StorageTek

Host Software Component (MVS Implementation)

Configuration Guide

Release 5.1

313486202

First Edition, December 2002

Part Number 313486202

EC 128601

This edition applies to Release 5.1 of the Nearline Control Solution (NCS) software. Information in this publication is subject to change. Comments concerning the contents of this publication should be directed to:

Storage Technology Corporation
Manager, Software Information Development
One StorageTek Drive
Louisville, Colorado 80028-5209

or

sid@stortek.com

Document Effectivity

EC Number	Date	Doc Kit Number	Type	Effectivity
128601	December, 2002	---	First Edition	This document applies to the Host Software Component for MVS (MVS/HSC), Version 5.1.

Contents

Figures

Tables

What's New With This Release?

HSC 5.1 includes the following changes and enhancements:

- SMP/E APPLY and ACCEPT installation steps for HSC are now included in the NCSAPPLY and NCSACCPT sample members, respectively.
- The ALLOC operator command no longer honors the following parameters:
  - Gdgall
  - SMSAcsr
  - SMSMod
  - Unitaff
  - UXPrms
  - X02sub
  - X08sub.

  The SMC provides allocation functions. Refer to the *SMC Configuration and Administration Guide* for more information.
- The allocation and job processing components of the TRace operator command have been moved to the SMC TRACE command. Specifically, support has ended in the HSC for the ALLCdata parameter and the following component names:
  - ALlocati
  - JES3Aloc
  - JES3Dira
  - JES3Msgs
  - JES3Sep
  - Job.

  Refer to the *SMC Configuration and Administration Guide* for more information.
- Swap processing is now controlled by the SMC. Refer to the *SMC Configuration and Administration Guide* for more information.
- Volume ranges can be specified either as alphabetic or numeric ranges for all commands and utilities that allow ranges to be entered.
- The Scratch Conversion utility compares tape management data base (TMC) scratch entries to volume and VTV entries in the CDS and scratches only volumes in the CDS that are not already in scratch status. Volumes that are already scratch or are not library or virtual volumes are ignored.

- The PGMI SLSXREQM macro has been modified to include the SLXEXLM0, SLXEXLM1, and SLXEXLM2 fields. These fields are used for ExLM license key verification.
- The Intercepted Messages List appendix, formerly Appendix B in the *HSC System Programmer's Guide*, has been moved to the *SMC Configuration and Administration Guide.* The SMC is now responsible for intercepting MVS, JES3, and TMS mount, dismount, and swap messages.
- Support for StorageTek's T9940B Cartridge Subsystem and T9940B cartridge for Open Systems clients.
- Message changes, additions and deletions.

Preface

Scope

This guide provides information about the Storage Technology Corporation (StorageTek®) Host Software Component (HSC) and its use with the Automated Cartridge System. Information is provided for systems programmers to configure and maintain the HSC.

Intended Audience

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

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

- MVS operating system
- JES2 principles and functions
- JES3 principles and functions (if applicable)
- ACF/VTAM functions and principles
- System Management Facility (SMF)
- System Modification Program Extended (SMP/E).

How To Use This Guide

This guide should be read completely prior to beginning installation tasks. Familiarize yourself with the overall organization and location of various information for reference purposes.

Reference To HSC Product Releases

The HSC Release 5.1.0 product is referred to as HSC 5.1.

Related Publications

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

Storage Technology Corporation Publications

The following documents are available for MVS and VM operating systems, respectively, and related miscellaneous topics.

StorageTek NCS 5.1 Publications — MVS Environment

- *NCS Installation Guide*
- *Storage Management Component (SMC) Configuration and Administration Guide*

StorageTek HSC 5.1 Publications — MVS Environment

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

Miscellaneous Publications

- *A Guide to Magnetic Tape Management*
- *Automated Cartridge System Hardware Operator's Guide*
- *Hardware Operator's Guide*
- *Requesting Help from Software Support*
- *Nearline Physical Planning Guide*
- *Physical Planning Guide*
- *POST Stand-Alone Executive Reference Manual*
- *POST Reference Manual*
- *POST Messages and Codes Manual*
- *POST FRIEND Function Reference Manual*
- *POST Diagnostic Reference Manual*

Computer Associates International, Inc. Publications

- *CA-1 User Manual, Volume 1*

Reader’s Comments

We’d like to know what you think about this guide. E-mail your comments to Software Information Development directly. Our Internet address is:

```
sid@stortek.com
```

Be sure to include the number and title of the guide you are referencing.

StorageTek Product Support

StorageTek Customer Services provides 24-hour assistance for questions or problems related to StorageTek products. Calls from our customers receive immediate attention from trained diagnostic specialists.

See the guide *Requesting Help from Software Suppor*t for information about contacting StorageTek for technical support and for requesting changes to software products. See “Gather Diagnostic Materials” in the *HSC System Programmer’s Guide* for information

Chapter 1. Overview

This chapter defines the procedures to plan and complete the configuration of the Host Software Component (HSC) product. Refer to the *NCS Installation Guide* for information about installing the HSC software.

Summary of Configuration Tasks

There are a variety of tasks necessary to configure the HSC software and prepare the library for use. Figure 1 on page 4 illustrates the flow of the major tasks recommended for installing and configuring the HSC (refer to the *NCS Installation Guide* for installation information). The order for performing the tasks may vary depending upon various circumstances, such as hardware availability. A summary description follows for each chapter contained in this guide:

- **Chapter 1, "Overview"** — This chapter summarizes the steps in planning for and configuring the HSC.
- **Chapter 2, "Configuring the HSC Environment"** — This chapter discusses configuration planning issues that relate to ensuring that all hardware installation/environmental provisions, software, and installation requirements are predetermined and complete before installing the software.
- **Chapter 3, "Performing Pre-execution Tasks"** — Preexecution tasks involve adding definitions for ACF/VTAM communications, coding and cataloging the HSC started task procedure, IPLing the system, and restarting JES3.
- **Chapter 4, "Creating the Library Configuration File (LIBGEN)"** — The LIBGEN process consists of defining the library configuration using LIBGEN macros. The LIBGEN macros define the hardware configuration, recovery requirements, global characteristics, and library control data sets and journals to the HSC software.

  In addition, the important process of verifying the LIBGEN is described. This verification process is performed to ensure that the library configuration defined in the LIBGEN is correct. Verification is performed by executing the SLIVERFY program.

  PARMLIB control statements for data set allocation (CDSDEF) and for any journaling (JRNDEF) are required. If you are upgrading from a prior release of the HSC or are adding hardware, it may be necessary to define the HSC 5.1 control data set (CDS) using the RECDEF control statement followed by an execution of the

Reconfiguration Utility (see “Reconfiguration Utility” in the *HSC System Programmer’s Guide*).

- **Chapter 5, “Initializing the Control Data Sets”** — The data set initialization process creates the library control data sets. The process results in the creation of a primary control data set, optional secondary and standby control data sets, and optional journal data sets.
- **Chapter 6, “Defining HSC Control Statements”** — Definition data sets allow you to define tape request characteristics, volume attributes, and unit attributes for mixed media and mixed device support.

  Defining PARMLIB control statements involves specifying static operational parameters for the HSC that are invoked at installation and initialization. The control statements become members in a user-defined data set that is used by the HSC at startup.
- **Chapter 7, “Configuring HSC/LibraryStation License Keys” —** This chapter discusses configuration procedures for StorageTek HSC and LibraryStation license keys.
- **Chapter 8, “Initializing the HSC”** — Starting execution of HSC software involves issuing the MVS START command that activates the library software. Starting execution of HSC software involves executing a job file for starting the subsystem. Refer to Appendix D, “Migration and Coexistence Processes” on page 167 for related information.
- **Chapter 9, “Terminating the HSC”** — Terminating HSC software involves issuing the MVS STOP command. Orderly and forced termination of the HSC are discussed.
- **Chapter 10, “Testing the Installation”** — Testing the software installation involves ensuring that information specified in the LIBGEN process is fully operational with the HSC software as installed with a working library configuration. The tests involve exercising the operational phases of the HSC software using the SLIEXERS program. The process includes exercising the library tape transports which mount, read, write to, and dismount tape cartridges. Refer to Appendix D, “Migration and Coexistence Processes” on page 167 for related information.

  Other tests are recommended to thoroughly test the installation. Each command and utility as well as every major HSC function should be fully verified to ensure that the HSC operates as intended.

  Since each library site has unique operating requirements, you should ensure that HSC defaults are properly set during the testing phase of HSC installation. To accomplish this, adjust your PARMLIB defaults to match the requirements for your library site.

- **Chapter 11. Planning Migration to the Library Migration** — planning involves the following tasks:
    - determining the procedures necessary to place external Tri-Optic labels on cartridges before loading them into a Library Storage Module
    - determining the method of entering cartridges into the library
    - invoking the Audit utility to update the control data set.

  Refer to “Loading Cartridges into the Library” in the *HSC System Programmer’s Guide* for performance considerations when loading cartridges into an LSM.

Performing Library Modifications

Certain modifications can be made to HSC software operation after an initial software installation. After installation and verification of a successful installation of the HSC, you may perform modifications to the library software configuration. These modifications cannot take place during the initial installation of the software. Library modifications may be made any time after the initial installation, when requirements at your site change.

Typical library modifications are to alter the LIBGEN macros and use the Reconfiguration function to enable library configuration modifications. This type of modification can be done without requiring a full audit of the library.

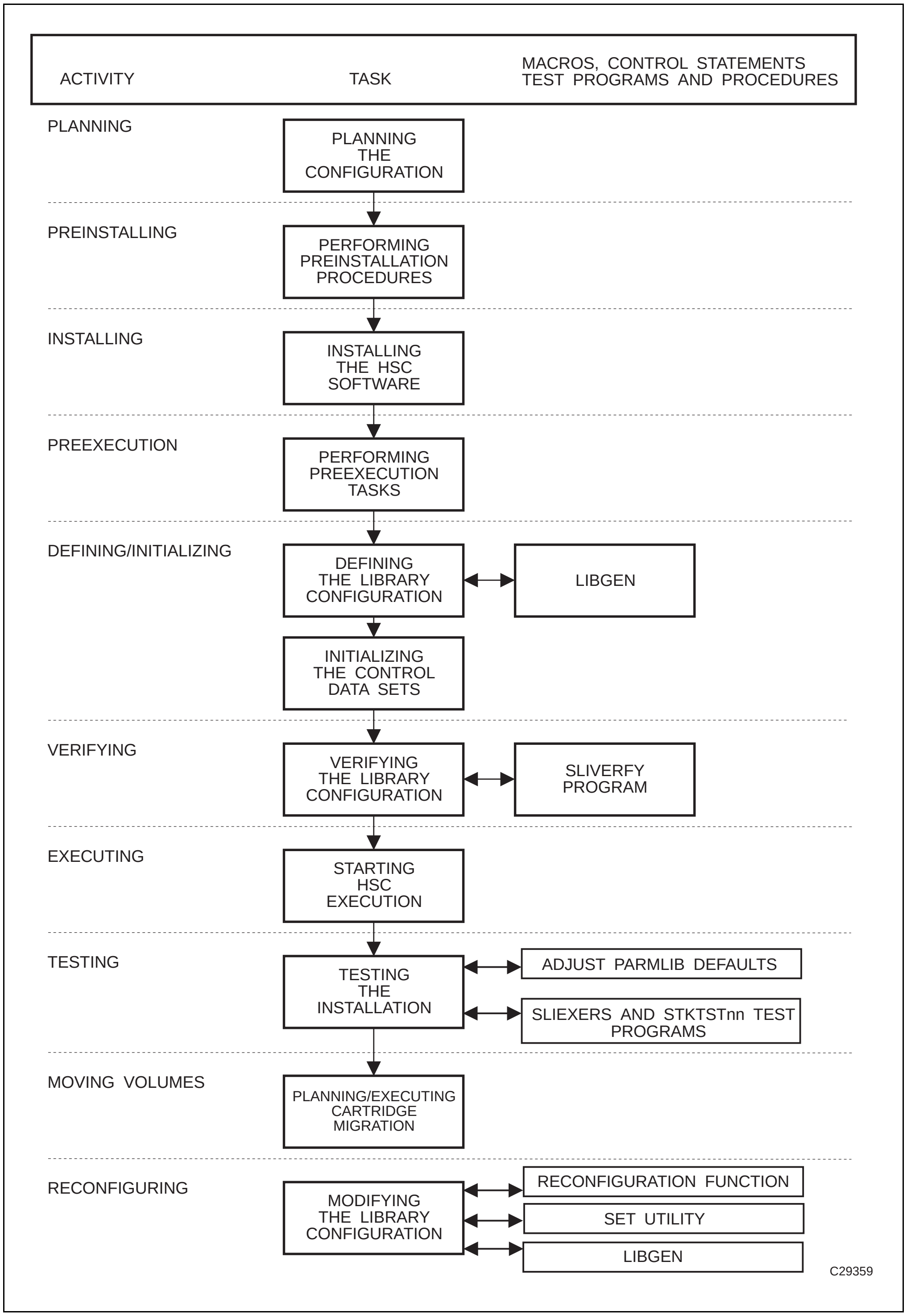


Figure 1. Configuration/Installation Flow Diagram

Refer to “Reconfiguration Utility” in the *HSC System Programmer’s Guide* for detailed procedures for reconfiguring the library.

See the “SET Utility” in the *HSC System Programmer’s Guide* for information on setting or changing the library configuration without performing reconfiguration.

Customizing HSC Software

Macros, utilities, HSC control statements, user exits, and operator commands allow users to customize the HSC.

Note: To assemble customized versions of HSC user exits or other modules, it is recommended that you use the High-Level Assembler.

Macros

LIBGEN macros are used to establish the library configuration and recovery options for the HSC. These macros are discussed in Chapter 4, "Creating the Library Configuration File (LIBGEN)" on page 27.

Utilities

Utilities allow you to dynamically control library resources. These appear in Chapter 5, "Utility Functions" in the *HSC System Programmer's Guide*.

One utility, Scratch Conversion, calls three routines (SLUDRCA1, SLUDRTLM, and SLUDRRMM) that read tape management library systems (TLMS) scratch data and then format this information so that it can be used by the Scratch Update utility. See "Scratch Conversion (SLUCONDB) Utility" in the *HSC System Programmer's Guide*.

HSC Control Statements

Two types of control statements can be defined: PARMLIB, used to set system values at initialization, and definition data set, used to specify mixed media and devices. These control statements are discussed in Chapter 3, "Performing Pre-execution Tasks" on page 23.

User Exits

Default HSC user exits are installed as part of the HSC SMP/E install process. If these defaults do not meet your operational requirements, you must create and install your own local HSC user exits. If you already use your own user exits, you must re-assemble and re-install them to validate the changes in the parameter lists.

Refer to Chapter 9, "User Exits" in the *HSC System Programmer's Guide* for more information about HSC user exits.

Operator Commands

Operator commands allow system operators to perform daily library operations. In addition, operator commands can be specified as PARMLIB control statements. Refer to Chapter 2, "Commands, Control Statements, and Utilities" in the *HSC Operator's Guide* for detailed information about each command.

Interacting With Third Party Software

The HSC operates with the following third-party software:

- Multi-Image Manager (MIM)
- CA-ASM2
- Global Resource Sharing (GRS)
- Multi-Image Integrity Manager (MII).
- CONTROL-M/TAPE Tape Management System

See Chapter 8, “Software Interaction” in the *HSC System Programmer’s Guide* for information about restrictions when using these products in conjunction with the HSC.

Library Configuration Checklist

A Library Configuration Checklist is provided to help you identify all of the steps involved in the configuration process for HSC software. This checklist is used to ensure that all of the tasks relating to the configuration process are performed.

Refer to Appendix A, “Library Configuration Checklist” on page 123 for the checklist.

Chapter 2. Configuring the HSC Environment

Configuration planning is an important phase of the installation process that must be completed to ensure smooth installation of the HSC software. The customer is responsible for ensuring that each task is successfully completed. Planning tasks include:

- physical plan verification
- system software verification
- migration from earlier HSC releases
- verification of third-party software compatibility
- LSM/pass-thru port (PTP) relationship definition(s)
- configuring MVS unit addresses and esoterics
- configuring LIBGEN unit addresses and esoterics
- DASD planning
- DASD sharing
- calculating DASD space.

Physical Plan Verification

All of the installation activities should be thoroughly planned before proceeding with installation of the HSC. StorageTek recommends that the configuration plan be available at the beginning of the installation process. The completed physical plan is your installation blueprint. Ensure that provisions are made for the following requirements:

- floor space
- power
- environmental considerations.

Note: All space requirements are computed using the StorageTek *Nearline Physical Planning Guide* and the templates provided. In the computations, provisions are made for each library component ordered, future components considered for growth of the system, service areas, personnel clearances, and furniture.

System Software Verification

The MVS version of the HSC system supports both JES2 and JES3. The specific MVS and JES2/JES3 levels supported coincide with IBM's current support position on these operating system levels. That is, if IBM currently provides program services for a particular level, then the HSC also supports it; however, StorageTek may require the customer to apply additional IBM maintenance to ensure satisfactory HSC operation. If IBM has dropped support for a particular level, then the HSC no longer supports that level. For newly announced IBM operating system levels, it is our intent to support each such new level.

Note: If you have installed third-party software at your site, refer to "Third-Party Software Interaction" in the *HSC System Programmer's Guide* for any restrictions that may apply to installing the HSC when such software is present. Refer to "Verification of Third-Party Software Compatibility" below for program product levels required for use with the HSC.

Migration from Earlier HSC Releases

If your installation plans to run a multiple-host environment including HSC 5.1 and earlier versions of the HSC on other hosts, HSC 4.0, 4.1, and 5.0 can run with HSC 5.1. Refer to Appendix D, "Migration and Coexistence Processes" on page 167 for more information.

For information regarding the latest PTF and PUT levels, contact StorageTek Software Support. Refer to the guide *Requesting Help from Software Support* for information on how to contact StorageTek Software Support.

Verification of Third-Party Software Compatibility

Caution: Initialization of the HSC subsystem in conjunction with initialization of third-party software and/or other subsystems may be order dependent. It may be necessary to initialize the HSC subsystem after third-party or other subsystem initialization.

The software products shown in the following table are compatible for use with the HSC.

Table 1. Other Software Products Compatible with the HSC

Software Product	Minimum Level Required
ACF Virtual Telecommunications Access Method (ACF/VTAM)	Release 3.2
CA-1	Release 4.7
CA DYNAM/TLMS	Release 5.2
DFSMSrmm	Version 1, Release 1
DF/SORT	Release 6
Multi-Image Manager (MIM)	Version 2
SYNCSORT	Release 2.5E

Warning: Caution must be exercised if you use any third-party software that modifies the Eligible Device List (EDL) and therefore the MVS Device Allocation process. These products may compromise the functionality of the HSC and lead to unpredictable results.

Note: HSC provides limited support for the CONTROL-M/TAPE tape management system. Refer to the BMC publication *CONTROL-M/TAPE Implementation Guide* for more information.

LSM/Pass-thru Port Relationship Definition

If your ACS contains only one LSM, you do not need to perform this installation step.

If your ACS contains two or more connected LSMs, you must define the LSM/pass-thru port (PTP) relationships.

PTPs are not designated as master or slave; the terms master and slave refer to the LSMs which share a common PTP. An LSM that controls the PTP is called the "master" LSM, and the LSM which shares that PTP and does not control it is called the "slave" LSM. An LSM can only be a master of two PTPs. Even though an LSM may have more than two PTPs, it can control only two PTPs; therefore, it is possible for one LSM to be both a master and a slave.

The LSM/PTP relationships are defined in the Configuration Plan. Verify that the Configuration Plan defines these relationships.

Note: These relationships will be logically defined later in the LIBGEN.

If verification is confirmed, continue with the installation. If verification of the LSM/PTP relationships is not confirmed, cease installation activity until resolution is achieved.

Refer to the "SLILSM Macro" on page 49 for additional information about PTP relationship definition.

Considerations for Configuring Unit Addresses and Esoterics

JCL Considerations

There is no need to change JCL. Continue to use the generic or esoteric which allows any library or nonlibrary device to be allocated. The HSC influences MVS to allocate the correct transport within the specified generic or esoteric.

Remote Library Considerations

For information about device allocation relating to the operation of remote-linked libraries, refer to “Special Considerations for Control Data Sets Processing Independently” in the *HSC System Programmer’s Guide*.

DFHSM Considerations

If you plan to use Data Facility Hierarchical Storage Manager (DFHSM) for library transports, and you plan to use the DFHSM ARCCMD*xx* member’s SETSYS command to direct the DFHSM output to an esoteric covering library drives, you must code the SETSYS command to define the tape environment. You must also specify the esoteric name that represents the library transports used for DFHSM functions on the USERUNITTABLE parameter.

However, if you plan to use UX02 to direct DFHSM scratch mounts to the ACS, and you do not use the USERUNITTABLE parameter, you do not have to code the SETSYS command or specify the esoteric name.

See the appropriate IBM publication on Data Facility Hierarchical Storage for more information.

HSC Scratch Allocation Considerations

HSC scratch allocation can be modified using the LSMPREF, SCRTECH, and LOWSCR keywords on the ALLOC operator command/PARMLIB statement.

Configuring MVS Unit Addresses and Esoterics

Unit Addresses

The HCD facility is used to assign MVS unit addresses to the devices in your I/O configuration. Refer to the appropriate IBM publications for more information about these facilities.

An LMU Station emulates a 3278-2 terminal attached to a local controller and must be assigned an MVS unit address. The LMU must be defined as a 3*x*74 local controller.

A 4480 cartridge tape transport is plug-compatible with an IBM 3480; 4490, 9490, and 9490EE cartridge tape transports are plug-compatible with an IBM 3490E; and SD-3, 9840, T9840B, T9940A, and T9940B cartridge tape transports are plug-compatible with either an IBM 3490E or 3590. All cartridge tape transports must be assigned MVS unit addresses.

If unit addresses are generated for nonexistent library tape transports, ensure that these addresses are also defined in a SLIDRIVS macro. Such drives are treated by the HSC as incompatible with any media type and are excluded from HSC allocation counts.

Nonlibrary Esoteric

The HCD facility is used to associate MVS unit addresses with user-defined esoteric unit names. Refer to the appropriate IBM publications for more information about these facilities.

A unique esoteric must be defined for all nonlibrary cartridge tape transports. Possible names for this esoteric might be NONLIB, NLIB, TNONLIB, TNLIB, etc.

If a unique esoteric is not defined, or nonlibrary transports do not actually exist, all cartridge tape requests are directed to use the library transports only.

If the nonlibrary esoteric contains unit addresses for nonexistent tape transports, specify a UNITATTR control statement with the MODel(IGNORE) parameter to exclude these devices from HSC allocation counts.

Library Esoteric(s)

A unique esoteric should be defined for each ACS in the complex using the HCD facility. The esoteric names are used by HSC allocation to ensure that only the library transports attached to a particular ACS are used to satisfy requests for a cartridge tape volume residing in that ACS. A possible naming convention for these esoterics might be ACS0, ACS1, ACS2, etc.

Configuring LIBGEN Unit Addresses and Esoterics

Unit Addresses

For a given host, the unit address of each cartridge tape transport attached to an LSM is defined to the HSC using the ADDRESS parameter on the SLIDRIVS macro. Nonexistent devices can be defined in LIBGEN only if the LIBGEN and LMU panel types match. Changing an LMU panel type requires action by a StorageTek Customer Service Engineer. When the new devices are actually installed, be sure to reconfigure your MVS unit address and esoteric definitions to accurately reflect the changes.

Nonlibrary Esoteric

For a given host, the esoteric of all nonlibrary transports is defined using the NNLBDRV parameter of the SLILIBRY macro. If the NNLBDRV parameter is not specified, either because a unique esoteric is not defined, or nonlibrary transports do not actually exist, all cartridge tape requests are directed to use the library transports only.

Library Esoteric(s)

For a given host, the esoteric of all cartridge tape transports attached to an ACS is defined using the ACSDRV parameter on the SLIACS macro.

DASD Planning

The HSC uses some data sets resident on DASD devices:

- the primary control data set
- optional secondary and standby control data sets
- optional journal data sets
- backup data sets.

As a result, some DASD planning is required. The following considerations must be made for DASD planning:

- control data set recovery strategies
- DASD space planning
- DASD sharing

Each of these requirements is described in the following paragraphs.

Control Data Set Recovery Strategies

To guard against the destruction of the primary control data set, the following recovery techniques are available:

- optional multiple copies of the control data set, available at all times, to the library hosts

- optional multiple journals recording library transactions separately from the control data sets

- BACKup and RESTore utilities available that perform extensive checking and reporting

- automatic switching of control data sets in cases of failure or degradation

- operator controlled switching of control data sets to allow for uninterrupted library operation during problem investigation.

The control data sets are important components relating to the recovery process. These data sets include:

Primary Control Data Set
The primary control data set resides on a DASD or solid state disk (SSD) device. The primary control data set must be accessible by all CPUs configured with the library. All configuration information about the ACS is stored in this data set, and it is continuously updated to reflect changes resulting from volume processing.

Secondary Control Data Set
This data set is an exact duplicate of the primary control data set and is also continuously updated to reflect changes in the library. In general, if the primary control data set becomes corrupted, the HSC continues to operate without interruption by automatically switching to the secondary control data set. Thus, the secondary control data set becomes the primary control data set. However, the data set name remains unchanged.

Note: It is highly recommended that the secondary control data set reside on separate HDAs and separate strings from the primary control data set.

The secondary control data set is commonly referred to as the Shadow CDS. The HSC allows for the SHADOW option to be specified at the time of product installation during library generation (LIBGEN). Refer to "SLIRCVRY Macro" on page 34 for instructions on specifying the use of a secondary control data set.

Standby Control Data Set

The standby control data set is optional. This data set is a formatted CDS containing only the first CDS record. If necessary, this data set is used for control data set disaster recovery. Refer to Chapter 6, "Software Diagnostics and Recovery" in the *HSC System Programmer's Guide* for more information on recovery techniques.

The HSC allows for the STANDBY option to be specified at the time of product installation during library generation (LIBGEN). Refer to the "SLIRCVRY Macro" on page 34 for instructions on specifying the use of a standby control data set.

Journals

Journals are data sets that record a running log of all transactions that affect the control data set(s). If journaling is used as a recovery technique, two journals must be specified for each host to record any activity affecting the primary control data set since the last HSC backup.

One journal is used to record all activity until it becomes full; then, the HSC automatically switches to the other journal and issues a message to inform the operator. The operator should then offload the first journal or back up the control data set. Backing up the CDS resets the journals to empty when the backup is completed.

By default, HSC abends when both journals become full. Warning messages are issued when the journals are more than 75 percent full. A second option can be specified by operator command or in the PARMLIB options to allow the HSC to "continue" to run without journals on all hosts, if both data sets become full on any one host.

Caution: With this option, if journaling is disabled, none of the journals may be used for recovery purposes.

Refer to "Journal Definition (JRNDEF) Control Statement" in the *HSC System Programmer's Guide* for a description of the CONTINUE option for the JRNDEF control statement.

The control data set can be reconstructed by using the journals and the most recent CDS backup. All HSCs must be stopped before attempting recovery by this technique and must remain down until the restore operation is finished.

The HSC allows for the journaling option to be specified at the time of product installation during library generation (LIBGEN). Refer to the "SLIRCVRY Macro" on page 34 for instructions on specifying the use of journaling.

Using a standby data set provides the best protection for the CDS. Journals should be used when the SHADOW and STANDBY techniques are not possible. Failure to specify any technique may require running an audit of the entire library to re-create the control data set.

Note: If a VM host shares the library, then the journal offload data sets must also reside on shared DASD.

DASD Sharing

There are very stringent requirements for DASD volumes shared between multiple host systems and processors.

Some data sets must be capable of being shared in read/write mode by all host systems which access the ACS. These data sets include:

- primary control data set
- optional secondary and standby control data sets
- optional journals for offload or backup reset.

The primary, secondary, and standby control data sets must be accessible to all hosts sharing the ACS. If the data sets are required by only one system, then this sharing requirement can be disregarded.

If you decide to use the optional journals and offload journals at your installation, a set of two journals (Journal 1 and Journal 2) is unique to each host. The same requirement applies for the optional offload journals.

I/O Device Reserve Considerations

StorageTek strongly recommends that you do **not** place copies of the control data set on the same volume(s) as other data sets that generate high I/O activity and excessive reserves to that volume during normal processing. This applies to all control data set copies including secondary (shadow) and standby.

For example, TMS catalog and audit data sets are known to cause contention and lockout problems when on the same volume as HSC CDSs, while a backup copy of a data set that is used only occasionally for restore purposes normally does not cause a significant problem. However, if response problems or lockouts do occur, an examination should be made of all ENQ and I/O activity related to that volume.

Various problems have been encountered when running the HSC on a VM host that shares the CDS with an HSC running on MVS.

- The DEFRAG utility running on MVS has caused problems with lockout conditions as well as moving a CDS copy while a VM HSC was running.

- HSM processing has caused problems with lockout conditions

In order to prevent errors caused by contention lockout situations with other hosts, it is recommended that the VM missing interrupt interval (MITIME) for the DASD volumes containing the primary, secondary, and standby control data sets be set to a value slightly greater than the length of the longest reserve that will be held on either pack. For backup utilities this is a minimum of thirty seconds and may take several minutes. Refer to the appropriate IBM Command Reference for the syntax of the SET MITIME command.

In order to prevent errors caused by contention lockout situations with other hosts when an MVS system is running as a guest under VM, it is recommended that the missing interrupt handler (MIH) for the DASD volumes containing the primary, secondary, and standby control data sets be set to a value slightly greater than the length of the longest reserve that will be held on either pack. Use the MIH parameter to set the time for specific devices in the MVS PARMLIB member IECIOSxx. Set the MVS MIH TIME value to either one half or two times the VM MITIME value, depending on which system you want to have control first. Set the value large enough so that a missing interrupt is not detected while a reserve is being held.[1] Then do one of the following:

- Issue the MVS SET IOS=*xx* command to read the PARMLIB member and reinstate it (where *xx* is the suffix of IECIOS*xx* PARMLIB member).
- IPL the system.

If you are running the HSC on a VM host that shares the CDS with an HSC running on MVS, make sure your command prefix does not conflict with any of the VM facilities, such as the CP line editing symbol.

1. If a reserve is being held, it can show up as a missing interrupt to other systems.

Calculating DASD Space

Instructions for computing the DASD space requirements for these data sets are contained in this section. The formula used for the computations calculates the number of 4K blocks required.

Notes:

1. It is recommended that each data set reside on a different HDA. If possible, the primary, secondary, and standby control data sets should be on different control units and different channels. Each control data set must be allocated in a single DASD extent.
2. If you are running Virtual Storage Manager (VSM), refer to the VTCS documentation to determine DASD space requirements for VSM.

Since the HSC uses hardware device reserve/release to control sharing, it is recommended for performance reasons that the library configuration allow device reserve/release to be issued.

For DASD planning, use the following formula to estimate the number of 4K blocks (NUMBLKS) necessary to store the primary, secondary, and standby control data sets, and each journal data set:

```
NUMBLKS = 125 + (130 * splsm) + (70 * wlsm) + (50 * tlsm)
```

where:

splsm
: the total number of 4410 (Standard) or 9310 (PowderHorn) LSMs

wlsm
: the total number of 9360 (WolfCreek) LSMs

tlsm
: the total number of 9740 (TimberWolf) LSMs.

Note: No additional space is required for an HSC 5.1 CDS, however, a CDS created by the 5.1 SLICREAT program may be slightly larger than a CDS created by HSC 2.0.1 or earlier releases, even when the LIBGEN input information is the same.

The CDS size increase allows users to specify additional drives for each LSM and, in future releases, to dynamically define more hosts.

Besides planning for the DASD space requirements for the primary, secondary, standby control data sets, and the unique set of journals to each host, you must ensure that enough DASD space exists for HSC authorized target and distribution libraries (refer to the *NCS Installation Guide*).

Automated Space Calculation

You can automatically calculate DASD space when you run the SLICREAT program, which is used to create the control data sets. Refer to “Calculating DASD Space” on page 20 for more information.

Data Set Placement

For performance and recovery considerations, each copy of the CDS should reside on a separate DASD HDA. Separate control units are also recommended to further ensure adequate recovery conditions. A CDS should not reside on the same volume as other high reserve or high I/O data sets. All journals for all hosts may be on the same volume as long as that volume does **not** contain a CDS.

Chapter 3. Performing Pre-execution Tasks

The following tasks must be performed as pre-execution tasks:

- adding definitions for ACF/VTAM communications
- adding a command list to the HSC
- coding and cataloging the HSC started task procedure
- IPLing the system.

Note: The majority of the pre-execution tasks are installation-related. Refer to the *NCS Installation Guide* for a description of these items.

If you are migrating from a previous HSC release, some of these tasks can be bypassed. Review each task and verify that it is properly completed before proceeding to the next task.

Adding Definitions for ACF/VTAM Communications

Ensure that you are familiar with the information presented in “Communication Functions” in the *HSC System Programmer’s Guide* before attempting to add communication definitions.

