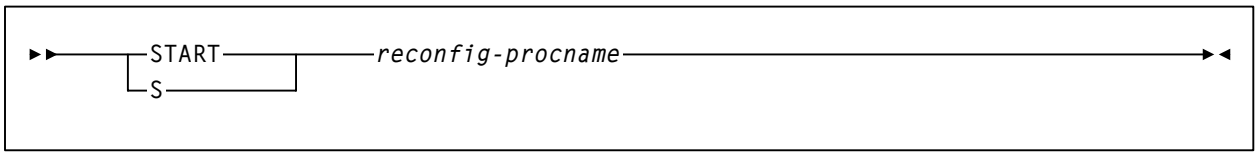
Journal OFFLoad utility



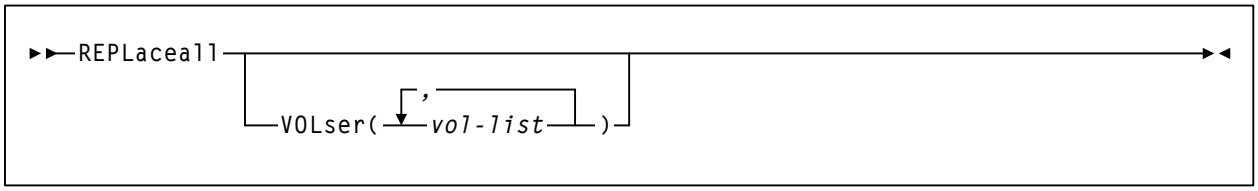
MOVe utility



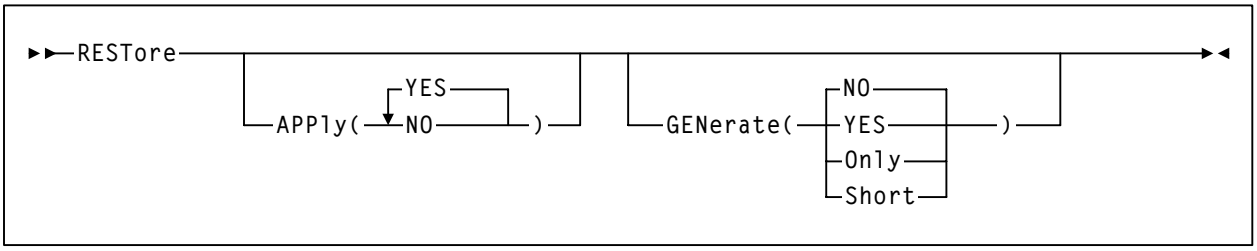
Reconfiguration utility



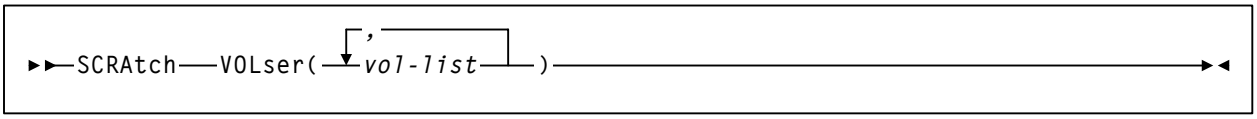
REPLace utility



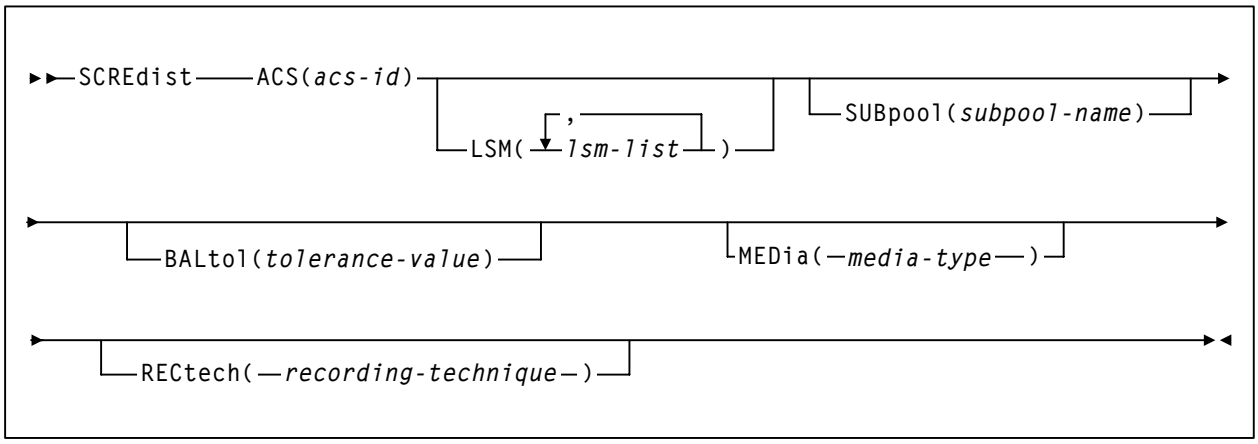
RESTore utility



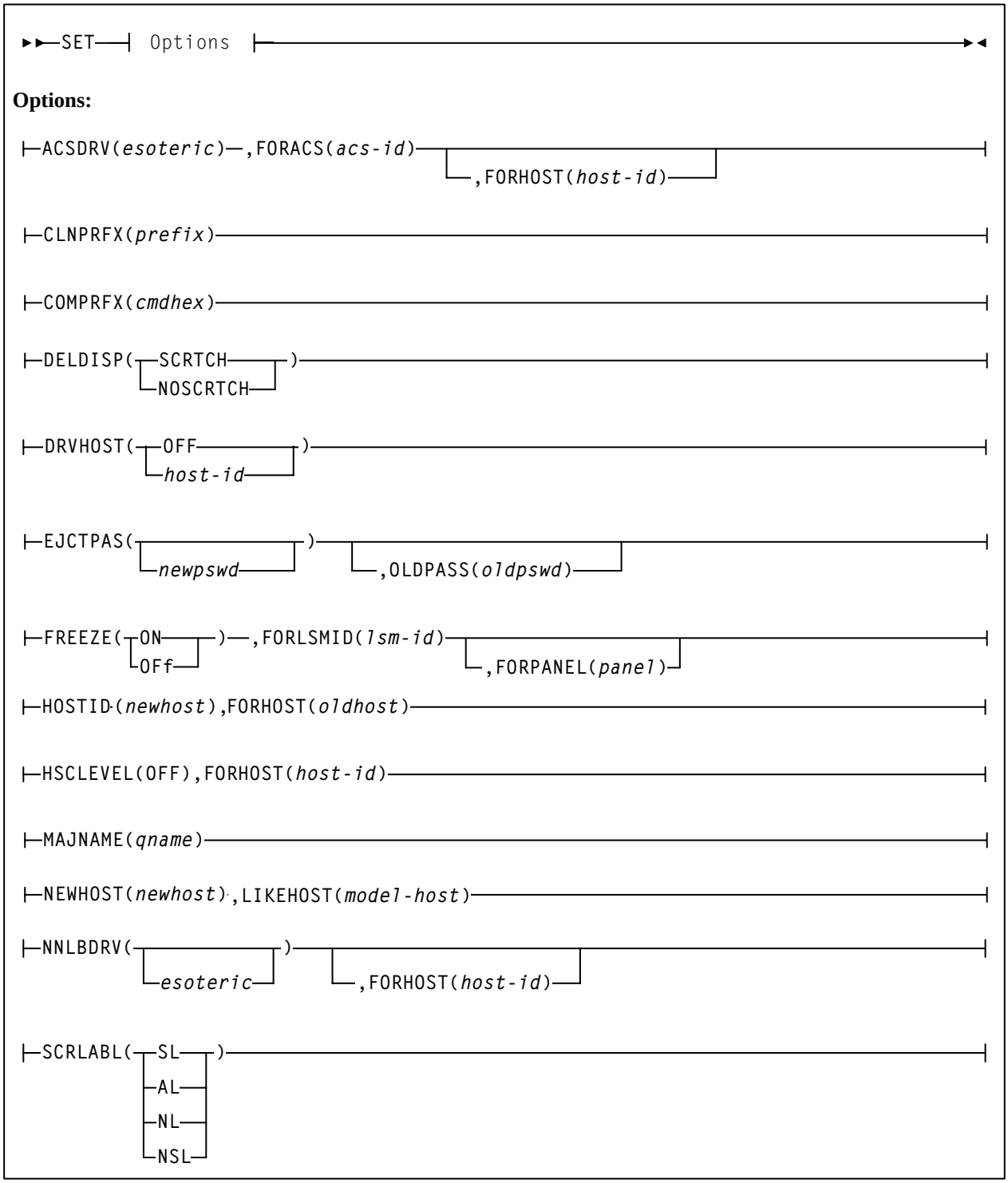
SCRAtch utility



Scratch Redistribution (SCREdist) utility

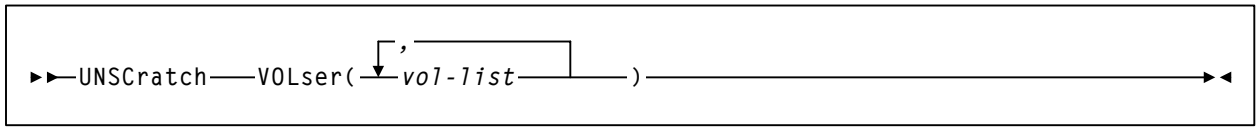


SET utility

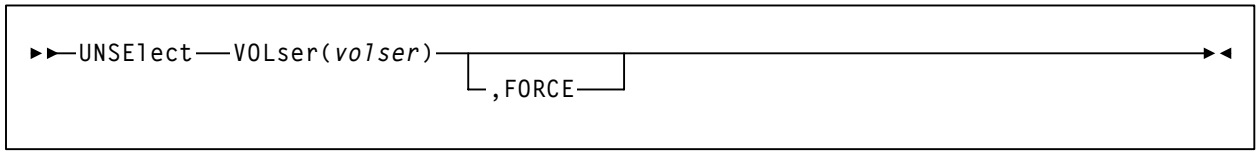

SET
Options
Options:
ACSDRV(esoteric),FORACS(acs-id)
,FORHOST(host-id)
CLNPRFX(prefix)
COMPRFX(cmdhex)
DELDISP(SCRTCH)
NOSCRTCH
DRVHOST(OFF)
host-id
EJCTPAS(newpswd)
,OLDPASS(oldpswd)
FREEZE(ON)
OFf
,FORLSMID(lsm-id)
,FORPANEL(panel)
HOSTID(newhost),FORHOST(oldhost)
HSCLEVEL(OFF),FORHOST(host-id)
MAJNAME(qname)
NEWHOST(newhost),LIKEHOST(model-host)
NNLBDRV(esoteric)
,FORHOST(host-id)
SCRLABL(SL)
AL
NL
NSL

SET utility (continued)

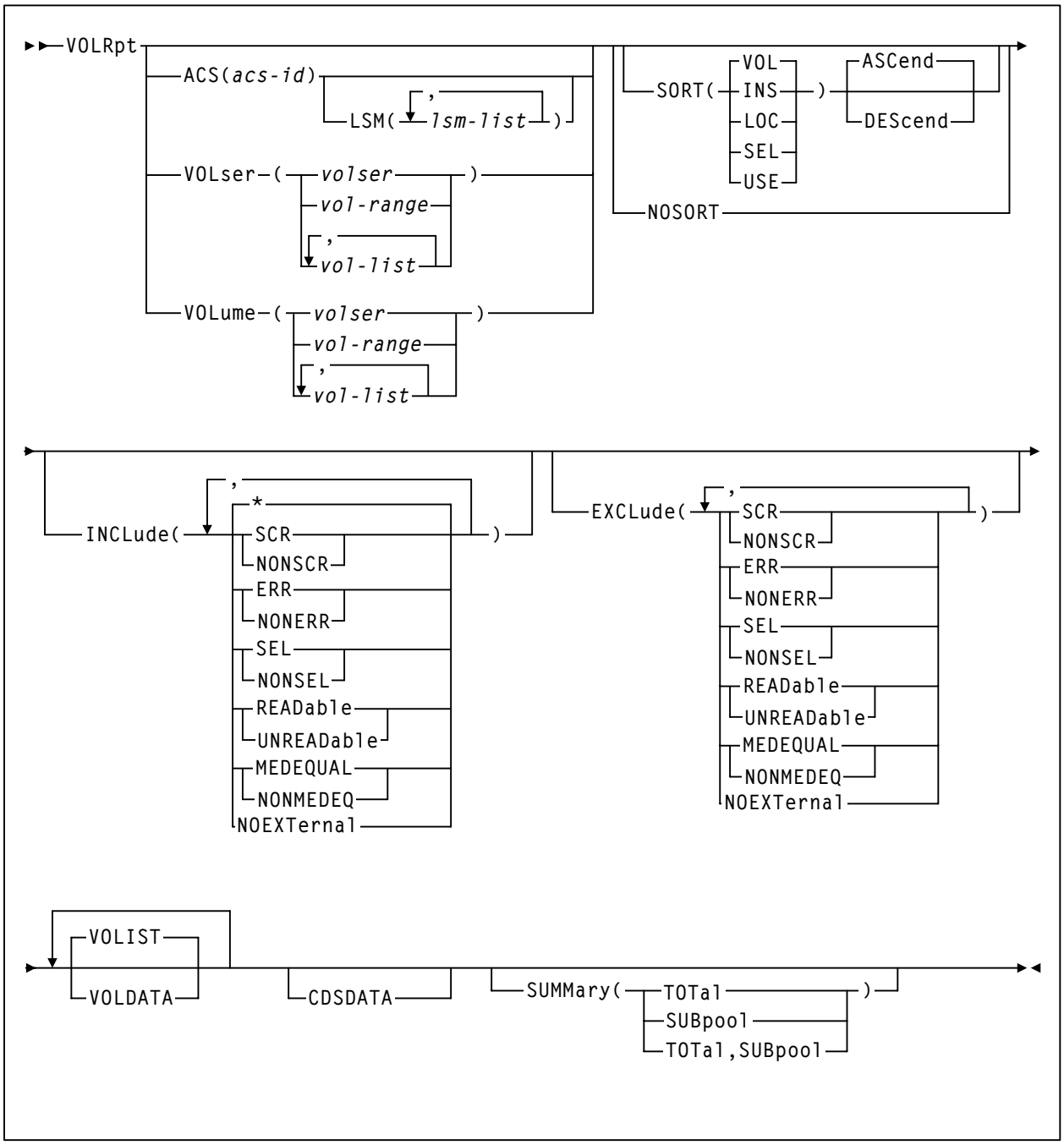
UNSCratch utility



Unselect utility



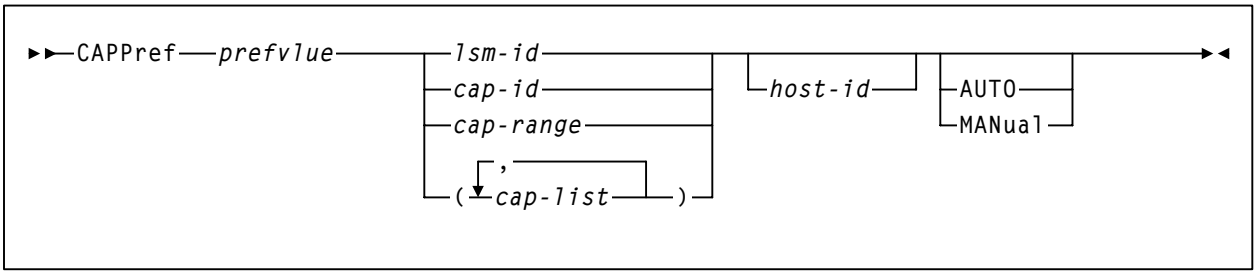
Volume Report (VOLRpt) utility



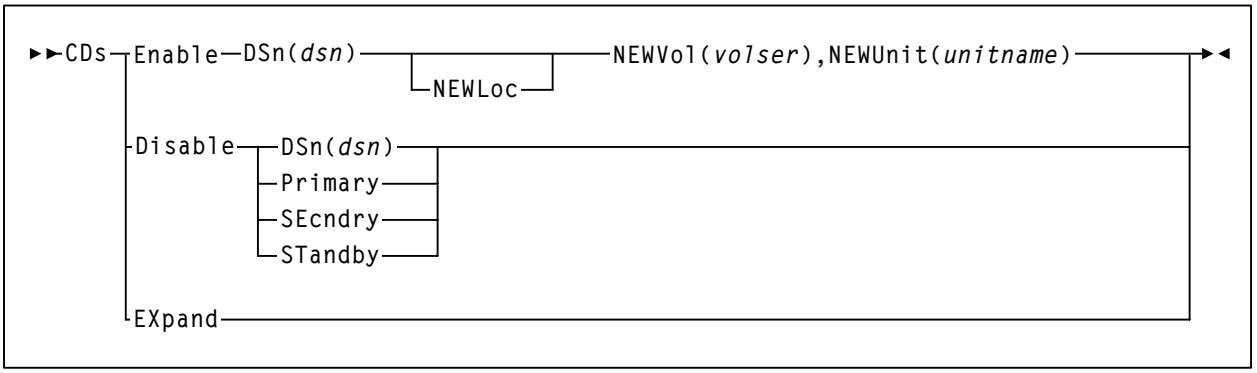
Operator Commands

Refer to ‘‘Operator commands’’ in the *HSC Operator’s Guide* for complete explanations of command syntax and parameters.