If ACF/VTAM is going to be used as a method for HSC host-to-host communications, the following definitions must be defined to VTAM:

- APPL
- CDRSC
- CDRM (if not using existing CDRMs)
- LOGMODE table entry for SNASVCMG (contained in the IBM-supplied logon mode table)
- LOGMODE table entry for SLSSVCMG. This can be defined the same as SNASVCMG. If not defined, the default logmode entry is used.

A sample APPL statement is contained in the HSC SAMPLIB member HSCAPPL. Assuming your HSC application program minor node (APPLID) is APHSC1, the sample APPL statement shows the recommended operands:

```
HSCAPPL  VBUILD TYPE=APPL
APHSC1   APPL  APPC=YES,
               AUTOSES=1,                                       +
               DMINWNL=1,                                       +
               DMINWNR=1,                                       +
               DESESLIM=2,                                      +
               EAS=10
```

where:

APPC=YES
must be coded because HSC uses VTAM LU 6.2 services.

AUTOSES=1
defines the number of contention-winner sessions VTAM is to establish automatically with the first CNOS request.

DMINWNL=1
defines the minimum number of parallel sessions with the local LU as the contention-winner. HSC only requires and uses one local contention-winner session.

DMINWNR=1
defines the minimum number of parallel sessions with the remote LU as the contention-winner. HSC only requires and uses one remote contention-winner session.

DSESLIM=2
defines the maximum number of sessions allowed between the local LU and a remote LU. This should be 2 because the HSC only establishes two sessions between each HSC: one local contention-winner session and one remote contention-winner session.

EAS=10
sets an estimated number of concurrent sessions this APPLID will have with other LUs.

Refer to the IBM *ACF/VTAM* manuals for definitions and explanations.

Coding and Cataloging the HSC Started Task Procedure

Your system cataloged procedure library must contain a started task procedure for HSC 5.1. The following JCL is a sample cataloged procedure to run HSC 5.1. This JCL is also contained in HSC SAMPLIB member JCLPROC.

Note: The PARMLIB control statement CDSDEF must be defined in your PARMLIB to allocate data sets. If journaling is desired, the JRNDEF control statement must also be defined in your PARMLIB. For more information, refer to“Parameter Library (PARMLIB) Control Statements” on page 78.

```
//SLSØ     PROC PROG=SLSBINIT,PRM=’ ‘
//*
//IEFPROC EXEC PGM=&PROG,TIME=144Ø,
//  PARM=’&PRM E(EØ86) F(23) M(ØØ) SSYS(SLSØ)’,REGION=4M
//*
//STEPLIB  DD DSN=SLS.SLSLINK,DISP=SHR
//*
//SLSSYSØØ DD DSN=SLS.PARMS,DISP=SHR
```

Refer to “Creating an HSC START Procedure” on page 87 for a complete description of the parameters that may be specified in the PARM operand.

IPLing the System

A system IPL is required after defining the HSC as a subsystem via the Subsystem Name Table entry IEFSSN*xx* for the first time. Once the HSC has been defined, you do not need to re-IPL in order to stop and start the HSC.

If you are migrating from a previous HSC release and the HSC is defined in the IEFSSN*xx* member, then a system IPL is not required. You must perform a COLD start at the first HSC startup. Subsequent HSC startups should not require a COLD start unless a problem is encountered.

If you are using SLSBPREI to initialize the HSC under JES, refer to “Preinitializing the HSC as a Subsystem” on page 97 for additional information about starting the HSC.

If you are **not** using SLSBPREI, refer to “Starting the HSC with PARM=‘INIT’” on page 97 and “Initializing the HSC Under the Master Subsystem” on page 98 for additional information about starting the HSC.

Restarting JES3

You must restart JES3 (hot start/local start) after installing the JES3 support function. See the *NCS Installation Guide* for information about installing the JES3 support function

Chapter 4. Creating the Library Configuration File (LIBGEN)

Defining the Library Configuration File(LIBGEN)

LIBGEN is a process of defining the library configuration and recovery options to the HSC. LIBGEN provides HSC with information necessary to control the automated library.

LIBGEN output is an object module created by the assembler and must be link-edited into a load module. This load module is loaded by the HSC during library control data set initialization and used to format the control data sets.

Note: The LIBGEN module **must** reside in an APF-authorized library, but does not itself require APF authorization.

The Installation Verification Process is used to verify information specified during the LIBGEN process.

Procedure for Library Generation (LIBGEN)

The LIBGEN process consists of the following steps:

1. Create a file to contain the assembler statements for the LIBGEN. The assembler file invokes a set of macros provided by StorageTek to describe the library configuration.The LIBGEN macros are described in "LIBGEN Macros" on page 28. Sample LIBGEN files are contained in Appendix B, "Library Configurations" on page 127.
2. Assemble and link-edit the LIBGEN file.
3. Initialize the library control data sets using the SLICREAT utility. Refer to "Executing the SLICREAT Program" on page 69 for the steps involved.
4. Allocate the library control data sets. Refer to Chapter 5, "Initializing the Control Data Sets" on page 65 for information on data set initialization.

Note: If you are migrating from a prior release of the HSC, refer to Appendix D, "Migration and Coexistence Processes" on page 167 for information concerning updating the CDS for HSC 5.1.

Upon the completion of these steps, the library generation is completed and the library control data sets are ready to use.

LIBGEN Macros

The LIBGEN macros are provided in source format on the distribution tape in SLS.SLSMAC.

Description of LIBGEN Macros

Each LIBGEN macro has a specific function. Descriptions of the LIBGEN macros follow:

Macro	Description
SLIRCVRY	This macro describes the recovery characteristics of the HSC. One SLIRCVRY macro is specified. It is the first macro of the LIBGEN.
SLILIBRY	This macro describes all global characteristics of the library. One SLILIBRY macro is specified. It must follow the SLIRCVRY macro.
SLIALIST	This macro includes a list of all of the ACSs which comprise the library. One SLIALIST macro follows the SLILIBRY macro.
SLIACS	This macro describes the characteristics of each ACS listed in the SLIALIST macro. One SLIACS macro is specified for each ACS listed in the SLIALIST macro. The ACSDRV parameter contains the esoterics of all attached transports. The STATION parameter contains label names used in SLISTATN macros. The LSM parameter contains label names used in SLILSM macros.
SLISTATN	This macro lists the stations (LMU interfaces) that connect a host to an ACS. One SLISTATN macro is specified for each station entry listed in the SLIACS macro. The SLISTATN macros follow the SLIACS macro in the order specified on the SLIACS macro STATION parameter.
SLILSM	This macro describes the characteristics of each Library Storage Module (LSM) defined by the SLIACS macro. One SLILSM macro is specified for each LSM listed in the SLIACS macro LSM parameter. The SLILSM macro follows the SLISTATN macro and both are referenced by the SLIACS macro. The SLILSM macro contains a PASTHRU parameter defining the LSM/PTP relationships. The ADJACNT parameter defines the label of the SLILSM macro which is adjacent to this LSM.
SLIDLIST	This macro lists the SLIDRIVS macro for each host. One SLIDLIST macro is specified for each DRVELST parameter entry listed in the SLILSM macro. The SLIDLIST macro follows the SLILSM macro which refers to it.
SLIDRIVS	This macro lists the transport device addresses used by each host attached to an LSM. The SLIDRIVS macro follows the SLIDLIST macro which refers to it.
SLIENDGN	This macro specifies the end of the LIBGEN macros.

Required Order for Specifying LIBGEN Macros

Figure 2 on page 30 illustrates a list of LIBGEN macros in required order.

LIBGEN Macro Relationship to a Library Configuration

Figure 3 on page 31 is an example of a typical library configuration. Figure 4 on page 32 contains the corresponding LIGBEN components applicable to the example configuration. The illustration and corresponding LIBGEN definitions are provided to help you better understand the relationship of a LIBGEN to an actual configuration.

Macro Syntax Conventions

Syntax conventions are important when specifying macros in LIBGEN. Refer to Appendix C, "Macros, Control Statements, Utilities and Commands Syntax Conventions" on page 157 for an explanation of macro syntax conventions.

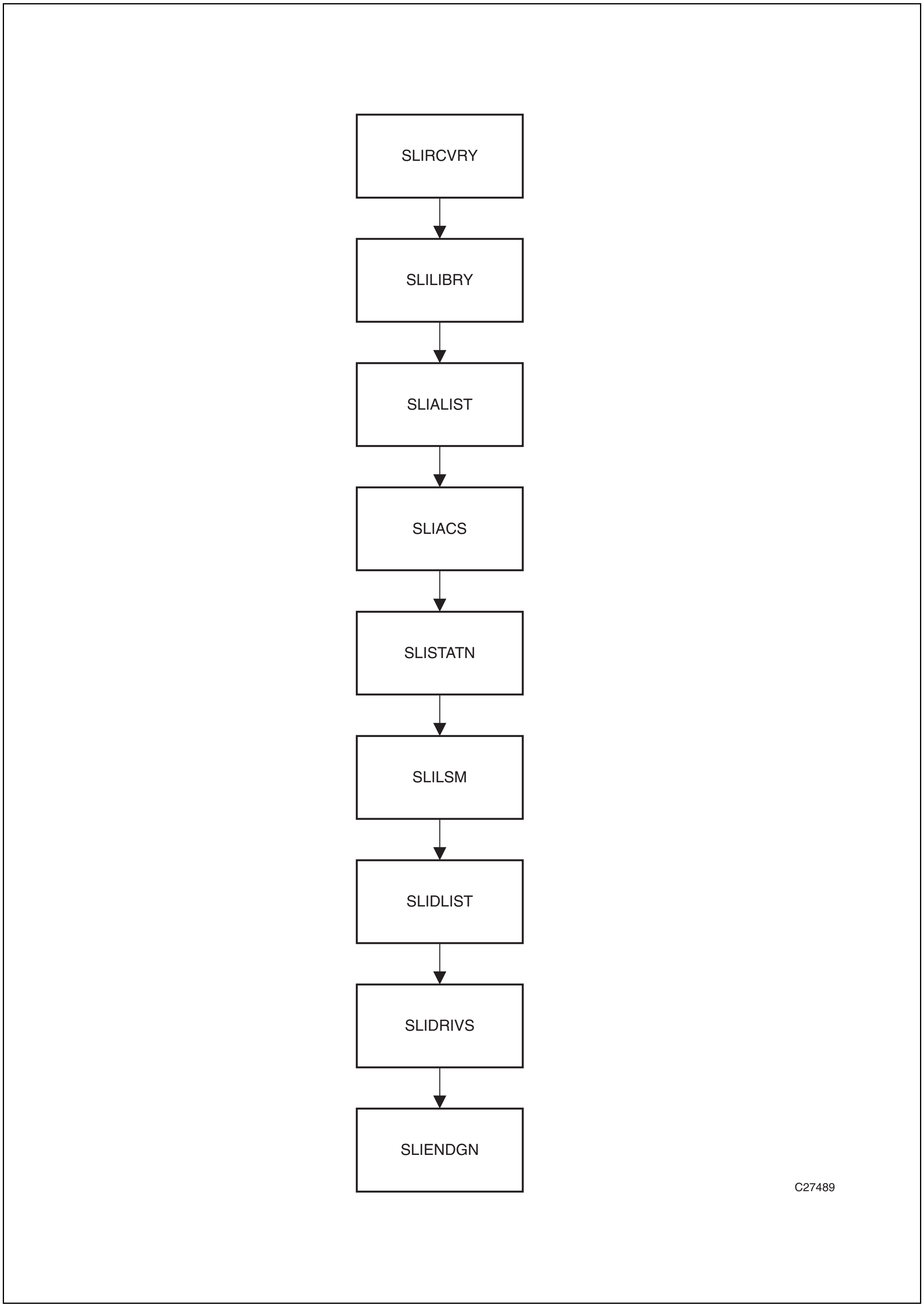


Figure 2. Required Order for Specifying the LIBGEN Macros

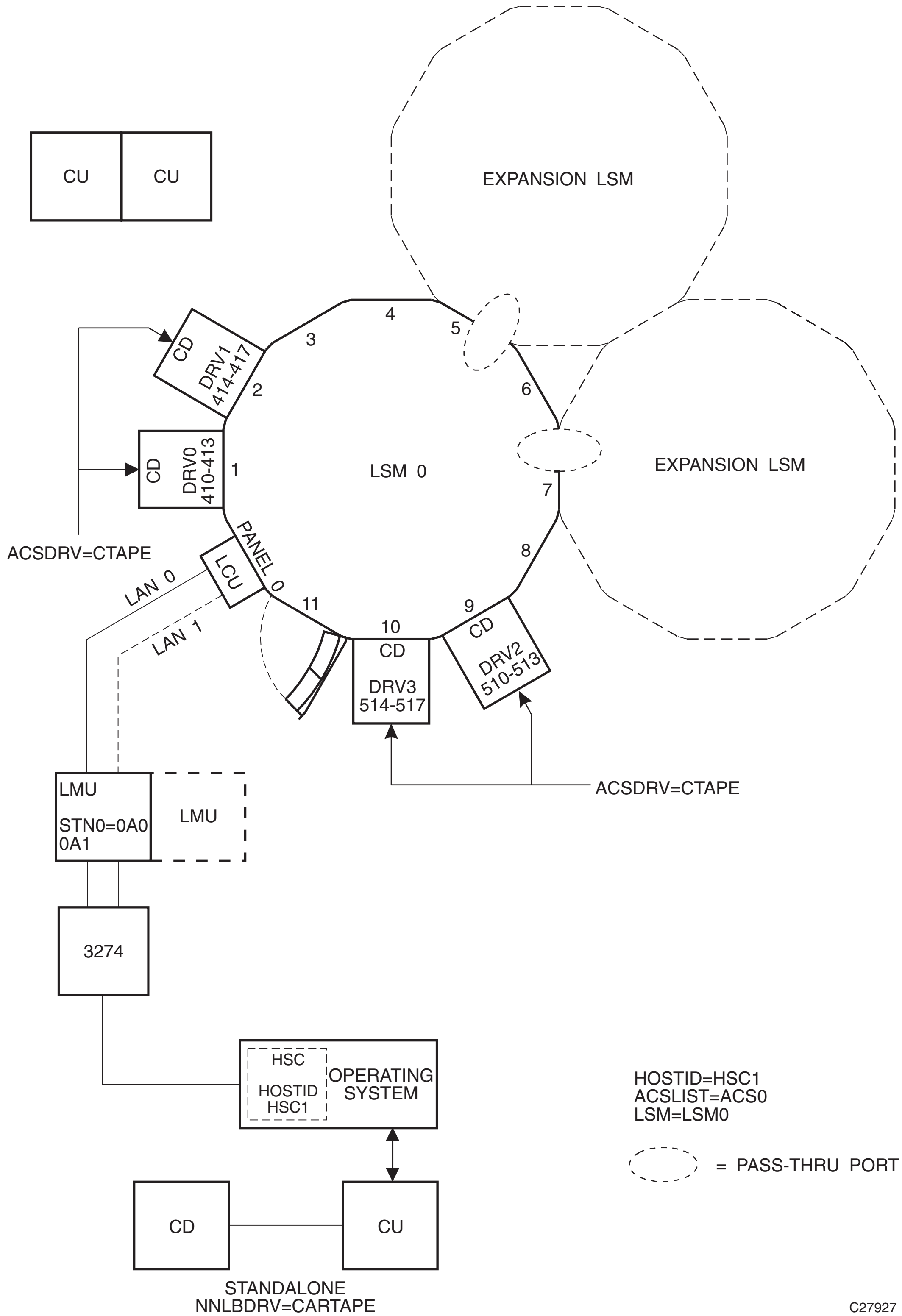


Figure 3. Sample Library Configuration

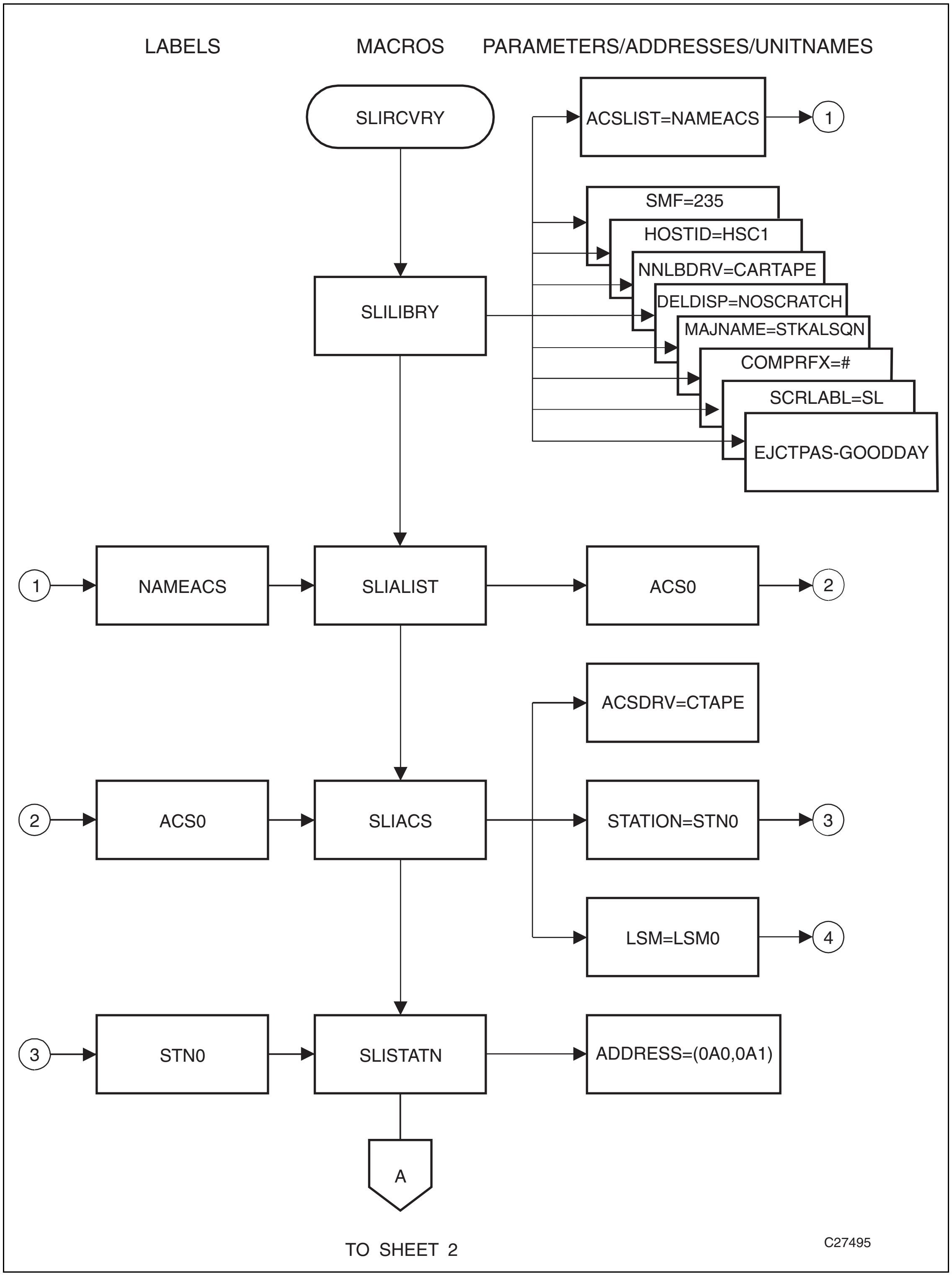


Figure 4. LIBGEN MACRO Relationship (1 of 2)

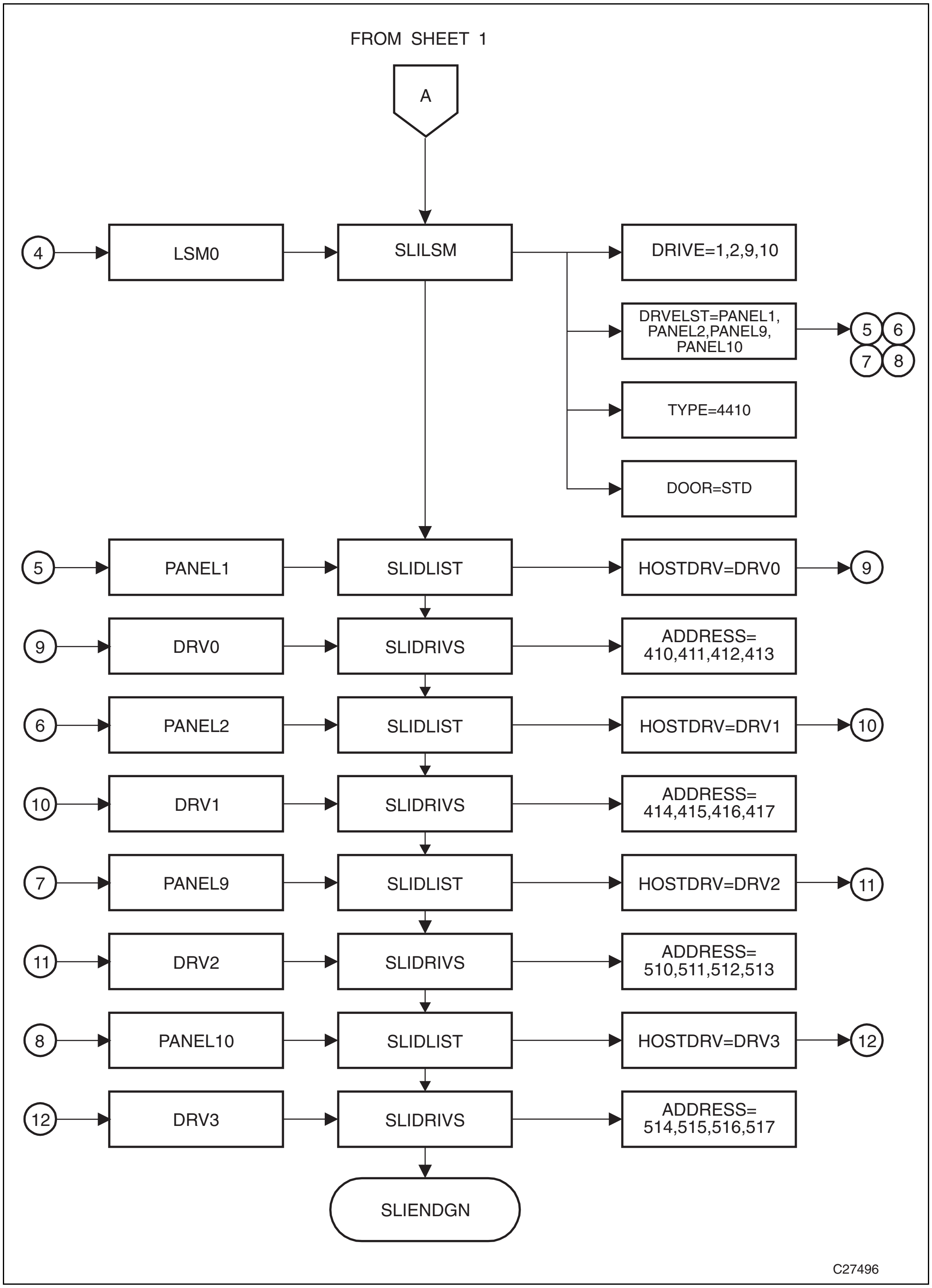


Figure 4. LIBGEN Macro Relationship (2 of 2)

SLIRCVRY Macro

The SLIRCVRY macro defines criteria to determine when a control data set has become inoperable and requires recovery processing. Only one SLIRCVRY macro is specified, and it is the first macro in the LIBGEN.

Syntax

```
►►─┬───────┬─SLIRCVRY─┬──────────────────────────┬──────────────────────────►◄
   └─label─┘          └─TCHIQE=─┬─BOTH────┬──────┘
                                ├─NONE────┤
                                ├─SHADOW──┤
                                ├─JOURNAL─┤
                                ├─STANDBY─┤
                                └─ALL─────┘
```

Parameters

label
name of the CSECT generated by LIBGEN. If not specified, an unnamed CSECT is generated.

SLIRCVRY
name of this macro.

TCHNIQE
parameter that selects the form of recovery from a CDS failure.

BOTH
specifies that two distinct copies of the control data set (primary and secondary) and journals are specified for recovery purposes. The default is **BOTH**.

NONE
specifies no form of recovery is used for the control data set. Thus, the primary control data set must be rebuilt, if inaccessible.

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.

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.

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.

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.

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.

Example

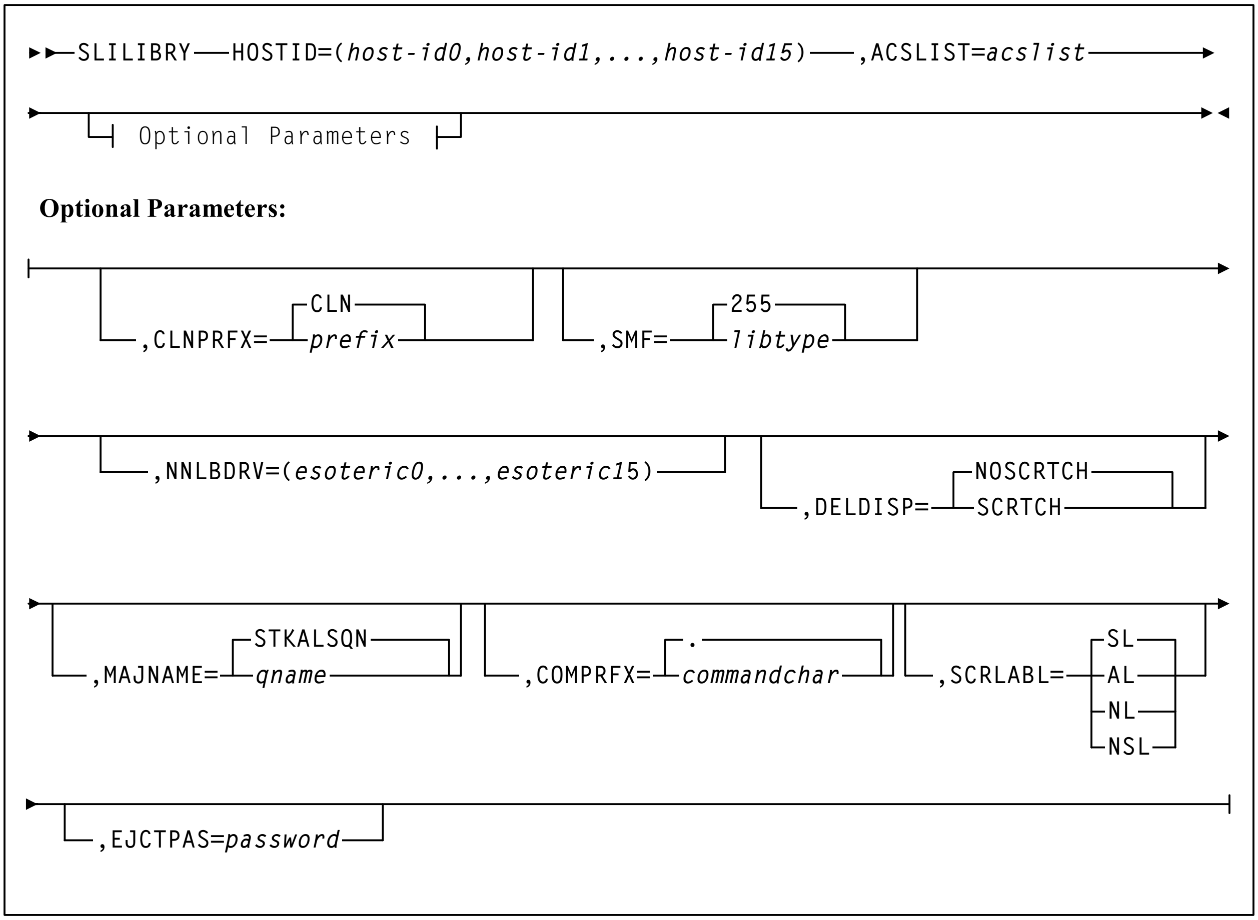
SLIRCVRY Statement

```
LIBGEN  SLIRCVRY TCHNIQE=STANDBY
```

SLILIBRY Macro

The SLILIBRY macro defines the global characteristics of the library. Only one SLILIBRY macro is specified and immediately follows the SLIRCVRY macro.

Syntax



Parameters

SLILIBRY
name of this macro.

HOSTID=
host-id0, *host-id1*, ..., *host-id15* identifies each host that accesses the library. This represents either the SMF System ID for JES2 or the Main Processor name for JES3. Valid characters for a HOSTID are A-Z, 0-9, #, $, and @.

JES2 Example:

```
HOSTID=(MVSA,MVSB)
```

where MVSA is Host0 and MVSB is Host1.

JES3 Example:

```
HOSTID=(MVSXA81A,MVSXA81B)
```

where MVSXA81A is Host0 and MVSXA81B is Host1.

☞ **Note:** The order of the hosts specified is positional. This information is used by other LIBGEN macros. Any changes in host order here may affect other areas of your LIBGEN configuration.

ACSLIST=

acslist is the assembler label of the SLIALIST macro that defines ACSs in the configuration.

Example:

```
ACSLIST=LACSLIST
```

CLNPRFX=

prefix is the three-character prefix that applies to all types of cleaning cartridges. Valid characters are A-Z, 0-9, $, #, and @. All cartridges having this prefix followed by numerics on their external labels are treated as cleaning cartridges. **CLN** is the default.

Examples:

```
CLNPRFX=CLN
CLNPRFX=KCR
```

☞ **Note:** Cleaning cartridges defined by VOLATTR control statements must still use the cleaning prefix established in the LIBGEN.

SMF=

libtype is the System Management Facility (SMF) record type used by the HSC to record cartridge movement and library performance. The value specified must match the SUBSYS type specified for the HSC in SMFPRMxx. The default is **255**.

Example:

```
SMF=235
```

NNLBDRV=

esoteric0,...esoteric15 specifies the esoterics of the manual transports located outside of library control for each host. *esoteric0* specifies the esoteric of manual transports attached to *host0* specified on the SLILIBRY macro HOSTID parameter. If an esoteric is not specified, this shows that the corresponding host has no manual transports. If an esoteric is omitted for a host, a comma is used in its place.

For JES2, refer to the unit name in the I/O Configuration for the esoteric name of the tape transports located outside of the library. For JES3, refer to the unit name in the I/O Configuration and the INISH deck for the esoteric name of the tape transports located outside the library.

Examples:

```
NNLBDRV=CARTAPE
```

where CARTAPE is for Host0

```
NNLBDRV=(CARTAPE,T38000,TTAPE)
```

where CARTAPE is for Host0, T38000 is for Host1, and TTAPE is for Host2.

```
NNLBDRV=(CARTAPE,CARTAPE,CARTAPE)
```

where CARTAPE is used for all three hosts.

Notes:

1. The NNLBDRV parameter is coded only if manual transports exist.
2. Make sure that each NNLBDRV esoteric is defined to its appropriate MVS host through the Hardware Configuration Definition (HCD) facility. Esoterics defined to the HSC, but not to MVS, may produce unpredictable and undesirable operational results.

   Make sure that each nonlibrary transport is defined to the appropriate NNLBDRV esoteric through the HCD facility.

   The HSC uses the number of transports defined to the NNLBDRV esoteric as the total number of nonlibrary transports for a host. Transports not defined in the NNLBDRV esoterics are **not** counted as nonlibrary transports. If the NNLBDRV esoterics definitions are incorrect, allocation decisions based on these counts may also be incorrect.

DELDISP=

specifies how the library is to interpret the delete disposition on a dismount message.

SCRTCH

specifies that the cartridge is to be placed into the HSC scratch pool when MVS indicates delete disposition.

NOSCRTCH

specifies that a delete disposition is to be ignored. Deleted volumes are retained as nonscratch during the CA-1 or TLMS grace period. Hence, CA-1 or TLMS users should specify NOSCRTCH for the delete disposition. The default is **NOSCRTCH**.

Example:

```
DELDISP=SCRTCH
```

MAJNAME=

qname specifies the ENQ/DEQ/QNAME used by host software for serialization. It must conform to the requirements for an ENQ/RESERVE/DEQ QNAME as defined by the IBM publication *MVS Supervisor Services and Macros*. The default is **STKALSQN**.

Example:

```
MAJNAME=STKALSQN
```

COMPRFX=

commandchar specifies the command prefix character used to direct operator commands to the HSC. It is a single character. The default command prefix character is a **period** (.).

Example command prefixes are: ¢, #, !

☞ **Note:** Ensure that the prefix character used does not conflict with any of the following:

- another subsystem's command prefix character (such as "$'' for JES2, "*'' for JES3, or ";'' the delimiter for TSO)
- the command delimiter for MVS — specified as the value for the CMDDELIM keyword in SYS1.PARMLIB (CONSOL*xx*) and described in the IBM publication *Installation and Tuning Guide for MVS*
- a JES line editing character as specified in the JES initialization statements or default. For JES2 the initialization statement is CONDEF.

  For JES3 the initialization statement is CONSTD. Descriptions of these statements and default values can be found in the IBM MVS publication *Initialization and Tuning Guide*.