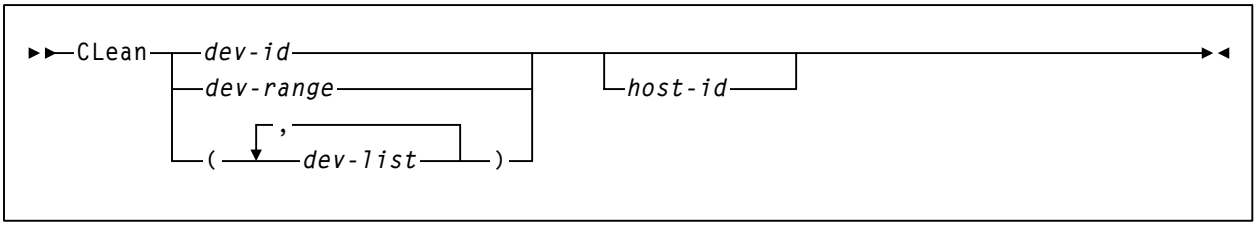
CAP Preference (CAPPref) command and control statement



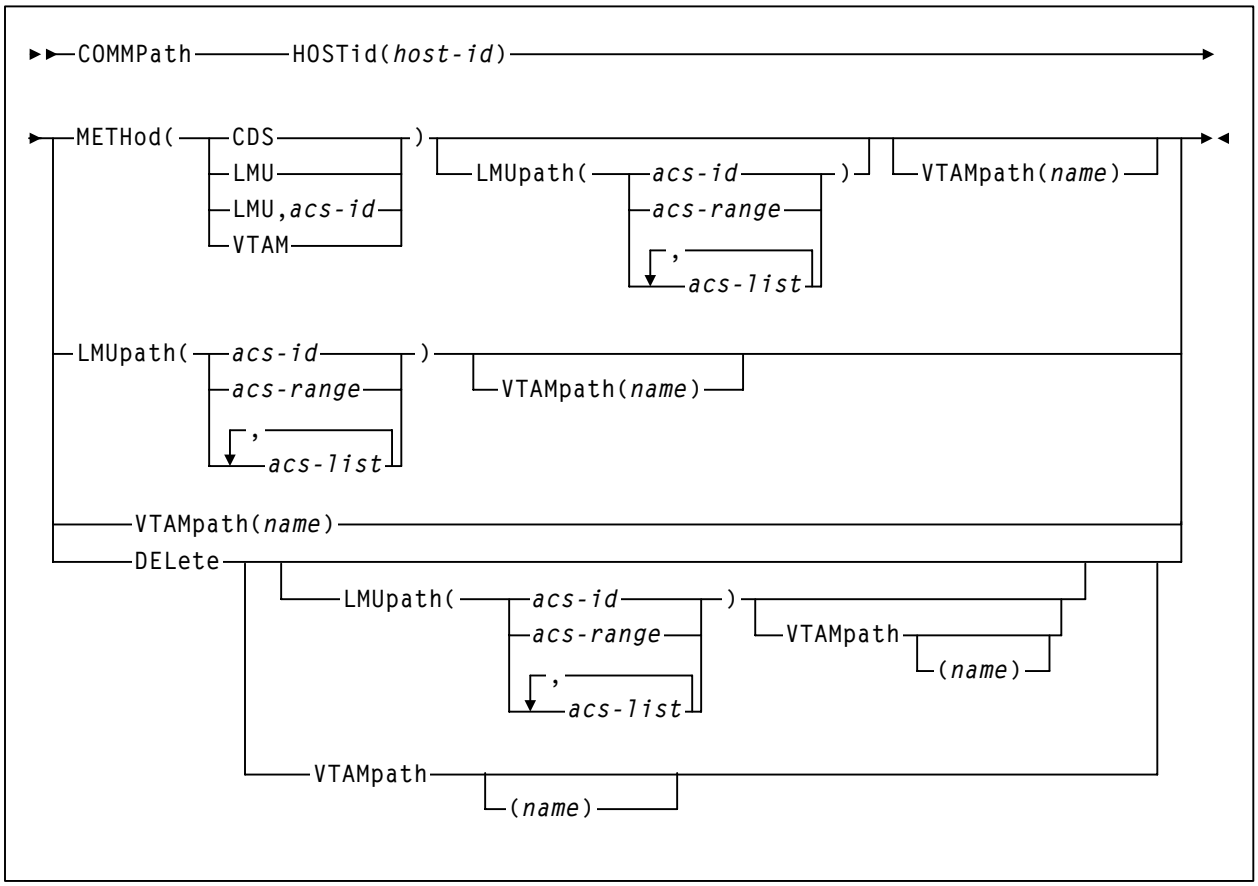
CDs Enable/Disable command



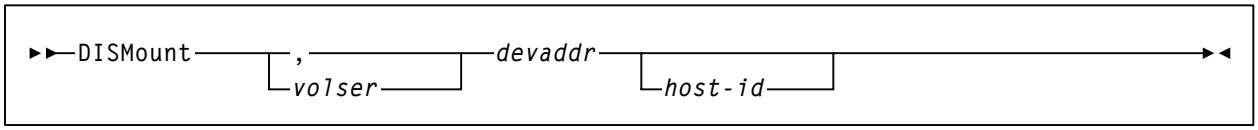
CLean command



Communications Path (COMMPath) command and control statement

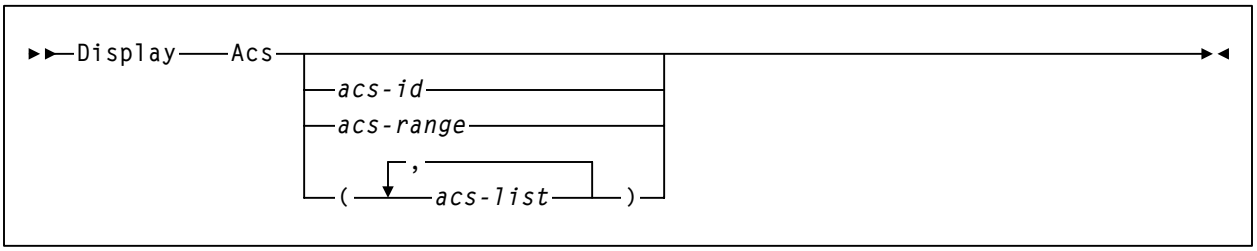


DISMount command

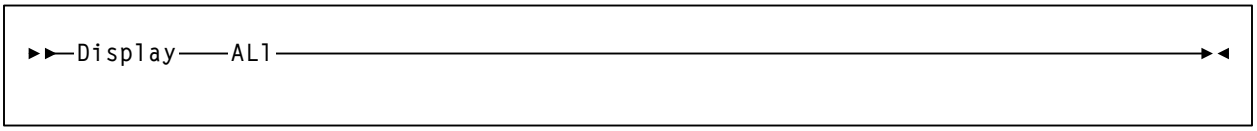


Display command

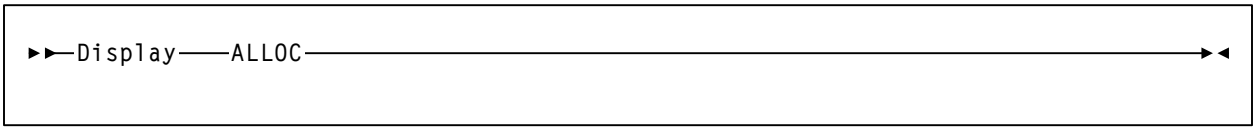
Display Acs



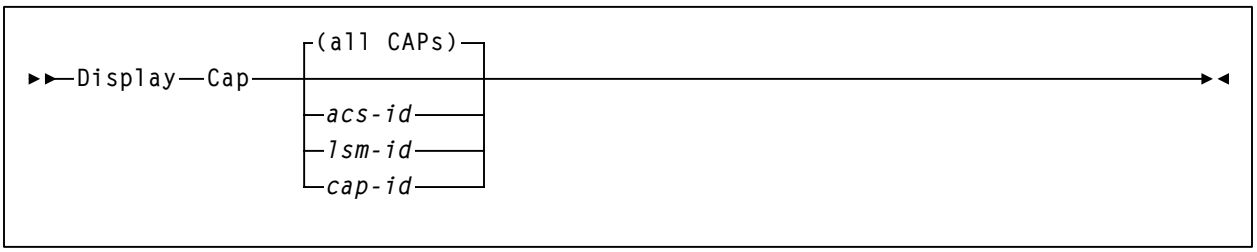
Display ALl



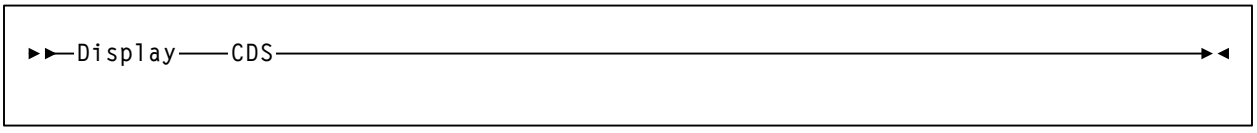
Display ALLOC



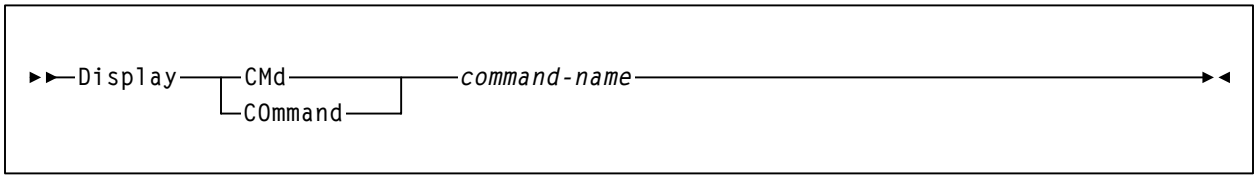
Display Cap



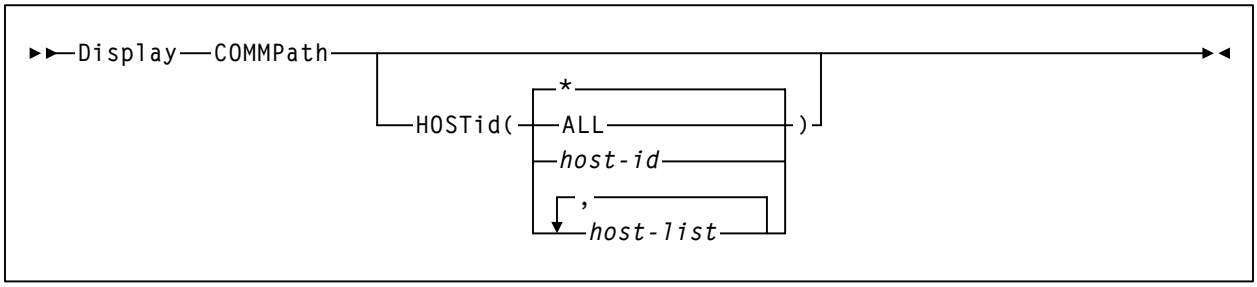
Display CDS



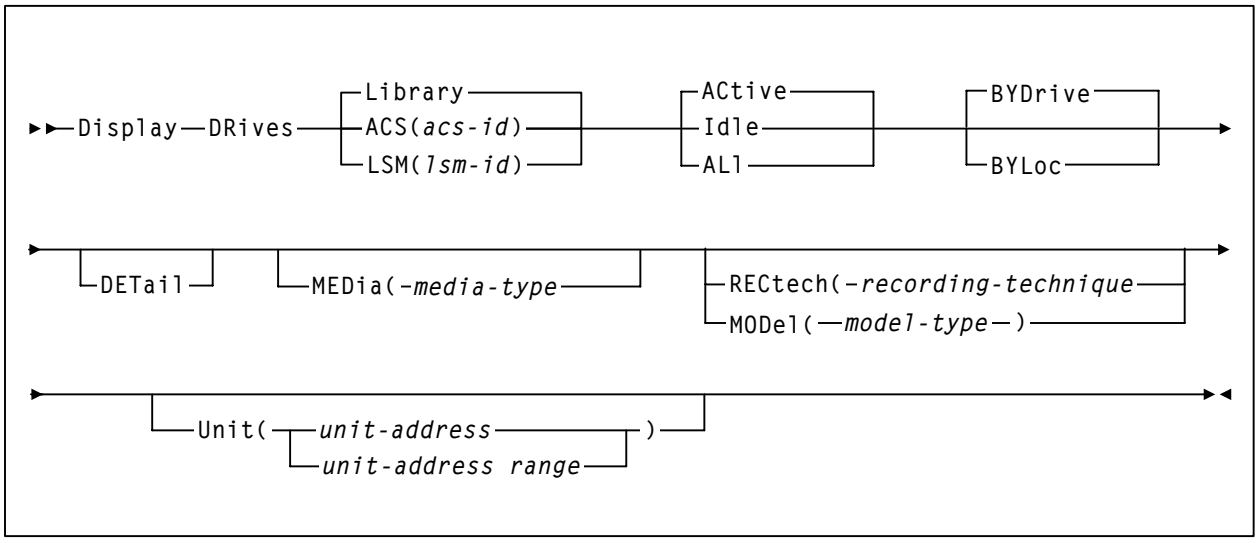
Display Cmd



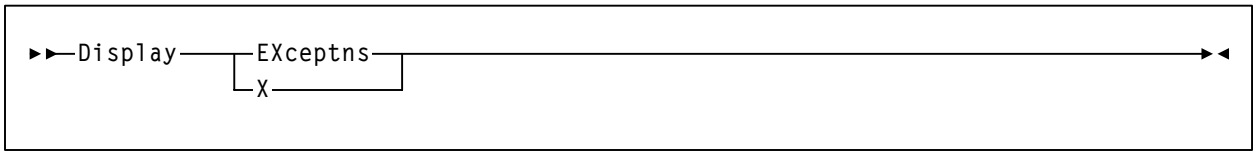
Display COMMPath



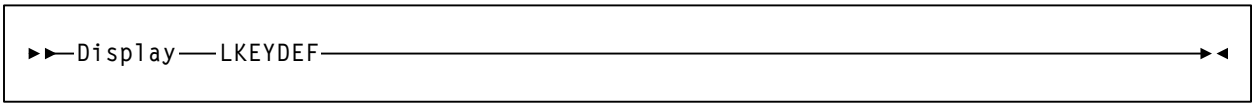
Display DRives



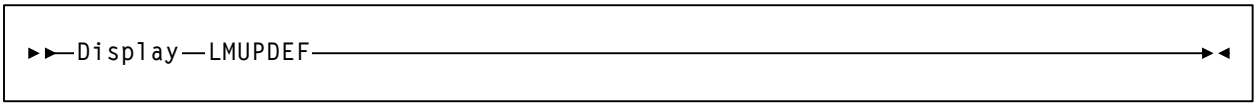
Display Exceptions



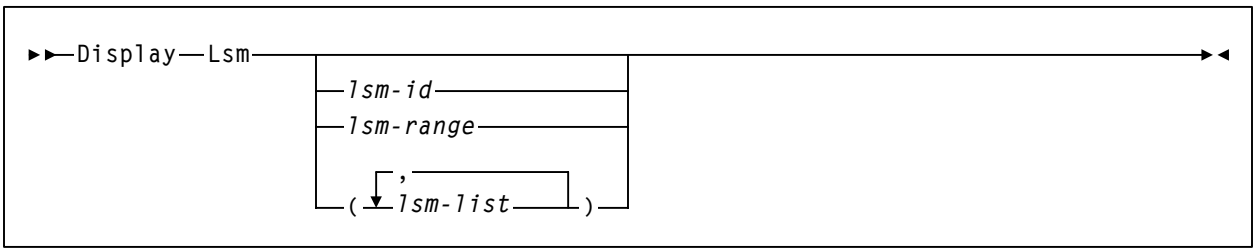
Display LKEYDEF



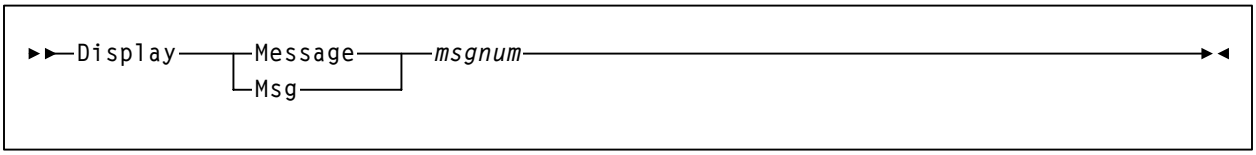
Display LMUPDEF



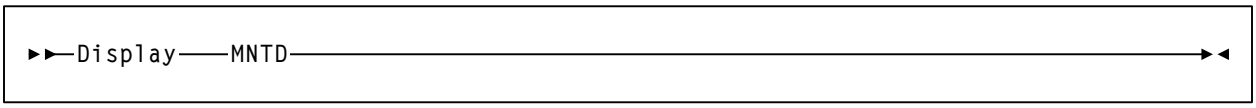
Display LSM



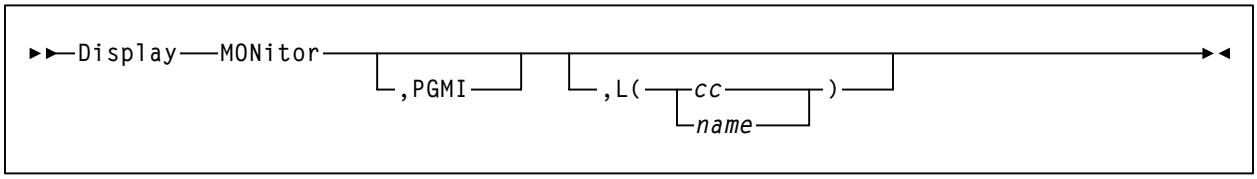
Display Message



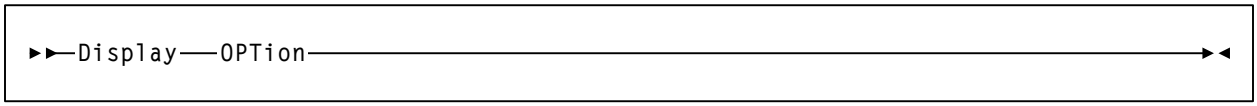
Display MNTD



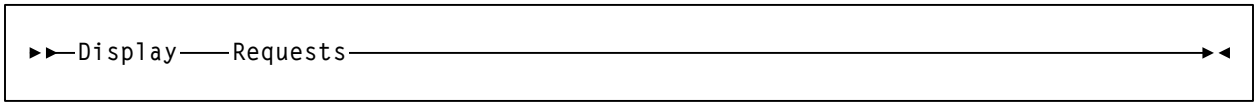
Display MONitor



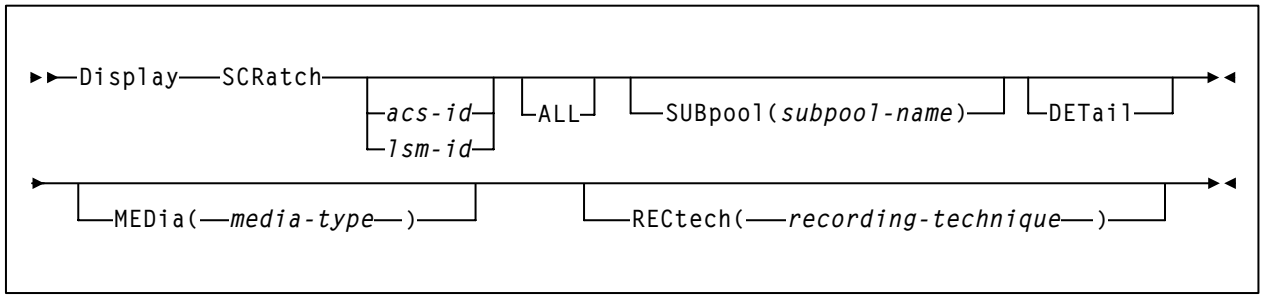
Display OPTion



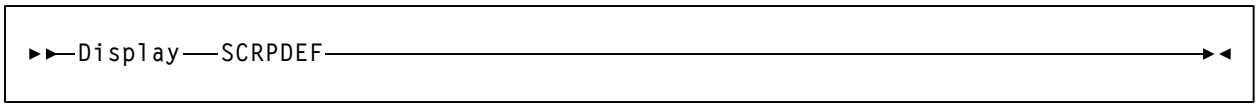
Display Requests



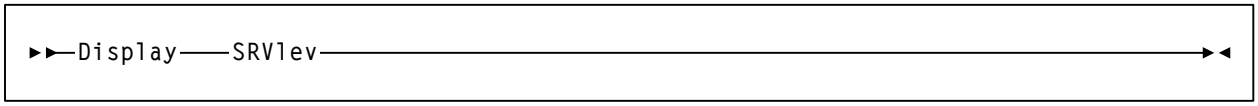
Display SCRatch



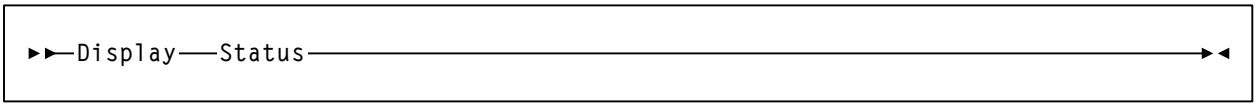
Display SCRPDEF



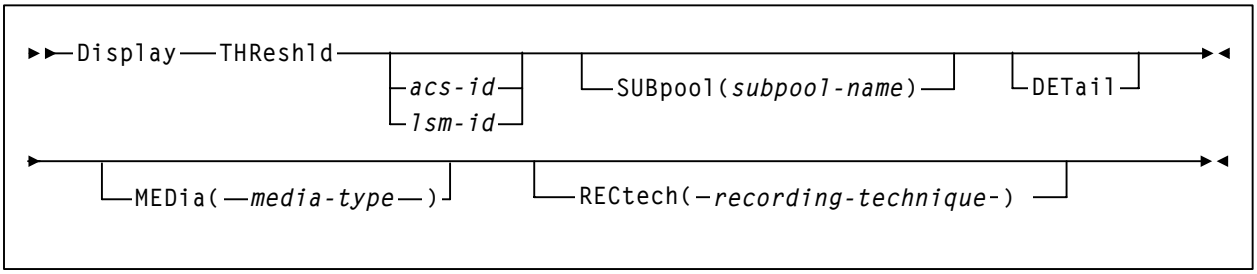
Display SRVlev



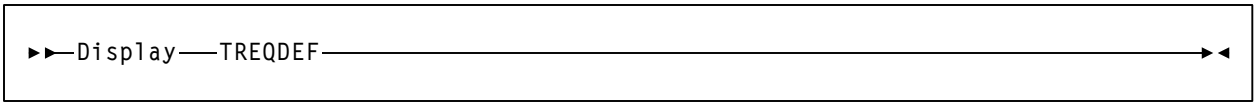
Display Status



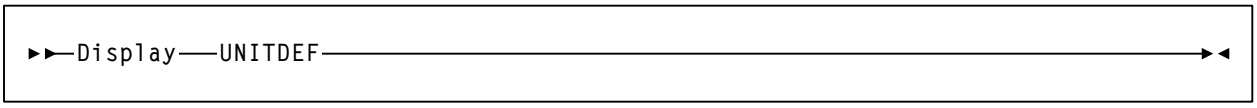
Display THReshld



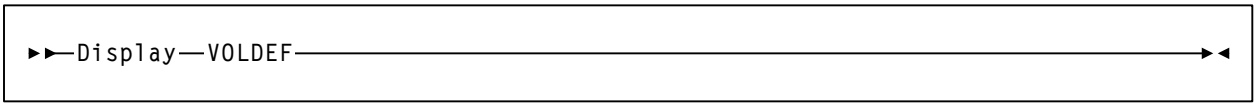
Display TREQDEF



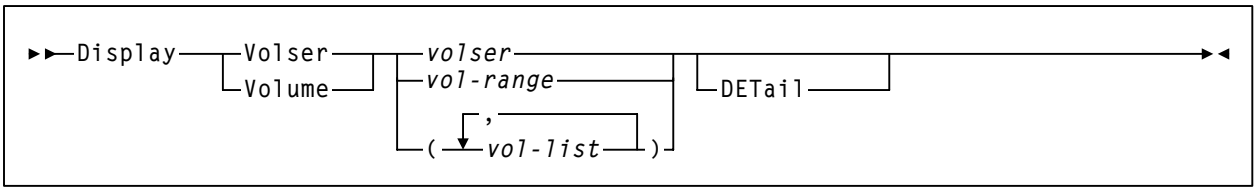
Display UNITDEF



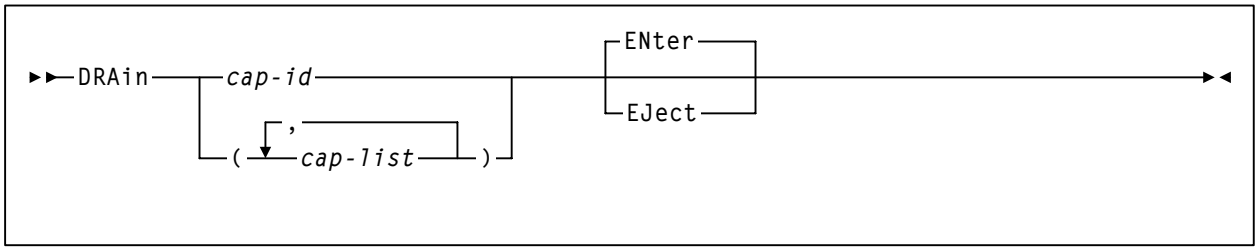
Display VOLDEF



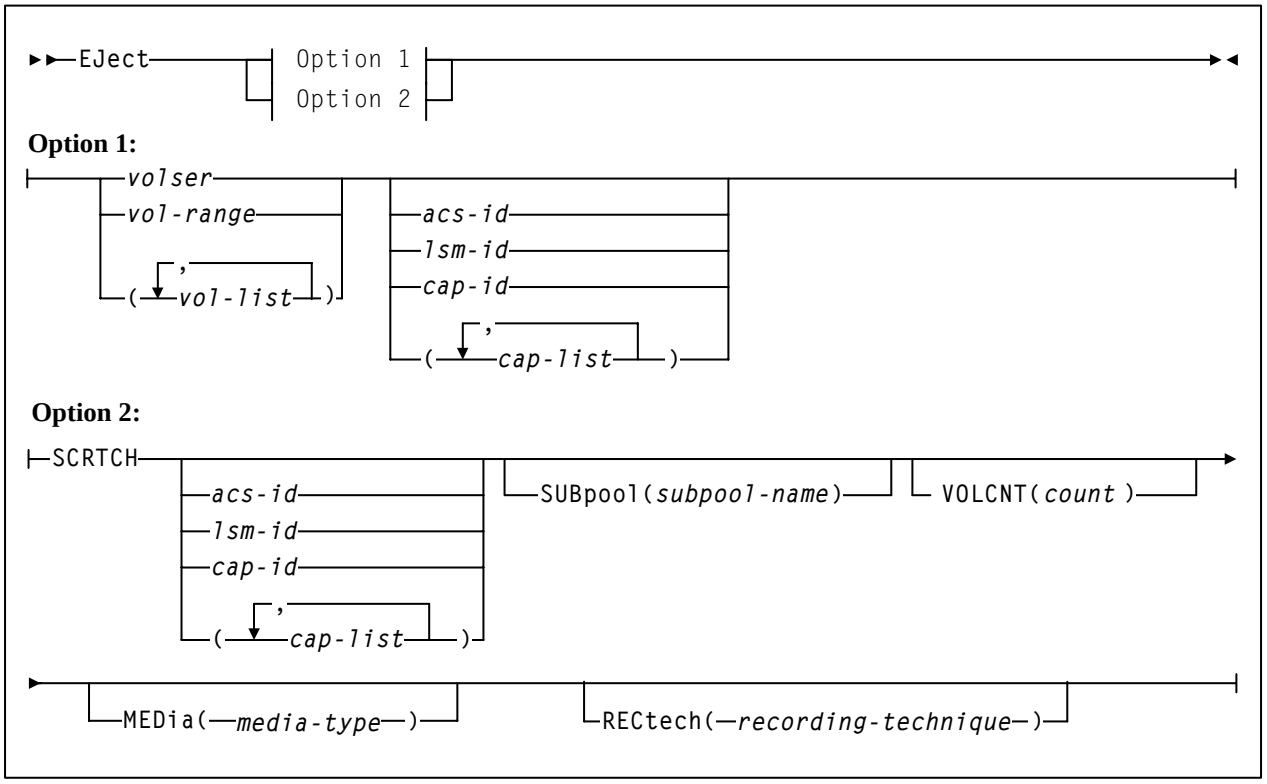
Display Volume



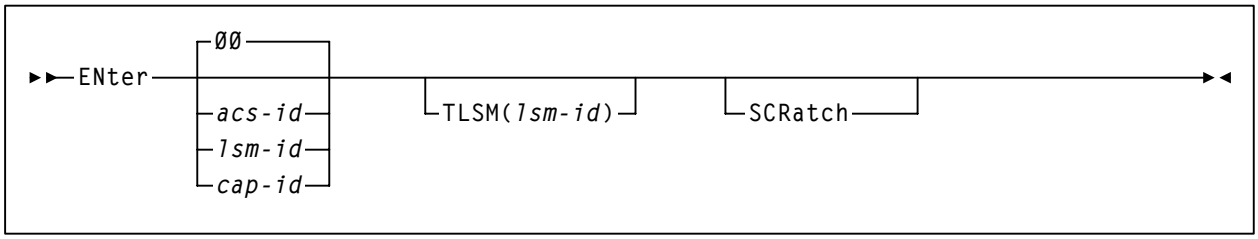
DRAin CAP command



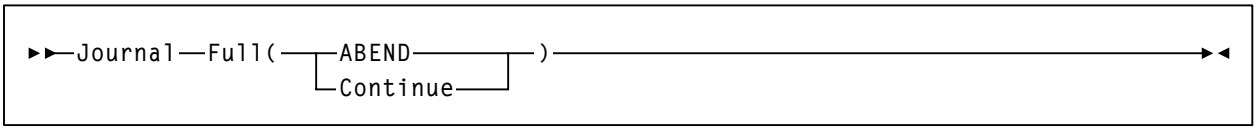
EJect command