- If you are running the HSC on a VM host that shares the CDS with an HSC running on MVS, make sure that your command prefix does not conflict with any of the VM facilities, such as the CP line editing symbol.

A null character can be specified as the command prefix character. During library operation, to specify an HSC command when the command prefix is a null character, you **must** use the MVS MODIFY command to issue commands to the HSC.

Even if you have specified a command prefix, you may use either method for issuing commands to the HSC:

- Specify an HSC command with the command prefix preceding the command.
- Specify an HSC command using the MVS MODIFY command. The following formats for the MVS MODIFY command may be used:

  Example:

  ```
  MODIFY hsc-subsystem-name,hsc-command
  ```

  or

  ```
  F hsc-subsystem-name,hsc-command
  ```

  where *hsc-subsystem-name* is the HSC subsystem name specified in the HSC startup proc.

  Examples of how a specific HSC command can be issued are:

  ```
  MODIFY hsc-subsystem-name,DISPLAY CDS
  ```

or

```
F hsc-subsystem-name,DISPLAY CDS
```

Table 2. 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

Table 2. Mapping of Command Prefix Codes to Characters (Continued)

Hex	Character	Description
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

Note: If you specify a null command prefix (hex 40), you must use the MVS MODIFY command to perform any HSC operator command.

Example:

```
F SLSØ, MOUNT EDUØ5Ø, B3Ø
```

where

F
an abbreviation for the MVS MODIFY command

SLS0
an HSC subsystem

MOUNT
an HSC operator command

EDU050
a VOLSER

B30
a designated tape drive

Because of IBM assembler restrictions, a single ampersand (&) cannot be specified as a command prefix. However, if you want to use an ampersand (&) as the command prefix, specify two ampersands (&&). When the LIBGEN file is assembled, the assembler strips off the first ampersand and leaves the second one. The result is that the valid command prefix is a single ampersand.

Example:

```
COMPRFX=&&
```

If specifying a left parenthesis (4D) or right parenthesis (5D), the prefix character must be enclosed in single quotes. For example:

```
COMPRFX='('
```

```
COMPRFX=')'
```

Another example of specifying a valid command prefix is:

```
COMPRFX=@
```

SCRLABL=

specifies the magnetic label type of a library controlled scratch volume. The HSC assumes nonspecific requests with other than the SCRLABL label type are outside the library. If a nonspecific volume is requested with the label type specified, it is considered a scratch volume. Parameter options are:

SL

standard label. The default is **SL**.

AL

ANSI label

NL

nonlabeled

NSL

nonstandard label.

Automated mounts of scratch volumes other than the SCRLABL label type can be performed by using user exits. Refer to Chapter 9, "User Exits" in the *HSC System Programmer's Guide* for invoking user exits.

Example:

```
SCRLABL=NSL
```

EJCTPAS=

password specifies that a password is required for the EJect operator command. The password is one to eight alphanumeric characters. Acceptable characters include A-Z (must be capitalized) and numbers 0-9.

Note: Existing passwords do not need to be changed to conform to these restrictions, but any new passwords must follow the guidelines described above. If EJCTPAS is not specified, no password is used. An encrypted form of the password is maintained in the control data set.

Example:

```
EJCTPAS=GOODDAY
```

Example

SLILIBRY Statement

```
SLILIBRY HOSTID=(MVSA,MVSB),                                        X
ACSLIST=LACSLIST,                                                   X
CLNPRFX=CLN,                                                        X
SMF=235,                                                            X
NNLBDRV=(CARTAPEA,CARTAPEB),                                        X
DELDISP=SCRTCH,                                                     X
MAJNAME=STKALSQN,                                                   X
COMPRFX=Ø,                                                          X
SCRLABL=NSL,                                                        X
EJCTPAS=GOODAY,                                                     X
```

SLIALIST Macro

The SLIALIST macro contains the assembler labels of the SLIACS macro(s). The first ACS listed has an ACSid of 00, the second 01, etc.

Syntax

```
►►─acslist───SLIALIST─acs0, acs1,.....acs255──────────────────────────►◄
```

Parameters

acslist
assembler label referred to by the SLILIBRY macro ACSLIST parameter.

SLIALIST
name of this macro.

acs0,acs1,...,acs255
label name used by the SLIACS macro(s). One label name is specified for each ACS, and at least one label name is required.

Example

SLIALIST Statement

```
ACSLIST SLIALIST  ACSØ,ACS1
```

SLIACS Macro

The SLIACS macro defines the esoteric unit name used by tape transports attached to an ACS, the communication paths between a host (or hosts) and an ACS, and the LSMs attached to an ACS. There must be one and only one SLIACS macro for each ACS.

The SLIACS macro for the first ACS must appear immediately after the SLIALIST macro. The SLIACS macro for each subsequent ACS must appear immediately after the last SLIDRIVS macro for the prior ACS definition.

Syntax

```
►►─acs0───SLIACS────┤ Additional Parameters ├──────────────────────────────►◄

Additional Parameters:

├──ACSDRV=(esoteric0, ...,esoteric15)───────────────────────────────────────►

►──┬────────────────────────────────────┬─,LSM=(lsm0,lsm1, ...,lsm15)───────┤
   └─,STATION=(station0, ...,station15)─┘
```

Parameters

acs0
assembler label referred to by the SLIALIST macro ACS positional parameter.

SLIACS
name of this macro.

ACSDRV=
esoteric0, ..., esoteric15 specifies the esoteric unit name defined by the I/O Configuration for each host which refers to the transports attached to this ACS. If an esoteric is omitted for a host, a comma is used in its place.

If an esoteric is omitted for a host, the esoteric specified with the first host system is substituted.

Notes:

1. The ACSDRV operands are positional. The SLILIBRY macro HOSTID parameter determines the positional ordering of the operands specified in the ACSDRV parameter. The first operand specified in the ACSDRV parameter corresponds to the first host specified in the SLILIBRY macro HOSTID parameter, etc.

Example:

```
ACSDRV=CTAPE,
```

where CTAPE corresponds to Host0.

Example:

```
ACSDRV=(CTAPEA,CTAPEB),
```

where CTAPEA corresponds to Host0 and CTAPEB corresponds to Host1.

2. Make sure that each ACSDRV esoteric is defined to its appropriate MVS host through the Hardware Configuration Definition (HCD) facility. Esoterics defined to the HSC, but not to MVS, may produce unpredictable and undesirable operational results.

   Make sure that each library transport for each ACS is defined to its appropriate ACSDRV esoteric through the HCD facility.

   The HSC uses the SLIDRIVS macro definitions to determine the number of library transports defined for each ACS for a host. Transports defined in the SLIDRIVS macros, but not in the ACSDRV esoterics, may cause esoteric substitution to be denied if they are the only transports capable of satisfying an allocation request.

   Transports defined in the ACSDRV esoterics, but not in SLIDRIVS macros, are **not** counted as library transports. If the SLIDRIVS macro definitions are incorrect, allocation decisions based on these counts may also be incorrect.

STATION=

station0, ...,*station15* are the assembler labels of the SLISTATN macro. They define the station numbers used to communicate between a host and an ACS. Multiple hosts (maximum of 16) may refer to the same SLISTATN macro.

Note: To establish communication with an ACS if the LIBGEN SLISTATN macro has been omitted, use the SET SLISTATN utility to add station addresses for the ACS. See the *HSC System Programmer's Guide* for a description of this utility.

This parameter is optional. If STATION is specified, parameters can be omitted for hosts that are not attached to the ACS by using the comma delimiter as follows:

```
STATION=(,STN1)
```

where Host0 does not have a defined connection and STN1 is a defined connection to Host1.

If STATION is omitted, the ACS has no defined connections to any host. Leaving out this parameter is desirable if the user wants to define a future ACS and automatically bypass the “ACS *acs-id* is disconnected” message.

Caution: If a CDS is created using HSC 5.1 LIBGEN macros without STATION definitions, then HSC 4.0, 4.1, and 5.0 systems cannot operate with this CDS. HSC 2.1 systems will fail in initialization.

Examples:

If the SLILIBRY macro has been entered as:

```
SLILIBRY HOSTID(MVS0,MVS1)
```

and , if the STATION parameter is specified as:

```
STATION=(STN0),
```

STN0 corresponds to MVS0.

If STATION is specified as:

```
STATION=(STN0,STN1),
```

STN0 corresponds to MVS0, and STN1 corresponds to MVS1.

LSM=

lsm0, ...,lsm15 are the assembler labels of the SLILSM macro which define each LSM configured within the ACS.

Examples:

```
LSM=(LSM0)
LSM=(LSM0,LSM1,LSM2)
```

Example

SLIACS Statement

```
ACS0   SLIACS   ACSDRV=(CTAPEA,CTAPEB),                      X
                STATION=(STN0,STN1),                         X
                LSM=(LSM0,LSM1,LSM2)
```

SLISTATN Macro

The SLISTATN macro contains LMU station addresses that connect a host system to an ACS. One SLISTATN macro is used for each station label coded in the SLIACS macro STATION parameter. The SLISTATN macro must appear immediately following the SLIACS macro which references them and in the order specified on the SLIACS macro STATION parameter.

Normally, the HSC waits for offline stations when it attempts to initiate communication. This means message IEF238D is issued when the HSC allocates the station.

However, if the HSC has already established communication with at least one station, the HSC does not wait for other stations to come on during initialization. Therefore, list the stations that are designated for backup usage last. These backup stations are normally offline.

Syntax

```
►►─station0──SLISTATN ADDRESS=(addr0,...,addr15)──────────────────────────►◄
```

Parameters

station0
assembler label referred to by the SLIACS macro STATION parameter.

SLISTATN
name of this macro.

ADDRESS=
addr0,...,*addr15* specifies the LMU addresses that connect the ACS to the host system. A minimum of one and a maximum of 16 station addresses may be used by a single host to communicate with an ACS. A maximum of 16 connections per ACS is allowed. In a dual LMU configuration the maximum is 32 connections per ACS; 16 to each LMU in the dual LMU configuration.

Examples:

```
ADDRESS=(ØAØ)
ADDRESS=(ØAØ,ØA1)
```

Example

SLISTATN Statement

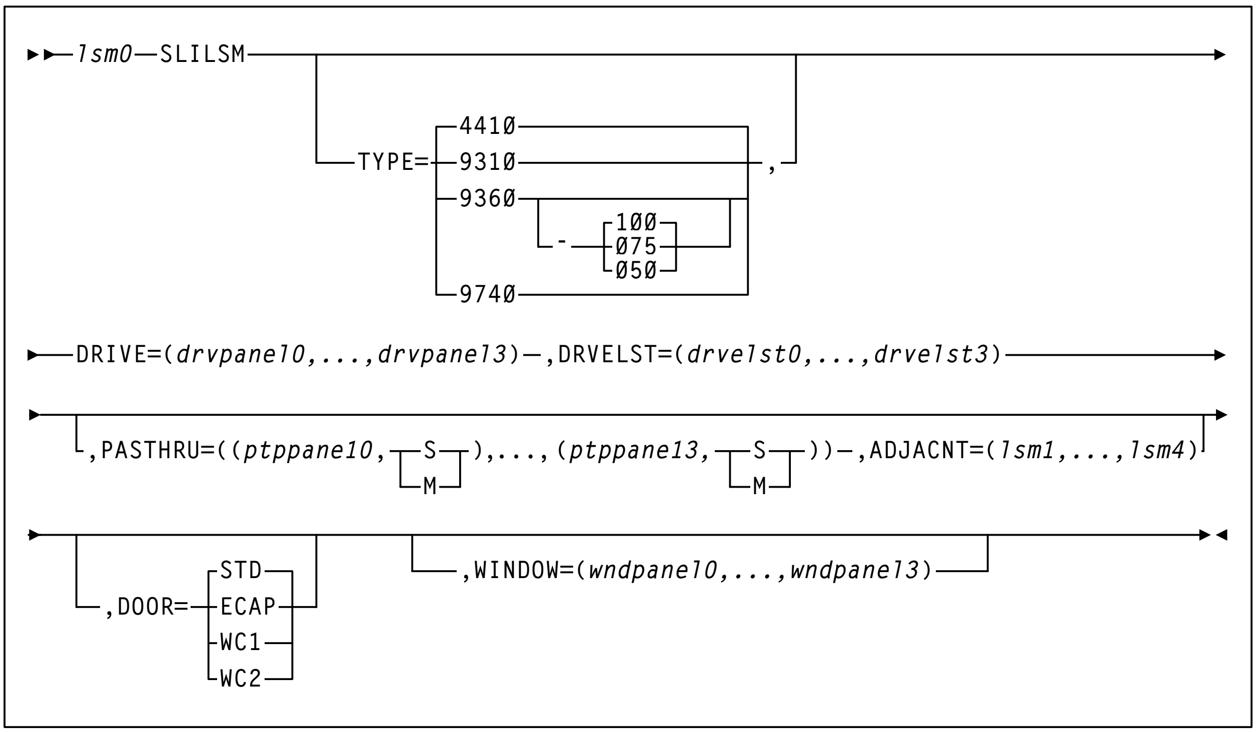
```
STNØ  SLISTATN   ADDRESS=(ØAØ,ØA1)
```

SLILSM Macro

This macro defines the panel numbers and relative position of cartridge drive panels around an LSM, the assembler labels for the SLIDLIST macro, the panel number for each pass-thru port in an LSM, and the assembler labels of SLILSM macros.

The first SLILSM macro for an ACS must appear immediately after the last SLISTATN macro for an ACS. Subsequent SLILSM macros for the ACS must appear immediately after the last SLIDRIVS macro referred to by the preceding SLILSM macro. The SLILSM macros are coded in the same order as specified in the SLIACS macro LSM parameter.

Syntax



Parameters

lsm0
assembler label referred to by the SLIACS macro LSM parameter.

SLILSM
specifies the name of this macro.

TYPE=
specifies the LSM type.

Caution: The value specified must match both the physical hardware configuration and the value coded by the StorageTek CSE or panel mismatch errors appear at startup. Confirm the value you are specifying on the **TYPE** parameter with your CSE.

Options include:

4410
standard LSM. **4410** is the default.

9310
specifies a PowderHorn™ LSM.

9360-*xxx*
specifies a WolfCreek™ LSM with a distinct cartridge capacity.
Allowable values for *xxx* are:

050
500 cartridge capacity WolfCreek. This is a WolfCreek LSM without cell arrays on panels 3 and 4.

075
750 cartridge capacity WolfCreek. This is a WolfCreek LSM without cell arrays on panel 4.

100
1000 cartridge capacity WolfCreek. This is the default value.

9740
specifies a TimberWolf LSM.

DRIVE=
drvpanel0,...,*drvpanel3* specifies the range of panel numbers. *drvpanel0* specifies the panel number of the first cartridge drive panel moving clockwise from the door; *drvpanel1* specifies the second cartridge drive panel, etc.

For the 4410 standard LSM and the 9310 PowderHorn LSM, *drvpanel* must be in the range from 1 through 10, with a maximum of four panels specified. For the ExtendedStore™ LSM, panel 10 **must** be defined as a drive panel because the SLIDRIVS macro requires a definition for panel 10 (see “SLIDRIVS Macro” on page 58 for additional information). WolfCreek LSMs must have one drive defined in panel 1, with the optional drive/viewing window available in panel 3. In 9740 TimberWolf LSMs, panel 1 is the drive panel (up to 10 drives can be specified), and panel 3 includes a viewing window if optional cells are not requested.

Examples:

```
DRIVE=(9,10)
DRIVE=(1,2,9,10)
DRIVE=(7,8,9,10)
DRIVE=(1) (WolfCreek or TimberWolf DRIVE example)
```

DRVELST=

drvelst0,...,*drvelst3* defines the assembler labels for the SLIDLIST macros. The positional ordering of the DRVELST parameter is determined by the DRIVE parameter.

Example:

```
DRVELST=(PANEL1,PANEL2,PANEL9,PANEL1Ø)
```

PASTHRU=

ptppanel0 specifies the panel number for each pass-thru port in the LSM. For 4410 Standard, and 9310 PowderHorn LSMs, *ptppanel0* is a decimal number in the range from 1 through 9 and identifies the panel number of a pass-thru port (PTP). For the 9360 WolfCreek and 9740 TimberWolf LSMs, the only valid values for *ptppanel0* are 0 and 2. The S or M specification defines LSM/PTP relationship.

S

indicates this LSM does not control the PTP (slave).

M

indicates this LSM controls the PTP (master).

There can be a total of four pass-thru port panels per 4410 and 9310 LSMs and a total of two pass-thru ports for the 9360 LSMs and 9740 LSMs. A maximum of two master (M) pass-thru ports are allowed per LSM as shown in Figure 5 on page 52.

For 9360 WolfCreek LSMs, panel zero (0) is always a master PTP. When a 9360 WolfCreek LSM is connected to a 4410 or 9310 LSM, the panel of the 9360 (panel 0 and or 2) connected to the 4410 or 9310 LSM is always a master. When 9360s are connected in a series with other 9360s, panel 0 is always a master and panel 2 is always a slave.

For 9740 TimberWolf LSMs, panel 2 is the master PTP and panel 0 is the slave. 9740 LSMs can attach only to other 9740s.

If the PASTHRU parameter is specified, the ADJACNT parameter must also be specified. The order of PTPs listed must correspond to that specified in the ADJACNT parameter.

Examples:

```
PASTHRU=((5,M))
PASTHRU=((5,M),(7,S))
PASTHRU=((1,M),(3,M),(5,S))
PASTHRU=((Ø,M),(2,S)) (WolfCreek Example)
PASTHRU=((2,M),(Ø,S)) (974Ø Example)
```

Note: All of parentheses delimiters must be included in the macro statement even if only one PTP is specified. For example, if only one PTP is specified, the double parentheses must be indicated as shown in the following example.

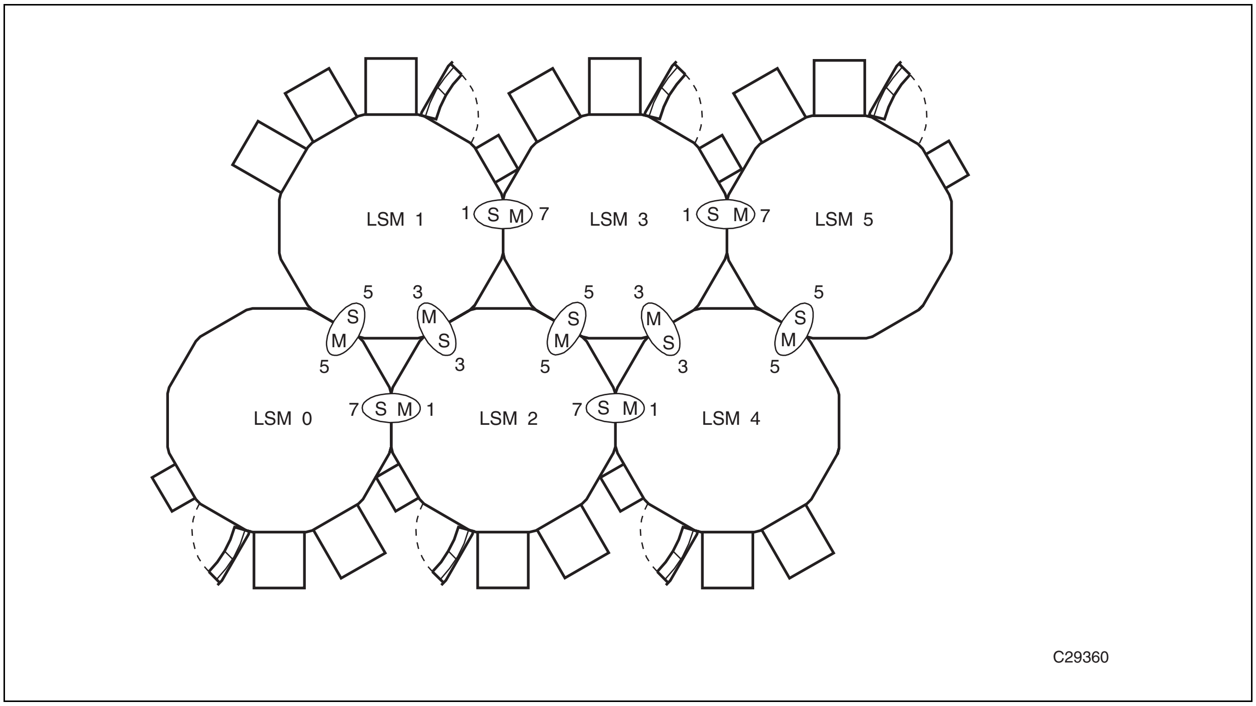


Figure 5. Example of Pass-thru Port Relationships

Example:

```
PASTHRU=((6,M))
```

ADJACNT=

lsm0,*lsm1*,*lsm2*,*lsm3* specifies the assembler labels of SLILSM macros, as coded in the SLILSM macro, which are connected via PTPs to this LSM. If the ADJACNT parameter is specified, the PASTHRU parameter must also be specified. The order listed must correspond to that specified in the PASTHRU parameter.

Examples:

```
ADJACNT=(LSM1) 3
```

where LSM1 is *ptppanel0*

```
ADJACNT=(LSM2,LSMØ)
```

where LSM2 is *ptppanel0* and LSM0 is *ptppanel2*

DOOR=

optionally specifies the CAP configuration in the LSM access door.

Note: The 9740 TimberWolf LSM contains either a 10-cell removable magazine or a 14-cell permanent rack. The HSC receives CAP configuration information directly from the LMU, so it is not necessary to specify this parameter for the 9740.

STD

indicates the LSM access door contains a standard CAP (capacity of twenty-one cartridges). Default is **STD**.

ECAP

indicates the LSM access door contains an enhanced CAP. The enhanced CAP door features two large CAPs (capacity of forty cartridges each), and one small CAP, referred to as the priority CAP or PCAP (capacity of one cartridge).

WC1

indicates the LSM access door contains a WolfCreek CAP having a 20-cell capacity and a PCAP.

WC2

indicates the LSM access door contains an optional WolfCreek CAP having a 30-cell capacity. This is in addition to the capacity provided by the WC1 CAP door. Thus a WolfCreek with an optional WC2 CAP has the following configuration: WC1 with 20-cell capacity and a PCAP plus a WC2 with 30-cell capacity.

WINDOW=

wndpanel0,...,*wndpanel3* specifies one or more panel numbers containing a viewing window. *wndpanel0* specifies the panel number of the first window panel moving clockwise from the access door; *wndpanel1* specifies the second window panel, etc. The panel number(s) designated for the viewing window(s) must be enclosed in parentheses. Viewing windows are an available option on the following LSM types:

- PowderHorn (9310)
- WolfCreek (9360)
- TimberWolf (9740).

Note: The standard LSM (TYPE=4410) does not allow the replacement of a panel with a viewing window. TYPE=4410 is the default LSM type. You must enter an LSM type of TYPE=9310 (PowderHorn), TYPE=9360-*xxx* (WolfCreek), or TYPE=9740 (TimberWolf) in order to specify a viewing window.

Only one viewing window can be specified for a WolfCreek or a TimberWolf LSM, and it must be defined in panel number three (3). Selecting any panel number other than three causes an error message to be displayed. If the viewing window is defined for the WolfCreek LSM, panel three may not be designated as a DRIVE panel.

The following example shows the WolfCreek and TimberWolf LSM viewing window selection:

Example:

```
WINDOW=(3)
```

The PowderHorn LSM supports from one to four viewing windows. Panel numbers one (1) through nine (9) are eligible for designations as viewing windows. Panel numbers zero (0), ten (10), and eleven (11), are not eligible as viewing windows. If panels zero, ten, or eleven are designated as viewing windows, an error message is issued describing their ineligibility.

The following examples show PowderHorn LSM viewing window selections:

Examples:

```
WINDOW=(2)
WINDOW=(2,5,7,9)
```

If more than one panel is designated as a viewing window, the panel numbers must be separated by commas and the entire list must be enclosed in parentheses. Panel numbers selected for viewing windows may not be designated as DRIVE panels or as PASTHRU panels.

Examples

SLILSM Statement for Standard LSM (4410) as Default

```
LSM0  SLILSM   DRIVE=(1,2,9,10),                                      X
               DRVELST=(PANEL1,PANEL2,PANEL9,PANEL10),                X
               PASTHRU=((5,M),(7,S)),                                 X
               ADJACNT=(LSM1,LSM2),                                   X
               DOOR=STD
```

SLILSM Statement for LSM Model 9310-PowderHorn

```
LSM4  SLILSM   TYPE=9310,                                             X
               DRIVE=(1,2,9,10),                                      X
               DRVELST=(PANEL1,PANEL2,PANEL9,PANEL10),                X
               PASTHRU=((5,M),(7,S)),                                 X
               ADJACNT=(LSM1,LSM2),                                   X
               DOOR=STD
```

SLILSM Statement for LSM Model 9310-PowderHorn

```
LSM4  SLILSM   TYPE=9310,                                             X
               DRIVE=(1,2,9,10),                                      X
               DRVELST=(PANEL1,PANEL2,PANEL9,PANEL10),                X
               PASTHRU=((5,M),(7,S)),                                 X
               ADJACNT=(LSM1,LSM2),                                   X
               DOOR=STD                                               X
               WINDOW=(4,8)
```

SLILSM Statement Specifying LSM Model 9360-075 WolfCreek

```
LSM4  SLILSM   TYPE=936Ø-Ø75,                                    X
               DRIVE=(1,3),                                      X
               DRVELST=(PANEL1,PANEL3),                          X
               PASTHRU=((Ø,M)),                                  X
               ADJACNT=(LSMØ),                                   X
               DOOR=WC1
```

SLILSM Statement Specifying LSM Model 9360-100 WolfCreek

```
LSM4  SLILSM   TYPE=936Ø-1ØØ,                                    X
               DRIVE=(1),                                        X
               DRVELST=(PANEL1),                                 X
               PASTHRU=((Ø,M)),                                  X
               ADJACNT=(LSMØ),                                   X
               DOOR=WC2                                          X
               WINDOW=(3)
```

SLILSM Statement Specifying LSM Model 9740 - TimberWolf

```
LSMØ   SLILSM   TYPE=974Ø                                         X
                DRIVE=(1),                                        X
                DRVELST=(PANEL1),                                 X
                PASTHRU=((2,M)),                                  X
                ADJACNT=(LSM1),                                   X
                WINDOW=(3)
```

SLIDLIST Macro

Each SLIDLIST macro specifies an assembler label corresponding to a SLIDRIVS macro which identifies the unique host addresses associated with the transports residing on a cartridge drive panel.

The first SLIDLIST macro for an LSM must appear immediately after the SLILSM macro which refers to it. Subsequent SLIDLIST macros for the LSM must appear immediately after the last SLIDRIVS macro for the preceding SLIDLIST macro.

Syntax

```
►►─drvelst0───SLIDLIST────HOSTDRV=(drives0,...,drives15)──────────────────────►◄
```

Parameters

drvelst0
specifies the assembler label that is referred to by the SLILSM macro DRVELST parameter.

SLIDLIST
name of this macro.

HOSTDRV=
(*drives0*,...,*drives15*) specifies the assembler label name of each SLIDRIVS macro which defines transport addresses.

Note: The HOSTDRV operands are positional. The SLILIBRY macro HOSTID parameter determines the positional ordering of the operands specified in the HOSTDRV parameter. The first operand specified in the HOSTDRV parameter corresponds to the first host specified in the SLILIBRY macro HOSTID parameter, etc.

Examples:

```
HOSTDRV=(DRVØ)
```

where DRV0 is for Host0

```
HOSTDRV=(DRVØ,DRV1)
```

where DRV0 is for Host0 and DRV1 is for Host1

```
HOSTDRV=(DRVØ,DRVØ)
```

where DRV0 is for Host0 and DRV0 is for Host1

Example

SLIDLIST Statement

```
PANEL1 SLIDLIST  HOSTDRV=(DRVØ,DRVØ)
```

SLIDRIVS Macro

The SLIDRIVS macro lists the transport device addresses used by a host, which correspond to a specific cartridge drive panel. A SLIDRIVS macro must be specified for each unique operand coded in the SLIDLIST macro HOSTDRV parameter. The SLIDRIVS macro(s) must appear immediately following the SLIDLIST macro which references it.

Syntax

```
►►─drives0 SLIDRIVS ADDRESS=(addr0,addr1...)──────────────────────────────►◄
```

Parameters

drives0
specifies the assembler label that is referenced by the SLIDLIST macro HOSTDRV parameter.

SLIDRIVS
name of this macro.

ADDRESS=
addr0,*addr1*,... specifies the host-unique device addresses associated with transports residing in a cartridge drive panel. Nonexistent transports are indicated by position-holding commas.

Note: If addresses exceed more than one line, place a comma after the last address **and** a nonblank character in column 72 (e.g., an X). Continue on the next line starting in column 16. Unlike control statements, no plus (+) or minus (-) continuation characters are required after the last parameter value.

Drives on a panel are defined from top to bottom. When multiple drive columns are present on a 9310 panel, the drive column on the left is defined first, followed by the drive column on the right (as viewed from outside the LSM). The HSC considers these addresses to be attached to an LSM. Verify the addresses you use with your Customer Service Engineer (CSE).

Examples:

`ADDRESS=(410,411,412,413)`	for a 4480 M24, 4490 M34, 9490 M34, 9490EE M34, or SD-3 H34 device
`ADDRESS=(410,,412,)`	for a 4480 M22 or 4490 M32 device
`ADDRESS=(,B75,,B76)`	for a 9490 or 9490EE M32 or SD-3 H32 device

`ADDRESS=(,B75,,)`		for an SD-3 H31 device
`ADDRESS=(,B75,B76,B77)`		for an SD-3 H33 device
`ADDRESS=(C10,C11,C12,C13,C14,` `C15,C16,C17,C18,C19)`	X	for a 9840, T9840B, T9940A, or T9940B device (10-drive panel)

`ADDRESS=(C10,C11,C12,C13,C14,`
`C15,C16,C17,C18,C19,C1A,C1B,`
`C1C,C1D,C1E,C1F,C20,C21,C22,`
`C23)`
	X
	X
	X
		for a 9840, T9840B, T9940A, or T9940B device (20-drive panel)

Notes:

1. Make sure that each library transport for each ACS is defined to its associated ACSDRV esoteric through the Hardware Configuration Definition (HCD) facility.

   The HSC uses the SLIDRIVS macro definitions to determine the number of library transports defined for each ACS for a host. Transports defined in the SLIDRIVS macros, but not in the ACSDRV esoterics, may cause esoteric substitution to be denied if they are the only transports capable of satisfying an allocation request. Transports defined in the ACSDRV esoterics, but not in SLIDRIVS macros, are **not** counted as library transports. If the SLIDRIVS macro definitions are incorrect, allocation decisions based on these counts may also be incorrect.

2. Duplicate unit addresses are not allowed for a given host.

3. You must specify at least one drive address for each ACS. For example, you cannot specify

   ```
   ADDRESS=(,,,)
   ```

   for **all** drive addresses in an ACS. If you fail to enter at least one drive address, unpredictable drive allocation may occur.

4. The total number of drive positions, including position-holding commas, must be 4, 10, or 20 depending on the LSM type:

   - 4410 or 9360 LSM, 4-drive panels are supported.
   - 9740 LSM, 4-drive or 10-drive panels are supported.
   - 9310 LSM, 4-drive, 10-drive, and 20-drive panels are supported.

5. The total number of drive positions specified by all SLIDRIVS statements for a single panel must be the same.

6. For an ExtendedStore library, panel 10 must be defined using commas to indicate nonexistent transports. Example:

   ```
   ADDRESS=(,,,)
   ```

7. On all LSMs, drives are defined to the HSC from top to bottom, with *addr0* representing the topmost drive and *addrn* the bottommost drive.

   However, on a 9740 10-drive panel LSM, the drives are populated and configured to the 9740 LSM from bottom to top. (9740 4-drive panels are configured to the 9740 LSM from top to bottom, as are all other LSM drive panels.)