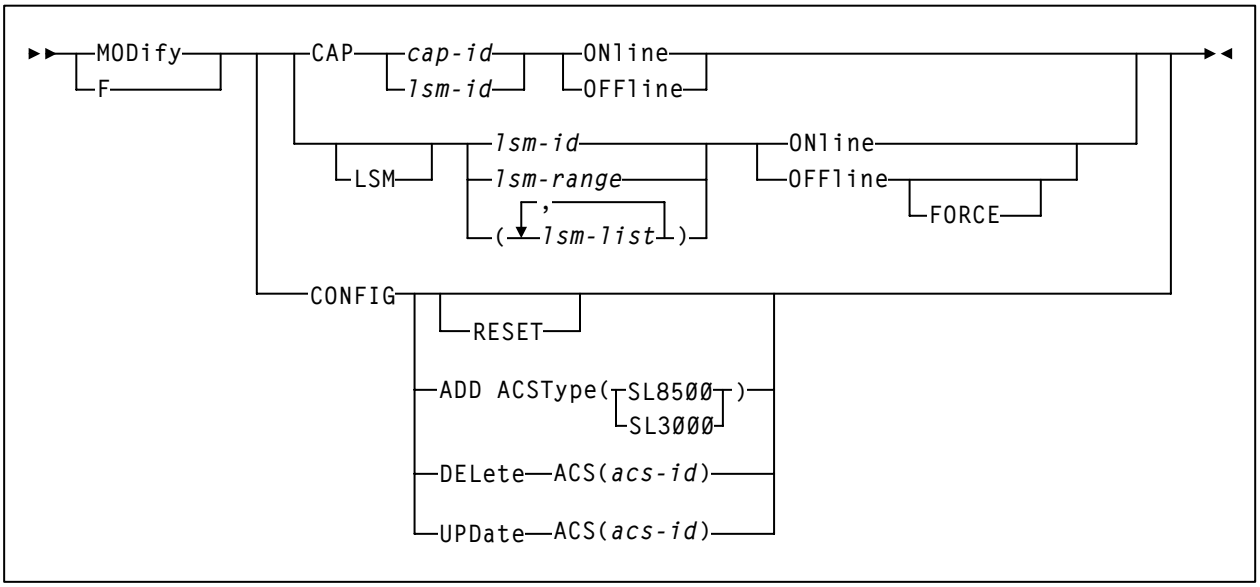
ENter command



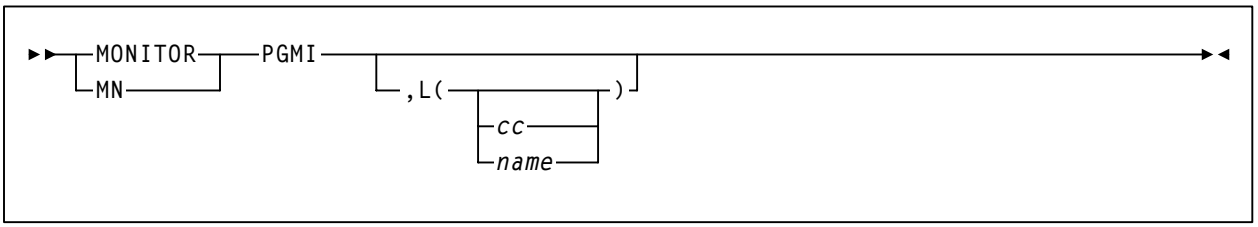
Journal command



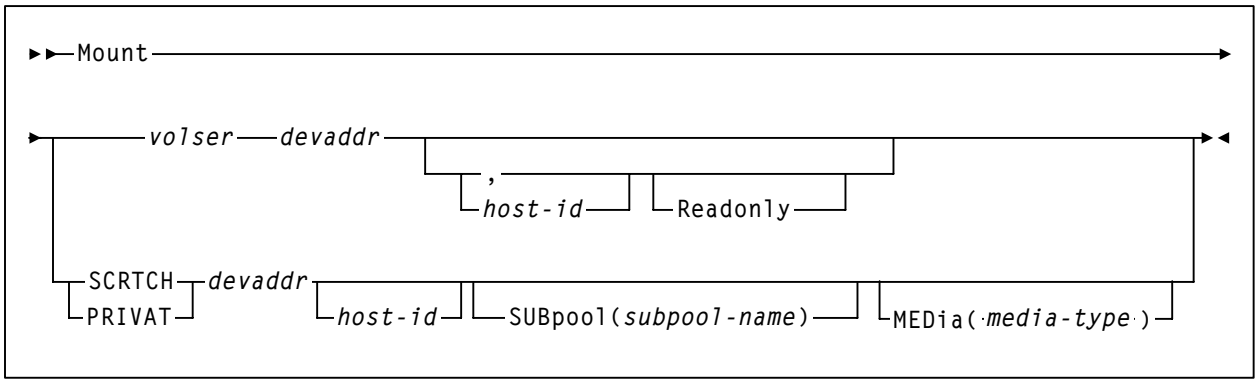
MODify command



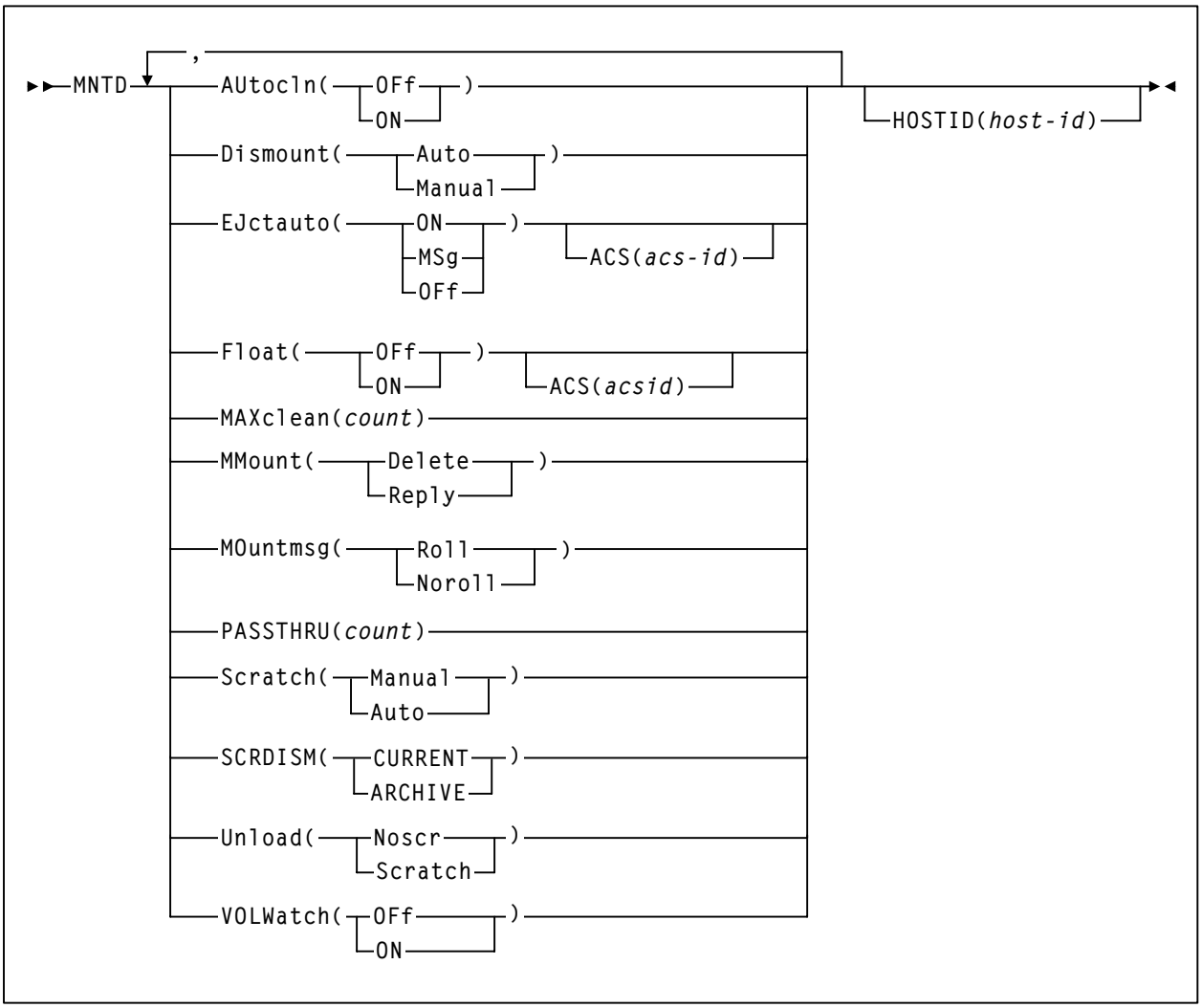
MONITOR command



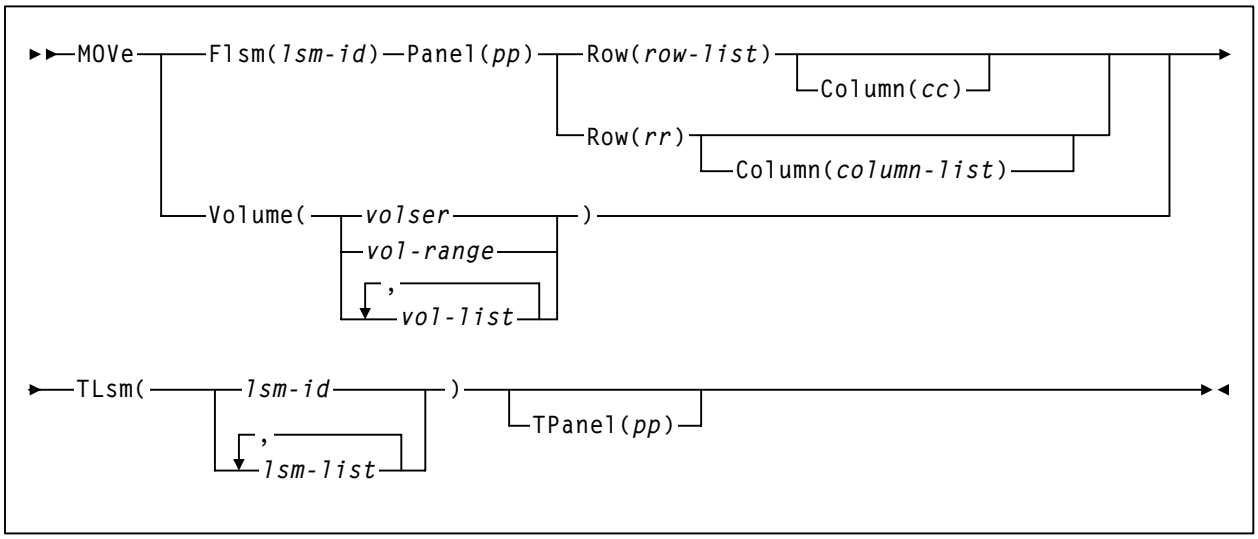
Mount command



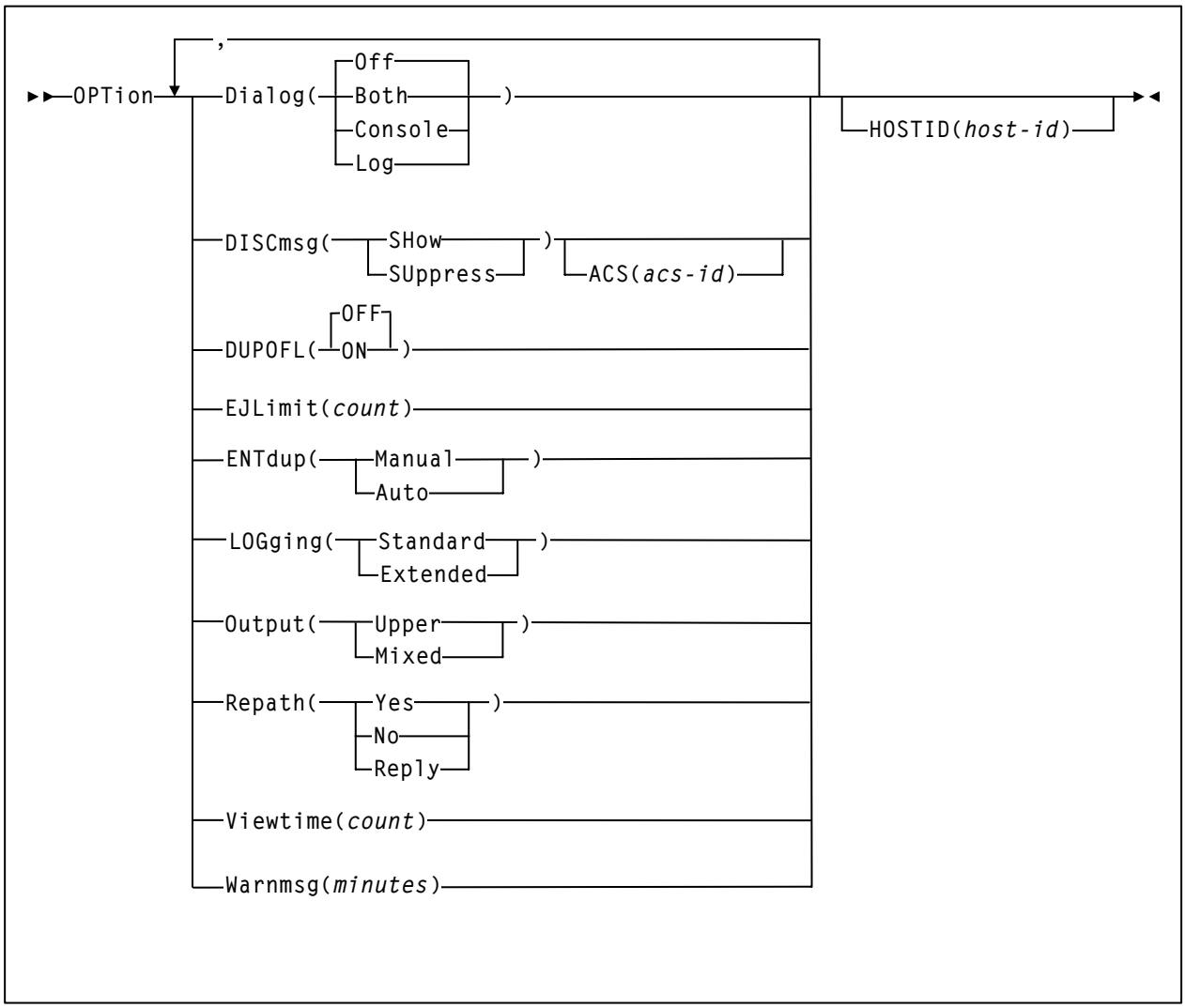
Mount/Dismount Options (MNTD) command and control statement



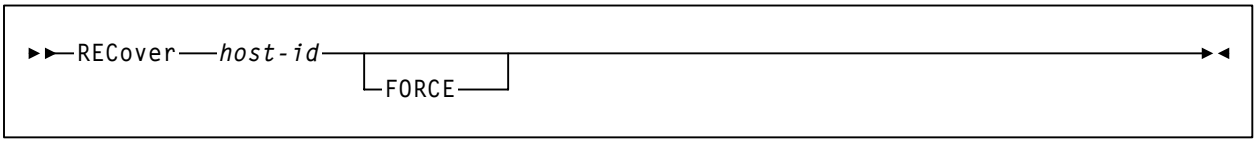
MOVe command



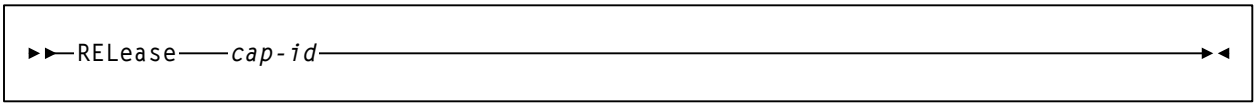
OPTion command and control statement



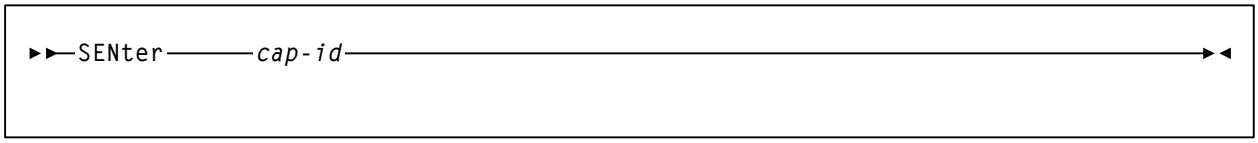
RECover Host command



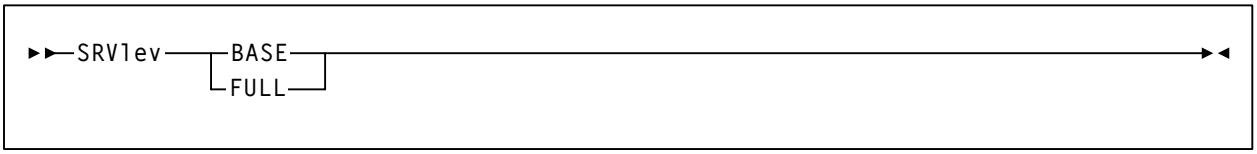
RELease CAP command



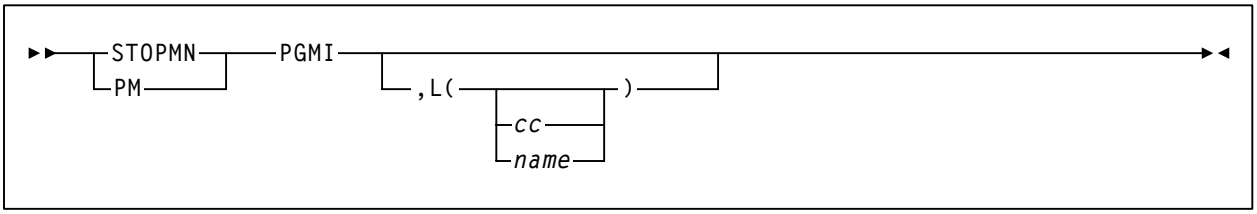
SENter command



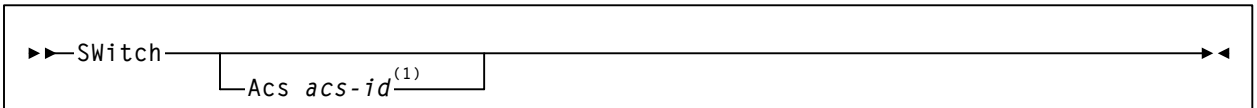
SRVlev (Service Level) command



Stop Monitoring (STOPMN) command



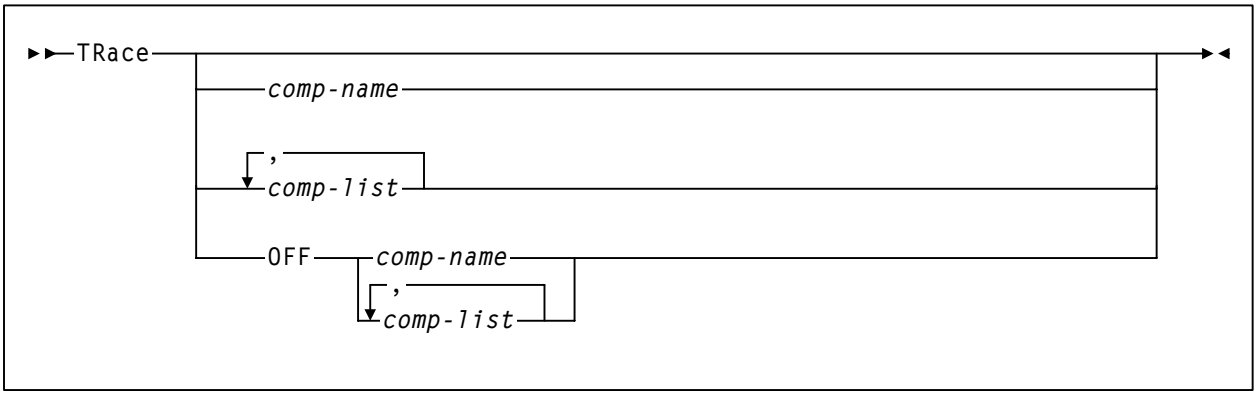
SWitch command



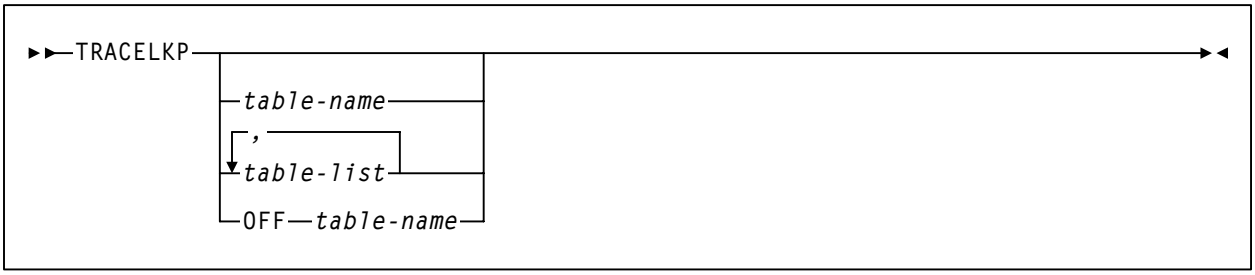
Note:

(1) ACS *acs-id* is optional in a single-ACS environment; it is required in a multiple-ACS environment.