   An example showing how to define a 9740 10-drive panel containing five 9840 drives is:

   ```
   ADDRESS=(,,,,,BD4,BD3,BD2,BD1,BDØ)
   ```

Examples

SLIDRIVS Statement

```
DRVØ  SLIDRIVS  ADDRESS=(41Ø,411,412,413)
```

SLILSM, SLIDLIST, SLIDRIVS Statements for ExtendedStore LSM

The following example illustrates how to code drive specifications for an ExtendedStore LSM on a system with four hosts.

```
LSM1    SLILSM   DRIVE=(1Ø),                                      X
                 PASTHRU=((1,S)),                                 X
                 ADJACNT=(LSMØ),                                  X
                 DRVELST=(PANL11Ø),                               X
                 TYPE=441Ø,                                       X
                 DOOR=STD
PANL11Ø SLIDLIST HOSTDRV=(DRV11Ø,DRV11Ø,DRV11Ø,DRV11Ø)
DRV11Ø  SLIDRIVS ADDRESS=(,,,)
```

SLILSM, SLIDLIST, SLIDRIVS Statements for a 9740 LSM

The following example illustrates how to code drive specifications for a 9740 LSM that contains a 10-drive 9840 panel.

```
LSMØ    SLILSM   TYPE=974Ø
                 DRIVE=(1),                                       X
                 DRVELST=(PANEL1),                                X
                 PASTHRU=((2,M)),                                 X
                 ADJACNT=(LSM1),                                  X
                 WINDOW=(3),                                      X
PANL1   SLIDLIST HOSTDRV=(P1ØDRVØ)
P1ØDRVØ SLIDRIVS ADDRESS=(D19,D18,D17,D16,D15,D14,D13,            X
                 D12,D11,D1Ø)
```

SLILSM, SLIDLIST, SLIDRIVS Statements for a 9310 LSM

The following example illustrates how to code drive specifications for a 9310 LSM that contains a 20-drive 9840 panel.

```
LSM1    SLILSM   DRIVE=(1Ø),                                    X
                 PASTHRU=((5,S)),                               X
                 ADJACNT=(LSMØ),                                X
                 DRVELST=(PANEL8),                              X
                 TYPE=931Ø,                                     X
                 DOOR=STD
PANEL8  SLIDLIST HOSTDRV=(DRV1Ø5)
DRV1Ø5  SLIDRIVS ADDRESS=(C10,C11,C12,C13,C14,C15,              X
                 C16,C17,C18,C19,C1A,C1B,C1C,C1D,               X
                 C1E,C1F,C20,C21,C22,C23)
```

SLIENDGN Macro

The SLIENDGN macro specifies the end of the LIBGEN macros. It must appear as the last statement of the LIBGEN. No comments or other statements can follow this macro because they generate assembler warning messages.

Syntax

```
►►─SLIENDGN──────────────────────────────────────────────────────────►◄
```

Parameters

SLIENDGN
name of this macro. The SLIENDGN macro has no parameters.

LIBGEN Outputs

Job step return codes are listed in the following table.

Table 3. LIBGEN Job Step Return Codes

Return Code	Description
0, x'00'	Indicates a successful LIBGEN.
4, x'04'	Indicates successful LIBGEN; however, warning messages have been issued.
12, x'0C'	Indicates that the LIBGEN failed.

LIBGEN error messages are issued as assembler MNOTES. Refer to the *HSC Messages and Codes Manual* for an explanation of any error message encountered while running LIBGEN.

LIBGEN Process Verification

The LIBGEN macros must be assembled and link edited into a load module used by control data set initialization. (It is recommended that you use the High-Level Assembler.) Refer to Chapter 5, "Initializing the Control Data Sets" on page 65 for more information.

Assembler and Linkage Editor JCL

The assembler and linkage editor JCL for LIBGEN is shown in the following listing.

```
//*
//ASM      EXEC PGM=ASMA90
//SYSPRINT  DD SYSOUT=*
//SYSTERM   DD SYSOUT=*  (optional)
//SYSLIB    DD DSN=SYS1.MACLIB,DISP=SHR
//          DD DSN=SLS.SLSMAC,DISP=SHR
//SYSUT1    DD UNIT=SYSDA,SPACE=(CYL,(3,1))
//SYSLIN    DD DSN=&&OBJ,UNIT=SYSDA,
//             SPACE=(CYL,(1,1)),DISP=(,PASS)
//SYSIN     DD *

                  LIBGEN deck goes here

/*
//LKED     EXEC PGM=IEWL,PARM='LIST,XREF,RENT,REUS,REFR,RMODE=24',
//                            COND=(0,NE)
//SYSPRINT  DD SYSOUT=*
//SYSLMOD   DD DSN=SLS.your.hsc.linklib(lgenname),DISP=SHR
//SYSUT1    DD UNIT=SYSDA,SPACE=(CYL,(3,1))
//SYSLIN    DD DSN=&&OBJ,DISP=(OLD,DELETE)
//*
```

Verifying the Library Generation (LIBGEN)

After creation of the LIBGEN, it is important to verify that the configuration is correct.

To verify the LIBGEN, execute the SLIVERFY program. Verification can be performed at this point or can be performed during installation verification when testing the basic installation (refer to "Basic Installation Integrity Test" on page 107).

SLIVERFY Program

The SLIVERFY program must be installed in an APF-authorized library. The program validates esoteric unit names defined in LIBGEN and compares them with the names in the Eligible Device Table (EDT). Station and transport device addresses are verified against Unit Control Blocks (UCBs) for each of a host's defined LMU addresses and transports. This verifies that the LMU addresses, if supplied, are 3278 devices. If transports exist, SLIVERFY ensures that they are 3480, 3490, or 3590 devices. SLIVERFY must execute on a host defined to access the library.

Sample JCL for SLIVERFY is contained in the HSC SAMPLIB member JCLVRFY.

Example

SLIVERFY Program JCL

```
//SLIVERFY job (account),'programmer',CLASS=A
//*
//VERIFY   EXEC PGM=SLIVERFY,PARM='libgen-load-module-name'
//STEPLIB  DD DSN=your.hsc.linklib,DISP=SHR
//SYSPRINT DD SYSOUT=*
//*
```

SLIVERFY must be run on all hosts defined in the LIBGEN.

Chapter 5. Initializing the Control Data Sets

Data set initialization creates the library control data sets and must be performed before the library is operational.

Steps required to initialize the library control data sets are:

1. Create data set definitions in the data set initialization JCL using the SLICREAT program.
2. Execute SLICREAT to create the library control data sets.
3. Verify successful completion of the SLICREAT program and note the library volume capacity displayed in a confirming message.

Note: If you are migrating from a prior release of the HSC, refer to Appendix D, "Migration and Coexistence Processes" on page 167 for more information regarding control data set changes.

Creating Control Data Set Initialization JCL

Creating the definitions for the library control data set is done by coding JCL in a job file named SLICREAT.

The following is an example of JCL for the SLICREAT program. This sample is also included in the HSC SAMPLIB as member JCLCRT.

```
//SLICREAT JOB (account),'programmer',CLASS=A
//CREATE   EXEC PGM=SLICREAT,                     CDS CREATE MODULE
//             PARM='libgen-load-module-name',
//             REGION=4096K
//*
//STEPLIB  DD  DSN=your.hsc.linklib,DISP=SHR
//SYSPRINT DD  SYSOUT=*                           MESSAGES
//*
//******************************************************************
//*            LIBRARY PRIMARY CONTROL DATASET (CDS)
//******************************************************************
//SLSCNTL  DD  DSN=SLS.SLSCNTL,                  PRIMARY CDS
//             SPACE=(4096,s,,CONTIG,ROUND),     REPLACE 's' WITH YOUR
//             DISP=(NEW,CATLG,DELETE),          SPACE CALCULATIONS
//             UNIT=SYSDA
//******************************************************************
//*            LIBRARY SECONDARY CONTROL DATASET (CDS)
//******************************************************************
//SLSCNTL2 DD  DSN=SLS.SLSCNTL2,                 SECONDARY CDS
//             SPACE=(4096,s,,CONTIG,ROUND),     REPLACE 's' WITH YOUR
//             DISP=(NEW,CATLG,DELETE),          SPACE CALCULATIONS
//             UNIT=SYSDA
//******************************************************************
//*            LIBRARY STANDBY CONTROL DATASET (CDS)
//******************************************************************
//SLSSTBY  DD  DSN=SLS.SLSCNTL3,                 STANDBY CDS
//             SPACE=(4096,s,,CONTIG,ROUND),     REPLACE 's' WITH YOUR
//             DISP=(NEW,CATLG,DELETE),          SPACE CALCULATIONS
//             UNIT=SYSDA
//******************************************************************
//*            LIBRARY JOURNAL DATASET (INITIAL)
//******************************************************************
//SLSJRN01 DD  DSN=SLS.SLSJRN*1,                 INITIAL JOURNAL
//             SPACE=(4096,u,,CONTIG,ROUND),     REPLACE 'u' WITH YOUR
//             DISP=(NEW,CATLG,DELETE),          SPACE CALCULATIONS
//             UNIT=SYSDA
//******************************************************************
//*            LIBRARY JOURNAL DATASET (ALTERNATE)
//******************************************************************
//SLSJRN02 DD  DSN=SLS.SLSJRN02,                 ALTERNATE JOURNAL
//             SPACE=(4096,u,,CONTIG,ROUND),     REPLACE 'u' WITH YOUR
//             DISP=(NEW,CATLG,DELETE),          SPACE CALCULATIONS
//             UNIT=SYSDA
//******************************************************************
//* ONE PAIR OF JOURNALS ARE REQUIRED FOR EACH GENED HOST
//******************************************************************
//*
```

Note: Refer to "Calculating DASD Space using SLICREAT" on page 68 for information about how to estimate DASD space before running SLICREAT.

Descriptions of DD Statements

The following are descriptions of the JCL DD statements that must be used to define the library control data sets.

SYSPRINT
output messages.

Refer to the following criteria when allocating the control and journal data sets:|

- Do not specify the DCB statement. The HSC defines the required blocksize (4K).
- The data set(s) must be allocated in a single contiguous extent.
- The CDS(s) must not include existing data sets containing records prior to running the SLICREAT process.
- StorageTek recommends that the CDSs do **not** reside on the same volume(s) as other CDSs or other data sets that generate high I/O activity. Refer to "I/O Device Reserve Considerations" on page 18 for more information.

SLSCNTL
primary library control data set. This is the initial data set that is used to control and synchronize all activities within the HSC. It is used by the HSC until the controlling data set is switched to the secondary, either automatically or manually. Refer to "Control Data Set Recovery Strategies" on page 15 for more information on multiple data set configurations.

SLSCNTL also controls the SLICREAT process. If you do not include an SLSCNTL DD statement when you run SLICREAT,

- the CDSs will not be formatted, and
- the size requirement (in blocks) of the LIBGEN load module included in the PARM statement will be calculated and reported and journal formatting will be attempted.

SLSCNTL2
secondary copy of the primary control data set. This is required only if the SLIRCVRY macro TCHNIQE parameter is SHADOW, STANDBY, BOTH, or ALL.

SLSSTBY
standby control data set. This data set is required only if the SLIRCVRY macro TCHNIQE parameter is STANDBY or ALL. A secondary data set is required if a standby control data set is specified. This data set is also required for STBYONLY processing (refer to "Creating Only the SLSSTBY CDS" on page 72).

SLSJRN*nn*

specifies the two journal DD statements for each host. This is required only if the SLIRCVRY macro TCHNIQE parameter is JOURNAL, BOTH, or ALL. The range if '*nn*' is from 01 to 32.

During SLICREAT, two SLSJRNnn statements are used per host specified. For example, if you define three hosts in the SLILIBRY macro, SLICREAT formats only the first six SLSJRNnn statements (two for each host), SLSJRN01 through SLSJRN06. Any other SLSJRNnn statements are ignored by SLICREAT. SLICREAT always formats the SLSJRNnn statements in sequential order, thus you may not specify that your formatted journals begin with SLSJRN24 and end with SLSJRN29.

Calculating DASD Space using SLICREAT

You can determine the minimum DASD space required for the CDSs by executing SLICREAT without specifying the SLSCNTL and SLSJRN*nn* DD statements. The HSC generates a message that indicates the minimum space requirements in 4096-byte blocks. When you execute SLICREAT, you must specify the number of blocks for each of these data sets that is **at least** as large as this minimum.

Note: If you are specifying multiple CDSs (SLSCNTL2, SLSSTBY), StorageTek recommends that you allocate the same amount of space (in blocks) for all your data sets when you define them.

If the data sets are defined with different space allocations, the HSC uses the size of the smallest data set to determine the number of 4K blocks that it will use for the CDS. The additional space in the other CDS data sets, if any, will **not** be used by the HSC.

The difference in space between the minimum space required (returned by SLICREAT) and the size of the smallest CDS copy is formatted as CDS free blocks.

Executing the SLICREAT Program

The next step in initializing the control data sets is to execute the SLICREAT program. Figure 6 on page 71 illustrates execution of SLICREAT.

The EXEC statement to execute the SLICREAT program which creates the library control data sets is

EXEC Statement for the SLICREAT Program

```
EXEC PGM=SLICREAT,PARM='libgen-load-module-name'
```

The PARM value indicates the LIBGEN load module name. The steplib statement must point to the appropriate library in which the LIBGEN load module currently resides.

Note: An HSC 5.1 SLICREAT requires a LIBGEN load module assembled with HSC 4.0, 4.1, 5.0, or 5.1 macros. A LIBGEN load module created with earlier HSC releases cannot be used as input to an HSC 5.1 SLICREAT.

The CDS files that are created by SLICREAT (SLSCNTL, SLSCNTL2, and SLSSTBY) are verified to be empty data sets prior to being formatted. If SLICREAT identifies any of these files as containing records, an error message is displayed and the creation process terminates. If this occurs, specify a different data set(s) or delete and redefine the data set(s) and reexecute SLICREAT.

The journal files (all SLSJRN*nn* files) are also verified prior to being formatted. If SLICREAT identifies any journal file as an existing CDS prior to formatting, an error message is generated and that journal file is not formatted. If this occurs, specify a different data set or delete and redefine the data set and reexecute SLICREAT without specifying the SLSCNTL DD statement. Refer to "Reformatting the SLSJRNnn Data Sets" on page 72 for more information about formatting journals.

If your installation previously installed the HSC and you have never created a standby control data set, you can run the SLICREAT program to create only the standby control data set. At least a primary control data set must exist before the SLICREAT program can be executed for this purpose.

A standby control data set is created by specifying the PARM='STBYONLY' statement.

Note: For a standby data set to be recognized by the system, it must be defined by a CDSDEF statement in the PARMLIB.

SLICREAT EXEC Statement to Create Standby CDS

```
EXEC PGM=SLICREAT,PARM='STBYONLY'
```

This method does not create a backup of the primary control data set. The first record of the primary control data set is copied and the remainder of the data set is formatted to allow the standby CDS to be enabled.

The following figure illustrates the dataset initialization process.

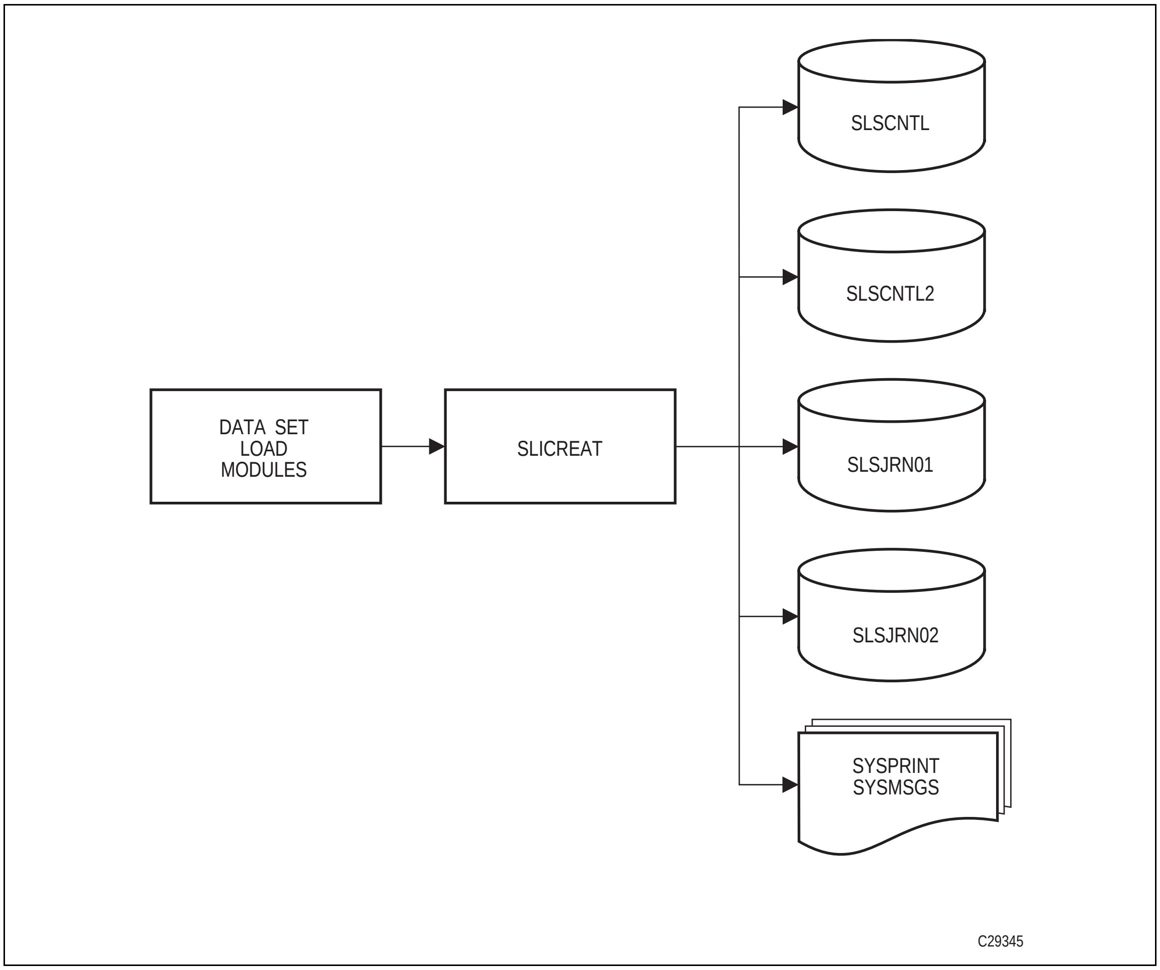


Figure 6. Data Set Initialization

Verifying Successful Completion of the SLICREAT Program

After the SLICREAT program is successfully processed, a message is generated indicating the status and the capacity of the library. An example is:

SLICREAT Success Status Message

```
SLSxxxxx DATABASE SUCCESSFULLY INITIALIZED; CAPACITY 32,956 VOLUMES
```

Reformatting the SLSJRNnn Data Sets

SLICREAT can be used to reformat your HSC journal file(s). To reformat only the journal file(s), you can run SLICREAT without the SLSCNTL DD statement. You should also omit any journal files you do not wish to have reformatted. The

```
PARM='libgen-load-module-name'
```

parameter is required.

SLICREAT attempts to reformat any valid journal file it finds and issues a message for all omitted DD statements.

Note: A backup must be run after you reformat any journal file(s).

Creating Only the SLSSTBY CDS

SLICREAT can be used to create an additional CDS. If the HSC was previously installed without a standby CDS, you can run the SLICREAT program to create one.

Notes: You must have a primary CDS before you can run the STBYONLY option of SLICREAT.

This method does not make a backup of the primary CDS. It formats the additional CDS and allows you to activate it with the CDS Enable command.

A standby CDS is created by specifying the following EXEC statement:

SLICREAT EXEC Statement to

```
EXEC PGM=SLICREAT,PARM='STBYONLY'
```

The SLSCNTL and SLSSTBY DD statements must be specified with the STBYONLY parameter.

Note: For the additional CDS to be recognized by the HSC, it must be defined by a CDSDEF statement in the PARMLIB.

Storage Cell Capacity for 4410, 9310, and ExtendedStore LSMs

Refer to Table 4 to determine the cartridge storage capacity of a 4410 standard, 9310 PowderHorn, or ExtendedStore LSM. Refer to Table 5, Table 6, and Table 7 to determine the cartridge storage capacity of the three 9360 WolfCreek LSM models.

Table 4. Storage Cell Capacity of 4410, 9310, ExtendedStore LSMs

Number of PTPs	Number of Drive Panels			
	1	2	3	4
0	5970	5786	5602	5418
1	5946	5762	5578	5394
2	5922	573	5554	5370
3	5898	5714	5530	5346
4	5874	5690	N/A	N/A

Notes:

1. If you have installed an enhanced CAP, reduce the number of cartridges by 240 for any given scenario listed in the table above.
2. If you have installed a PowderHorn (9310) window, reduce the number of cartridges by 288 for each window for any given scenario listed in the table above.

Storage Cell Capacity for 9360 LSMs

Storage capabilities for the 9360 WolfCreek LSMs is affected by the number of pass-thru ports, cartridge drives, CAPs, and whether a viewing window is desired. Certain options preclude each other. For instance, you may select the viewing window or add a second cartridge drive, but not both, since they both need the same panel for installation. Multiple CAPs will also affect cartridge storage volume as well as multiple pass-thru ports. The following tables illustrate the storage capacity available for each model, dependent on the options available and selected.

Table 5. Storage Cell Capacity of WolfCreek 9360-050 LSMs

WolfCreek 9360-050	0 PTPs	1 PTP	2 PTPs
Base Unit	504	496	488
Additional options do not affect capacity			

Table 6. Storage Cell Capacity of WolfCreek 9360-075 LSMs

WolfCreek 9360-075	0 PTPs	1 PTP 2	PTPs
1 Cartridge Drive (CD)	756	748	740
2nd CD (optional)	648	640	632
Viewing window (optional)	672	664	656

Table 7. Storage Cell Capacity of WolfCreek 9360-100 LSMs

WolfCreek 9360-100	0 PTPs	1 PTP	2 PTPs
1 CD, standard WolfCreek CAP	949	941	933
1 CD, standard and optional WolfCreek CAPs	865	857	849
2nd optional CD, standard WolfCreek CAP	841	833	825
2nd optional CD, standard and optional WolfCreek CAPs	757	749	741
Viewing window, standard WolfCreek CAP	865	857	849
Viewing window option, standard and optional WolfCreek CAPs	781	773	765

Storage Cell Capacity for TimberWolf 9740 LSMs

Storage capacity for the TimberWolf 9740 LSMs varies depending on the number of PTPs (two maximum) configured and whether or not a viewing window is present. The following table illustrates the storage capacity available.

Table 8. Storage Cell Capacity of TimberWolf 9740 LSMs

9740 LSM	0 PTPs	1 PTP	2 PTPs
Standard 9740 (window present)	326	322	318
9740 without window	494	488	484

Backup Utility Recommendation

It is recommended that the BACKup utility be executed after data set initialization to maintain the integrity of the library system should a DASD failure occur. The primary control data set is backed up to a user-specified data set.

At this point, in the event of CDS problem, it is quicker to rebuild a CDS from a backup than it is to execute a SLICREAT again.

If journaling is enabled, all specified journal data sets are reset during backup processing, and the primary control data set is returned to support normal library processing. For additional instructions, refer to the “BACKup Utility” in the *HSC System Programmer’s Guide*.

Chapter 6. Defining HSC Control Statements

At this point in the installation process, you may want to consider setting up your definition data set and PARMLIB control statements. The following sections briefly discuss these two kinds of control statements: definition data set, which allow you to define mixed media and devices, and PARMLIB, which are used to define various operation parameters.

Definition Data Set Control Statements

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

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

Definition data set control statements include:

- OPTion TITLE
- Scratch Subpool Definition (SCRPDEF).
- Tape Request (TAPEREQ)
- Tape Request Definition (TREQDEF)
- Unit Attribute (UNITATTR)
- Unit Attribute Definition (UNITDEF)
- Volume Attribute (VOLATTR)
- Volume Attribute Definition (VOLDEF).

☞ **Note:** If your library contains more than one media type or device type, enter TAPEREQ, VOLATTR, and UNITATTR control statements to manage allocation of mixed media and/or devices.

For VOLATTR statements, you must enter a statement for each media type so that the HSC can correctly determine scratch counts.

Some alternatives are available to using these control statements:

- create esoterics for each device type (4480, 4490, 9490, 9490EE, SD3, 9840, T9840B, T9940A, or T9940B)

- change the UNIT parameter in your JCL to specify the esoteric containing the devices you wish to use
- create scratch subpools for each media type
- define and invoke User Exit 01 and 02 to direct scratch mount requests to the scratch subpool you select.

If you do not use any of these methods to manage allocation of mixed media and devices, unacceptable media/devices may be selected.

For more detailed information about definition data sets, refer to Chapter 3, “HSC Control Statements and HSC Start Procedure” in the *HSC System Programmer’s Guide*.

Parameter Library (PARMLIB) Control Statements

PARMLIB consists of command and control statements that are executed during each time the HSC is initialized. PARMLIB control statements provide a way, at HSC initialization, to statically define 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.

PARMLIB control statements discussed in the *HSC System Programmer’s Guide* include the following:

- CDS Definition (CDSDEF)
- EXECParm Control Definition
- Journal Definition (JRNDEF)
- License Key Definition (LKEYDEF)
- Reconfiguration CDS Definition (RECDEF).

Additional control statements that can be entered as operator commands include:

- Allocation (ALLOC)
- CAP Preference (CAPPref)
- Communications Path (COMMpath)
- MNTD
- OPTion
- User Exit (UEXIT).

These are described in the *HSC Operator’s Guide*.

Some PARMLIB options can be altered after HSC initialization with the HSC executing. These options can be changed using an appropriate HSC operator command, which means that it is not necessary to stop the HSC and restart it to initialize the new or changed options.

Note: PARMLIB control statements that can be altered with the HSC executing are identified as PARMLIB commands or control statements.

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

For a detailed discussion of the PARMLIB command and control statements, refer to Chapter 3, “HSC Control Statements and HSC Start Procedure” in the *HSC System Programmer’s Guide*.

Chapter 7. Configuring HSC/LibraryStation License Keys

Overview

HSC and LibraryStation require valid license keys for initialization. Product license keys are validated during initialization and immediately after midnight each day. The MVS/HSC will **not** initialize without a valid license key.

License keys can be obtained through the StorageTek Customer Resource Center (CRC) at **www.support.storagetek.com**, or by contacting your StorageTek Software Manufacturing Distribution Representative, Marketing Representative, or Systems Engineer. License Keys are generally issued within 48 hours of receipt of the request.

Visit the Customer Resource Center at the above address for more information about obtaining a license key.

Once a licence key is issued by StorageTek, you must make the license key information available to the HSC license key validation service. This is accomplished using the LKEYDEF and LKEYINFO control statements described on the following pages.

LKEYINFO Control Statement

The LKEYINFO control statement is used to input license key information for the HSC and LibraryStation. 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 and/or LibraryStation to initialize.

Syntax

```
►►─LKEYINFO──PRODuct(product_identifier)──CUSTomer('customer_name')──────────►

►──SITEno(nnnnnnn)──EXPRdate(yyyyddd)──KEY(license_key_string)──────────►◄
```

Parameter Descriptions

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

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

product-identifier
Indicates the product identifier.

The product identifier consists of the HSC or LibraryStation product abbreviation (HSC or LS) followed by a four-character release id. i.e. HSC0500.

CUSTomer
Specifies the customer name as received from 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 StorageTek.

nnnnnnn
Indicates the site number.

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

yyyyddd
Indicates the expiration date.

KEY

Specifies the license key string as received from StorageTek.

license-key-string

Indicates the license key string.

Examples

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

```
LKEYINFO PROD(HSCØ5ØØ) -
         CUST('CUSTOMER NAME') -
         SITE(111222) -
         EXPRD(2ØØ2365) -
         KEY(5IX4IX4ITE*T8M3W)
```

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

```
LKEYINFO PROD(LSØ5ØØ) -
         CUST('CUSTOMER NAME') -
         SITE(111222) -
         EXPRD(2ØØ1ØØ1) -
         KEY(RQ2KQ2KQVWTØFR3C)
```

LKEYDEF Command and Control Statement

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

Warning: The LKEYDEF control statement **must** be present in the HSC START procedure prior to initialization.

The LKEYDEF operator command can be issued from the console without terminating the HSC and/or LibraryStation.

Syntax

```
►►─LKEYDEF──┬─DATASET(dataset.name)─┬─┬──────────────────┬──────────────────────────────►
            └─DSN(dataset.name)─────┘ └─VOLume(volser)─┘

►─┬──────────────────┬─┬───────────────────┬─────────────────────────────────────────────►◄
  └─UNIT(unitname)─┘ └─HOSTID(host-id)─┘
```

Command Name

LKEYDEF
initiates the LKEYDEF command or control statement.

Parameter Descriptions

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

dataset-name
Indicates the name of the data set.

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

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

volser
Indicates the volume serial number.

UNIT

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

unitname

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

HOSTID

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

host-id

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

Example

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

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

Chapter 8. Initializing the HSC

Starting the HSC

Starting the HSC has two requirements:

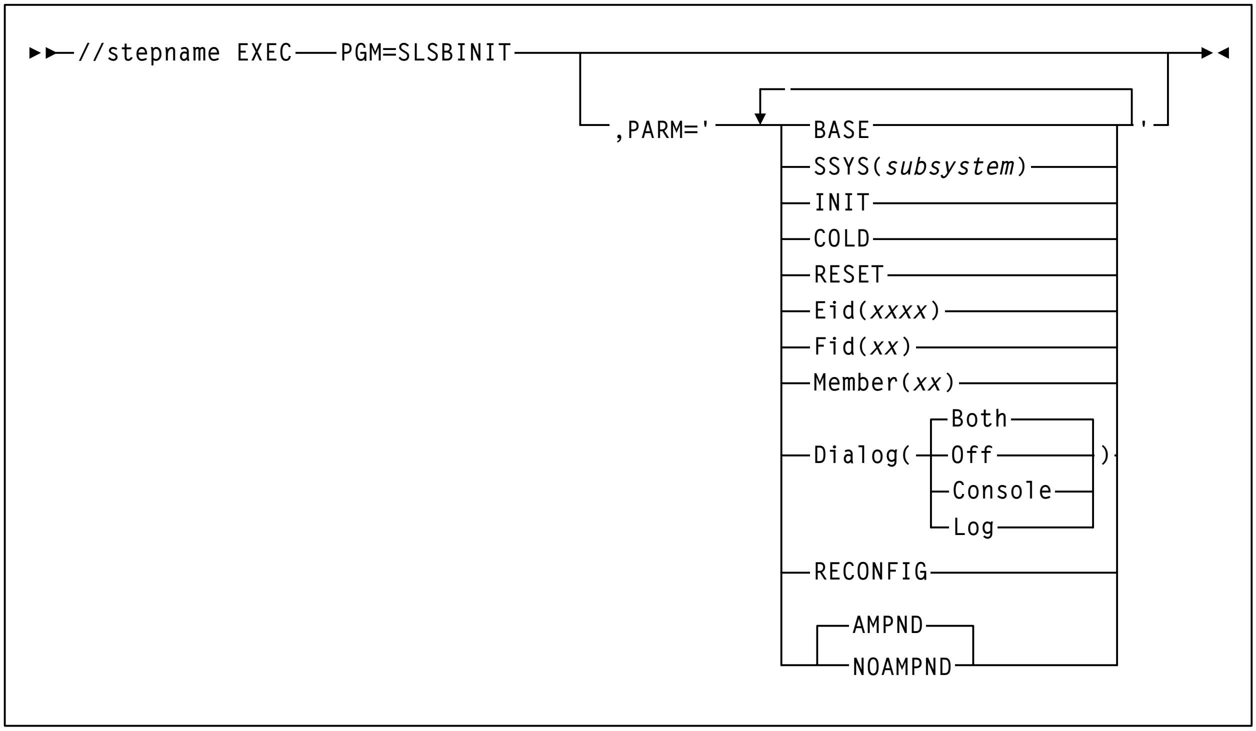
- creating an HSC START procedure
- executing the HSC START procedure.

Creating an HSC START Procedure

A procedure for starting the HSC must be created in the cataloged procedure library of the host system. The START command invokes the cataloged procedure. The procedure loads the initialization routine specified in the nucleus of the HSC into main storage, instructs the operating system to allocate data sets, and activates the library host software.

This section describes how to create the procedure. A typical syntax for the EXEC statement and full descriptions of each of the parameters follows.

EXEC Statement Syntax



EXEC Statement Parameters

PARM=

defines the list of parameters passed to the HSC initialization routine.

Note: If you enter more than one of the following parameters, **you must separate them with a blank space** (e.g., BASE SSYS(subsystem) RESET).

BASE

specifies that the HSC initialize and execute at the base service level.

SSYS

specifies that HSC initialization search for the *subsystem* name specified. If the name is not found or is not a valid name, the subsystem terminates. *subsystem* must be a 1- to 4-character name or problems can occur when initializing the HSC.

This parameter permits you to symbolically specify the subsystem and retain the same startup procedure whether starting the HSC before or after JES.

INIT

specifies that only preinitialization of the HSC occur. See “Preinitializing the HSC as a Subsystem” on page 97.

Note: If PARM=INIT is specified, the HSC subsystem is only initialized. It is still necessary to issue an HSC Start command to start the HSC. If any other parameters are specified with INIT (except for SSYS), they are ignored.

COLD

specifies that any permanent in-memory data structures previously allocated by HSC are reallocated and reinitialized.

On the first startup of the HSC after an IPL, this option is meaningless. If the HSC has been brought up previously for this IPL, use of this option results in the loss of a system linkage index for Program Call (PC) instructions. There are a limited number of system linkage indexes. Once exhausted, they can only be restored by IPLing. If COLD is not specified, the linkage index used previously by the HSC is reused.

This parameter should be used only when absolutely necessary. (The installation instructions for some HSC maintenance may direct you to perform a COLD start.)

Note: You do **not** need to include the COLD parameter when you are initializing an HSC that is at a different release level than the HSC that was previously running on a host. When an initializing HSC detects a release level difference, it performs an automatic internal cold start. For an automatic cold start, PC system linkage indexes are reused by the HSC.

If error conditions persist, contact StorageTek Software Support before using this parameter (see the guide *Requesting Help from Software Support*).