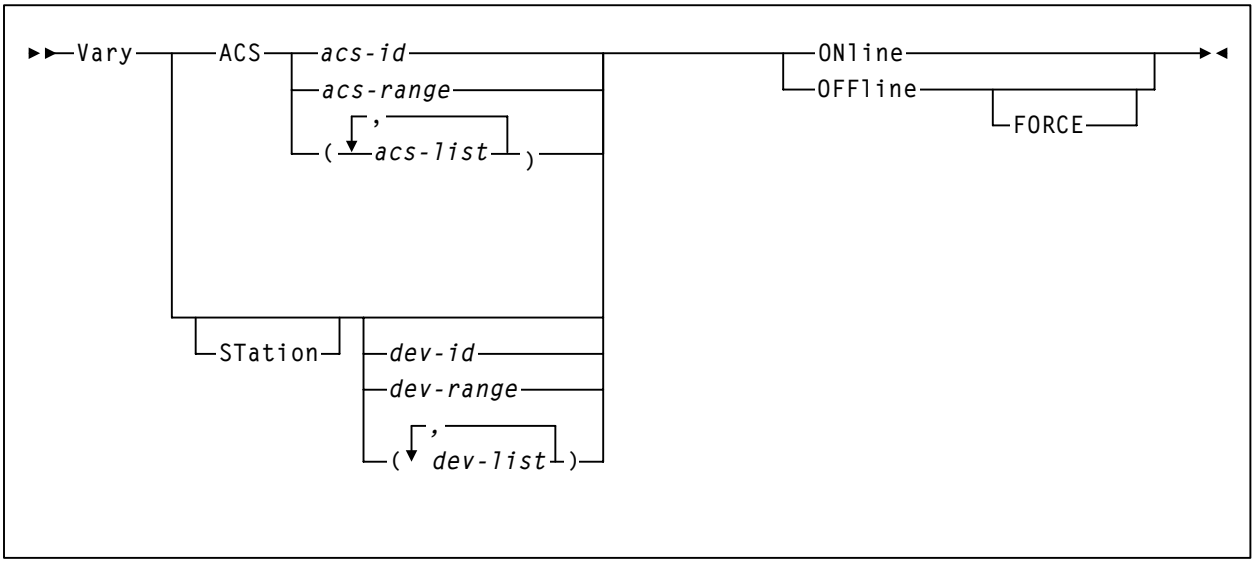
TRace command



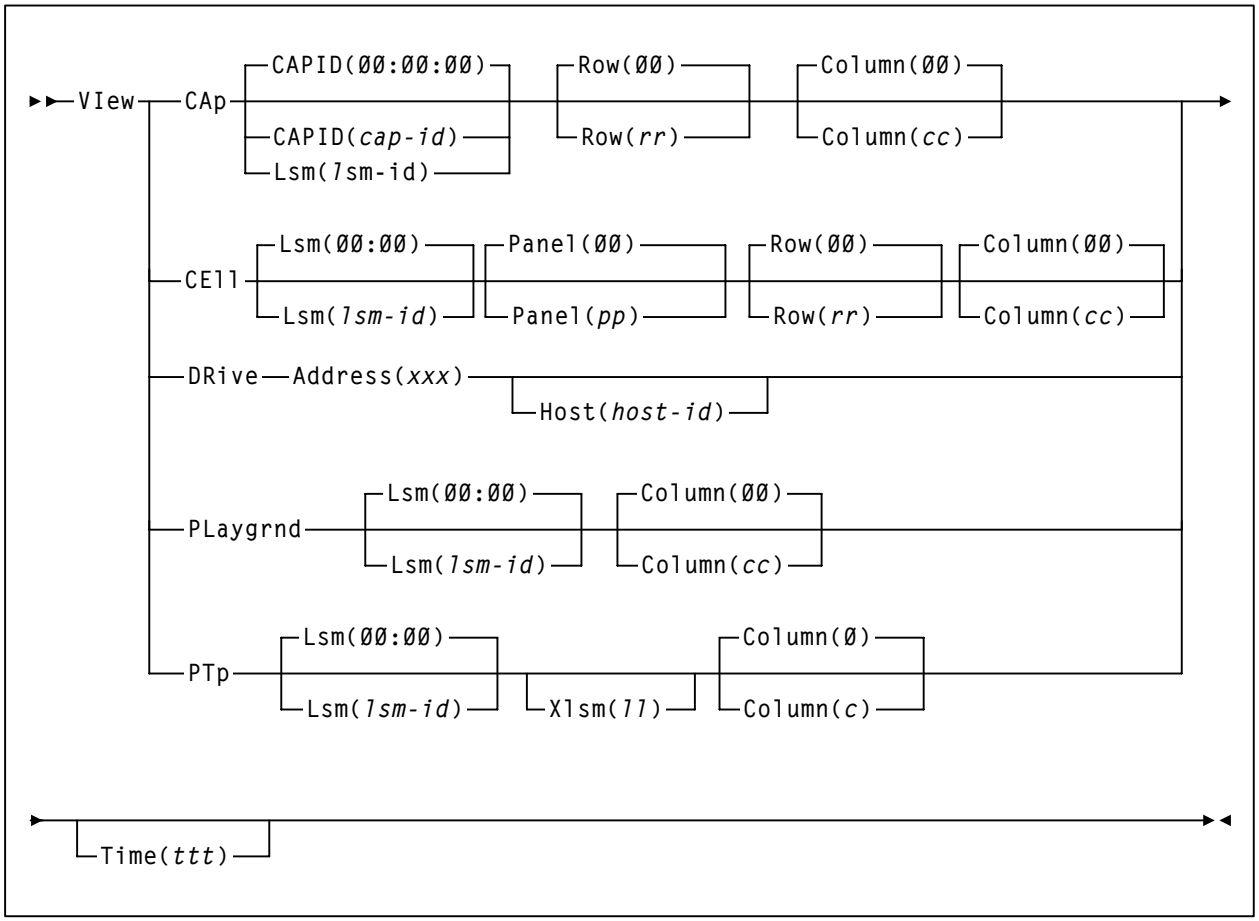
TRACELKP command



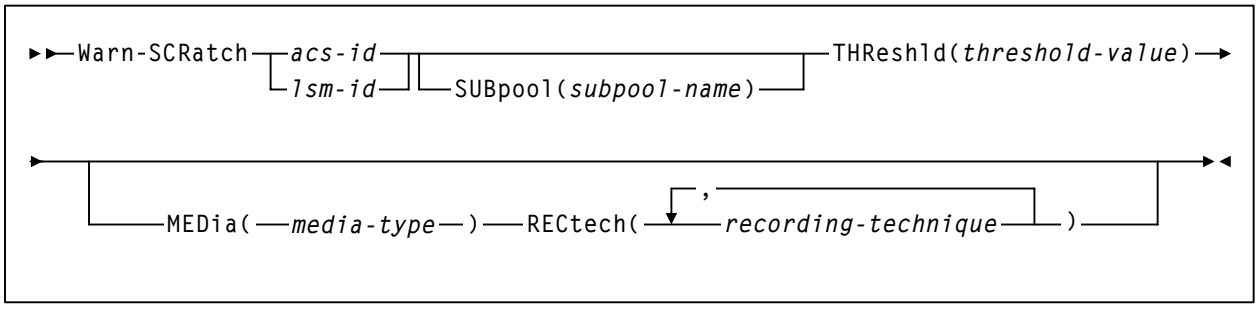
Vary Station command



VIew command

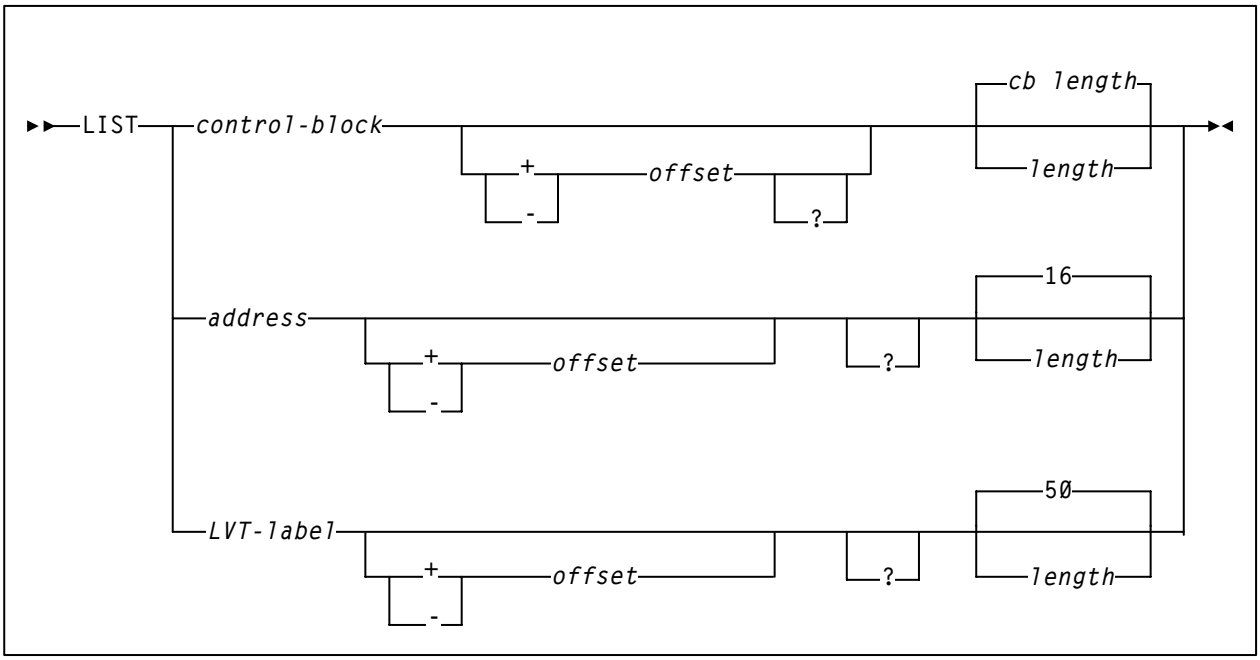


Warn command

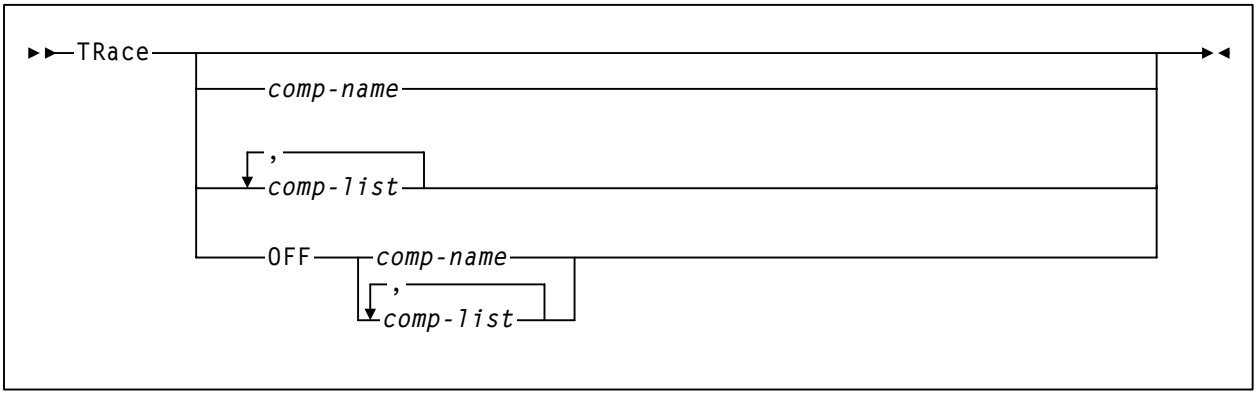


HSC Diagnostic Commands

LIst command

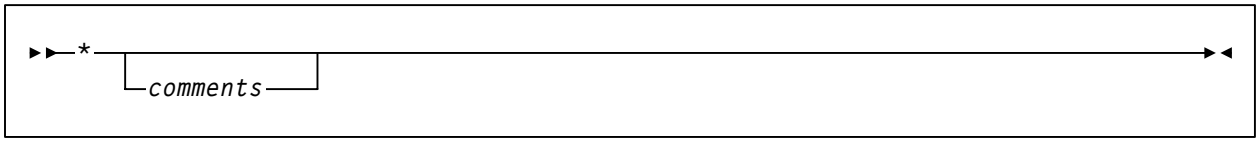


TRace command

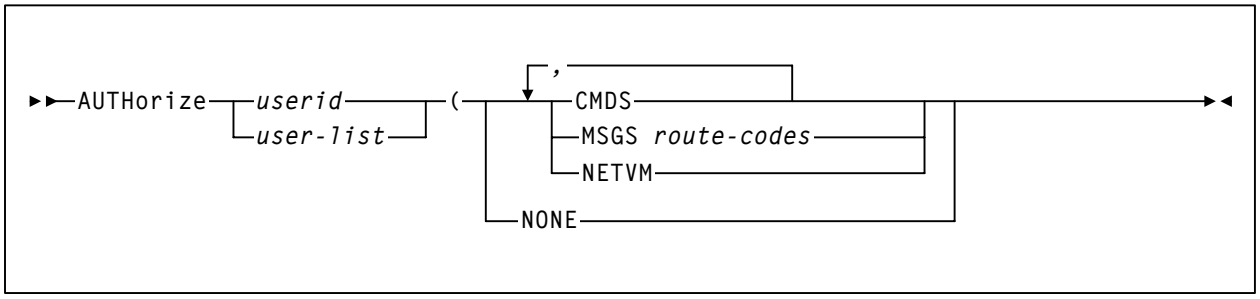


SCP Operator Commands

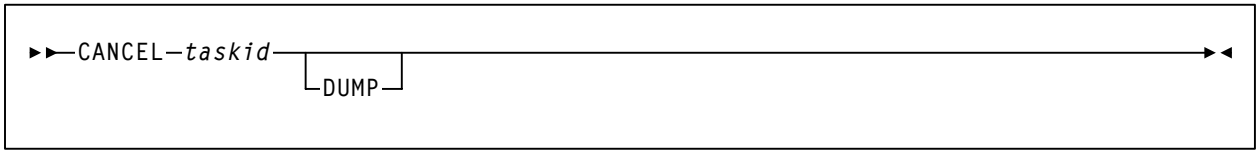
* (comment) Statement



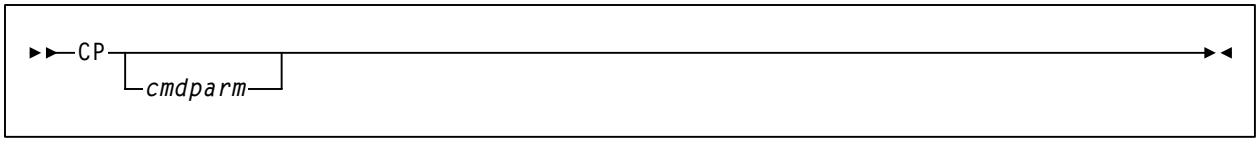
AUTHorize Command



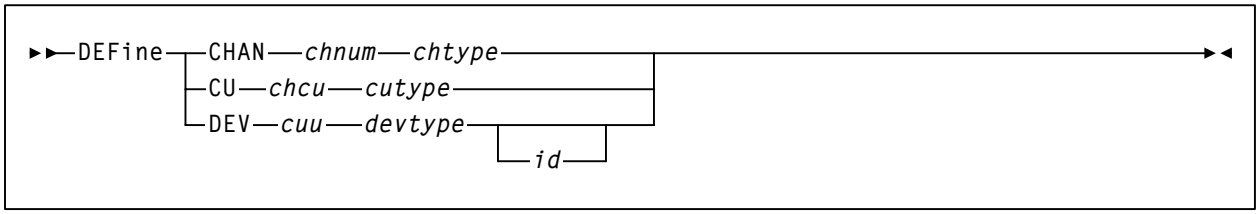
CANCEL command



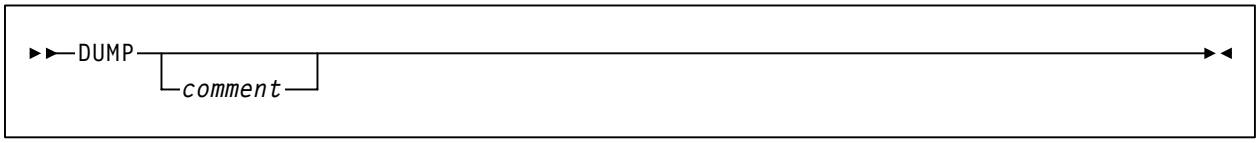
CP Command



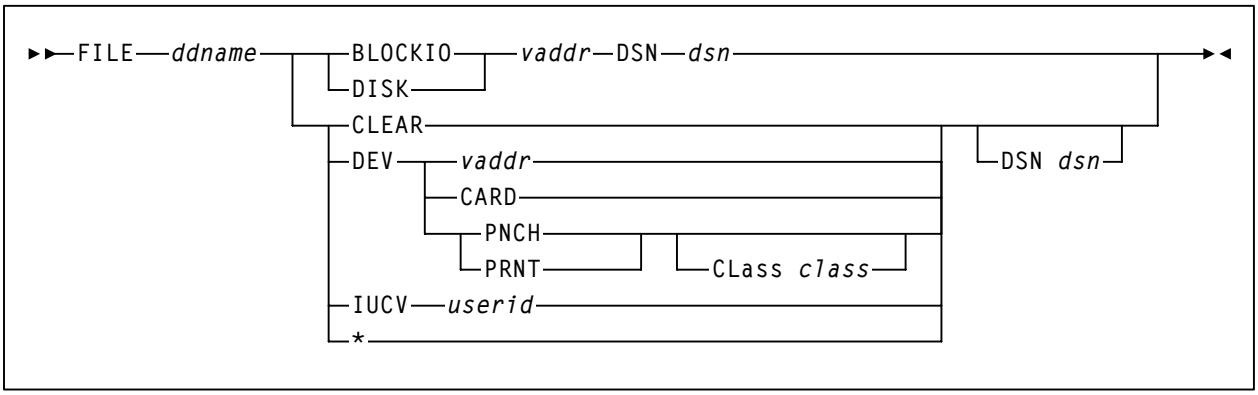
DEFine Command



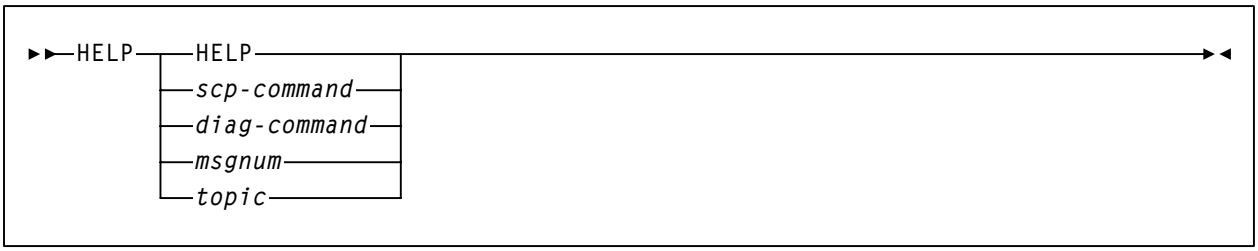
DUMP Command



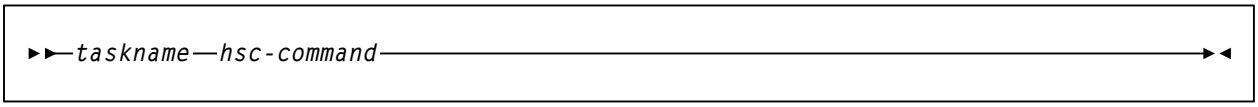
FILE Command



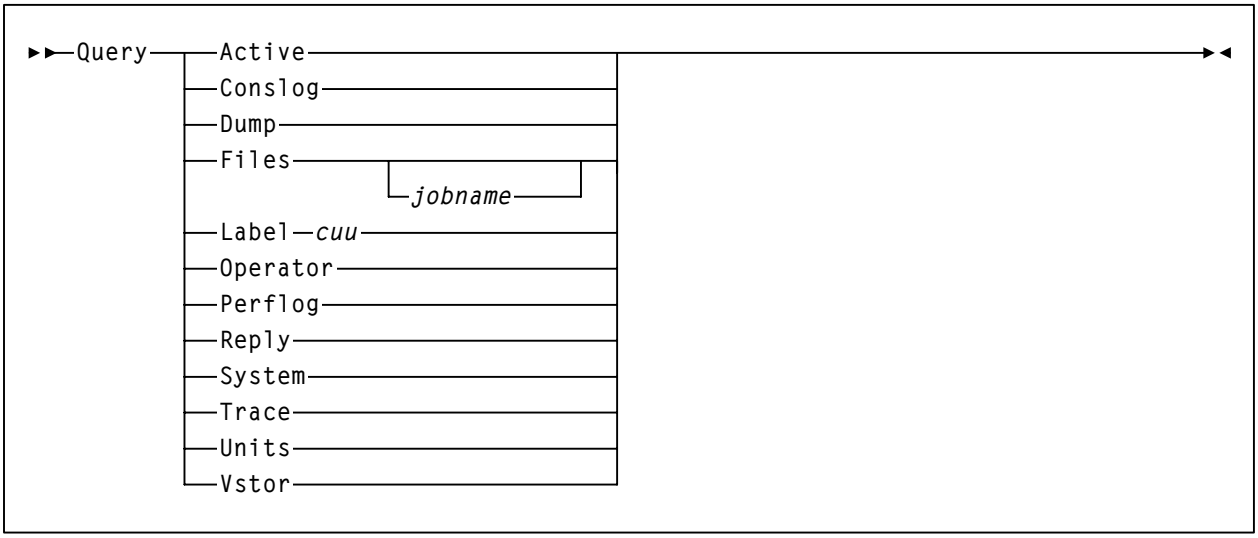
HELP Command



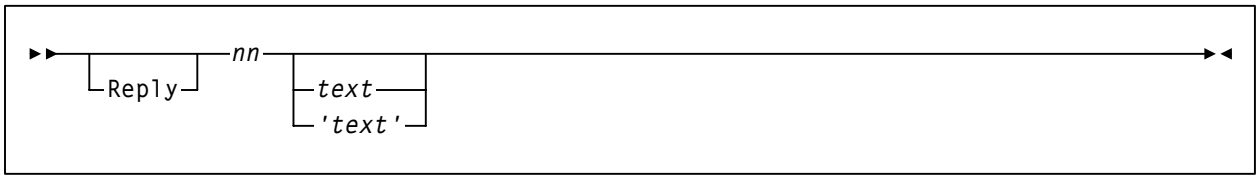
Modify Command (SCP)



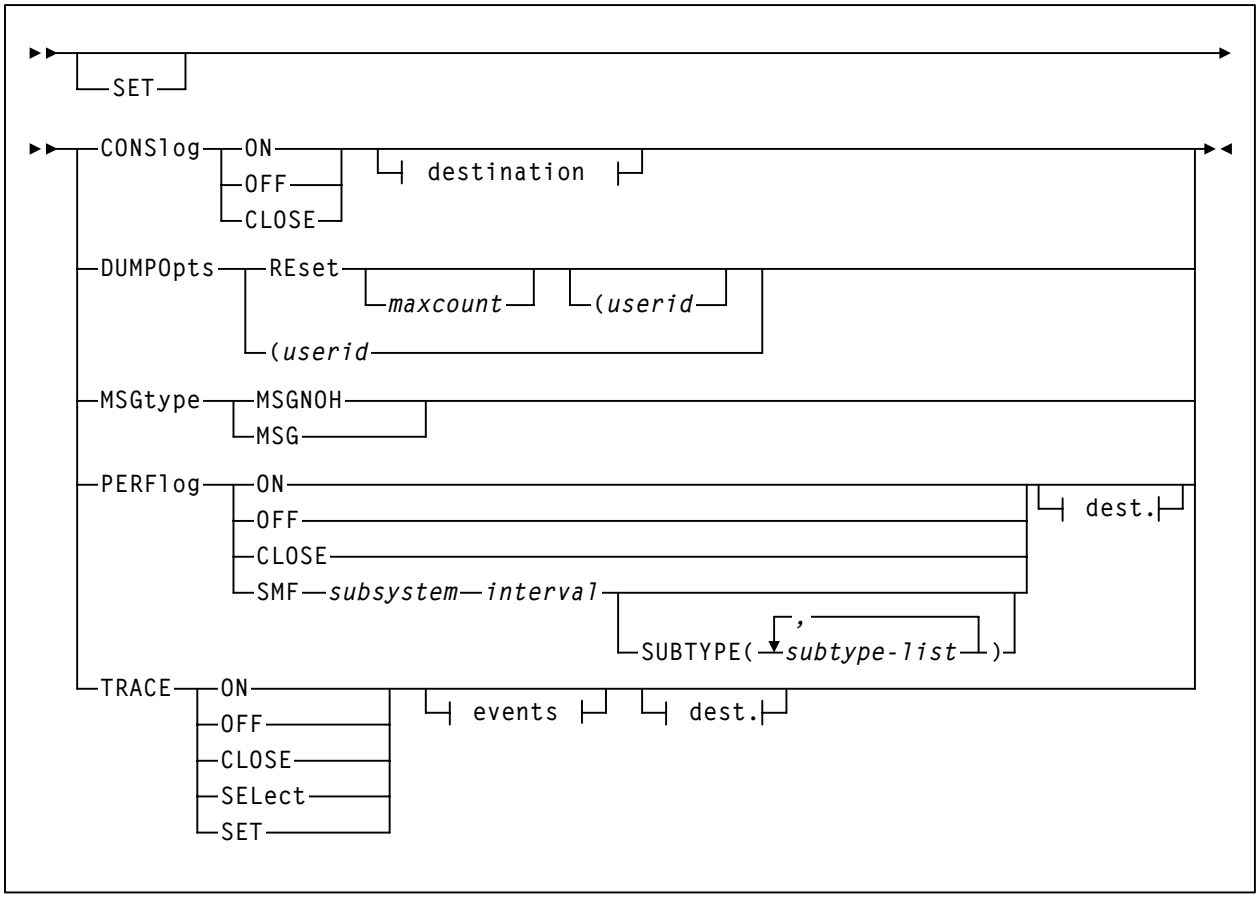
Query Command



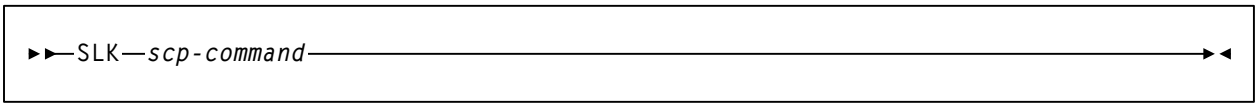
Reply Command



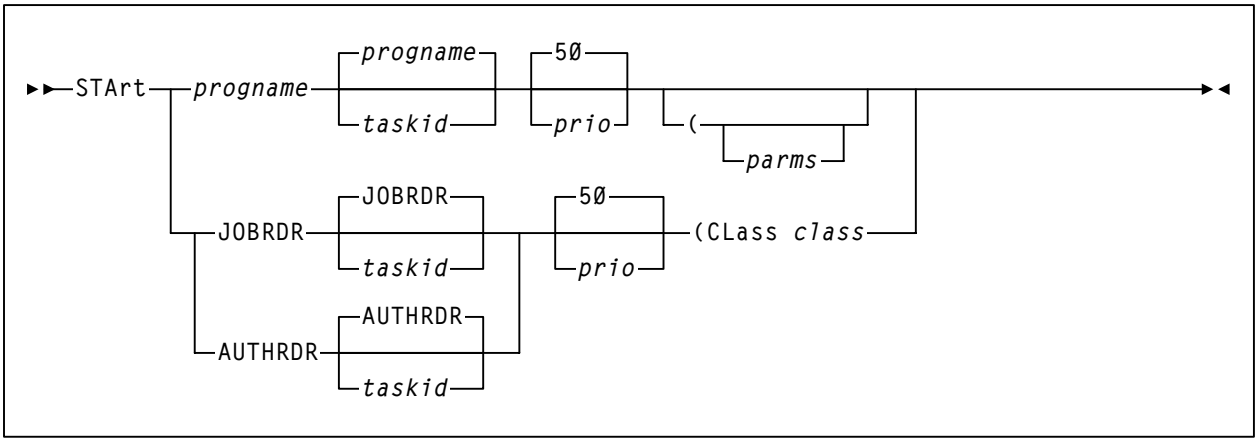
SET Command



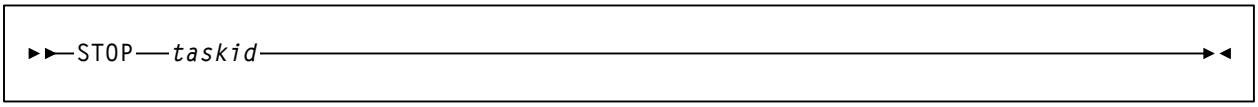
SLK Command



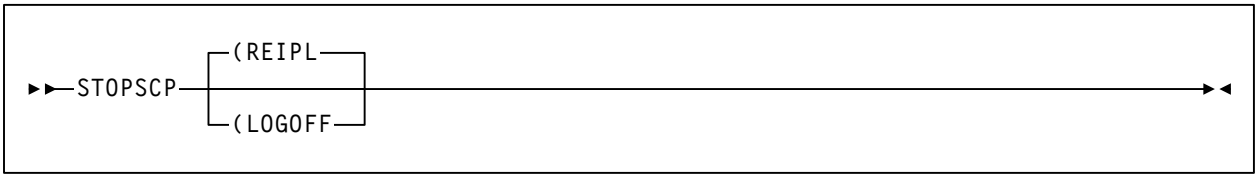
STArt Command



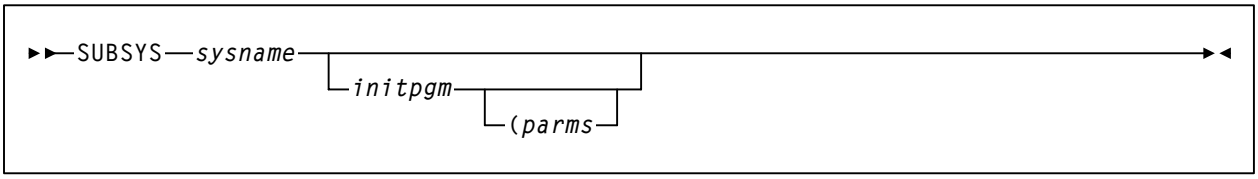
STOP Command



STOPSCP Command

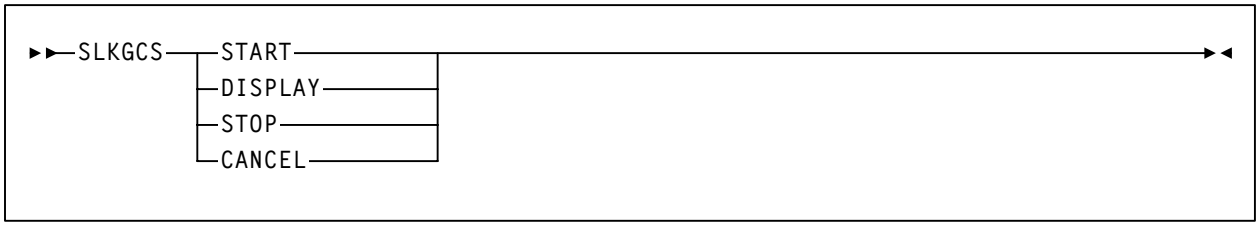


SUBSYS Command



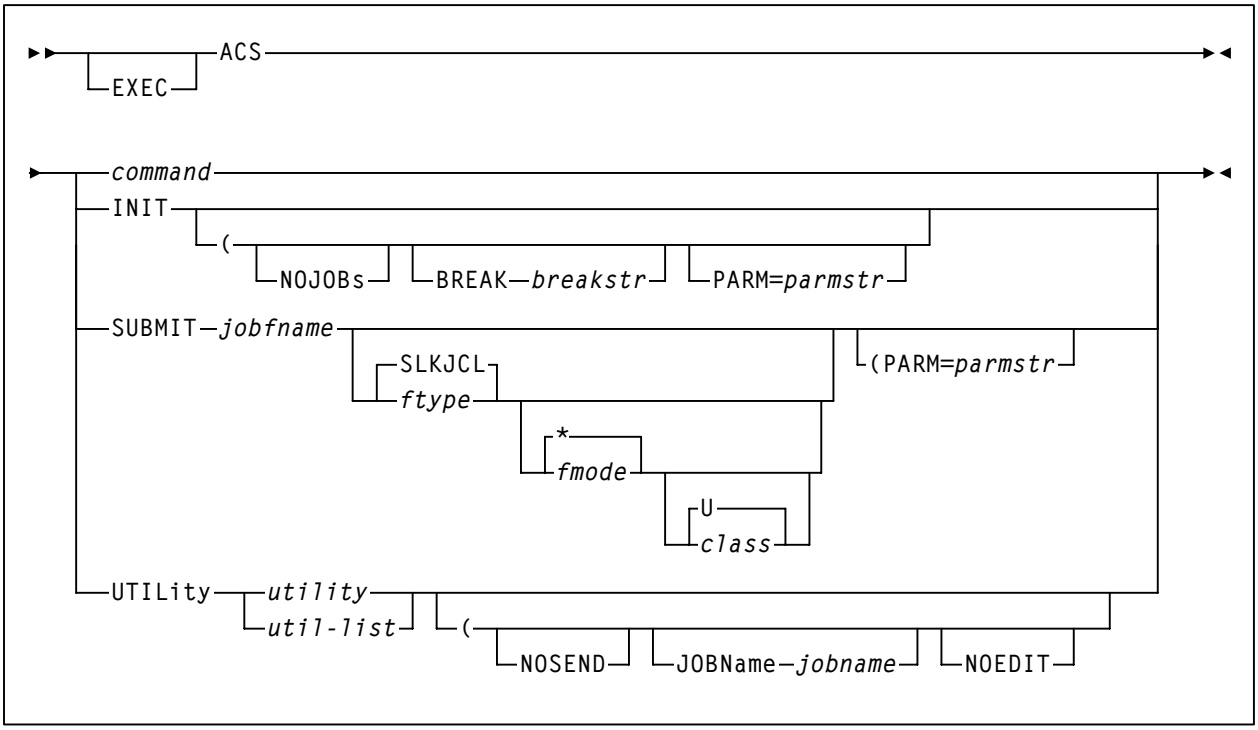
GCS Component Server Commands

SLKGCS Command

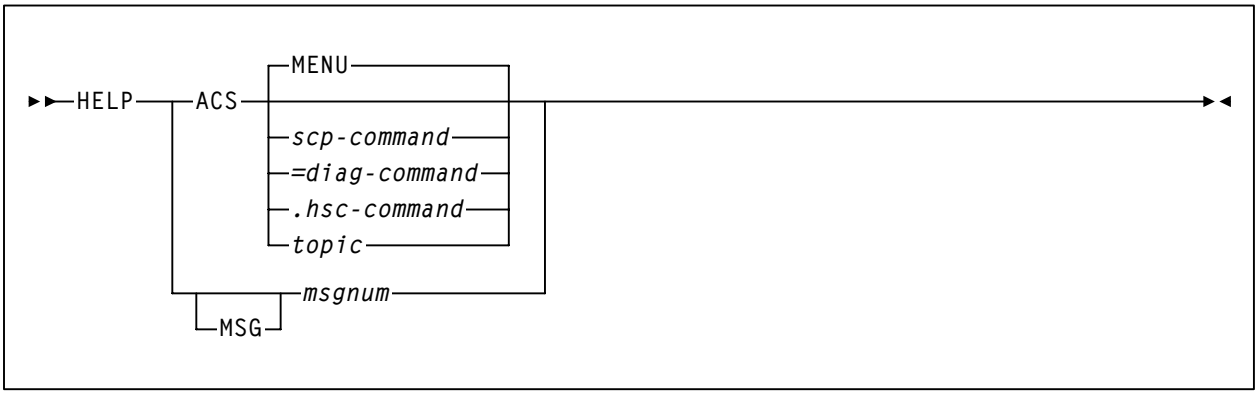


CMS Operator Commands

ACS EXEC



CMS HELP



Appendix E. CP Commands and DIAGNOSE Codes

Overview

This appendix lists all of the CP commands and programming services codes that may be issued by the VM HSC. The VM HSC uses only privilege class G DIAGNOSE codes, and with the exception of MSGNOH, uses only privilege class G commands. Refer to ‘‘Define the ACS Service Machine’’ in the *HSC Installation Guide* for more information about MSGNOH.

CP Commands

The following CP commands may be issued by the VM HSC:

CHANGE IPL	IPL	PURGE	SMSG
CLOSE	LOGOFF	QUERY	SPOOL
DEFINE	MESSAGE	RESET	TAG
DETACH	MSGNOH	SCREEN	TERMINAL
DISPLAY	ORDER	SET	TRANSFER

CP Programming Services

The following DIAGNOSE codes may be issued by the HSC:

DIAGNOSE Code X’00’ Store extended-identification code.
DIAGNOSE Code X’08’ Virtual console function
DIAGNOSE Code X’0C’ Pseudo timer
DIAGNOSE Code X’14’ Input spool file manipulation.
DIAGNOSE Code X’20’ General I/O.
DIAGNOSE Code X’24’ Device type and features.
DIAGNOSE Code X’60’ Determine virtual machine storage size.
DIAGNOSE Code X’7C’ Logical device support facility.
DIAGNOSE Code X’94’ VMDUMP function.
DIAGNOSE Code X’BC’ Open spool file (not used in VM Release 4 or HPO 4.2).
*BLOCKIO
*MSG

IUCV

Communication vehicle for API and communication with Host to Host component.

Appendix F. Record Formats

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 37 provides a key to the SMF record format tables.

Table 37. 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 38 on page 679.

Mapping Macros for LOGREC Records

Mapping macros for LOGREC records are listed in Table 49 on page 705.

Mapping Macros for Volume Report and Batch API Records

Mapping macros for Volume Report and Batch API records are listed in Table 64 on page 742.

Mapping Macros for Batch API Records

Mapping macros for Batch API Records available only through the Batch API are listed in Table 71 on page 773.

SMF Records

SMF Mapping Macros

Table 38. 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
SLSSLSB	SMF LMU ATHS Statistics Buffer
SLSSMF07	SMF Move Detail Record
SLSSMF08	SMF View Detail Record

SMF Record Formats

SLSDVAR

Table 39. 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 40. SLSSFHDR Record Format

Dec	Hex	Type	Length	Label	Description
SLSSFHDR - SMF RECORD HEADER MAP 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. SYMBOLICS: &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 ---------- THE FOLLOWING VTCS SUBTYPES DO NOT SUPPORT DSECT GENERATION BY THIS SLSSFHDR.MACRO. ---------- 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 40. 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 40. SLSSFHDR Record Format (Continued)

Dec	Hex	Type	Length	Label	Description
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

Name	Len	Offset Value
OSHDVT20	-	14
OSHDVT21	-	15
OSHDVT22	-	16
OSHDVT23	-	17
OSHDVT24	-	18
OSHDVT25	-	19
OSHDVT26	-	1A
OSHDVT27	-	1B
OSHDVT28	-	1C
SLSSTYPE	-	18

SLSSBLOS

Table 41. SLSSBLOS Record Format

Dec	Hex	Type	Length	Label	Description
SLSSBLOS - LSM OPERATIONS STATISTICS 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 SYMBOLICS: &DSECT - DSECT OR CONTINUATION OF DATA AREA. YES - PRODUCE A DSECT LISTING NO - NO DSECT					
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’		BLOSNTR	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 41. 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
BLOSNTR	-	02
BLOSPTRU	000004	14
BLOSSOPC	000004	04
BLOSSTIM	000004	08
BLOSSWS	-	08
BLOSTYP0	000001	02
BLOSVL	-	16
BLOSVL1	-	14
SLSSBLOS	000002	00

SLSSCAPJ

Table 42. 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 43. 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 44. 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 45. 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 46. SLSSLSB Record Format

Dec	Hex	Type	Length	Label	Description
SLSSLSB - LMU STATISTICS BUFFER DATA BLOCK 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: 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. SYMBOLICS: &DSECT - DSECT OR CONTINUATION OF DATA AREA. YES - PRODUCE A DSECT LISTING NO - NO DSECT					
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 46. 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 47. SLSSMF07 Record Format

Dec	Hex	Type	Length	Label	Description
DSECT: SLSSMF07 - HSC RECORD TYPE 7 MAPPING MACRO FUNCTION: MAPS THE SUBTYPE 7 SMF RECORD PRODUCED BY THE HSC. THIS IS PRODUCED FOR EACH SUCCESSFUL MOVE INITIATED BY THE HSC. 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. USAGE TIPS: TO FIND ENTER ACTIVITY WITH THE SLSSMF07 RECORDS: • FIND ALL SLSSMF07 MOVE DETAIL RECORDS WITH A SOURCE IDENTIFIER (SMF07SRI) = “CAP”(SMF07SCP). • YOU CAN DETERMINE THE LIBRARY CARTRIDGE MOVEMENT TYPE THAT INITIATED THE ENTER BY CHECKING SMF07TYP. TO FIND EJECT ACTIVITY WITHIN THE SLSSMF07 RECORDS: • FIND ALL SLSSMF07 MOVE DETAIL RECORDS WITH A DESTINATION IDENTIFIER(SMF07DEI) = “CAP”(SMF07TCP). • YOU CAN DETERMINE THE LIBRARY CARTRIDGE MOVEMENT TYPE THAT INITIATED THE EJECT BY CHECKING SMF07TYP.					
0	(0)	AREA	1	SLSSMF07	MOVE DETAIL SMF RECORD SUBTYPE
THIS DSECT MAPS THE SUBTYPE 7 RECORD PRODUCED BY THE HSC FOR EACH SUCCESSFUL MOVE IF SUBTYPE 7 RECORDING IS ENABLED.					
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 47. SLSSMF07 Record Format (Continued)

Dec	Hex	Type	Length	Label	Description
		.... .1.1 X'05'		SMF07OPR	HSC OPERATOR COMMAND INITIATED
		.... .11. X'06'		SMF07TMI	VM TMI INTERFACE
2	(2)	BITSTRING	1	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
		.... 1... X'08'		SMF07PRF	PERFORMANCE SIGNIFICANTLY IMPACTED BY LMU RETRY
3	(3)	HEXSTRING	4	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 (0CYYDDDF)
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 'FFFFFFFF' INDICATES COUNTER OVERFLOW

Table 47. 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 47. 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 0CYYDDF.
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 47. 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

Name	Len	Offset Value
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’

Name	Len	Offset Value
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 48. SLSSMF08 Record Format

Dec	Hex	Type	Length	Label	Description
SLSSMF08 - HSC RECORD TYPE 8 MAPPING MACRO FUNCTION: MAPS THE SUBTYPE 8 SMF RECORD PRODUCED BY THE HSC. THIS IS PRODUCED FOR EACH SUCCESSFUL VIEW COMMAND INITIATED BY THE HSC. SPECIAL CONSIDERATIONS: This data represents a record that is written out to the SMF data set.					
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

Name	Len	Offset Value
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 49. 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 50. SLSSLHDR Record Format

Dec	Hex	Type	Length	Label	Description
SLSSLHDR - LOGREC RECORD HEADER MAP 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. SYMBOLICS: &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 & Softfail Counts 7000 - DATABASE JOURNALLING 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					
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 50. 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	OLHDRRAL	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	OLHDRTYP	RECORD TYPE or Subtype number
642	(282)	CONST		LTYPAREA	HSC SOFTWARE ERROR RECORD TYPE
16385	(4001)	CONST		LTYP4001	- VOL/CELL FORCE UNSELECT RECORD
20480	(5000)	CONST		LTYP5000	- INIT/TERM LOGREC RECORD
25857	(6501)	CONST		LTYP6501	- LMU DRIVER LOGREC FORMAT 1
25858	(6502)	CONST		LTYP6502	- LMU DRIVER LOGREC FORMAT 2
25859	(6503)	CONST		LTYP6503	- LMU DRIVER LOGREC FORMAT 3
25860	(6504)	CONST		LTYP6504	- LMU DRIVER LOGREC FORMAT 4
25861	(6505)	CONST		LTYP6505	- DUAL LMU STATUS CHANGE RECORD
25862	(6506)	CONST		LTYP6506	- R+ Robotic Motion & Softfail Counts
28672	(7000)	CONST		LTYP7000	- DATABASE JOURNALING LOGREC RECORD
28673	(7001)	CONST		LTYP7001	- DATABASE PRIMARY SHADOW SWITCH RECORD
34048	(8500)	CONST		LTYP8500	- RECOVERY ERDS RECORD 0
34049	(8501)	CONST		LTYP8501	- RECOVERY ERDS RECORD 1
37377	(9201)	CONST		LTYP9201	- HOST COMMUNICATIONS LOGREC FORMAT 1
644	(284)	HEXSTRING	4	OLHDSTC	STC RECORD X’FEEDFACE’
648	(288)	HEXSTRING	4	OLHDETIM	TIMESTAMP

Table 50. SLSSLHDR Record Format (Continued)

Dec	Hex	Type	Length	Label	Description
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

Name	Len	Offset Value
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 51. 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

Name	Len	Offset Value
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 52. 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

Name	Len	Offset Value
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 53. 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’		LLG1NTCT	CAN’T HAVE INTERMEDIATE RESP
		.... 1... X’08’		LLG1NTNM	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 53. 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 53. 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

Name	Len	Offset Value
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
SLSSLLG1	000002	00

SLSSLLG2

Table 54. 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 54. 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 55. 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 56. 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

Name	Len	Offset Value
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 57. 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 57. 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

Name	Len	Offset Value
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 58. 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 58. 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 58. SLSSLLG6 Record Format (Continued)

Dec	Hex	Type	Length	Label	Description
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

Name	Len	Offset Value
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 59. SLSSDJLR Record Format

Dec	Hex	Type	Length	Label	Description
SLSSDJLR - DATABASE JOURNALING LOGREC MAP FUNCTION: TO MAP THE VARIABLE LENGTH AREA OF THE JOURNALLING ERDS LOG RECORD WHICH BEGINS AT LABEL OLHDRCRD OF OLHDR LOGREC MAPPING MACRO. SPECIFYING OLHDR TYPE=7000 WILL GENERATE THIS MAP VIA AN INNER MACRO CALL WITHIN OLHDR. SYMBOLICS: &DSECT - DSECT OR CONTINUATION OF DATA AREA. YES - PRODUCE A DSECT LISTING NO - NO DSECT					
0	(0)	AREA	2	SLSSDJLR	DATABASE JOURNALLING 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 59. 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 60. 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

Name	Len	Offset Value
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 61. 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 62. 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 63. 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 63. 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 773 to see SLUVDDAT and SLUVPDAT, which are used only by the Batch API.