RESET

specifies that all subsystem status flags in the MVS Subsystem Communications Vector Table (SSCVT) for the HSC are unconditionally reset. Use of this option may correct a situation in which the HSC was terminated abnormally without resetting the status flags; for example, if the HSC was terminated with the MVS FORCE command.

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 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” in the HSC System Programmer’s Guide for an alternative method of specifying GTF Eid and Fid parameters.

Member

For MVS, *xx* is the suffix of the SLSSYS*xx* member in SYS1.PARMLIB, or an SLSSYS*xx* DD statement in the startup procedure used as the automatic commands (PARMLIB control statements) data set. “M” is the abbreviation for this parameter.

Dialog

specifies that messages can be displayed on the operator console and/or written to the system log. This option can be used to further restrict where messages are displayed based on the ROUTCDE. These messages indicate that the HSC is waiting for an active task to complete before the HSC terminates.

If Dialog is specified, one of the options must be selected, there is no default value for Dialog. The options for Dialog include:

Off

specifies that you do not want 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.

AMPND
specifies to automate pending mounts during initialization. This setting is the default and need not be entered.

NOAMPND
specifies to disable pending mount automation during initialization. If this parameter is entered, an HSC Mount command must be issued to complete any mounts that are pending when the HSC is started.

Example

The following listing is an example PROC for the START command. This sample is also included in the HSC SAMPLIB as member JCLPROC.

Example PROC for START Command

```
//SLSØ     PROC PROG=SLSBINIT,PRM=' '
//*
//IEFPROC  EXEC PGM=&PROG,TIME=144Ø,
//  PARM='&PRM E(EØ86) F(23) M(ØØ) SSYS(SLSØ)',REGION=4M
//*
//STEPLIB  DD DSN=SLS.SLSLINK,DISP=SHR
//*
//SLSUEXIT DD DSN=load.module.library,DISP=SHR
//SLSSYSØØ DD DSN=SLS.PARMS,DISP=SHR
```

In the example PROC shown above, SLS0 is used as both the name of the started task procedure (line 1) and as the subsystem name defined in the SSYS parameter "SSYS (SLS0)" in line 4. Your site is not required to use these values. You can replace either or both of these values with more meaningful or useful names pertaining to your site specific needs. However, you must keep in mind the following:

- HSC subsystem names must be cataloged in your IEFSSN*xx* member.
- The subsystem name must be 4 characters in length.
- If the started task member name and the subsystem name are identical, the SSYS parameter is not necessary in the started task procedure. If the started task procedure name is not identical to the subsystem name, then the SSYS parameter must be used to point the started task procedure to the required HSC subsystem.

For more information on using the SSYS parameter, refer to “SSYS” on page 88 and “Starting the HSC Using the SSYS Parameter” on page 99.

Notes:

1. Control data sets are normally defined using the CDSDEF and RECDEF control statements. 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.

   When the HSC is started to run the Reconfiguration utility, the CDSDEF control statement identifies the old control data sets, while the RECDEF control statement designates the new control data sets. If the old and new CDSs are to be temporarily placed on VIO to reduce reconfiguration time during the reconfiguration, (see “Minimizing I/O Time” in the *HSC System Programmer’s Guide*), JCL DD statements are required to identify the temporary VIO data sets. Refer to “Reconfiguration Utility” in the *HSC System Programmer’s Guide* for more details.

2. The number of CDS copies used by the HSC is dependent on the number of CDS copies defined in the CDSDEF PARMLIB control statement. It is **not** determined by the TCHNIQE parameter of the LIBGEN SLIRCVRY macro. The HSC uses all of the CDS copies defined in the CDSDEF control statement (whether this includes more or less CDS copies than are specified by the TCHNIQE parameter).

3. Journals are defined using the JRNDEF control statement. The JRNDEF statement must be present in your PARMLIB definitions if you want to use journaling. Journal data sets may no longer be defined in JCL. Refer to and “Journal Definition (JRNDEF) Control Statement” in the *HSC System Programmer’s Guide* for more information.

4. If journaling is specified by the TCHNIQE parameter of the LIBGEN SLILIBRY macro, journals must be defined in your PARMLIB definitions for successful HSC initialization.

5. TIME=1440 or TIME=NOLIMIT should be coded to ensure that the HSC does not time out and terminate.

Descriptions of DD Statements

The following are descriptions of the JCL DD statements used in the example PROC for the START command.

SLSSYS*xx*

statement that defines the data set containing the HSC PARMLIB. In the example procedure above, *xx* is replaced by the suffix “00”. The SLSSYS00 DD statement matches the M(00) declaration and points to the PARMLIB member “00” that contains your start-up parameters.

SLSUEXIT
statement that defines the data set containing HSC user exits.

Executing the HSC START Procedure

The HSC cataloged procedure is invoked by issuing the MVS START command. Refer to "Issuing the START Command" on page 96 for information about the MVS START command, syntax, and parameter descriptions. During HSC initialization, messages inform you when HSC base service level initialization completes and when full service level initialization completes.

Notes:

1. **An SMC subsystem must be active for the HSC to initialize. Refer to the "Starting SMC" chapter in the *SMC Configuration and Administration Guide* for more information.**
2. When it is initialized, the HSC determines whether this release differs from the release level of the previous HSC subsystem. If there is a difference, an internal cold start is invoked.

Before starting the internal cold start processing, however, the Program Call system linkage index is saved, and the HSC's main in-memory data structure is freed. This reduces the resources lost due to the cold start.

If your SMF options for the HSC did not specify the SUBTYPE parameter, the HSC issues a message indicating that SMF record subtypes 1 through 6 are being recorded.

If you did not specify GTF Eid and Fid parameters on the PARM operand in the HSC startup procedure, HSC issues a message indicating that default Eid and Fid values are being used.

The HSC may be started prior to hardware arrival to ensure that it has been installed properly. The HSC subsystem comes up with the LMU stations offline. HSC operator commands may be entered, but any functions requiring interaction with the ACS hardware result in error messages.

Modifying LSMs Online

When the CDS is initialized, the status of all LSMs defined in the LIBGEN is OFFLINE. You must issue the HSC MODify ONline command to bring all of your LSMs online.

For subsequent executions of the HSC, the last recorded status of the LSMs is obtained from the control data set.

When an LSM is modified online for the first time, the drive types of all drives in the LSM are recorded in the CDS. Before an LSM is modified online, the drive type is determined from UNITATTR control statements, if any exist. If not, drive types are set to a model type of IGNORE, which is incompatible with all media types.

Configuration Mismatches

During HSC initialization, the HSC remains active if LSM or panel type configuration mismatches occur between the CDS and LMU. Specifically, these mismatches include:

- different numbers of LSMs
- different or unknown types of LSMs
- different or unknown panel types in an LSM.

In these cases, the affected ACS(s) is forced offline. The HSC continues to support the unaffected ACS(s).

While the unaffected ACS(s) remains online, the mismatched configuration can be corrected. If the hardware configuration is incorrect, the affected ACS(s) can then be brought online. Otherwise, the configuration can be changed through the LIBGEN/SLICREAT/MERGEcds process at your convenience.

Multiple Hosts Startup Considerations

In a multiple-host configuration, start one host at a time. **Do not bring up multiple hosts simultaneously**.

Issuing the START Command

The HSC software is initialized by issuing the MVS START command. Parameters associated with PARM= on the EXEC statement of the HSC cataloged procedure (see “Creating an HSC START Procedure” on page 87) can also be supplied via PARM= on the START command. The PARM= specification on the START command overrides the PARM= specification in the HSC cataloged procedure.

☞ **Note:** Examples in this section relevant to single PARM= parameters may need to be accompanied by other parameters present in the HSC cataloged procedure.

Alternately, a JCL substitution symbol may be specified in the HSC cataloged procedure, and additional parameters passed via the START command using the substitution symbol.

The HSC can be initialized to a full or base service level by issuing the MVS START command. The HSC can also be preinitialized or initialized under the MVS Master Subsystem (MSTR) through the START command.

The following table shows examples of the START command options introduced in this section. For further information about these options, refer to the paragraphs following the table.

Table 9. HSC Initialization

HSC Start Command	**Proc Name Same as EFSSN*xx* Entry**	**SLSBPREI in IEFSSN*xx* or Previous HSC Start With PARM=’INIT’**
HSC Started Under MSTR and PROC in SYS1.PROCLIB		
S SLS0	Yes	No
S SLS0,SUB=MSTR	Yes	Ignored
S SLS0,PRM=’SSYS(SLS0)’,SUB=MSTR	No	Ignored
HSC Started Under JES and PROC in a PROCLIB		
S SLS0	Yes	Yes
S SLS0,PARM=’INIT’ S SLS0	Yes	No
S SLS0,PARM=’SSYS(SLS0)’	No	Yes
S SLS0,PARM=’INIT,SSYS(SLS0)’ S SLS0,PARM=’SSYS(SLS0)’	No	No

Preinitializing the HSC as a Subsystem

The HSC must first be initialized as an MVS subsystem before it can perform any services such as mount/dismount of cartridges, etc. This is accomplished by placing the HSC subsystem name in the IEFSSN*xx* member of SYS1.PARMLIB. In addition to this, there are two valid ways to preinitialize the HSC as a JES-dependent subsystem:

- specifying SLSBPREI as the HSC subsystem initialization routine in the IEFSSN*xx* member of the system PARMLIB and IPLing MVS

```
SUBSYS SUBNAME(SLSØ) INITRTN(SLSBPREI)  /* keyword format */
```

☞ **Note:** SLSBPREI must reside in SYS1.LINKLIB or another link-listed library. After installation, copy the SLSBPREI module from the HSC load library to a library in the MVS link list.

- starting the HSC with PARM=’INIT’.

By using this method, HSC is **not** a subsystem of MVS. Some tasks, such as enters and ejects, can be done, but HSC cannot determine drive or cartridge selection nor perform other tasks.

Starting the HSC with PARM=‘INIT’

An alternative method to the SLSBPREI subsystem initialization routine is to specify PARM=’INIT’ in a START command for a preinitialization startup followed by a START command for the actual startup of the HSC.

The need for the HSC’s subsystem Master Subsystem Initialization (MSI) routine is eliminated. Its functions are taken over by the main HSC address space initialization routines. The use of any subsystem MSI exit routine imposes a restriction that it must be in a data set that is cataloged in the master catalog, and included in the LNKLST. Previous HSC versions have distributed this module to install in SYS1.LINKLIB.

The first example is the START command for preinitializing the HSC; the second example is the START command for actual startup of the HSC. The first START command performs only the preinitialization and must be followed by the second command to startup the HSC. The example command is:

Preinitialization of HSC

```
S SLSØ,PARM=’INIT’
```

The second START command performs actual HSC startup. The example command is:

Actual HSC Startup

```
S SLSØ
```

The startup procedure can be a normal procedure with the exception of using the INIT parameter or it can be specified separately.

Note: This preinitialization of the HSC is for initializing the HSC under the primary Job Entry Subsystem (JES).

Initializing the HSC Under the Master Subsystem

If you want to initialize the HSC under the Master subsystem (MSTR), the following circumstances must be considered:

- If SLSBPREI is part of the subsystem definition in IEFSSN*xx* or a prior execution of the subsystem using the INIT parameter was done, then the subparameter SUB=MSTR must be appended to the START command to start the HSC under Master subsystem control. For example:

SLSBPREI Defined in IEFSSNxx or Prior Execution Using INIT

```
S SLSØ,SUB=MSTR
```

If you specify SUB=MSTR in a JES3 environment, the SMF identifier must be the same as the Main Processor name for that system.

- If SLSBPREI is not part of the subsystem definition in IEFSSN*xx* and the subsystem name is the same as the start procedure name, then no preinitialization or SUB=MSTR is necessary. For example:

Subsystem Name is the same as Start Procedure Name

```
S SLSØ
```

Note: When running the HSC under the Master subsystem, JES services are not used. It is also possible to receive duplicate messages in the system log.

If you want to initialize the HSC under JES later, the INIT parameter may be used to do the preinitialization when necessary.

Starting the HSC Using the SSYS Parameter

The HSC can be started against a particular subsystem by specifying the SSYS parameter. Refer to "Creating an HSC START Procedure" on page 87.

Starting HSC Against a Subsystem Named SLS0

In this example, PARM overrides all other parameter values.

```
S HSCPROC,PARM='SSYS(SLSØ)'
```

Note: This example shows that the procedure name specified (HSCPROC) is more than four characters long. The SSYS parameter contains the subsystem name identified in the IEFSSN*xx* member of SYS1.PARMLIB. Note that the first four characters of the procedure name can be different than the subsystem name.

Starting 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 START command to initialize the HSC to the full service level is:

Starting to Full Service Level

```
S SLSØ
```

Starting the HSC at the Base Service Level

HSC software can be started only to the base level by coding the BASE parameter in the PARM field of the MVS START command.

The syntax for the START command to initialize the HSC to the base service level is:

Starting to Base Service Level

```
S SLSØ,PRM='BASE'
```

Note: PRM adds the parameter BASE to the startup PARMs.

The BASE parameter should be used with other parameters in the START command since these parameters override whatever is specified in the HSC START Procedure. A sample START command with parameters is:

```
S SLSØ,PARM='BASE E(Ø86) F(23) M(ØØ)'
```

In this case, PARM overrides **all** parameters in the PARM field.

Refer to "Creating an HSC START Procedure" on page 87 for a description of these and other related parameters.

After initializing to this point, the HSC SRVlev command can be used to bring the subsystem up to full function. Refer to “SRVlev (Service Level) Command” in the *HSC Operator’s Guide* for more information.

Chapter 9. Terminating the HSC

Stopping the HSC

The HSC may be terminated by issuing MVS commands. Either an orderly or forced termination of the HSC can be accomplished depending upon the MVS command used.

Orderly Termination of the HSC

You may terminate execution of the HSC in an orderly manner by issuing the MVS STOP command at an operator console. An orderly termination causes the HSC to complete all outstanding processing for library activity known to the HSC before termination begins. The HSC is not aware of new activity while in termination processing. Ensure that tape allocation is not being performed by the operating system before executing termination of the HSC. During termination, the following actions occur:

1. The HSC waits for pending work to complete. This includes actions against the LMU such as current mounts and dismounts, utilities, active CAPs, operator commands, and station termination(s).
2. The control data sets and journals are updated as the outstanding processes are performed.
3. Resource cleanup and termination occurs.
4. An HSC message is displayed on the system console indicating that the HSC is terminated.

Restart of the HSC is achieved by running the HSC startup procedure. After startup, the HSC executes and normal operation of the library occurs. See “Executing the HSC START Procedure” on page 94 for more information.

Forced Termination of the HSC

You may force the immediate termination of the HSC by issuing an MVS Cancel command at an operator console. If this does not work, issue a second Cancel command, and if this still does not terminate the HSC, issue the MVS FORCE command.

Warning: Forced termination of the HSC is not recommended by StorageTek as a normal form of termination, and should be avoided if possible. Unpredictable results may occur on subsequent startups following forced terminations.

Before executing forced termination of the HSC, ensure that tape allocation is not being performed by the operating system. Tape drive separation and device allocation for the library is not performed during the period that the HSC is down.

A forced termination of the HSC causes all HSC processes to abort immediately and termination occurs. Any of the following conditions may exist:

- volumes may be left mounted in tape drives or may be left in transit
- outstanding utilities may abend
- the control data sets and journals may lose synchronization.

An MVS message is displayed at an operator console indicating that the HSC subsystem was abnormally terminated.

Restart of the HSC after a forced termination may produce unpredictable results and may affect subsequent operation of the library.

Errant volume records are created for volumes left in drives, the playground, CAPs, or pass-thru ports. Operator intervention may be required to resolve the status of errant volumes when HSC execution is resumed. Tape transports may require operator intervention to satisfy mount requests.

Chapter 10. Testing the Installation

Testing the installation consists of executing the Installation Verification Process (IVP). The process consists of performing a set of recommended test procedures for testing of the Automated Cartridge System before introducing the library into the production environment. Individual procedures contain steps to test the basic functions of the HSC, the Automated Cartridge System (library), and the attached tape transports. The procedures also contain functional tests to exercise the main functions of the HSC and ACS components.

Each program is contained in the HSC SAMPLIB on the HSC Base tape.

Scope of Installation Verification

Installation verification consists of the execution of planned tests to verify proper functioning of basic HSC operations. Figure 7 on page 104 illustrates the flow of a recommended verification process.

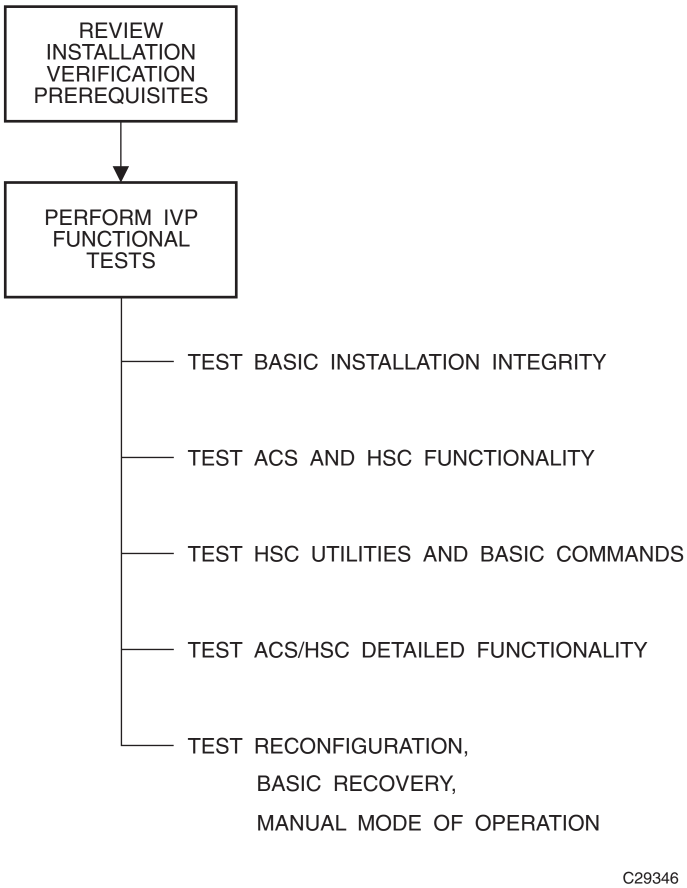


Figure 7. Installation Verification Flow Diagram

The following tables provide a summary of recommended IVP tests.

Table 10. Utilities Tested During Installation Verification

Utility	Description of Required Function
ACTIvities Report	Produces a report presenting library activity.
AUDIt	Causes the robot to scan all library cells and to update the control data sets with cartridge location information.
BACKup	Creates a backup copy of the HSC control data sets and analyzes data.
EJECt	Ejects tape cartridges from the library.
INITialize cartridge	Initializes tape cartridges through the CAP.
MOVe	Directs the robot to move cartridges to specified designations.
POST VOLSER to Location	Locates a particular volume in the library.

Table 10. Utilities Tested During Installation Verification

Utility	Description of Required Function
RESTore	Restores the HSC control data sets and generates control statements.
Scratch Conversion	Reads the TMS database and produces input of scratch VOLSERs to be used by the Scratch Update utility.
Scratch Update	Updates the scratch list contained in the control data sets.
Volume Report (VOLRpt)	Produces a volume report by VOLSER and LOCATION sequence.
SLIVERFY and SLIEXERS are two additional utility-type testing programs used specifically during Installation Verification. Refer to "SLIVERFY Program" on page 64 and "SLIEXERS Program" on page 113 for more information about these programs.	

Refer to "Utility Functions" in the *HSC System Programmer's Guide* for detailed information on each HSC utility.

Table 11. Commands Tested During Installation Verification

Command	Description of Required Function
CAP	Pref Sets and resets CAP selection parameters.
COMMPath	Establishes or changes the communication method for a host.
DISMount	Performs an operator requested dismount for a specific volume and for any volume.
Display	Display CDS displays control data set information. Other Display commands display status of an ACS, an LSM, a volume in the library, a detailed status of a volume in the library, a message, a command, a drive request, the status of a CAP, and so forth.
DRAin	Terminates an ENter or EJect command and releases the CAP from the enter mode.
EJect	Ejects the labeled volumes (previously entered) from the library. Ejects one unlabeled volume from the library.
ENter	Enters a number of labeled volumes into the library. Enters one unlabeled volume into the library.
MODify	Changes status of an LSM or CAP from online to offline.
Mount	Performs an operator requested mount.
MOVe	Directs the robot to move cartridges to specified designations.
Vary	Varies a station online and offline.
VIew	If video monitors are attached to the LSM, permits visual inspection of the interior of the LSM.
Warn	Sets the scratch warning threshold values.

Table 12. Job Processing Functions Tested During Installation Verification

Job Processing Function	Description of Required Function
Initialization	Performs the following: • Successful initializations of the HSC • Displays the ACS from all hosts • Verifies that all station addresses indicate online.
Drive Exclusion	Verifies that library tape transports are selected for library volumes and that nonlibrary transports are selected for nonlibrary volumes.
Drive Prioritization	Verifies that tape transports allocated are attached to LSMs containing the requested volumes.
Multi-unit DD statements	Verifies successful execution of a job that contains multi-unit DD statements in the JCL.
Multi-volume file	Verifies successful execution of a job that reads from and writes to a multi-volume file.

Installation Verification Prerequisites

There are certain initial requirements and considerations of which you should be aware before performing the verification. These include:

- Ensure that you have the complete set of StorageTek documentation. Refer to the HSC publications shown in the Preface for a complete list.
- Ensure that you have all pertinent IBM documentation.
- Prepare/setup JCL in advance for those HSC utilities being tested.
- Store the test JCL in a permanent library for future use.

IVP Functional Test Phases

Installation Verification consists of several phases. Each phase is dependent on the previous phase; therefore, testing is executed in a required order. Some portions of the tests consist of simply verifying that all of the necessary installation tasks were completed. Other portions of the tests require that you run jobs or issue commands to insure that the HSC and the library function as intended.

It is highly recommended that every procedure in the IVP be performed and completed to ensure absolute system functionality.

Direct any questions or notification of problems to StorageTek Support Services. Refer to the guide *Requesting Help from Software Support* for support information.

Use the tables contained in following sections as reference for running each testing step and as a check list to validate completion of each testing phase.

IVP programs used for testing are described in “Description of Test Programs” on page 113. Refer to this section for a description of each test used in the IVP.

Basic Installation Integrity Test

The HSC must be installed but not started to perform the following recommended tests.

Recommended Test Procedure

Perform the steps listed in the following table to test the HSC and library basic functions.

When you have completed this test phase, go to “ACS and HSC Functionality Test” on page 108 to continue the installation verification process.

Table 13. Basic Installation Test Procedure

Step	Description of Action	Checkmark to Verify Completion	Person Responsible for Test / Verification
1	Install STCPOST/STC PM2		
2	Verify that the HSC software was installed as specified in the *NCS Installation Guide*.		
3	Verify that all PUT tapes to date were received and applied as specified in the *NCS Installation Guide*.		
4	Verify that LIBGEN modules are coded, assembled, and link-edited. The EJECt password will be changed in another testing phase.		
5	Verify that the SLIVERFY utility was executed to confirm a valid LIBGEN with the existing hardware configuration.		
6	Verify that the SLICREAT utility was executed to initialize the library control data sets.		
7	Execute test program STKTSTA to ensure that the LIBGEN data is valid and matches the hardware configuration.		
8	Execute test program STKTSTB for each LSM in the library to verify target alignment.		
9	Execute test program STKTSTC to exercise basic LSM and tape transport functions.		

ACS and HSC Functionality Test

The HSC must be installed and running to perform the following recommended tests.

Recommended Test Procedure

Perform the steps listed in Table 15 to test ACS and HSC functionality.

When you have completed this test phase, go to “HSC Utilities and Basic Commands Test” on page 109 to continue the installation verification process.

Table 14. ACS and HSC Functionality Test Procedure

Step	Description of Action	Checkmark to Verify Completion	Person Responsible for Test / Verification
1	Verify that the HSC was initialized on each host. The MVS START command (S hscprocname) was used.		
2	Issue the Display CDS command to display database information.		
3	Display the ACS from all attached hosts. Verify that all configured station addresses are online.		
4	Display each LSM from each host.		
5	Display the CAP status.		
6	Display the help text for any message (Display Message msg-id).		
7	Issue the ENter command for a CAP.		
8	Issue the DRAin command for a CAP.		
9	Display, modify, and restore CAPPref parameters.		
10	Display (Display THReshld), modify, and restore Warn parameters.		
11	Modify an LSM offline, display the LSM, modify the LSM back online. Display LSM status.		
12	Vary a station address offline. Vary the station back online.		
13	Use the TREQDEF, UNITDEF, and VOLDEF commands to load/reload the definition data sets. Then display information about the TREQDEF, UNITDEF, and VOLDEF data sets.		
14	Display the drive status (Display DRives).		
15	Display, modify, and restore COMMPath settings.		
16	Use the OPTion command to change output to uppercase and back to mixed case.		

HSC Utilities and Basic Commands Test

The HSC must be installed and running to perform the following recommended tests.

Recommended Test Procedure

Perform the steps listed in Table 15 to test the functionality of HSC utilities and basic operator commands.

When you have completed this test phase, go to "ACS/HSC Detailed Functionality Test" on page 111 to continue the installation verification process.

Table 15. HSC Utilities and Basic Commands Test Procedure

Step	Description of Action	Checkmark to Verify Completion	Person Responsible for Test / Verification
1	Execute the BACKup utility. Verify that the backup of the control data sets was successful.		
2	Execute the RESTore utility. Verify that the restore of the control data sets was successful.		
3	Open the door to an LSM and place cartridges into a panel and row of the LSM. Close the LSM door. Execute the AUDIt utility for the LSM, panel, and row where the cartridges were placed. Specify APPly(YES).		
4	Use the Initialize Cartridge utility to initialize several volumes through the CAP.		
5	Execute the EJect command to eject half of the volumes that were entered in the previous step.		
6	Execute the EJect utility to eject the remainder of the volumes that were entered through the CAP.		
7	Use the ENter command to place volumes ejected in the previous two steps back into the LSM.		
8	Use the DRAin command to terminate the ENter function.		
9	Ensure that there is at least one initialized volume in the ACS for each type of drive attached to the ACS (specifically, an STK1 volume for 9840 drives; an STK2 volume for T9940A or T9940B drives; a helical volume for SD-3s; an 18-track volume for 4480s; and a 36-track volume for 4490s, 9490s, and 9490EEs). These volumes are needed for the SLIEXERS program (see below). If necessary, use the ENter command to enter the required volumes.		
10	Use the SLIEXERS program to automatically exercise each available transport in an ACS. Refer to "SLIEXERS Program" on page 113 for more information.		

Table 15. HSC Utilities and Basic Commands Test Procedure (Continued)

Step	Description of Action	Checkmark to Verify Completion	Person Responsible for Test / Verification
11	Execute the LOCATE (POST utility) to find a specific volume in an LSM.		
12	Execute the VOLRpt utility to produce a volume report.		
13	If your tape management system is CA-1, CA-DYNAM/TLMS, or DFSMSrmm, use the Scratch Conversion utility to generate transactions for the Scratch Update utility.		
14	Execute the SCRAtch utility to scratch designate the cartridges entered in Step 7 as scratch volumes.		
15	Use the Mount, MVS UNLOAD, and DISMount commands to mount and dismount a selected volume.		
16	Use the SET utility to change the EJect password. Use the EJect command to eject a volume. Use the SET utility to change the password back to its original setting.		
17	Use the MOVe command to move some cartridges to a new location.		
18	Use the MOVe utility to move other cartridges to a different panel.		
19	Execute the VOLRpt utility to produce a volume report (again). Examine the entries for the scratch cartridges in the volume report.		
20	If video monitors are attached to an LSM, use the VIew command to display a cartridge in its cell and in cells in a CAP.		

ACS/HSC Detailed Functionality Test

The HSC must be installed and running to perform the following recommended tests.

Recommended Test Procedure

Performance of the steps listed in Table 16 is recommended to test ACS/HSC detailed functionality.

When you have completed this test phase, go to “Manual Mode Test” on page 112 to continue the installation verification process.

Table 16. ACS/HSC Detailed Functionality Test Procedure

Step	Description of Action	Checkmark to Verify Completion	Person Responsible for Test / Verification
1	Test LSM-attached tape transports by executing test program STKTST0.		
2	Test allocation influence on scratch volumes residing within the ACS by executing test program STKTST1.		
3	Test allocation when a specific volume resides within the ACS by executing test program STKTST2.		
4	Test allocation when a specific volume resides external to the ACS by executing test program STKTST3.		
5	Test multi-unit device allocation when one volume resides within the ACS and one volume resides external to the ACS by executing test program STKTST4.		
6	Test drive prioritization when single volume data sets are concatenated by executing test programs STKTST5A and STKTST5B.		
7	Test drive prioritization for a multi-volume file by executing test programs STKTST6A and STKTST6B.		
8	Test drive prioritization in a multi-LSM environment when the order of JCL DD statements are changed by executing test programs STKTST7A and STKTST7B.		
9	Test drive prioritization in a multi-LSM environment when placing volumes in different LSMs by executing test programs STKTST8A and STKTST8B.		
10	Exercise the LMU from various HSC hosts (if applicable) by executing test program STKTST9.		
11	Test unit affinity (UNIT=AFF) by executing test program STKTST10.		
12	Test pass-thru port functions (if applicable) by executing test program STKTST11.		

Manual Mode Test

The HSC must be installed and running to perform the following recommended tests.

Recommended Test Procedure

Perform the steps listed in Table 17 to test manual mode operation.

When you have completed this test phase, the installation verification process is completed.

Table 17. ACS/HSC Detailed Functionality Test Procedure

Step	Description of Action	Checkmark to Verify Completion	Person Responsible for Test / Verification
1	Modify an LSM from automatic to manual mode. Verify that the LSM switched to the manual mode successfully.		
2	Restore automatic mode from manual mode. Verify that the LSM switched to the Automatic mode successfully.		

Description of Test Programs

Various test programs are provided to verify performance of the HSC as installed on your system. These programs include:

- SLIVERFY (refer to "SLIVERFY Program" on page 64)
- SLIEXERS
- hardware test programs
- allocation test programs.

The following paragraphs describe the purpose for each program and the functions that the program tests.

SLIEXERS Program

The SLIEXERS program automatically exercises each available transport in an ACS. The ACS is defined by the PARM parameter of the EXEC statement. It is recommended that SLIEXERS be executed on each host and each ACS combination to verify library installation.

Note: This program must be executed from an APF-authorized library. SLIEXERS dynamically allocates each library transport defined to the executing host. A compatible scratch cartridge is then retrieved from the ACS, mounted on the transport, opened, written to, read from, and closed.

This process is repeated for each transport in the specified ACS. If no scratch tapes of the required media type are available, a WTOR is issued to the operator requesting a scratch cartridge VOLSER.

For SLIEXERS to execute properly, the HSC subsystem must be started. Refer to "Issuing the START Command" on page 96 for detailed information on the START command.

SLIEXERS DD Parameters

SLIEXERS JCL consists of the following statements:

EXEC statement
Specify PGM=SLIEXERS.

The PARM parameter specifies one operand: the ID (range 00 to FF) of the ACS to be exercised.

STEPLIB
The partitioned data set name where the SLIEXERS program resides. This data set must be APF-authorized.

SYSPRINT
Diagnostic messages.

Example

JCL for SLIEXERS Program

```
//SLIEXERS job (account),'programmer',CLASS=A
//*
//EXERS    EXEC PGM=SLIEXERS,PARM='ØØ',REGION=4Ø96K
//STEPLIB  DD DSN=your.hsc.linklib,DISP=SHR
//SYSPRINT DD SYSOUT=*
//*
```

Hardware Test Programs

The following test programs test various hardware-to-software relationships of a library. StorageTek's POST program is executed in each of the programs.

Note: HSC may be running and functional while POST tests are being executed. However, the station address used by POST must be varied offline to HSC before POST is executed. If only one station address exists and that station address is varied offline, then robotic activity stops.

Refer to the POST Reference Manual for additional details and specific information about POST program parameters.

STKTSTA

This program consists of two steps using the POST program and the SLUADMIN program to verify the match between the data in the control data set and the LMU hardware configuration.

- Steps 1 and 2 use POSTMAIN to produce a report of the LMU configuration from two ACSs. At least one station address from each ACS must be varied offline to the HSC. The address of that station is used in the station parameter of the TESTAPST proc. A WTOR is issued to the operator. Reply "GO".
- Step 2 executes the SLUADMIN program to read the control data set and produce a LIBGEN matching the hardware configuration. It is important that you compare the output of POSTMAIN, SLUADMIN, and the input to the LIBGEN.

STKTSTB

This program tests the roof and inner wall alignment, the CAP targets, and the tape transport targets of the LSM.

- Step 1 executes the LIBLOOK function of the POST program which directs the robot to read cell targets at the top inner walls of each LSM.
- Step 2 executes the LIBLOOK function of the POST program which directs the robot to read the cell targets on the CAP.
- Step 3 executes the LIBLOOK function of the POST program which directs the robot to read each tape transport target.

A report is produced indicating any problems related to the targets.

STKTSTC

Caution: This test program is a verification test only and should not be executed after production tape cartridges have been entered into an LSM.

This program exercises the LSM robot. It uses the LSMEXER function of the POST program to move cartridges within an LSM.

Chapter 11. Planning Migration to the Library

To ensure a successful movement and installation of cartridges into an LSM, a Tri-Optic label verification must be made and the cartridges must be loaded into the library.

Tri-Optic Label Verification

Verify that the Tri-Optic labels are placed correctly on the cartridge. When the cartridge is positioned so the customer label is on the left while the leader block is pointing up and away from the person verifying the label, a recessed area is visible on the cartridge surface.

The Tri-Optic label should be centered in this area, without any edges extending beyond the recessed area, and the VOLSER characters must be to the left of the bar code. After the Tri-Optic labels have been visually verified, cartridges can be stored in the LSM, and the labels may be read by the machine-vision system.

Refer to Figure 8 on page 118 for an illustration of cartridge with a Tri-Optic label attached.

ECART External Media Label Requirements

ECART cartridges require a volume serial number (VOLSER) but do not require a media type indicator in their external labels. StorageTek recommends, however, that customers provide a media type indicator for all ECARTs. The media type for ECARTs is “E.” The VOLSER occupies the first six positions of the external label.

ZCART External Media Label Requirements

Every ZCART cartridge requires both a volume serial number (VOLSER) and a media type indicator in its external label. The VOLSER occupies the first six positions of the external label; the media type indicator occupies the seventh position of the external label. The media type for ZCART cartridges is “Z.”

Helical External Media Label Requirements

Every helical cartridge requires both a volume serial number (VOLSER) and a media type indicator in its external label. The VOLSER occupies the first six positions of the external label; the media type indicator occupies the seventh position of the external label. The media type for helical cartridges must be one of the following:

- A (10 GB)
- B (25 GB)
- C (50 GB)
- D (cleaning cartridge).

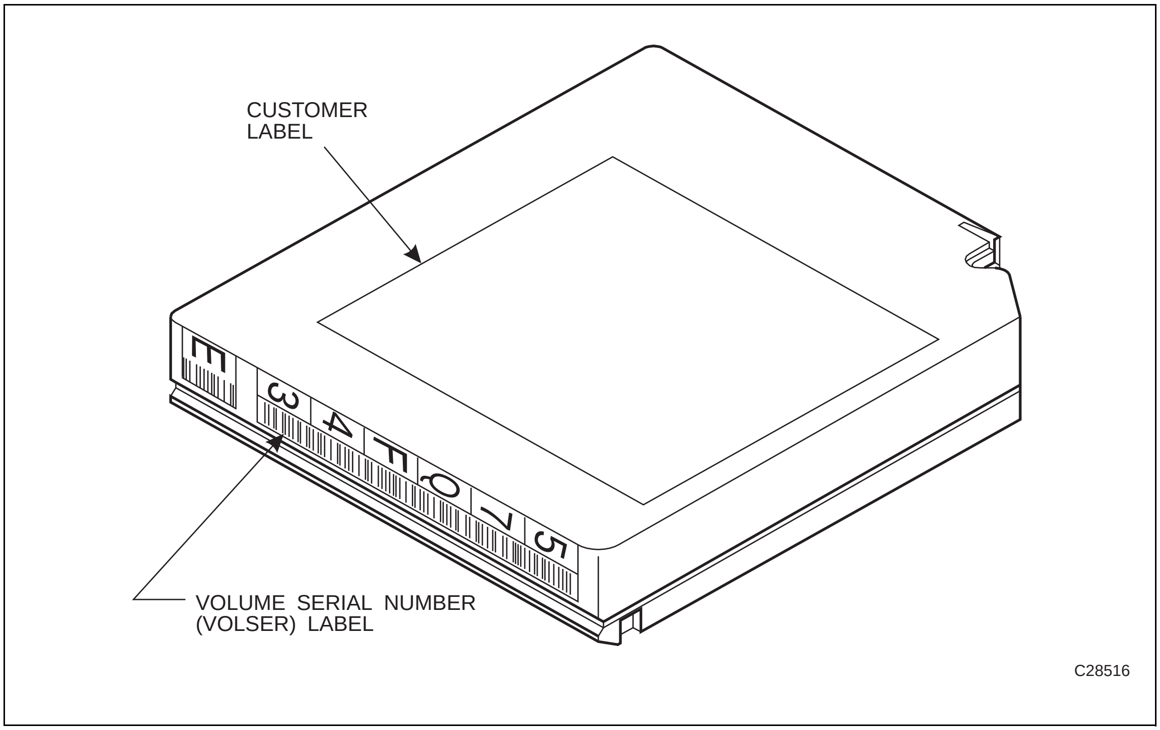


Figure 8. Cartridge with Tri-Optic label and ECART Media Type Indicator

STK1 (9840 or T9840B) External Media Label Requirements

Every STK1 cartridge requires both a volume serial number (VOLSER) and a media type indicator in its external label. The VOLSER occupies the first six positions of the external label; the media type indicator occupies the seventh position of the external label. The media type for STK1 cartridges must be one of the following:

- R
- U (cleaning cartridge).

STK2 (T9940A or T9940B) External Media Label Requirements

Every STK2 cartridge requires both a volume serial number (VOLSER) and a media type indicator in its external label. The VOLSER occupies the first six positions of the external label; the media type indicator occupies the seventh position of the external label. The media type for STK2 cartridges must be one of the following:

- P
- W (cleaning cartridge).

Loading Cartridges into the Library

There are several ways to load cartridges into the library during initial installation of the system:

- Use the ENter command to load initialized cartridges into the LSM.
- Manually load initialized cartridges into LSM and invoke the AUDIt utility.
- Use the Initialize Cartridge utility to enter cartridges through the CAP.
- Use an auto-mode CAP to load cartridges into an LSM without using HSC commands or utilities.
- Manually load and run IEHINITT.

ENter Command

The ENter command is used to move cartridges from the CAP to the LSM and to record the location data in the primary control data set. The operator types the ENter command at the system console; the CAP is then available for inserting cartridges. The operator can insert one or more cartridges into the LSM via the CAP (when free cells exist) placing them under library control. The HSC selects a storage cell location for the cartridge at the time of entry.

Note: When a cartridge is entered, if the vision system does not detect a media label, the cartridge is entered and the media type defaults to Standard. If the media label is unreadable, a message is displayed prompting the operator to supply a valid media type or eject the cartridge. VOLATTR information is not used during ENter processing.

The CAP remains in enter mode until the console operator terminates enter processing by issuing the DRAin command.

Scratch volumes can also be placed into the LSM by specifying the SCRatch parameter for the ENter command. The scratch status of volumes previously entered into the LSM may be changed using the SCRatch Update utility.

Manually Loading Cartridges into LSM

Cartridges may be loaded into LSM cell storage locations by opening the LSM door and manually placing them into the cells. Refer to the appropriate Hardware Operator's Guide for the location of reserved cells. Once the LSM has been filled with cartridges, the AUDIt utility may be invoked to update the control data set with physical volume location information. The SCRatch Update function may be executed to update scratch status for these volumes, if required. Refer to "Overview of Library Utilities" in the *HSC System Programmer's Guide* for a description of library utilities.

Note: Before loading the LSM, verify that the cartridges have Tri-Optic labels. Cartridges without Tri-Optic labels are ejected by the AUDIt utility.

Initialize Cartridge Utility

The Initialize Cartridge utility permits batch entry of cartridges into the library through the CAP and the writing of magnetic labels for those cartridges. This program reads the external Tri-Optic labels and records them in the data set defined through the CNTLDD parameter. When there are no more cartridges to be labeled, and the empty CAP has been opened and closed, cartridge initialization begins. For additional information, refer to "Initialize Cartridge (INITialize) Utility" in the *HSC System Programmer's Guide*.

Using an Auto-mode CAP to Load Cartridges

An automatic mode CAP (referred to as an auto-mode CAP), allows cartridges to be entered into an LSM without using HSC commands or utilities. Any CAP can be placed in automatic mode, which unlocks the CAP making it available for entering cartridges.

Note: An auto-mode CAP may be locked temporarily while another process is using it for enter/eject processing.

When cartridges are entered into an LSM through an auto-mode CAP, the AUDit utility is run automatically. Refer to the *HSC Operator's Guide (VM Implementation)* for more information about using an auto-mode CAP.

Migrating Applications to Library Use

User Exits 02 and 04 can be used to cause nonspecific allocation to the data set, job, or step names. If there is one application which is intended for library usage, User Exits 02 and 04 can cause that application's nonspecific requests to be library allocated and all others to be nonlibrary. More applications can be added, as warranted, until all applications use library scratch volumes, at which time the user exit can be removed from the HSC.

User Exit 02 is used in the JES2 or JES3 without SETUP environment. User Exit 04 is used in the JES3 SETUP environment.

Refer to the *HSC System Programmer's Guide* for more information on user exits and JES3.

Appendix A. Library Configuration Checklist

The following check list can be used to ensure that all necessary steps for installing HSC software are complete.

Table 18. Library Configuration Checklist

Step	Description of Action	Checkmark to Verify Completion	Person Responsible for Test / Verification
	Planning the Configuration		
1	Verify the physical plan, including floor space, power, environmental considerations.		
2	Verify that the operating system release level is at the proper level.		
3	If your installation utilizes application programs that will interface with the HSC, verify that custom routines have been considered and that program routines conform to the requirements specified in Appendix F, “Programmatic Interface”, in the *HSC System Programmer’s Guide*.		
4	Verify that LSM/pass-thru port relationships are properly defined.		
5	Verify that MVS and LIBGEN esoterics are defined.		
6	Verify that DASD space is planned and sufficient to accommodate library data sets.		
7	Determine which control data sets and journals will be allocated and the locations on DASD.		
8	Determine which control data sets are shared data sets; ensure that space calculations are completed.		
	Performing Pre-execution Tasks		
9	Add definitions for ACF/VTAM communications.		
10	Code and catalog the HSC started task procedure.		
11	IPL the system.		
	Defining the Library Configuration (LIBGEN)		
12	Prepare the library configuration (LIBGEN file).		

Table 18. Library Configuration Checklist (Continued)

Step	Description of Action	Checkmark to Verify Completion	Person Responsible for Test / Verification
13	Assemble and link-edit the LIBGEN file.		
Verifying the Library Generation			
14	Execute SLIVERFY program to verify the library configuration created by the LIBGEN file.		
Initializing the Control Data Sets			
15	Create JCL to initialize the library control data sets.		
16	Execute SLICREAT program to initialize the data sets.		
17	Verify completion of SLICREAT program.		
18	Verify the storage capacity of the LSMs in the installation.		
19	Execute the BACKup utility.		
Defining Definition Data Sets and PARMLIB Control Statements			
20	Define TAPEREQ, UNITATTR, and VOLATTR control statements.		
21	Define PARMLIB control statements applicable for your installation: Control data set definition Journal data set definition Device allocation CAP preference Communications path definition EXECparm definition Mount processing control General purpose OPTions Scratch subpool definitions User exit execution control TREQDEF, UNITDEF, VOLDEF definition.		
Starting HSC Execution			
22	Start HSC software. Determine and verify if system IPL is required and performed.		
23	Modify LSMs and CAPs online.		
Testing the Installation (Recommended Testing)			
24	Perform each group of recommended test procedures. Verify completion of each test by completing the applicable test form contained in that section.		
Planning and Executing Cartridge Migration into the Library			
25	Verify that Tri-Optic labels are correctly placed on each cartridge.		

Table 18. Library Configuration Checklist (Continued)

Step	Description of Action	Checkmark to Verify Completion	Person Responsible for Test / Verification
26	Load cartridges into the library.		

Appendix B. Library Configurations

This appendix contains examples of library configurations that can be used as models for analyzing how you can configure your library and future expansion. Example LIBGEN files corresponding to each configuration are also provided.

Example Configuration with LIBGEN Files

Examples provided include the following:

- one host, one ACS, one 4410 LSM configuration
- one host, one ACS, one 9310 PowderHorn, one 9360-075 WolfCreek LSM configuration
- one host, one ACS, one 9360-050 WolfCreek, one 9360-100 WolfCreek LSM configuration
- two host, one ACS, two 4410 LSM configuration
- two host, one ACS, two 4410, one 9310 PowderHorn LSM configuration
- two host, one ACS, six 4410 LSM configuration
- two host, two ACS, six 4410 LSM configuration
- one host, one ACS, one 4410 LSM, dual LMU configuration.

Note: For two host configurations, it is absolutely necessary that host IDs be included in the LIBGEN for each host having access to the library CDS. An example is:

```
SLILIBRY ...
HOSTID=(HSC1,HSC2)
```

Be aware that the HSC does not distinguish the type of host; that is, production or test machine.

The source code for the example LIBGENs shown in this appendix are included in the SAMPLIB as members LIBGENnn, where nn is the corresponding LIBGEN example number.

One Host, One ACS, One 4410 LSM Configuration

Hardware Components

This configuration consists of the following components:

- one host (HSC1)
- manual transport esoteric (CARTAPE)
- one ACS (ACS0)
- library transport esoteric (CTAPE) for ACS0
- one 4410 LSM (LSM0) with four cartridge drive panels (1,2,9,10) and an enhanced CAP
- two station addresses (0A0,0A1)
- sixteen transports (410-417 and 510-517).

Figure 10 on page 130 illustrates the current layout for this configuration.

LIBGEN01

An example LIBGEN for this configuration is shown in Figure 9 on page 129. This sample LIBGEN is also included in the SAMPLIB as member LIBGEN01.

```
LIBGENØ1 SLIRCVRY  TCHNIQE=BOTH
*
         SLILIBRY HOSTID=HSC1,                                                 X
               SMF=235,                                                        X
               DELDISP=NOSCRTCH,                                               X
               COMPRFX=#,                                                      X
               ACSLIST=NAMEACS,                                                X
               NNLBDRV=CARTAPE,                                                X
               MAJNAME=STKALSQN,                                               X
               SCRLABL=SL,                                                     X
               EJCTPAS=GOODAY,                                                 X
               CLNPRFX=CLN,                                                    X
*
NAMEACS  SLIALIST  ACSØ
*
ACSØ     SLIACS    ACSDRV=CTAPE,                                               X
               STATION=STNØ,                                                   X
               LSM=(LSMØ)
*
STNØ     SLISTATN  ADDRESS=(ØAØ,ØA1)
*
LSMØ     SLILSM    DRIVE=(1,2,9,1Ø),                                           X
               DRVELST=(PANELØØ1,PANELØØ2,PANELØØ9,PANELØ1Ø),                  X
               TYPE=441Ø,                                                      X
               DOOR=ECAP
*
PANELØØ1 SLIDLIST  HOSTDRV=DRVØ
DRVØ     SLIDRIVS  ADDRESS=(41Ø,411,412,413)
PANELØØ2 SLIDLIST  HOSTDRV=DRV1
DRV1     SLIDRIVS  ADDRESS=(414,415,416,417)
PANELØØ9 SLIDLIST  HOSTDRV=DRV2
DRV2     SLIDRIVS  ADDRESS=(51Ø,511,512,513)
PANELØ1Ø SLIDLIST  HOSTDRV=DRV3
DRV3     SLIDRIVS  ADDRESS=(514,515,516,517)
*
         SLIENDGN
```

Figure 9. LIBGEN for One Host, One ACS, One 4410 LSM Configuration

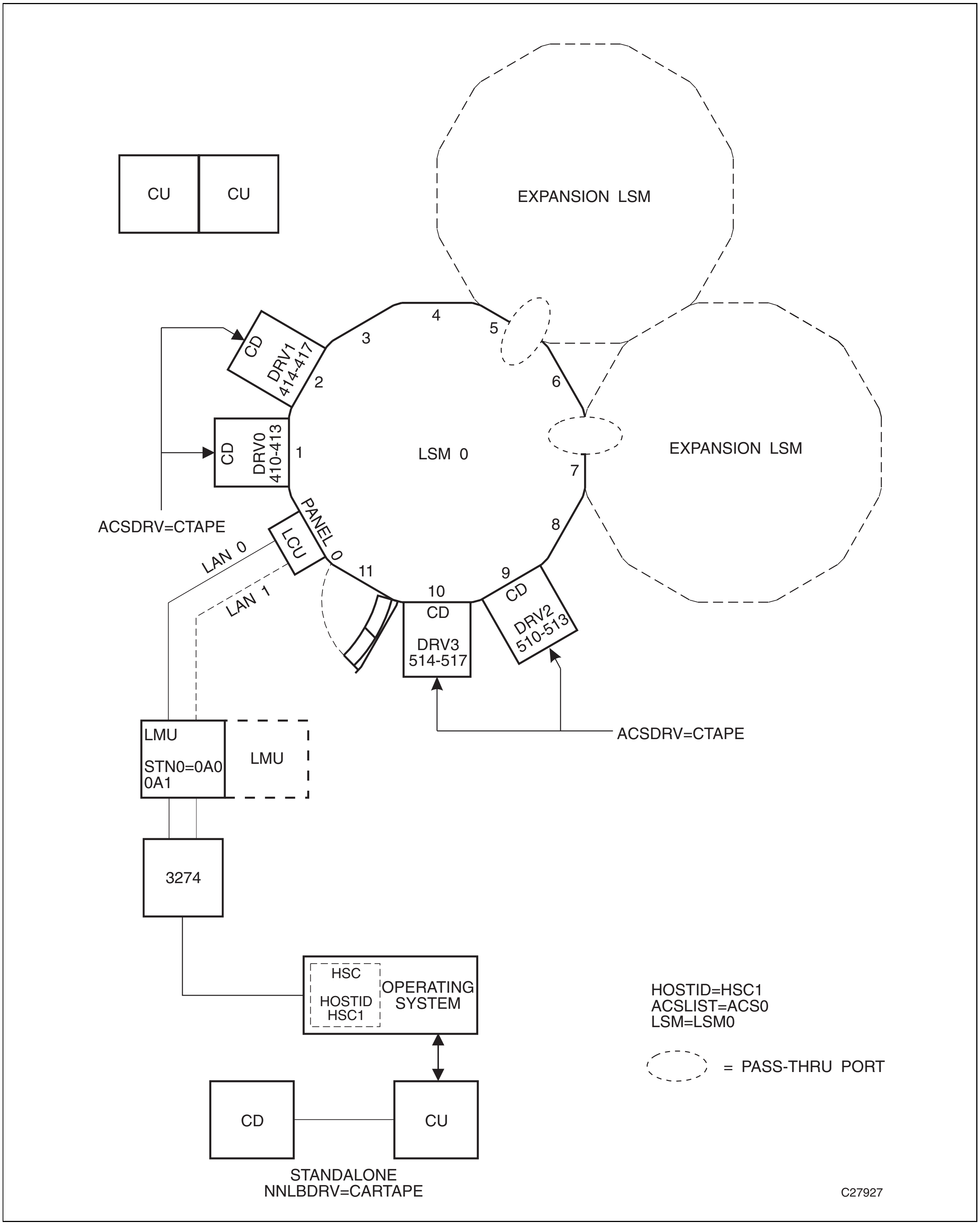


Figure 10. One Host, One ACS, One 4410 LSM Configuration

One Host, One ACS, 9310/PowderHorn 9360/WolfCreek LSM Configuration

Hardware Components

This configuration consists of the following components:

- one host (HSC1)
- manual transport esoteric (CARTAPE)
- one Automated Cartridge System (ACS0)
- library transport esoterics (CTAPEA) for ACS0
- Library Storage Modules
  - one 9310 PowderHorn LSM designated as LSM0 with four cartridge drive panels (1,2,9,10) and a standard 21-cell CAP
  - one 9360-075 WolfCreek LSM designated as LSM1 with two cartridge drive panels (1 and 3) and a 20-cell WolfCreek CAP
- two station addresses (0A0,0A1)
- twenty -four tape transports (410-417, 510-517, 610-617).

Figure 12 on page 133 illustrates the layout for this configuration.

LIBGEN02

An example LIBGEN for this configuration is shown in Figure 11 on page 132. This sample LIBGEN is also included in the SAMPLIB as member LIBGEN02.

```
LIBGENØ2 SLIRCVRY  TCHNIQE=SHADOW
*
         SLILIBRY HOSTID=HSC1,                                               X
               SMF=235,                                                      X
               DELDISP=NOSCRTCH,                                             X
               COMPRFX=#,                                                    X
               ACSLIST=NAMEACS,                                              X
               NNLBDRV=CARTAPE,                                              X
               MAJNAME=STKALSQN,                                             X
               SCRLABL=SL,                                                   X
               EJCTPAS=GOODAY,                                               X
               CLNPRFX=CLN,                                                  X
*
NAMEACS  SLIALIST  ACSØ
*
ACSØ     SLIACS    ACSDRV=(CTAPEA),                                          X
               STATION=STNØ,                                                 X
               LSM=(LSMØ,LSM1)
*
STNØ     SLISTATN  ADDRESS=(ØAØ,ØA1)
*
LSMØ     SLILSM    DRIVE=(1,2,9,1Ø),                                         X
               DRVELST=(PANELØØ1,PANELØØ2,PANELØØ9,PANELØ1Ø),                X
               PASTHRU=((5,S)),                                              X
               ADJACNT=(LSM1),                                               X
               TYPE=931Ø,                                                    X
               DOOR=STD
*
PANELØØ1 SLIDLIST  HOSTDRV=DRVØ
DRVØ     SLIDRIVS  ADDRESS=(41Ø,411,412,413)
PANELØØ2 SLIDLIST  HOSTDRV=DRV1
DRV1     SLIDRIVS  ADDRESS=(414,415,416,417)
PANELØØ9 SLIDLIST  HOSTDRV=DRV2
DRV2     SLIDRIVS  ADDRESS=(51Ø,511,512,513)
PANELØ1Ø SLIDLIST  HOSTDRV=DRV3
DRV3     SLIDRIVS  ADDRESS=(514,515,516,517)
*
LSM1     SLILSM    DRIVE=(1,3),                                              X
               DRVELST=(PANEL1Ø1,PANEL1Ø3),                                  X
               PASTHRU=((Ø,M)),                                              X
               ADJACNT=(LSMØ),                                               X
               TYPE=936Ø-Ø75,                                                X
               DOOR=WC1
*
PANEL1Ø1 SLIDLIST  HOSTDRV=DRV4
DRV4     SLIDRIVS  ADDRESS=(61Ø,611,612,613)
PANEL1Ø3 SLIDLIST  HOSTDRV=DRV5
DRV5     SLIDRIVS  ADDRESS=(614,615,616,617)
*
         SLIENDGN
```

Figure 11. LIBGEN for One Host, One ACS, 9310 PowderHorn 9360 WolfCreek Configuration

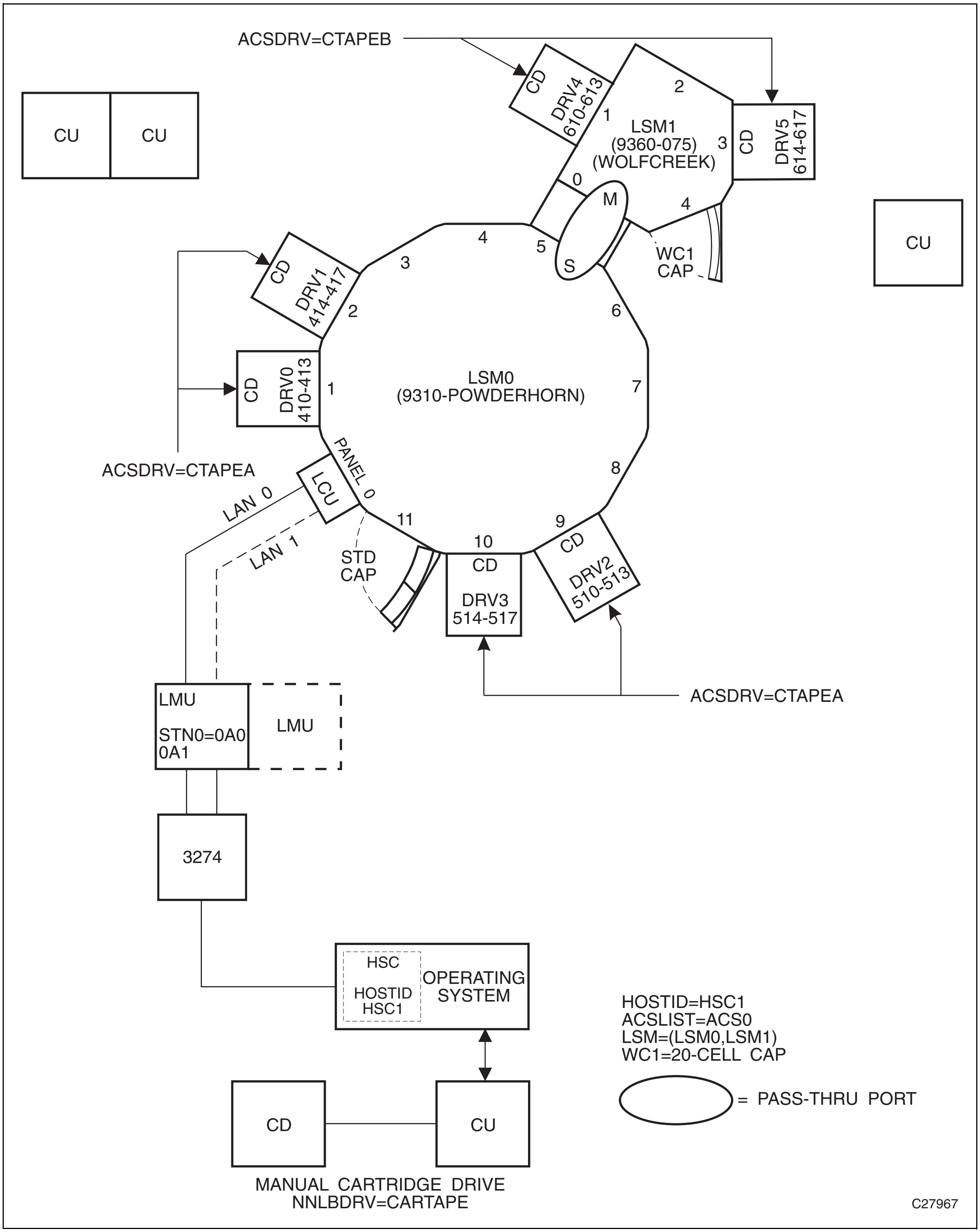


Figure 12. One Host, One ACS, 9310 PowderHorn 9360 WolfCreek Configuration

One Host, One ACS, Two 9360 WolfCreek LSM Configuration

Hardware Components

This configuration consists of the following components:

- one host (HSC1)
- manual transport esoteric (CARTAPE)
- one Automated Cartridge System (ACS0)
- library transport esoterics (CTAPEA) for ACS0
- Library Storage Modules
    - one 9360-050 WolfCreek LSM designated as LSM0 with two cartridge drive panels (1,3) and a 20-cell CAP
    - one 9360-100 WolfCreek LSM designated as LSM1 with two cartridge drive panels (1,3) and an optional 30-cell WolfCreek CAP
- two station addresses (0A0,0A1)

Figure 14 on page 136 illustrates the layout for this configuration.

LIBGEN03

An example LIBGEN for this configuration is shown in Figure 13 on page 135. This sample LIBGEN is also included in the SAMPLIB as member LIBGEN03.

```
LIBGENØ3 SLIRCVRY  TCHNIQE=SHADOW
*
         SLILIBRY HOSTID=HSC1,                                       X
               SMF=235,                                              X
               DELDISP=NOSCRTCH,                                     X
               COMPRFX=#,                                            X
               ACSLIST=NAMEACS,                                      X
               NNLBDRV=CARTAPE,                                      X
               MAJNAME=STKALSQN,                                     X
               SCRLABL=SL,                                           X
               EJCTPAS=GOODAY,                                       X
               CLNPRFX=CLN,                                          X
*
NAMEACS  SLIALIST  ACSØ
*
ACSØ     SLIACS    ACSDRV=(CTAPEA),                                  X
               STATION=STNØ,                                         X
               LSM=(LSMØ,LSM1)
*
STNØ     SLISTATN  ADDRESS=(ØAØ,ØA1)
*
LSMØ     SLILSM    DRIVE=(1,3),                                      X
               DRVELST=(PANELØØ1,PANELØØ3),                          X
               PASTHRU=((2,S)),                                      X
               ADJACNT=(LSM1),                                       X
               TYPE=936Ø-Ø5Ø,                                        X
               DOOR=WC1
*
PANELØØ1 SLIDLIST  HOSTDRV=DRVØ
DRVØ     SLIDRIVS  ADDRESS=(31Ø,311,312,313)
PANELØØ3 SLIDLIST  HOSTDRV=DRV1
DRV1     SLIDRIVS  ADDRESS=(41Ø,411,412,413)
*
LSM1     SLILSM    DRIVE=(1,3),                                      X
               DRVELST=(PANEL1Ø1,PANEL1Ø3),                          X
               PASTHRU=((Ø,M)),                                      X
               ADJACNT=(LSMØ),                                       X
               TYPE=936Ø-1ØØ,                                        X
               DOOR=WC2
*
PANEL1Ø1 SLIDLIST  HOSTDRV=DRV2
DRV2     SLIDRIVS  ADDRESS=(51Ø,511,512,513)
PANEL1Ø3 SLIDLIST  HOSTDRV=DRV3
DRV3     SLIDRIVS  ADDRESS=(61Ø,,612,)
*
         SLIENDGN
```

Figure 13. LIBGEN for One Host, One ACS, Two 9360 LSM Configuration

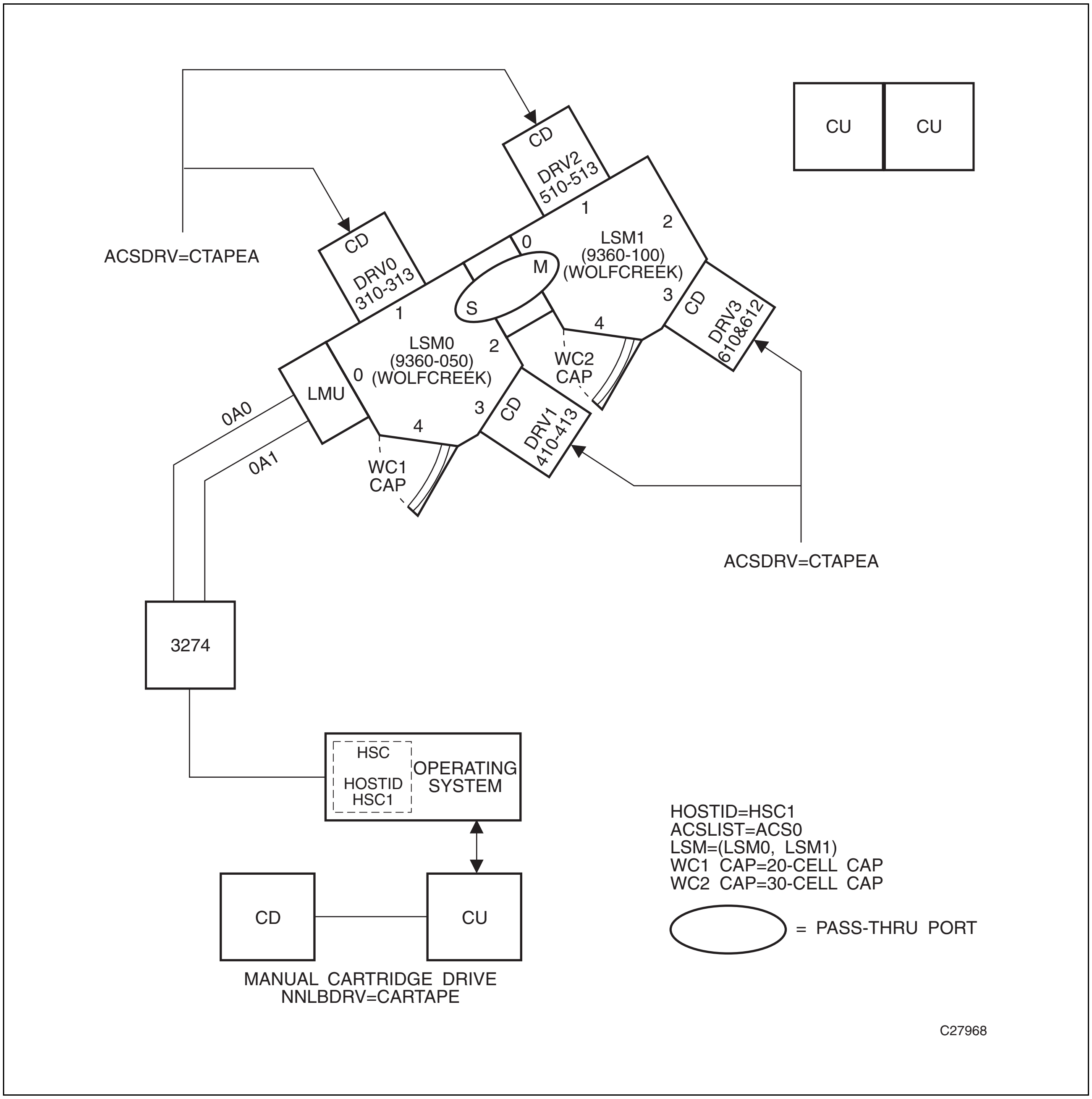


Figure 14. One Host, One ACS, Two 9360 LSM Configuration

Two Host, One ACS, Two 4410 LSM Configuration

Hardware Components

This configuration consists of the following components:

- two hosts (HSC1,HSC2)
- two manual transport esoterics (CARTAPEA,CARTAPEB)
- one Automated Cartridge System (ACS0)
- two library transport esoterics (CTAPEA,CTAPEB) for ACS0 l
- Library Storage Modules
  - one 4410 LSM designated as LSM0 with four cartridge drive panels (1,2,9,10) and a standard CAP.
  - one 4410 LSM designated as LSM1 with four cartridge drive panels (7,8,9,10) and an enhanced CAP
- four station addresses (0A0,0A1,0A2,0A3)
- thirty-two transports (410-41F and 510-51F).