Table 64. 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 65. 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	ACSLTYPS	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		ACSFXLEN	LENGTH OF FIXED PORTION
42	(2A)	OFFSET		ACSLSMBG	BEGINNING OF LSM ENTRIES
ACSLSMS 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 65. 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	LSMNPGCS	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	LSMNXPRT	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 65. 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 65. 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'		LSMWP0PT	..1. ..1. - WOLF PANEL 0 W/PTP
		..1. ..11 X'23'		LSMW1NOD	..1. ..11 - WC PANEL WITHOUT DRIVE
		..1. .1.. X'24'		LSMWP1DR	..1. .1.. - WOLF PANEL 1 W/DRIVE
		..1. .1.1 X'25'		LSMWPNL2	..1. .1.1 - WOLF PANEL 2
		..1. .11. X'26'		LSMWP2PT	..1. .11. - WOLF PANEL 2 W/PTP
		..1. .111 X'27'		LSMWPNL3	..1. .111 - WOLF PANEL 3
		..1. 1... X'28'		LSMWP3DR	..1. 1... - WOLF PANEL 3 W/DRIVE
		..1. 1..1 X'29'		LSMWP41C	..1. 1..1 - WOLF PANEL 4 W/1 CAP
		..11 .... X'30'		LSMWP42C	..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 65. 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
ACSFXLEN	-	2A
ACSHCNMP	000004	04
ACSLSMBG	-	2A
ACSLTYPS	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

Name	Len	Offset Value
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

Name	Len	Offset Value
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

Name	Len	Offset Value
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 66. 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'		CFGCHKEP	..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 66. 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
CFGCMDPF	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
CFGLNGTH	-	1A
CFGMXLSM	-	100
CFGNMACS	000002	0C
CFGSCRAL	-	01
CFGSCRBL	-	04
CFGSCRLB	000001	19
CFGSCRNA	-	05
CFGSCRNL	-	02
CFGSCRNS	-	03
CFGSCRSL	-	00
CFGSMFTY	000001	14
CFGTOTCA	000002	10
CFGTOTDR	000002	12
CFGTOTLS	000002	0E
CFGTOTXP	000004	04

SLUVHDAT

Note: Field HSTLIBEN contains only the first 16 ACS esoterics.

Table 67. 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 67. SLUVHDAT Record Format (Continued)

Dec	Hex	Type	Length	Label	Description
		.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 68. 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	CDSCDATE	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 68. SLUVIDAT Record Format (Continued)

Dec	Hex	Type	Length	Label	Description
0	(0)	CHARACTER	44	CDSDSN	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 69. 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

Name	Len	Offset Value
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 5.1, 6.0, or 6.1 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 70. 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 70. 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 70. 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 *
THE FOLLOWING FIELDS: VOLTDINS, VOLTDSEL, VOLTDMNT 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. 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. THE VALUES IN FIELDS: VOLDTINS, VOLTMINS, VOLDTSEL, VOLTMSEL, VOLDTMNT, VOLTMMNT 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 VOLTDINS, VOLTDSEL, AND VOLTDMNT.					
56	(38)	SIGNED-FWORD	4	VOLTDINS	TOD CLOCK VALUE WHEN VOLUME WAS INSERTED INTO THE LIBRARY
60	(3C)	SIGNED-FWORD	4	VOLTDSEL	TOD CLOCK VALUE WHEN VOLUME WAS LAST SELECTED
64	(40)	SIGNED-FWORD	4	VOLTDMNT	TOD CLOCK VALUE WHEN VOLUME WAS LAST MOUNTEDD

Table 70. 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/VOLTMMNT 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 70. SLUVVDAT Record Format (Continued)

Dec	Hex	Type	Length	Label	Description
		..1. .... X’20’		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
121	(79)	BITSTRING	1	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 70. 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		VOLSCELL	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 70. SLUVVDAT Record Format (Continued)

Dec	Hex	Type	Length	Label	Description
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

Name	Len	Offset Value
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

Name	Len	Offset Value
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’
VOLSCELL	-	‘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’

Name	Len	Offset Value
VOLSPNLN	000001	03
VOLSPNON	-	‘CVAL’
VOLSPNSL	-	‘CVAL’
VOLSPSL	-	‘CVAL’
VOLSRCE	000006	7E
VOLSROWN	000001	04
VOLSTYPE	000001	00
VOLTDINS	000004	38
VOLTDMNT	000004	40
VOLTDSEL	000004	3C
VOLTMINS	000008	4C
VOLTMMNT	000008	6C
VOLTMSEL	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 742 to see the records that map both Volume Report and Batch API.

Table 71. 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 I, “Batch Application Program Interface (API)” for more information.

Table 72. 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 72. 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

Name	Len	Offset Value
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
UVDRACF	-	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’

Name	Len	Offset Value
UVD994B5	-	‘CVAL’

SLUVPDAT

This record is produced only by the Batch API QCDS request. Refer to Appendix I, "Batch Application Program Interface (API)" for more information.

Table 73. 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 CAPHOST
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	UVPNPRIO	NUMBER OF CAP PRIORITY ELEMENTS

Table 73. 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
UVPNPRIO	000002	1E
UVPNROWS	000001	1A
UVPPANEL	000001	32
UVPPCAP	-	80
UVPPRITY	000001	22
UVPRT	000001	00
UVPTWOPT	-	04

Name	Len	Offset Value
UVPTWSTD	-	03
UVPTYPE	000001	33
UVP9740	-	05

Appendix G. Logging ACS Robotics Motion

Overview

Sun 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

Sun 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.

Note: Robotic motion start counts and temporary motion errors will only be recorded if OPTION LOGGING is set to EXTENDED.

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 VIew 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 74. 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 Sun StorageTek identifier (X’FEEDFACE’ at bytes 644-647) is present.

Such a record is called an LLG6 record. Refer to Appendix F, “Record Formats” to see the record layout for LLG6.

Table 74. 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 74. Format for Total Motions and Temporary Error Counts (Continued)

Initiated and Temporary Error Motion Software Error Record	
BYTE #	**Description of Field**
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 74. Format for Total Motions and Temporary Error Counts (Continued)

Initiated and Temporary Error Motion Software Error Record	
BYTE #	**Description of Field**
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	Sun 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 75. 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 Sun 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 75. Record Format for a Hard Failure

Motion Hard Fail 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 '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 75. Record Format for a Hard Failure (Continued)

Motion Hard Fail Software Error Record	
BYTE #	**Description of Field**
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	Sun StorageTek identifier X’FEEDFACE’
648-651	Timestamp

Logging Interval

When LMU 3.0 or 9315/9330 1.0 µ-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 791 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 Sun 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:

Code	Description
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 76. 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 77. 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 78. 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 79. 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 79. 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 80. 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 81. 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 82. 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 83. 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 84. 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 84. 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
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 84. 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 85. 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 86. 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 H. 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.

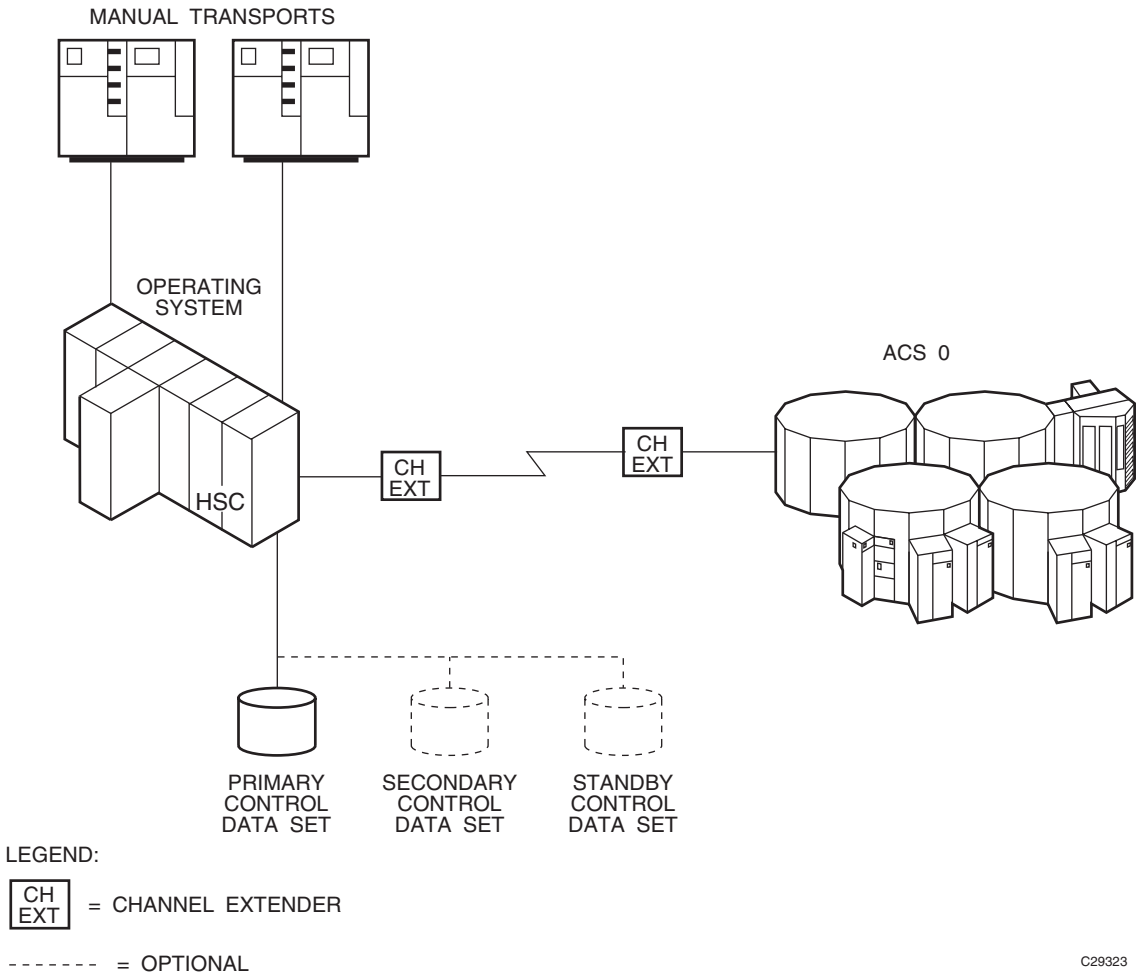


Figure 59. Configuration 1

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.

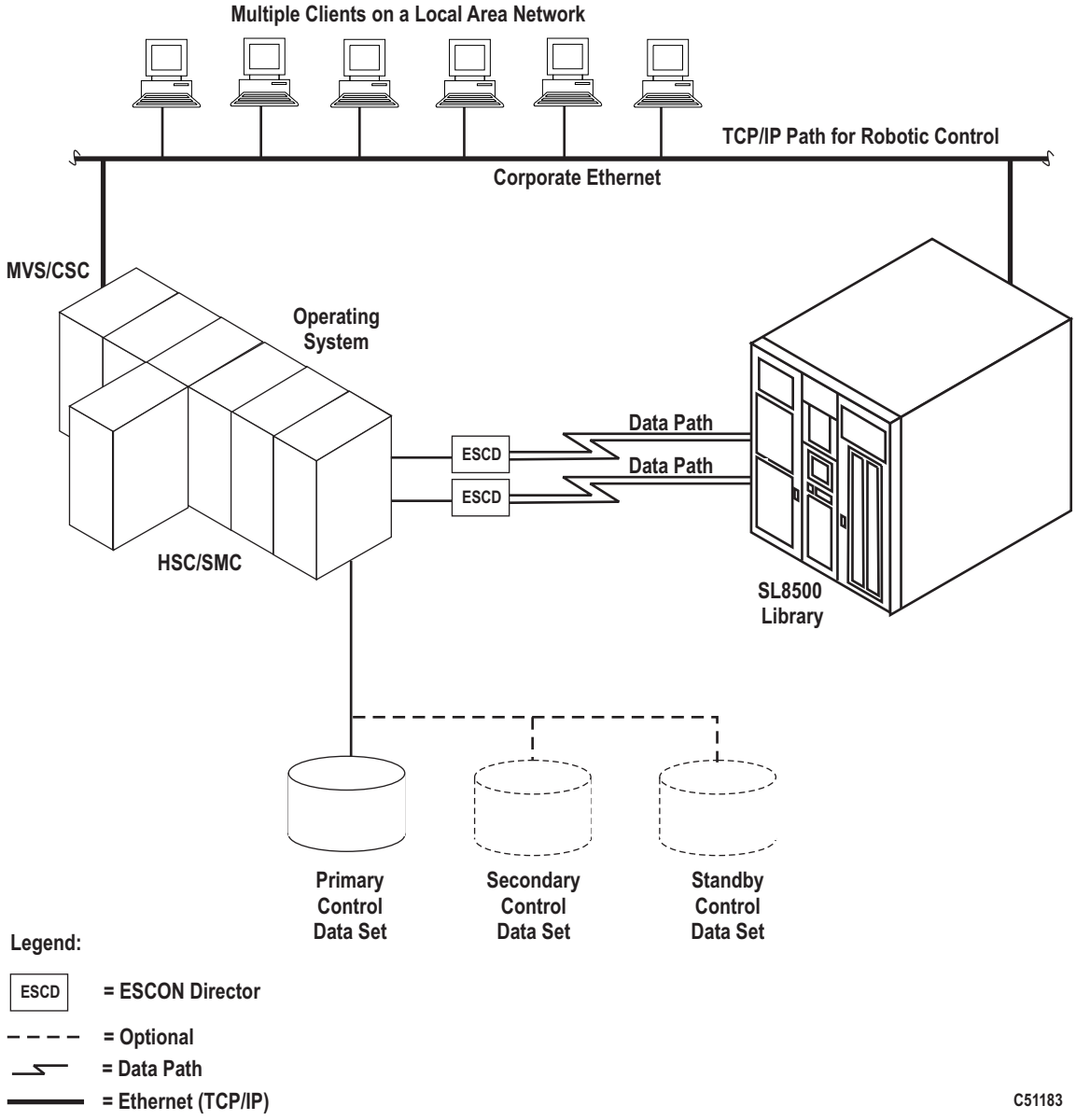


Figure 60. Configuration 2

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.

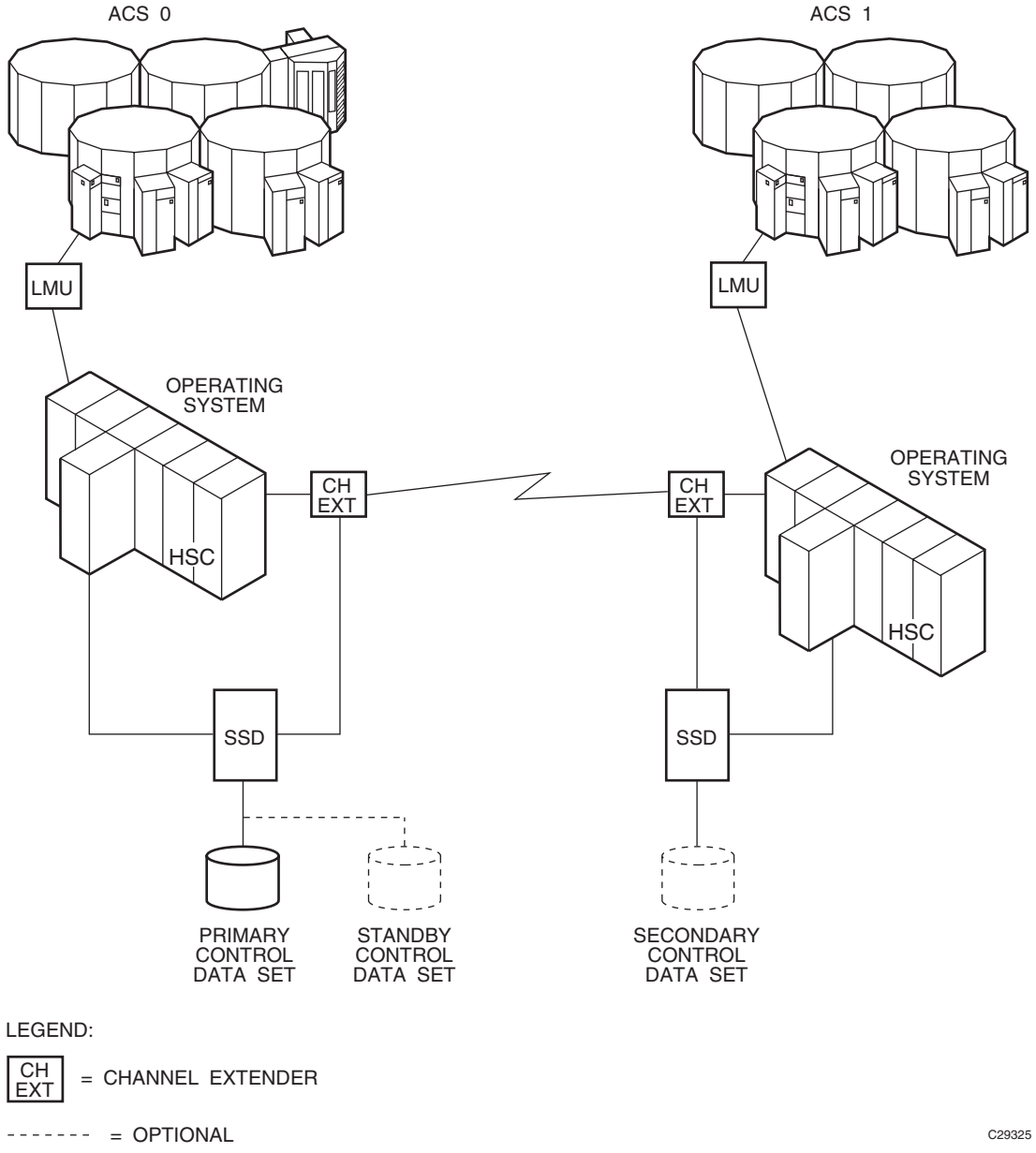


Figure 61. Configuration 3

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.