Figure 16 on page 139 illustrates the current layout for this configuration.

LIBGEN04

An example LIBGEN for this configuration is shown in Figure 15 on page 138. This sample LIBGEN is also included in the SAMPLIB as member LIBGEN04.

```
LIBGENØ4 SLIRCVRY  TCHNIQE=SHADOW
*
         SLILIBRY SMF=235,                                                X
               HOSTID=(HSC1,HSC2),                                        X
               NNLBDRV=(CARTAPEA,CARTAPEB),                               X
               DELDISP=NOSCRTCH,                                          X
               ACSLIST=NAMEACS,                                           X
               MAJNAME=STKALSQN,                                          X
               COMPRFX=#,                                                 X
               SCRLABL=SL,                                                X
               EJCTPAS=GOODDAY,                                           X
               CLNPRFX=CLN,                                               X
*
NAMEACS  SLIALIST  ACSØ
*
ACSØ     SLIACS    ACSDRV=(CTAPEA,CTAPEB),                                X
               STATION=(STNØ,STN1),                                       X
               LSM=(LSMØ,LSM1)
*
STNØ     SLISTATN  ADDRESS=(ØAØ,ØA1)
STN1     SLISTATN  ADDRESS=(ØA2,ØA3)
*
LSMØ     SLILSM    DRIVE=(1,2,9,1Ø),                                      X
               DRVELST=(PANELØØ1,PANELØØ2,PANELØØ9,PANELØ1Ø),             X
               PASTHRU=((5,M)),                                           X
               ADJACNT=(LSM1),                                            X
               TYPE=441Ø,                                                 X
               DOOR=STD
*
PANELØØ1 SLIDLIST  HOSTDRV=(DRVØ,DRVØ)
DRVØ     SLIDRIVS  ADDRESS=(41Ø,411,412,413)
PANELØØ2 SLIDLIST  HOSTDRV=(DRV1,DRV1)
DRV1     SLIDRIVS  ADDRESS=(414,415,416,417)
PANELØØ9 SLIDLIST  HOSTDRV=(DRV2,DRV2)
DRV2     SLIDRIVS  ADDRESS=(418,419,41A,41B)
PANELØ1Ø SLIDLIST  HOSTDRV=(DRV3,DRV3)
DRV3     SLIDRIVS  ADDRESS=(41C,41D,41E,41F)
*
LSM1     SLILSM    DRIVE=(7,8,9,1Ø),                                      X
               DRVELST=(PANEL1Ø7,PANEL1Ø8,PANEL1Ø9,PANEL11Ø),             X
               PASTHRU=((5,S)),                                           X
               ADJACNT=(LSMØ),                                            X
               TYPE=441Ø,                                                 X
               DOOR=ECAP
*
PANEL1Ø7 SLIDLIST  HOSTDRV=(DRV4,DRV4)
DRV4     SLIDRIVS  ADDRESS=(51Ø,511,512,513)
PANEL1Ø8 SLIDLIST  HOSTDRV=(DRV5,DRV5)
DRV5     SLIDRIVS  ADDRESS=(514,515,516,517)
PANEL1Ø9 SLIDLIST  HOSTDRV=(DRV6,DRV6)
DRV6     SLIDRIVS  ADDRESS=(518,519,51A,51B)
PANEL11Ø SLIDLIST  HOSTDRV=(DRV7,DRV7)
DRV7     SLIDRIVS  ADDRESS=(51C,51D,51E,51F)
*
         SLIENDGN
```

Figure 15. LIBGEN for Two Host, One ACS, Two 4410 LSM Configuration

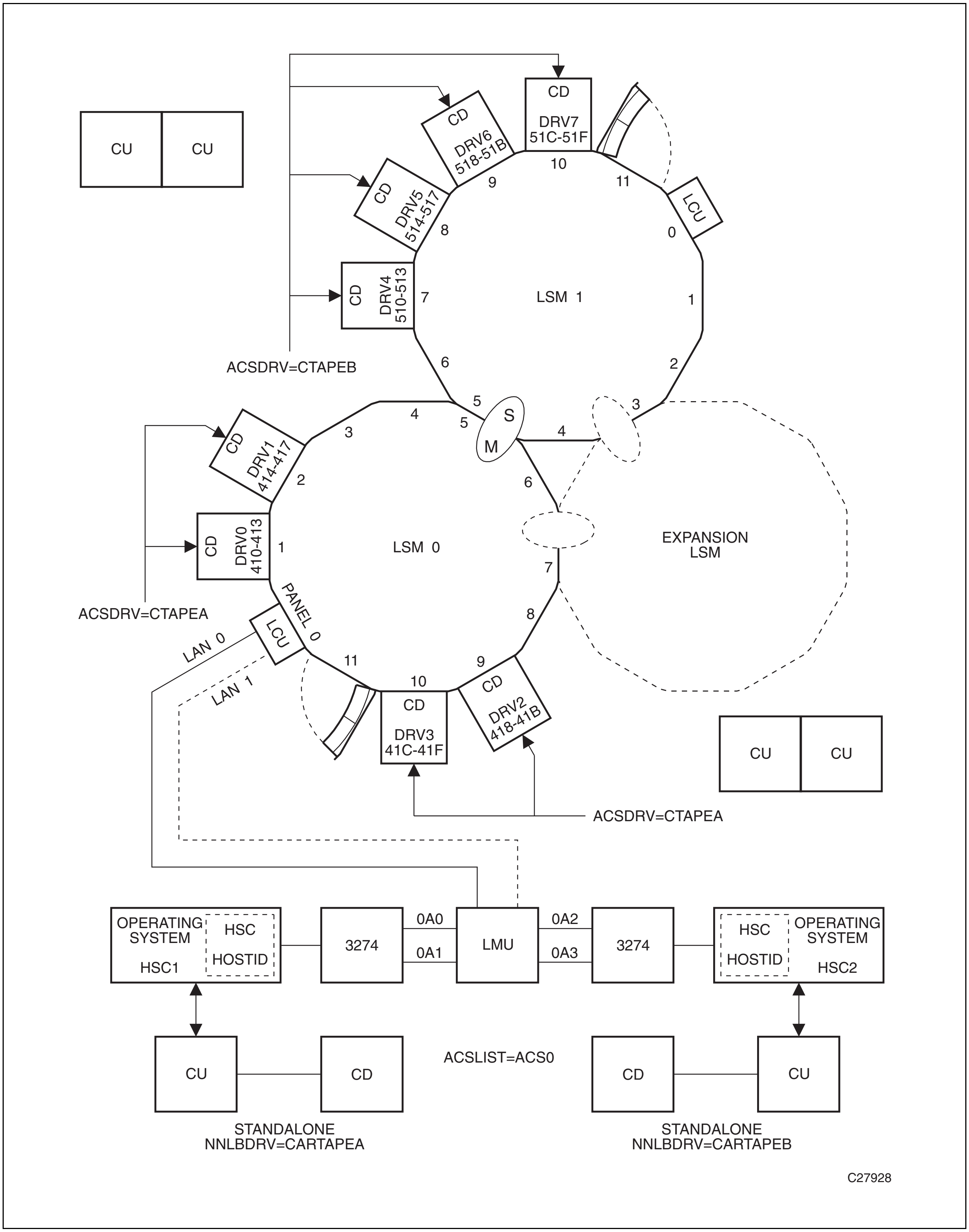


Figure 16. Two Host, One ACS, Two 4410 LSM Configuration

Two Host, One ACS, Two 4410, One 9310 PowderHorn LSM Configuration

Hardware Components

This configuration consists of the following components:

- two hosts (HSC1,HSC2)
- two manual transport esoterics (CARTAPEA,CARTAPEB)
- one Automated Cartridge System (ACS0)
- two library transport esoterics (CTAPEA,CTAPEB) for ACS0
- Library Storage Modules
  - one 4410 LSM designated as LSM0 with four cartridge drive panels (1,2,9,10) and a standard CAP
  - one 4410 LSM designated as LSM1 with four cartridge drive panels (7,8,9,10) and an enhanced CAP
  - one 9310 PowderHorn LSM designated as LSM2 with two cartridge drive panels (9,10) and an enhanced CAP
- four station addresses (0A0,0A1,0A2,0A3)
- forty transports (410-41F), (510-51F), (610-617).

Figure 18 on page 143 illustrates the current layout for this configuration. This configuration expands on the previous example by adding a 9310 PowderHorn LSM.

LIBGEN05

An example LIBGEN for this configuration is shown in Figure 17 on page 141. This sample LIBGEN is also included in the SAMPLIB as member LIBGEN05.

```
LIBGENØ5 SLIRCVRY  TCHNIQE=SHADOW
*
         SLILIBRY SMF=235,                                            X
               HOSTID=(HSC1,HSC2),                                    X
               NNLBDRV=(CARTAPEA,CARTAPEB),                           X
               DELDISP=NOSCRTCH,                                      X
               ACSLIST=NAMEACS,                                       X
               MAJNAME=STKALSQN,                                      X
               COMPRFX=#,                                             X
               SCRLABL=SL,                                            X
               EJCTPAS=GOODDAY,                                       X
               CLNPRFX=CLN,                                           X
*
NAMEACS  SLIALIST  ACSØ
*
ACSØ     SLIACS    ACSDRV=(CTAPEA,CTAPEB),                            X
               STATION=(STNØ,STN1),                                   X
               LSM=(LSMØ,LSM1,LSM2)
*
STNØ     SLISTATN  ADDRESS=(ØAØ,ØA1)
STN1     SLISTATN  ADDRESS=(ØA2,ØA3)
*
LSMØ     SLILSM    DRIVE=(1,2,9,1Ø),                                  X
               DRVELST=(PANELØØ1,PANELØØ2,PANELØØ9,PANELØ1Ø),         X
               PASTHRU=((5,M),(7,S)),                                 X
               ADJACNT=(LSM1,LSM2),                                   X
               TYPE=441Ø,                                             X
               DOOR=STD
*
PANELØØ1 SLIDLIST  HOSTDRV=(DRVØ,DRVØ)
DRVØ     SLIDRIVS  ADDRESS=(41Ø,411,412,413)
PANELØØ2 SLIDLIST  HOSTDRV=(DRV1,DRV1)
DRV1     SLIDRIVS  ADDRESS=(414,415,416,417)
PANELØØ9 SLIDLIST  HOSTDRV=(DRV2,DRV2)
DRV2     SLIDRIVS  ADDRESS=(418,419,41A,41B)
PANELØ1Ø SLIDLIST  HOSTDRV=(DRV3,DRV3)
DRV3     SLIDRIVS  ADDRESS=(41C,41D,41E,41F)
*
LSM1     SLILSM    DRIVE=(7,8,9,1Ø),                                  X
               DRVELST=(PANEL1Ø7,PANEL1Ø8,PANEL1Ø9,PANEL11Ø),         X
               PASTHRU=((3,M),(5,S)),                                 X
               ADJACNT=(LSM2,LSMØ),                                   X
               TYPE=441Ø,                                             X
               DOOR=ECAP
*
PANEL1Ø7 SLIDLIST  HOSTDRV=(DRV4,DRV4)
DRV4     SLIDRIVS  ADDRESS=(51Ø,511,512,513)
PANEL1Ø8 SLIDLIST  HOSTDRV=(DRV5,DRV5)
DRV5     SLIDRIVS  ADDRESS=(514,515,516,517)
PANEL1Ø9 SLIDLIST  HOSTDRV=(DRV6,DRV6)
DRV6     SLIDRIVS  ADDRESS=(518,519,51A,51B)
PANEL11Ø SLIDLIST  HOSTDRV=(DRV7,DRV7)
DRV7     SLIDRIVS  ADDRESS=(51C,51D,51E,51F)
```

Figure 17. LIBGEN for Two Host, One ACS, Two 4410, One 9310 Powderhorn Configuration (1 of 2)

```
*
LSM2     SLILSM    DRIVE=(9,1Ø),                                              X
               DRVELST=(PANEL2Ø9,PANEL21Ø),                                   X
               PASTHRU=((1,M),(3,S)),                                         X
               ADJACNT=(LSMØ,LSM1),                                           X
               TYPE=931Ø,                                                     X
               DOOR=ECAP
*
PANEL2Ø9 SLIDLIST  HOSTDRV=(DRV8,DRV8)
DRV8     SLIDRIVS  ADDRESS=(61Ø,611,612,613)
PANEL21Ø SLIDLIST  HOSTDRV=(DRV9,DRV9)
DRV9     SLIDRIVS  ADDRESS=(614,615,616,617)
*
         SLIENDGN
```

Figure 17. LIBGEN for Two Host, One ACS, Two 4410, One 9310 PowderHorn Configuration (2 of 2)

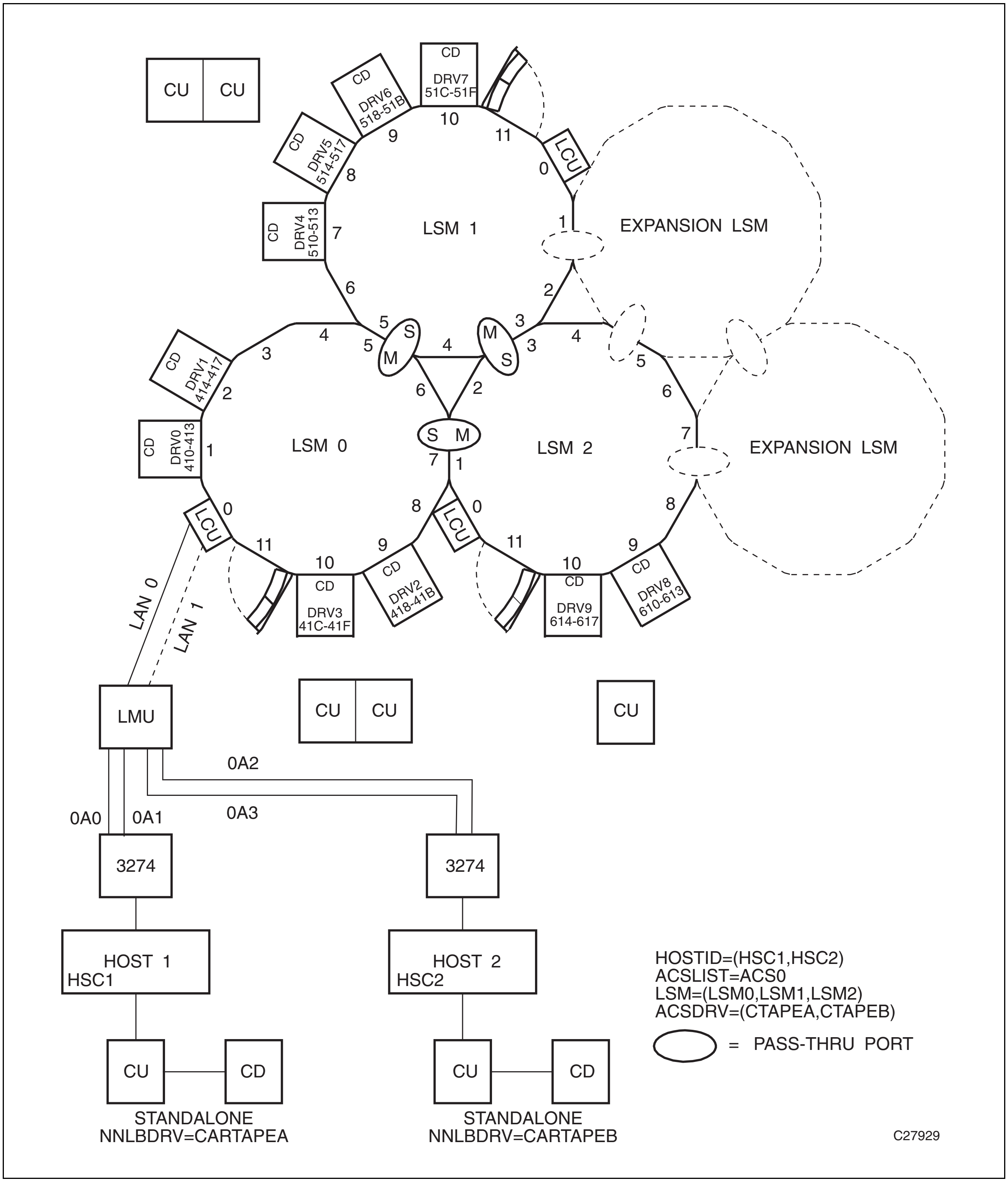


Figure 18. Two Host, One ACS, Two 4410, One 9310 PowderHorn

Two Host, One ACS, Six 4410 LSM Configuration

Hardware Components

This configuration consists of the following components:

- two hosts (HSC1,HSC2)
- two manual transport esoterics (CARTAPEA,CARTAPEB)
- one Automated Cartridge System (ACS0)
- two library transport esoterics (CTAPEA,CTAPEB) for ACS0
- six 4410 Library Storage Modules designated as (LSM0,LSM1,LSM2,LSM3,LSM4,LSM5). Each LSM has an enhanced CAP.
- four station addresses (0A0,0A1,0A2,0A3)
- twelve cartridge drive panels (9,10), (9,10), (9,10), (9,10), (9,10), (9,10)
- forty-eight transports (410-417), (510-517), (610-617), (710-717), (810-817), (910-917).

Figure 20 on page 147 illustrates the layout for this configuration.

LIBGEN06

An example LIBGEN for this configuration is shown in Figure 19 on page 145. This sample LIBGEN is also included in the SAMPLIB as member LIBGEN06.

```
LIGBENØ6 SLIRCVRY  TCHNIQE=SHADOW
*
         SLILIBRY SMF=235,                                              X
               HOSTID=(HSC1,HSC2),                                      X
               NNLBDRV=(CARTAPEA,CARTAPEB),                             X
               DELDISP=NOSCRTCH,                                        X
               ACSLIST=NAMEACS,                                         X
               MAJNAME=STKALSQN,                                        X
               COMPRFX=#,                                               X
               SCRLABL=SL,                                              X
               EJCTPAS=GOODDAY,                                         X
               CLNPRFX=CLN,                                             X
*
NAMEACS  SLIALIST  ACSØ
*
ACSØ     SLIACS    ACSDRV=(CTAPEA,CTAPEB),                              X
               STATION=(STNØ,STN1),                                     X
               LSM=(LSMØ,LSM1,LSM2,LSM3,LSM4,LSM5)
*
STNØ     SLISTATN  ADDRESS=(ØAØ,ØA1)
STN1     SLISTATN  ADDRESS=(ØA2,ØA3)
*
LSMØ     SLILSM    DRIVE=(9,1Ø),                                        X
               DRVELST=(PANELØØ9,PANELØ1Ø),                             X
               PASTHRU=((5,M),(7,S)),                                   X
               ADJACNT=(LSM1,LSM2),                                     X
               TYPE=441Ø,                                               X
               DOOR=ECAP
*
PANELØØ9 SLIDLIST  HOSTDRV=(DRVØ,DRVØ)
DRVØ     SLIDRIVS  ADDRESS=(41Ø,411,412,413)
PANELØ1Ø SLIDLIST  HOSTDRV=(DRV1,DRV1)
DRV1     SLIDRIVS  ADDRESS=(414,415,416,417)
*
LSM1     SLILSM    DRIVE=(9,1Ø),                                        X
               DRVELST=(PANEL1Ø9,PANEL11Ø),                             X
               PASTHRU=((1,M),(3,M),(5,S)),                             X
               ADJACNT=(LSM3,LSM2,LSMØ),                                X
               TYPE=441Ø,                                               X
               DOOR=ECAP
*
PANEL1Ø9 SLIDLIST  HOSTDRV=(DRV2,DRV2)
DRV2     SLIDRIVS  ADDRESS=(51Ø,511,512,513)
PANEL11Ø SLIDLIST  HOSTDRV=(DRV3,DRV3)
DRV3     SLIDRIVS  ADDRESS=(514,515,516,517)
*
LSM2     SLILSM    DRIVE=(9,1Ø),                                        X
               DRVELST=(PANEL2Ø9,PANEL21Ø),                             X
               PASTHRU=((1,M),(3,S),(5,S),(7,M)),                       X
               ADJACNT=(LSMØ,LSM1,LSM3,LSM4),                           X
               TYPE=441Ø,                                               X
               DOOR=ECAP
```

Figure 19. LIBGEN for Two Host, One ACS, Six 4410 LSM Configuration (1 of 2)

```
*
PANEL209 SLIDLIST  HOSTDRV=(DRV4,DRV4)
DRV4     SLIDRIVS  ADDRESS=(610,611,612,613)
PANEL210 SLIDLIST  HOSTDRV=(DRV5,DRV5)
DRV5     SLIDRIVS  ADDRESS=(614,615,616,617)
*
LSM3     SLILSM    DRIVE=(9,10),                                           X
               DRVELST=(PANEL309,PANEL310),                                X
               PASTHRU=((1,S),(3,M),(5,M),(7,S)),                          X
               ADJACNT=(LSM5,LSM4,LSM2,LSM1),                              X
               TYPE=4410,                                                  X
               DOOR=ECAP
*
PANEL309 SLIDLIST  HOSTDRV=(DRV6,DRV6)
DRV6     SLIDRIVS  ADDRESS=(710,711,712,713)
PANEL310 SLIDLIST  HOSTDRV=(DRV7,DRV7)
DRV7     SLIDRIVS  ADDRESS=(714,715,716,717)
*
LSM4     SLILSM    DRIVE=(9,10),                                           X
               DRVELST=(PANEL409,PANEL410),                                X
               PASTHRU=((1,S),(3,S),(5,M)),                                X
               ADJACNT=(LSM2,LSM3,LSM5),                                   X
               TYPE=4410,                                                  X
               DOOR=ECAP
*
PANEL409 SLIDLIST  HOSTDRV=(DRV8,DRV8)
DRV8     SLIDRIVS  ADDRESS=(810,811,812,813)
PANEL410 SLIDLIST  HOSTDRV=(DRV9,DRV9)
DRV9     SLIDRIVS  ADDRESS=(814,815,816,817)
*
LSM5     SLILSM    DRIVE=(9,10),                                           X
               DRVELST=(PANEL509,PANEL510),                                X
               PASTHRU=((5,S),(7,M)),                                      X
               ADJACNT=(LSM4,LSM3),                                        X
               TYPE=4410,                                                  X
               DOOR=ECAP
*
PANEL509 SLIDLIST  HOSTDRV=(DRV10,DRV10),
DRV10    SLIDRIVS  ADDRESS=(910,911,912,913)
PANEL510 SLIDLIST  HOSTDRV=(DRV11,DRV11),
DRV11    SLIDRIVS  ADDRESS=(914,915,916,917)
*
         SLIENDGN
```

Figure 19. LIBGEN for Two Host, One ACS, Six 4410 LSM Configuration (2 of 2)

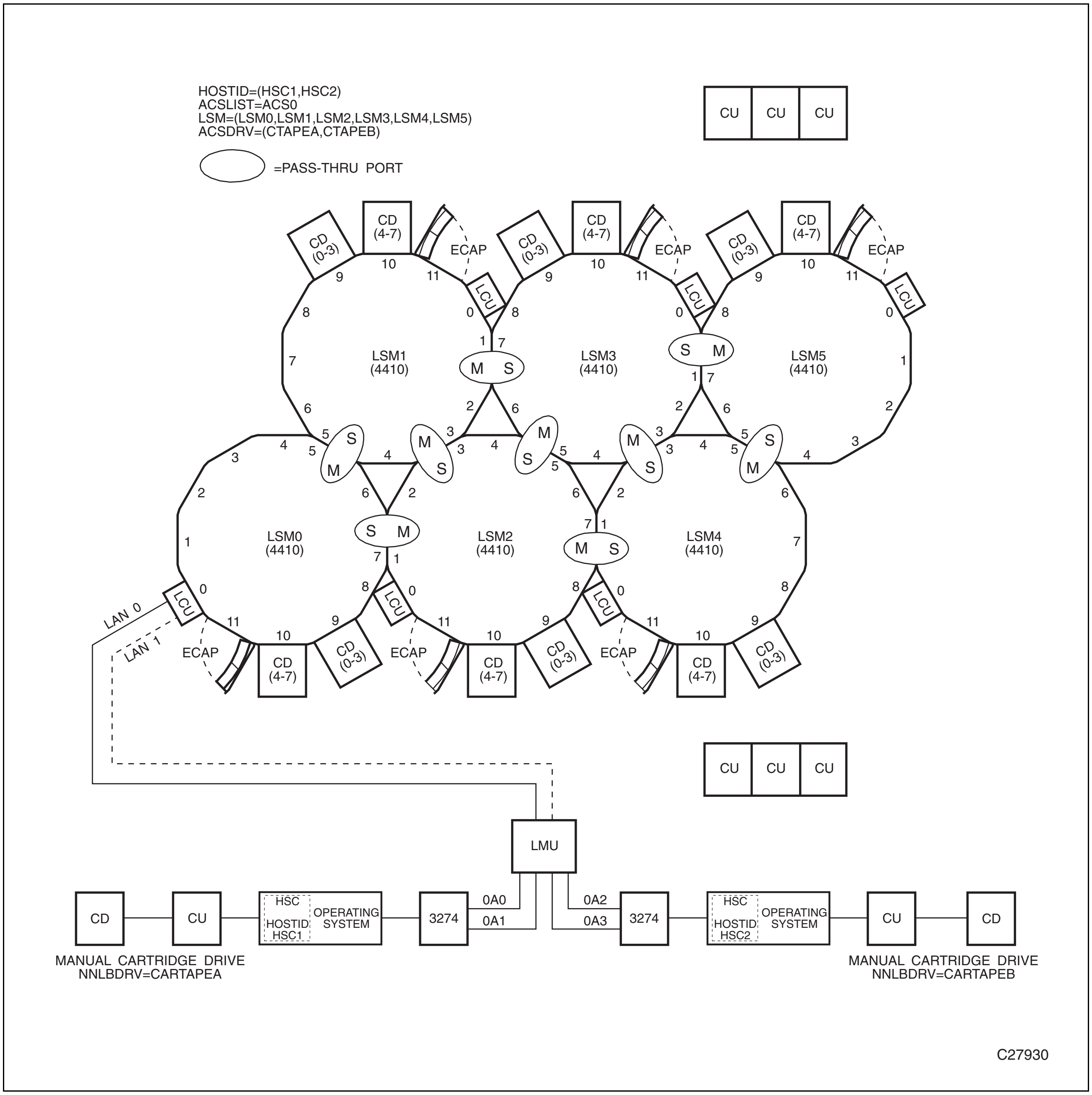


Figure 20. Two Host, One ACS, Six 4410 LSM Configuration

Two Host, Two ACS, Six 4410 LSM Configuration

Hardware Components

This configuration consists of the following components:

- two hosts (HSC1,HSC2)
- two manual transport esoterics (CARTAPEA,CARTAPEB)
- two Automated Cartridge Systems (ACS0,ACS1)
- two library transport esoterics (CTAPEA,CTAPEB) for ACS0
- two library transport esoterics (CTAPEC,CTAPED) for ACS1
- six 4410 Library Storage Modules designated as (LSM0,LSM1,LSM2,ALSM0,ALSM1,ALSM2). Each LSM has an enhanced CAP.
- four station addresses (0A0,0B0) and (0A1,0B1)
- twenty cartridge drive panels (1,2,9,10), (7,8,9,10), (9,10), (1,2,9,10), (7,8,9,10), (9,10)
- eighty transports (410-437, 510-537, 610-61F, 710-71F, 810-817).

Figure 22 on page 152 illustrates the layout for this configuration.