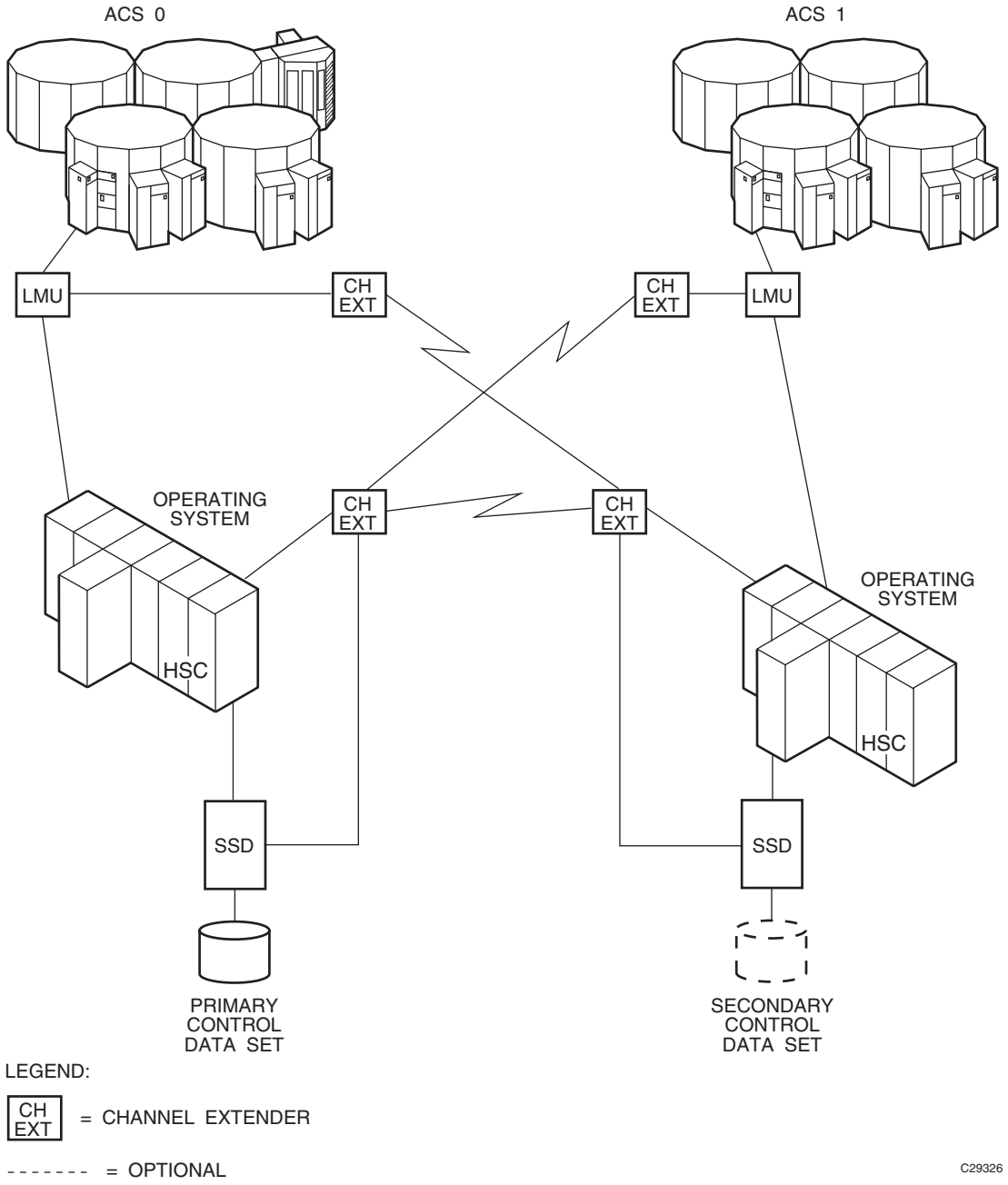


Figure 62. Configuration 4

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.

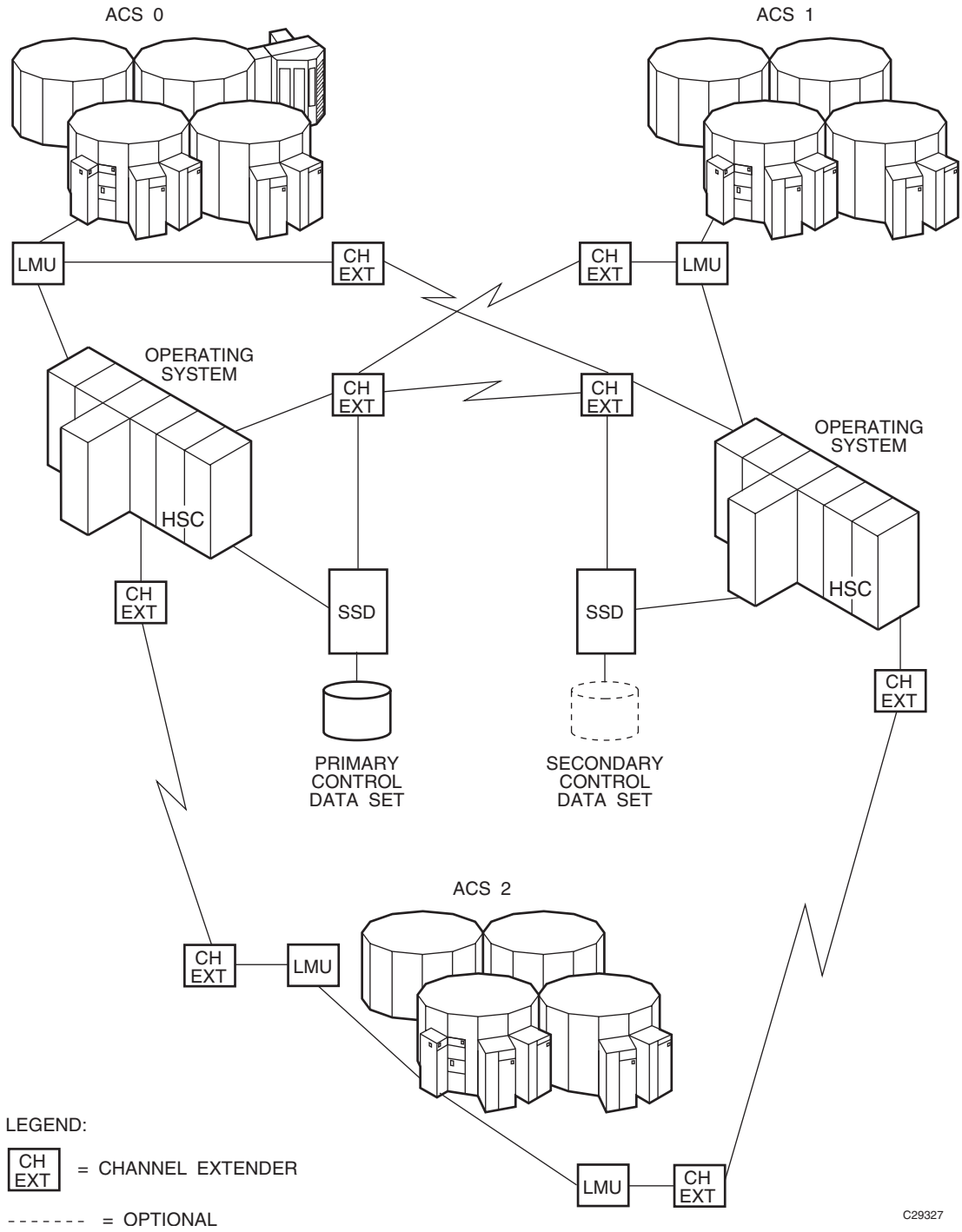


Figure 63. Configuration 5

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 87 lists the functions and the programming precautions that must be followed for associated configurations.

Table 87. Programming and Operation Precautions for Remote-linked Libraries

Function	Applicable Configuration(s)
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

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” on page 167 and the AUDIt, BACKup, and RESTore utilities for detailed information.

Appendix I. Batch Application Program Interface (API)

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 Batch API executes in the user's virtual machine, and the HSC does not have to be active to submit the request.

Note: The HSC CDS must be linked to the virtual machine that is running the Batch API.

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.

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 SLUV*x*DAT record formats. Refer to "Volume Report and Batch API Records" on page 742 to see these layouts.

The SLSUREQM macro maps the SLSUREQ reply header, parameter list, and return code values. Refer to “SLSUREQM Macro” on page 825 to see the record layout.

Reply header length is defined in SLSUREQM, and library element record lengths are defined in the SLUV*x*DAT macros. Return codes for each request (see “Return Codes” on page 814) are stored in register 15.

VM Requirement

The program issuing the SLSUREQ macro must include the SLSMAC MACLIB in the GLOBAL MACLIB definition.

```
GLOBAL MACLIB SLSMAC...
```

The SLSMAC MACLIB residing on the HSC run-disk (254) must be available to assemble the SLSUREQ program.

The SLSUCAL TXTLIB is required to access the SLSUCAL program. The TXTLIB must be available when needed:

- For the technique where the SLSUCAL is included in the SLSUREQ program (VCON), the SLSUCAL TXTLIB must be available at CMS command (LOAD/GENMOD) time.
- When SLSUCAL is loaded using the LOAD macro, the SLSUCAL TXTLIB must be available at program execution time.

The SLSUCAL TXTLIB must be included in the GLOBAL TXTLIB for both LOAD options.

```
GLOBAL TXTLIB SLSUCAL
```

SLSUREQ VM Requirements

The program issuing the SLSUREQ macro must include the SLSMAC MACLIB in the GLOBAL MACLIB definition:

```
GLOBAL MACLIB SLSMAC …
```

The SLSMAC MACLIB, which resides on HSC RUN-disk 254, must be available to assemble SLSUREQ.

The SLSUCAL TXTLIB is required to access the SLSUCAL routine.

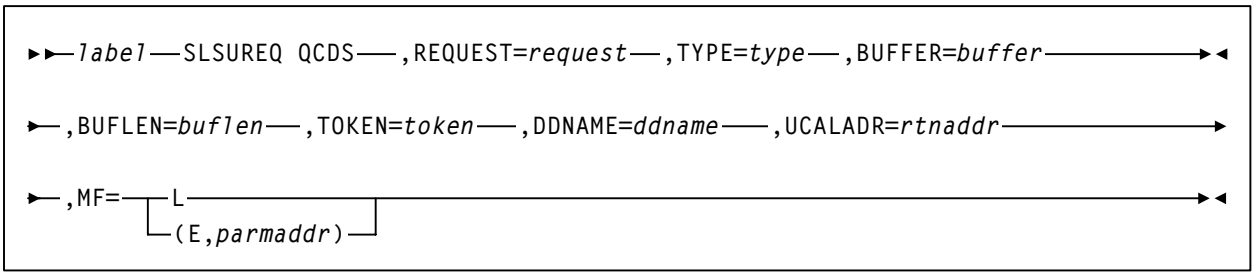
Addresses and Registers

- 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 MVS 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

rtnaddr 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 80 shows the list of return codes.

Table 88. Batch API Return Codes

Return Field Name:	Decimal Value and Description:
Invalid SLSUREQ Requests:	
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.
OPEN Return Codes:	
SLUROPOK	0 - Record area was opened successfully.
SLUROPAO	4 - Open failed: Attempt to open a record area that is already open.
SLUROPIT	8 - Open failed: Invalid token value.
SLUROPRA	12 - Open failed: Invalid record area type.
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.
READ Return Codes:	
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.

Table 88. Batch API Return Codes (Continued)

Return Field Name:	Decimal Value and Description:
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.
CLOSE Return Codes:	
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    RØ,WKUCAL        Save SLSUCAL routine address
*
* Initialize the QCDS token and the SLSUREQ plist:
*
         XC    WKTOK,WKTOK      QCDS token initially zero
         LA    RØ,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  RØ,R14           Initialize SLSUREQ plist storage
*
```

Figure 64. 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,                                   +
               BUFLEN=QCDSBLEN,                                 +
               TOKEN=WKTOK,                                     +
               UCALADR=WKUCAL,                                  +
               MF=(E,WKQCDS)
         ST    R15,WKRDRC       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 64. Sample 1 - Automatic CDS Allocation (2 of 4)

```
* Inner loop - process each VTV record in the response area:
*
VOLPROC  DS    ØH               Over all VTV records in reply:
*          ... process VTV record here ...
         PUT   WKFLATDD,((R8))
         LA    R8,VDRECLEN(,R8) Pointer to next VTV record
         BCT   R9,VOLPROC       Process next VTV record
CHECKEOA DS    ØH               Check for more VTV records
         CLC   WKRDRC,=A(SLURRDEA) VTV end-of-area?
         BNE   READVOL          No, read more VTV records
*
* Close the CDS VTV record area:
*
CLOSEVOL DS    ØH               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    ØH               Clean up and return to caller:
         DELETE EP=SLSUCAL      Unload SLSUCAL routine
         L     RØ,QCDSBLEN      Load response area length
         L     R1,WKBUFP        Pointer to response area
         FREEMAIN R,A=(R1),LV=(RØ) 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    RØ,R12,2Ø(R13)   Restore caller's registers Ø-12
         XR    R15,R15          Set return code zero
         BR    R14              Return to caller
*
```

Figure 64. 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=VDRECLEN,                                     +
               BLKSIZE=VDRECLEN*100,RECFM=FB
KFLATDDL EQU   *-KFLATDD
*
* Module work area map:
*
WKAREA   DSECT                  Module work area
WKSAVE   DS    18F              MVS 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 64. 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 (MVS1CDS 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    RØ,WKUCAL          SAVE SLSUCAL ROUTINE ADDRESS
*
* INITIALIZE THE QCDS TOKEN AND THE SLSUREQ PLIST:
*
         XC    WKTOK,WKTOK        QCDS TOKEN INITIALLY ZERO
         LA    RØ,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  RØ,R14             INITIALIZE SLSUREQ PLIST STORAGE
```

Figure 65. 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),
                   BUFLEN=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),
                   BUFLEN=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 65. 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
QCDSMLEN  EQU  *-QCDSMODL       LENGTH OF SLSUREQ PLIST MODEL
QCDSDD    DC   CL8'MVS1CDS '    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              MVS REGISTER SAVE AREA
WKUCAL    DS   A                SLSUCAL ROUTINE ADDRESS
WKTOK     DS   F                QCDS REQUEST TOKEN
WKQCDS    DS   XL(QCDSMLEN)     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 65. Sample 2- Reading ACS and DRV Together (3 of 4)

```
*
* MAPPING MACROS:
*
                            SLSREGS                                REGISTER
EQUATES
                              SLSUREQM ,                            SLSUREQ
MAPPING MACRO
                                 SLUVADAT ,                            ACS
```

Figure 65. 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 SLUV*x*DAT macros. These macros are SMP-distributed and are discussed in "Volume Report and Batch API Mapping Macros" on page 742.

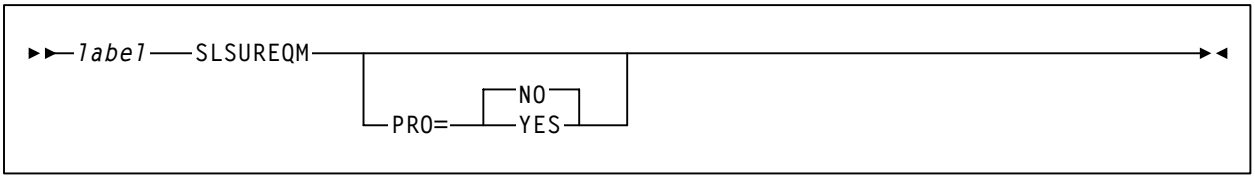
Table 89. Library Element Record Mapping

Request Entered:	Records Returned:
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 90. 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:
4	(04)	CONST		SLSUVN	CURRENT VERSION
5	(5)	A-ADDR	1	SLSURT	REQUEST TYPE:
1	(01)	CONST		SLSUQCDS	QCDS REQUEST
6	(6)	A-ADDR	1	SLSUQCDT	QCDS REQUEST TYPE:
0	(00)	CONST		SLSUQCDO	OPEN REQUEST
1	(01)	CONST		SLSUQCDR	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	SLSUQCDK	QCDS TOKEN POINTER

Table 90. 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 90. 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		SLUROPIT	OPEN FAILED - INVALID TOKEN VALUE.
12	(0C)	CONST		SLUROPRA	OPEN FAILED - INVALID RECORD AREA TYPE.
16	(10)	CONST		SLUROPIO	OPEN FAILED - I/O ERROR WHILE ACCESSING THE ASSOCIATED CDS.
20	(14)	CONST		SLUROPDD	OPEN FAILED - AN INPUT CDS IS NOT ALLOCATED TO THE DESIGNATED DDNAME.
24	(18)	CONST		SLUROPNA	OPEN FAILED - HSC ADDRESS SPACE NOT OPERATIONAL DURING AUTOMATIC CDS ALLOCATION ATTEMPT.
28	(1C)	CONST		SLUROPDA	OPEN FAILED - ERROR DURING AUTOMATIC CDS DYNAMIC ALLOCATION OPERATION.
32	(20)	CONST		SLUROPDM	OPEN FAILED - DD PARAMETER MISSING
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 90. 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 90. SLSUREQM Record Format (Continued)

Dec	Hex	Type	Length	Label	Description
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

Name	Len	Offset Value
SLSUQCDT	000001	06
SLSUQDSN	000044	18
SLSURT	000001	05
SLSUSTAA	-	06
SLSUVER	000001	04
SLSUVN	-	04
SLSUVOLA	-	07
SLSUVTVA	-	09
SLURCLAC	-	04
SLURCLIO	-	10
SLURCLIT	-	08
SLURCLOK	-	00
SLURCLRA	-	0C
SLURFRS	000004	10
SLURHDR	000004	00
SLURHSCV	000002	04
SLURID	-	‘CVAL’
SLUROPAO	-	04
SLUROPDA	-	1C
SLUROPDD	-	14
SLUROPDM	-	20
SLUROPIO	-	10
SLUROPIT	-	08
SLUROPNA	-	18
SLUROPOK	-	00
SLUROPRA	-	0C
SLURQCDN	000004	08
SLURQCDO	000004	0C
SLURQCRT	-	3EA
SLURRDBA	-	18
SLURRDEA	-	04
SLURRDIB	-	1C

Name	Len	Offset Value
SLURRDIL	-	20
SLURRDIO	-	10
SLURRDIT	-	08
SLURRDNO	-	14
SLURRDOK	-	00
SLURRDRA	-	0C
SLURRHLN	-	10
SLURRPLY	000001	00
SLURRQPL	-	3E8
SLURRQRT	-	3E9
SLURVER	000001	06

Glossary

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 MVS for MVS allocation without the HSC).

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 decompaction.

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 MVS term meaning that a user has requested a specific unit.

device allocation— The HSC function of *influencing* the MVS 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 T9840A 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/µ-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 MVS 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 µ-software reload the functional µ-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 µ-software reload the functional µ-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 µ-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.

LTO*x*— 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* µ-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 Sun StorageTek transport that supports a helical recording technique. (2) *See* SD-3.

Remote Diagnostics Center (RDC)— The Remote Diagnostics Center at Sun StorageTek. RDC operators can access and test Sun 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 Sun StorageTek transport that supports a helical recording technique.

SDLT— *See* SuperDLT.

SDLT*x*— 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.

SL3000 library— *See* StreamLine (SL3000) library.

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 T9840A drives. These include:

- T9840A cleaning cartridge
- T9840A microcode load cartridge
- T9840A 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 EJctauto 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 T9840A cartridges and recording techniques.

STK1R— Value that can be specified on the MEDia and RECtech parameters and includes only the specified type of T9840A cartridge or recording technique. STK1R can be abbreviated as R.

STK1U— Value that can be specified on the MEDia parameter and includes the specified types of T9840A, T9840B, and T9840C cleaning cartridges. STK1U can be abbreviated as U.

STK1Y— Value that can be specified on the MEDia parameter and includes only the specified type of T9840D cleaning cartridge. STK1Y can be abbreviated as Y.

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 (SL3000) library— A modular library that can scale from 200 to 4500 cartridges in mainframe, Windows, UNIX, and supercomputer environments.The SL3000 utilizes hot swap components and multiple robots.

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, T9840A, 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 defines the transport's media type and recording technique capabilities.

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 Sun 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 Sun 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 Sun StorageTek 4490 Cartridge Subsystem is equivalent to a 3490E device.

3000 library— *See* StreamLine Library (SL3000).

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 Sun 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.

T9840A Cartridge Subsystem— A high performance tape transport for enterprise and open systems environments that reads and writes T9840A cartridges. T9840As can be defined in 10-drive and 20-drive panel configurations. The T9840A can perform as a standalone subsystem with a cartridge scratch loader attached, or it can be attached to a Sun StorageTek ACS.

T9840B—The Sun StorageTek cartridge transport that reads and writes T9840B cartridges.

T9840C— The Sun StorageTek cartridge transport that reads and writes T9840C cartridges.

T9840D— The Sun StorageTek cartridge transport that reads and writes T9840D cartridges

T9940A— The Sun StorageTek capacity-centric cartridge transport capable of reading and writing 60GB T9940A cartridges.

T9940B— The Sun StorageTek capacity-centric cartridge transport capable of reading and writing 200GB T9940B cartridges.

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