LIBGEN07

An example LIBGEN for this configuration is shown in Figure 21 on page 149. This sample LIBGEN is also included in the SAMPLIB as member LIBGEN07.

```
LIBGENØ7 SLIRCVRY  TCHNIQE=SHADOW
*
         SLILIBRY SMF=235,                                              X
               HOSTID=(HSC1,HSC2),                                      X
               NNLBDRV=(CARTAPEA,CARTAPEB),                             X
               DELDISP=NOSCRTCH,                                        X
               ACSLIST=NAMEACS,                                         X
               MAJNAME=STKALSQN,                                        X
               COMPRFX=#,                                               X
               SCRLABL=SL,                                              X
               EJCTPAS=GOODDAY,                                         X
               CLNPRFX=CLN,                                             X
*
NAMEACS  SLIALIST  ACSØ,ACS1
*
ACSØ     SLIACS    ACSDRV=(CTAPEA,CTAPEB),                              X
               STATION=(STNØ,STN1),                                     X
               LSM=(LSMØ,LSM1,LSM2)
*
STNØ     SLISTATN  ADDRESS=(ØAØ)
STN1     SLISTATN  ADDRESS=(ØBØ)
*
LSMØ     SLILSM    DRIVE=(1,2,9,1Ø),                                    X
               DRVELST=(PANELØØ1,PANELØØ2,PANELØØ9,PANELØ1Ø),           X
               PASTHRU=((5,M),(7,S)),                                   X
               ADJACNT=(LSM1,LSM2),                                     X
               TYPE=441Ø,                                               X
               DOOR=ECAP
*
PANELØØ1 SLIDLIST  HOSTDRV=(DRVØ,DRVØ)
DRVØ     SLIDRIVS  ADDRESS=(61Ø,611,612,613)
PANELØØ2 SLIDLIST  HOSTDRV=(DRV1,DRV1)
DRV1     SLIDRIVS  ADDRESS=(614,615,616,617)
PANELØØ9 SLIDLIST  HOSTDRV=(DRV2,DRV2)
DRV2     SLIDRIVS  ADDRESS=(618,619,61A,61B)
PANELØ1Ø SLIDLIST  HOSTDRV=(DRV3,DRV3)
DRV3     SLIDRIVS  ADDRESS=(61C,61D,61E,61F)
*
LSM1     SLILSM    DRIVE=(7,8,9,1Ø),                                    X
               DRVELST=(PANEL1Ø7,PANEL1Ø8,PANEL1Ø9,PANEL11Ø),           X
               PASTHRU=((3,M),(5,S)),                                   X
               ADJACNT=(LSM2,LSMØ),                                     X
               TYPE=441Ø,                                               X
               DOOR=STD
*
PANEL1Ø7 SLIDLIST  HOSTDRV=(DRV4,DRV4)
DRV4     SLIDRIVS  ADDRESS=(71Ø,711,712,713)
PANEL1Ø8 SLIDLIST  HOSTDRV=(DRV5,DRV5)
DRV5     SLIDRIVS  ADDRESS=(714,715,716,717)
PANEL1Ø9 SLIDLIST  HOSTDRV=(DRV6,DRV6)
DRV6     SLIDRIVS  ADDRESS=(718,719,71A,71B)
PANEL11Ø SLIDLIST  HOSTDRV=(DRV7,DRV7)
DRV7     SLIDRIVS  ADDRESS=(71C,71D,71E,71F)
*
```

Figure 21. LIBGEN for Two Host, Two ACS, Six 4410 LSM Configuration (1 of 3)

```
*
LSM2     SLILSM    DRIVE=(9,1Ø),                                          X
               DRVELST=(PANEL2Ø9,PANEL21Ø),                             X
               PASTHRU=((1,M),(3,S)),                                   X
               ADJACNT=(LSMØ,LSM1),                                     X
               TYPE=441Ø,                                               X
               DOOR=STD
*
PANEL2Ø9 SLIDLIST  HOSTDRV=(DRV8,DRV8)
DRV8     SLIDRIVS  ADDRESS=(81Ø,811,812,813)
PANEL21Ø SLIDLIST  HOSTDRV=(DRV9,DRV9)
DRV9     SLIDRIVS  ADDRESS=(814,815,816,817)
*
ACS1     SLIACS    ACSDRV=(CTAPEC,CTAPED),                                X
               STATION=(A1STNØ,A1STN1),                                 X
               LSM=(ALSMØ,ALSM1,ALSM2)
*
A1STNØ   SLISTATN  ADDRESS=(ØA1)
A1STN1   SLISTATN  ADDRESS=(ØB1)
*
ALSMØ    SLILSM    DRIVE=(1,2,9,1Ø),                                      X
               DRVELST=(ALSMØP1,ALSMØP2,ALSMØP9,ALSMØP1Ø),              X
               PASTHRU=((5,M),(7,S)),                                   X
               ADJACNT=(ALSM1,ALSM2),                                   X
               TYPE=441Ø,                                               X
               DOOR=STD
*
ALSMØP1  SLIDLIST  HOSTDRV=(ADRVØ,BDRVØ)
ADRVØ    SLIDRIVS  ADDRESS=(41Ø,411,412,413)
BDRVØ    SLIDRIVS  ADDRESS=(51Ø,511,512,513)
ALSMØP2  SLIDLIST  HOSTDRV=(ADRV1,BDRV1)
ADRV1    SLIDRIVS  ADDRESS=(414,415,416,417)
BDRV1    SLIDRIVS  ADDRESS=(514,515,516,517)
ALSMØP9  SLIDLIST  HOSTDRV=(ADRV2,BDRV2)
ADRV2    SLIDRIVS  ADDRESS=(418,419,41A,41B)
BDRV2    SLIDRIVS  ADDRESS=(518,519,51A,51B)
ALSMØP1Ø SLIDLIST  HOSTDRV=(ADRV3,BDRV3)
ADRV3    SLIDRIVS  ADDRESS=(41C,41D,41E,41F)
BDRV3    SLIDRIVS  ADDRESS=(51C,51D,51E,51F)
*
ALSM1    SLILSM    DRIVE=(7,8,9,1Ø),                                      X
               DRVELST=(ALSM1P7,ALSM1P8,ALSM1P9,ALSM1P1Ø),              X
               PASTHRU=((3,M),(5,S)),                                   X
               ADJACNT=(ALSM2,ALSMØ),                                   X
               TYPE=441Ø,                                               X
               DOOR=STD
```

Figure 21. LIBGEN for Two Host, Two ACS, Six 4410 LSM Configuration (2 of 3)

```
*
ALSM1P7  SLIDLIST  HOSTDRV=(ADRV4,BDRV4)
ADRV4    SLIDRIVS  ADDRESS=(42Ø,421,422,423)
BDRV4    SLIDRIVS  ADDRESS=(52Ø,521,522,523)
ALSM1P8  SLIDLIST  HOSTDRV=(ADRV5,BDRV5)
ADRV5    SLIDRIVS  ADDRESS=(424,425,426,427)
BDRV5    SLIDRIVS  ADDRESS=(524,525,526,527)
ALSM1P9  SLIDLIST  HOSTDRV=(ADRV6,BDRV6)
ADRV6    SLIDRIVS  ADDRESS=(428,429,42A,42B)
BDRV6    SLIDRIVS  ADDRESS=(528,529,52A,52B)
ALSM1P1Ø SLIDLIST  HOSTDRV=(ADRV7,BDRV7)
ADRV7    SLIDRIVS  ADDRESS=(42C,42D,42E,42F)
BDRV7    SLIDRIVS  ADDRESS=(52C,52D,52E,52F)
*
ALSM2    SLILSM    DRIVE=(9,1Ø),                                      X
               DRVELST=(ALSM2P9,ALSM2P1Ø),                            X
               PASTHRU=((1,M),(3,S)),                                 X
               ADJACNT=(ALSMØ,ALSM1),                                 X
               TYPE=441Ø,                                             X
               DOOR=STD
*
ALSM2P9  SLIDLIST  HOSTDRV=(ADRV8,BDRV8)
ADRV8    SLIDRIVS  ADDRESS=(43Ø,431,432,433)
BDRV8    SLIDRIVS  ADDRESS=(53Ø,531,532,533)
ALSM2P1Ø SLIDLIST  HOSTDRV=(ADRV9,BDRV9)
ADRV9    SLIDRIVS  ADDRESS=(434,435,436,437)
BDRV9    SLIDRIVS  ADDRESS=(534,535,536,537)
*
         SLIENDGN
```

Figure 21. LIBGEN for Two Host, Two ACS, Six 4410 LSM Configuration (3 of 3)

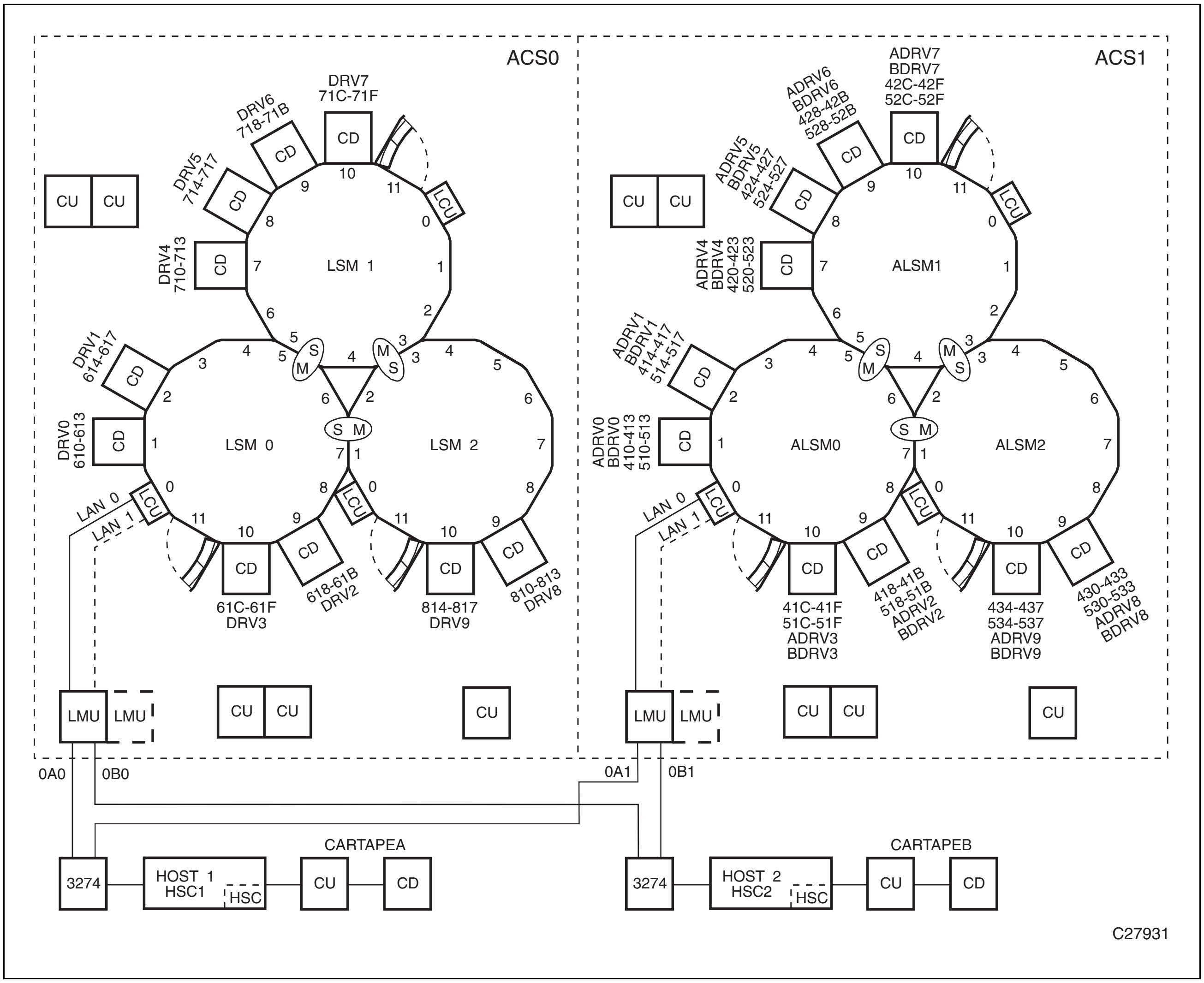


Figure 22. Two Host, Two ACS, Six 4410 LSM Configuration

One Host, One ACS, One 4410 LSM, Dual LMU Configuration

Hardware Components

This configuration consists of the following components:

- one host (HSC1)
- manual transport esoteric (CARTAPE)
- one Automated Cartridge System (ACS0) Library transport esoteric (CTAPE) for ACS0
- one 4410 Library Storage Module (LSM0)
- four station addresses (0A0,0A1,0C0,0C1)
- four cartridge drive panels (1,2,9,10)
- sixteen transports (410-417 and 510-517).

Figure 24 on page 155 illustrates the layout for this configuration.

LIBGEN08

An example LIBGEN for this configuration is shown in Figure 23 on page 154. This sample LIBGEN is also included in the SAMPLIB as member LIBGEN08.

```
LIBGENØ8 SLIRCVRY  TCHNIQE=BOTH
*
         SLILIBRY HOSTID=HSC1,                                          X
               SMF=235,                                                 X
               DELDISP=NOSCRTCH,                                        X
               COMPRFX=#,                                               X
               ACSLIST=NAMEACS,                                         X
               NNLBDRV=CARTAPE,                                         X
               MAJNAME=STKALSQN,                                        X
               SCRLABL=SL,                                              X
               EJCTPAS=GOODDAY,                                         X
               CLNPRFX=CLN,                                             X
*
NAMEACS  SLIALIST  ACSØ
*
ACSØ     SLIACS    ACSDRV=CTAPE,                                        X
               STATION=STNØ,                                            X
               LSM=(LSMØ)
*
STNØ     SLISTATN  ADDRESS=(ØAØ,ØA1,ØCØ,ØC1)
*
LSMØ     SLILSM    DRIVE=(1,2,9,1Ø),                                    X
               DRVELST=(PANELØØ1,PANELØØ2,PANELØØ9,PANELØ1Ø),           X
               TYPE=441Ø,                                               X
               DOOR=STD
*
PANELØØ1 SLIDLIST  HOSTDRV=DRVØ
DRVØ     SLIDRIVS  ADDRESS=(41Ø,411,412,413)
PANELØØ2 SLIDLIST  HOSTDRV=DRV1
DRV1     SLIDRIVS  ADDRESS=(414,415,416,417)
PANELØØ9 SLIDLIST  HOSTDRV=DRV2
DRV2     SLIDRIVS  ADDRESS=(51Ø,511,512,513)
PANELØ1Ø SLIDLIST  HOSTDRV=DRV3
DRV3     SLIDRIVS  ADDRESS=(514,515,516,517)
*
         SLIENDGN
```

Figure 23. LIBGEN for One Host, One ACS, One 4410 LSM, Dual LMU Configuration

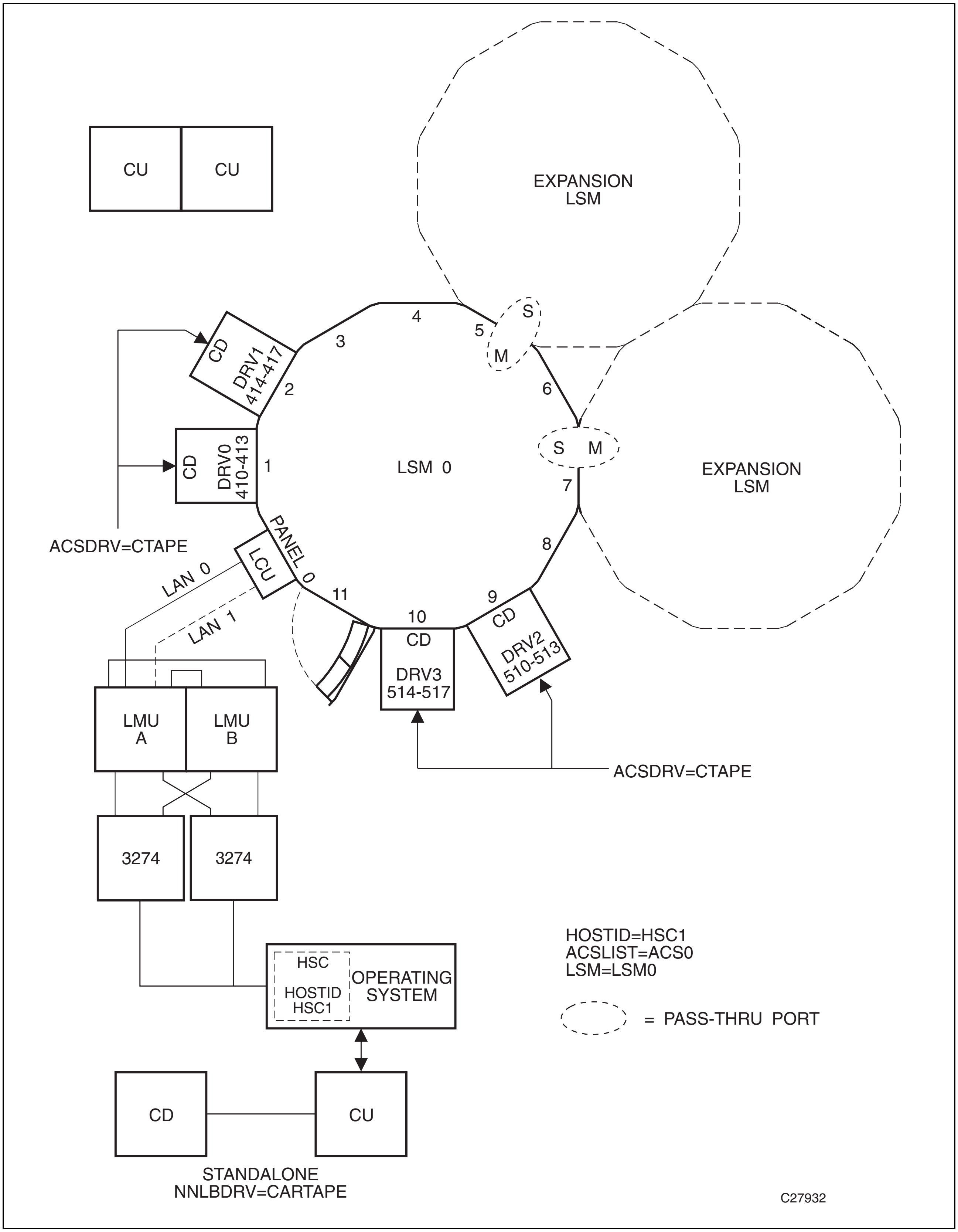


Figure 24. One Host, One ACS, One 4410 LSM, Dual LMU Configuration

Appendix C. Macros, Control Statements, Utilities and Commands Syntax Conventions

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

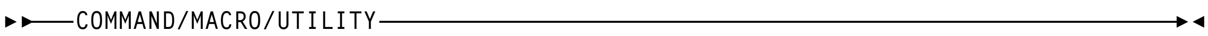
Variables are italicized.

Delimiters

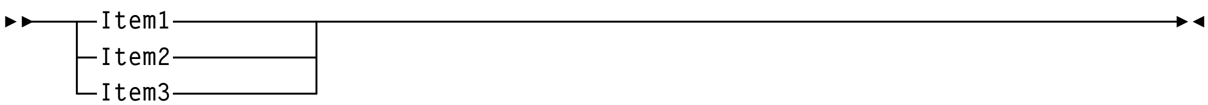
If a comma (,), a semicolon (;), or other delimiter is shown with an element of the syntax diagram, it must be entered as part of the statement or command.

Flow Lines

Syntax diagrams consist of horizontal and vertical lines and the text of a command, control statement, macro, or utility.

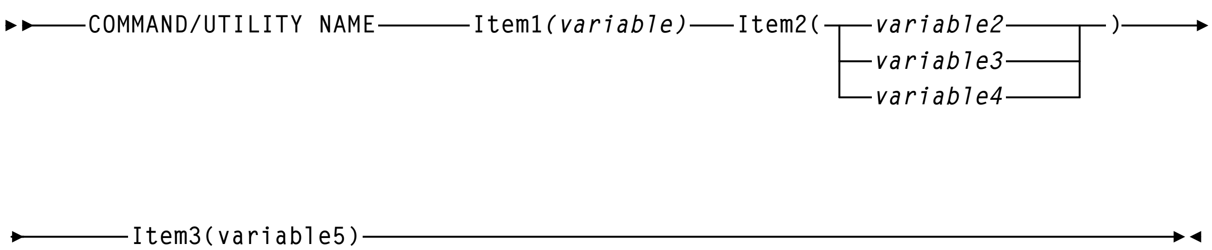


or



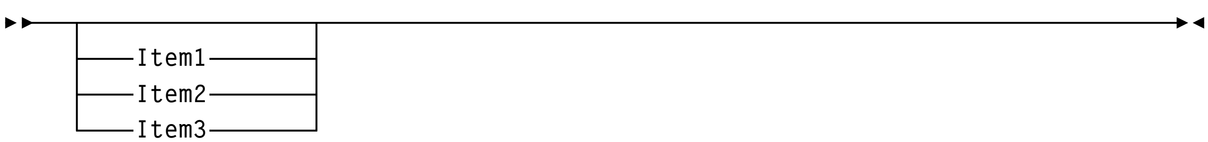
Diagrams are read left to right and top to bottom. Arrows show flow and direction.

- A statement begins with ►►
- A statement ends with ►◄
- Diagrams continuing to the next line begin with ►
- Fragments begin and end with |



Single Required Choice

Branch lines, without repeat arrows, indicate that a single choice must be made. If one of the items from which a choice is being made is on the base line of the diagram, a single choice is required.

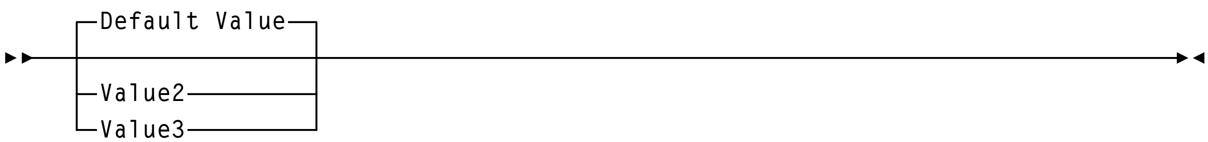


Single Optional Choice

If the first item is on the line below the base line, a single choice of items in the stack is optional.

Defaults

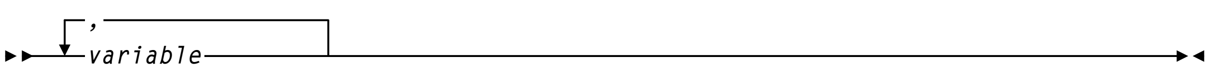
Default values and parameters appear above the syntax diagram line. In the following example, if a value is not specified with the command, Default Value is used by the HSC.



Some keyword parameters provide a choice of values in a stack. When the stack contains a default value, the keyword and the value choices are placed below the baseline to indicate that they are optional, and the default value appears above the keyword line. In the following example, if the keyword is not specified with the command, Keyword (Default Value) is used by the HSC.

Repeat Symbol

A repeat symbol indicates that more than one choice can be made or that a single choice can be made more than once. The repeat symbol shown in this example indicates that a comma is required as the repeat separator.



Syntax Continuation (Fragments)

Fragment references direct you to parts (fragments) of the syntax that contain more detail than can be shown in the main syntax diagram.

```
►►─COMMAND/UTILITY NAME────┤ Fragment Reference ├───────────────────────►◄
```

Fragment:

```
├─Item1(──┬─variable1─┬──,──┬─variable3─┬─)──────────────────────────►
          └─variable2─┘     └─variable4─┘

►─Item2(──┬─variable5─┬──,──┬─variable7─┬─)──────────────────────────┤
          └─variable6─┘     └─variable8─┘
```

Library Identification

Each ACS, LSM, and CAP is assigned a unique identification number during LIBGEN. Use this number in HSC commands and utilities when identifying a specific ACSid, LSMid, or CAPid.

- ACSid (*acs-id*) is a hexadecimal value from 00 through FF that identifies the LMU. An *acs-id* is the result of defining the SLIALIST macro during a LIBGEN. See “LIBGEN Macros” on page 28 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 (*l*) is a hexadecimal value from 0 through F. 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 “LIBGEN Macros” on page 28 for information about the SLIACS macro. The first LSM listed for an ACS acquires a hexadecimal number of 0, the second LSM listed for an ACS acquires a hexadecimal number of 1, and so forth.
- An LSMid (*lsm-id*) is the concatenation of the ACSid and the LSM number. It differentiates an LSM from every other LSM in a library.
- A CAP number is a hexadecimal value from 00 to 02. The CAP number identifies a specific CAP in an LSM that has more than one CAP.
- A CAPid (*cap-id*) is a hexadecimal value made up of the LSMid and the CAP number separated by a colon.

Some HSC commands and utilities require, or optionally allow, the user to specify a host identifier or a VOLSER.

- The *host-id* for a given host is the identifier specified in the HOSTID parameter of the SLILIBRY macro in the LIBGEN: the SMF system identifier for JES2, or the main processor name for JES3. 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.

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, only the right-most portion is valid as the incremental range. For example:

A00B00	the largest range that can be specified is A00B00 through A00B99.
A0B0CC	the largest range that can be specified is A0B0CC through A0B9CC.
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.

  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.

  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.
- . 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.

Appendix D. Migration and Coexistence Processes

This appendix describes the requirements and procedures for migrating HSC software from Releases 4.0, 4.1, and 5.0 to Release 5.1 (up-level migration), and, if required, from Release 5.1 to Release 4.0 (down-level migration). It is very important that all guidelines, procedures, and cautions be followed. Successful migration depends on following the requirements and instructions described here.

In addition, library hardware and software requirements are discussed that must be considered before attempting to migrate between HSC releases.

This appendix also details the conditions for coexistence of different HSC releases in a multiple-host environment. Coexistence occurs when HSC 4.0, 4.1, HSC 5.0, *and* HSC 5.1 are installed and executing on separate hosts sharing the same library complex and CDS in 2.1 format.

Notes:

1. The CDS format has not been changed between HSC 5.0 and HSC 5.1.
2. In HSC 5.0 and 5.1, the HSC lets you convert the CDS to extended format to support future enhancements to the Virtual Tape Control System (VTCS). After you convert the CDS to extended format, you **cannot** run VTCS 4.1 or earlier versions against the converted CDS.

   Refer to the VTCS documentation for additional information about converting the CDS to extended format.

Overview of Migration and Coexistence

As discussed in this appendix, migration is the process of upgrading from a previous release of the HSC (i.e., 4.0, 4.1, or 5.0) to HSC 5.1. Migration may also involve moving back to the previous release and returning to a production environment.

Coexistence applies only to a multiple-host environment and is intended to be an interim step in the migration process, where different hosts temporarily run different HSC releases (i.e., 4.0, 4.1, 5.0, and 5.1) and share a control data set. This appendix describes the requirements and restrictions for operating in a coexistence environment.

HSC Migration Scenarios

The following migration scenarios are possible:

- Up-level:
  - HSC 4.0 to HSC 5.1
  - HSC 4.1 to HSC 5.1
  - HSC 5.0 to HSC 5.1.
- Down-level:
  - HSC 5.1 to HSC 5.0
  - HSC 5.1 to HSC 4.1
  - HSD 5.1 to HSC 4.0.

Migration should be performed by system programmers responsible for installing and maintaining HSC software. System programmers must be knowledgeable and experienced in topics discussed in the *HSC System Programmer's Guide*.

Software Support

For questions regarding migration, contact StorageTek Software Support for assistance. Refer to the guide *Requesting Help from Software Support* for software support reporting procedures and phone numbers.

HSC Coexistence Scenarios

In multiple-host configurations, HSC 4.0, 4.1, and 5.0 can coexist with HSC 5.1.

Each HSC release provides new functions that were not present in previous releases. For this reason, any coexistence environment must be carefully managed to take advantage of new functions and to ensure that the HSC control data set accurately reflects library contents.

HSC Installation Scenarios

Two installation scenarios are described in this appendix:

- installing HSC in a verification environment before installing it in your production environment
- installing HSC directly into your production environment.

Installation in a Verification Environment

Installing 5.1 into a verification environment in your data center involves installing 5.1 onto a verification system during off-hours or off-peak times. This approach has distinct advantages:

- It allows system programmers, application programmers, operators, and system users to become thoroughly familiar with 5.1 functions and operation before it is placed on production systems. Comparison of new to previous functions enables your personnel to better understand the enhancements provided by 5.1.
- For more information about 5.1 functions, refer to "What's New With This Release?" on page xv.
- It allows you to validate the environmental specifics of your library complex. These can include unique conditions and implementation of user exits, designation of scratch subpools, allocation, and other specific operation processes.
- It allows you to update one host (subsystem) at a time instead of immediately migrating the entire library complex.

This appendix describes procedures to migrate from HSC 4.0, 4.1, or HSC 5.0 to HSC 5.1 using a verification system. Refer to "Procedure to Verify HSC 5.1 Functions Against a Separate CDS" on page 176 for more information. Also included are procedures for temporarily terminating HSC 4.0, 4.1, or 5.0; initiating a 5.1 verification subsystem; terminating the 5.1 subsystem; and returning back to your 4.0, 4.1, or 5.0 system for production operations.

Direct Installation into a Production Environment

For data centers installing 5.1 directly into a production environment, the contents of this appendix is extremely important. For successful installation, the procedures described should be followed carefully.

Migration and Coexistence Considerations

The following guidelines apply to migration and coexistence involving HSC 4.0, 4.1, or 5.0.

Migration

- No new LMU microcode is required for HSC 5.1 if you are migrating from HSC 4.0, 4.1, or 5.0.
- Programs using the programmatic interface (PGMI) do not need to be recompiled for HSC 5.1.
- You are not required to re-assemble your user exits. If you choose to do so, StorageTek suggests that user modifications to user exits and other StorageTek-supplied programs be based on the source code shipped in the current release.

Coexistence PTFS

HSC 5.1 uses the same level CDS (2.1) as HSC 4.0, 4.1, and 5.0. Coexistence PTFs to HSC 4.0, 4.1, and 5.0 allow HSC 4.0, 4.1, 5.0, and 5.1 to run on multiple hosts sharing the same CDS.

Note: HSC 4.0, 4.1, and 5.0 will not initialize if any ACS is defined that does not include attached stations.

Coexistence

- Utilities that require HSC services must match the HSC release level. That is, a 4.0 utility must run with an active 4.0 subsystem, a 4.1 utility must run with an active 4.1 subsystem, and so forth. See “Utility Usage Requirements” on page 174 for additional information.
- Some stand-alone utilities (not requiring an active HSC) are dependent on the CDS level. HSC 4.0, 4.1, 5.0, and 5.1 stand-alone utilities are used with a CDS in 2.1 format, and since the CDS level is the same between both HSC releases, stand-alone utilities can be run from all of these releases. Refer to “Utility Usage Requirements” on page 174 for additional information.

Hardware Support Dependencies Between HSC Releases

Library hardware supported by 4.0, 4.1, 5.0, and 5.1 can vary depending on the composition of your library. In some cases, the software is not compatible with the hardware and will not initialize. In other cases, the user must implement procedures to prevent problem situations.

Table 19 on page 171 lists the supported functionality for major library hardware components under 4.0, 4.1, 5.0, and 5.1 subsystems, respectively.

Table 19. HSC Library Hardware Dependencies

Hardware Component	HSC 4.0	HSC 4.1	HSC 5.0	HSC 5.1
4410 (Standard) LSM	Supported	Supported	Supported	Supported
9310 (PowderHorn) LSM	Supported	Supported	Supported	Supported
9360 (WolfCreek) LSM	Supported	Supported	Supported	Supported
9740 (TimberWolf) LSM	Supported	Supported	Supported	Supported
4430 LMU	Supported for non-9840	Supported for non-9840	Supported for non-9840	Supported for non-9840
9315 LMU	Supported	Supported	Supported	Supported
9330 LMU	Supported	Supported	Supported	Supported
4480 (18-track) Cartridge Subsystem	Supported	Supported	Supported	Supported
4490 (36-track) Cartridge Subsystem	Supported	Supported	Supported	Supported
9490 (36-track) Cartridge Subsystem	Supported	Supported	Supported	Supported
9490EE (36-track) Cartridge Subsystem	Supported	Supported	Supported	Supported
9840 Cartridge Subsystem	Supported	Supported	Supported	Supported
T9840B Cartridge Subsystem	Supported	Supported	Supported	Supported
T9940A Cartridge Subsystem	Supported	Supported	Supported	Supported
T9940B Cartridge Subsystem	Not Supported	Supported	Supported	Supported
Virtual Tape Storage Subsystem	Supported	Supported	Supported	Supported

HSC Support for Virtual Media

Only Virtual media can be mounted on Virtual Tape Drives. Refer to the VTCS documentation for more information.

Control Data Set and Journal Requirements

The format of the HSC control data set is identified by the "CDS level". The control data set for HSC 4.0, 4.1, HSC 5.0, and HSC 5.1 is CDS level 2.1.

The CDS level is contained in the CDS and may be seen using the Display CDS command or the MVS BROWSE facility to view the CDS content. The CDS level is the first physical record (the DHB), is located in columns 1725-1730 on an ISPF BROWSE screen. The CDS level is a 6-character field: 020000 for a 2.0-level CDS and 020100 for a 2.1-level CDS.

Note: Expert Library Manager (ExLM) 3.0 runs with a 2.1 CDS. ExLM 2.1 requires PTF(s) to work with a 2.1 CDS.

Backup Requirements

Use the HSC 4.0, 4.1, or HSC 5.0 BACKup utility before migrating and the HSC 5.1 BACKup utility after migrating.

CDS Conversion Requirements (Up-Level Migration)

No CDS conversion is required to migrate from HSC 4.0, 4.1, or 5.0 to 5.1.

CDS Conversion Requirements (Down-Level Migration)

No CDS conversion is required to migrate from HSC 5.1 to HSC 4.0, 4.1, or 5.0.

Utility Usage Requirements

Whenever you are migrating between HSC releases or operating in a coexistence environment, correct usage of utilities is extremely important. HSC utilities are categorized as follows:

- stand-alone utilities, which do not require HSC services. These utilities can execute with or without an active HSC subsystem. Some stand-alone utilities function only with the corresponding CDS level; 4.0, 4.1, 5.0, and 5.1 stand-alone utilities are used with a 2.1 CDS.
- utilities requiring HSC services. These utilities are dependent on the release level of the HSC.

Compatibility of Stand-Alone Utilities

The following stand-alone utilities are not dependent on the HSC release or CDS level:

- Activities Report
- Journal Offload
- Performance Log Reblocker
- Scratch Conversion (SLUCONDB), unless LIBONLY is specified as an option.

Compatibility of Utilities Requiring the HSC Subsystem

Utilities requiring the services of an active HSC are dependent on the release level of the HSC. For example, a 5.1 utility requiring an active HSC must execute against an active HSC 5.1 subsystem.

In this circumstance, the general rule is that the release level of the utility's execution library should match the release level of the current HSC subsystem for that host. That is, a 5.1 utility must execute with a 5.1 subsystem, a 5.0 utility must execute with a 5.0 subsystem, and so forth.

If a 5.1 utility is executed with a 5.0 or earlier subsystem, an error message describing the incompatibility is displayed on the system console and the utility terminates. The following HSC utilities require HSC services:

- AUDIt
- EJECt
- INITialize Cartridge
- MERGEcds
- MOVe
- SCRAtch, UNSCratch, REPLaceall
- Scratch Conversion (SLUCONDB) with the LIBONLY parameter
- Scratch Redistribution (SCREdist)
- UNSElect.

Up-Level Migration

Up-level migration to 5.1 should be performed by a system programmer who is familiar with the HSC product. Before attempting to perform an up-level migration, verify the release level of the current HSC subsystem and ensure that the migration being attempted is supported (see "HSC Migration Scenarios" on page 168).

Procedure for 4.0/4.1/5.0 to 5.1 Up-Level Migration

The step-by-step procedure presented in Table 20 is a summary of the required steps to migrate HSC software from 4.0, 4.1, or 5.0 to 5.1.

This procedure is a recommended approach and is not considered to be the only method to migrate successfully. Each site may have specific conditions that require special precautions and procedures. If you think your site requires additional assistance, contact StorageTek Software Support for assistance (refer to the guide *Requesting Help from Software Support* for instructions).

Table 20. Procedure for 4.0/4.1/5.0 to 5.1 Up-Level Migration

Step	Description of Action	Verification
1	Apply the coexistence PTFs on all 4.0, 4.1, or 5.0 hosts (see the *NCS Installation Guide* for information).	
2	Identify the host(s) being migrated to 5.1. All active hosts must be running HSC 4.0, 4.1, or 5.0 with the 5.1 coexistence PTF(s) applied.	
3	Install HSC 5.1. See the *NCS Installation Guide* for detailed information.	
4	Initialize HSC 5.1 on any host to be migrated. See Chapter 8, "Initializing the HSC" for more information.	
5	Optionally, perform verification of 5.1 functions. Refer to "Procedure to Verify HSC 5.1 Functions Against a Separate CDS" on page 176 for detailed steps.	

Host-by-host Migration - 4.0/4.1/5.0 to 5.1

If desired, users can migrate from 4.0, 4.1, or 5.0 to 5.1 on a host-by-host basis without having to terminate the HSC on all hosts. HSC 4.0, 4.1, or 5.0 hosts, with the 5.1 coexistence PTF(s) applied, will run with a 5.1 host initialized. The CDS does not need to be converted.

Procedure to Verify HSC 5.1 Functions Against a Separate CDS

This procedure permits you to perform initial 5.1 verification against a separate CDS before migrating the production CDS. Your initial verification of 5.1 should exercise the HSC 5.1 utilities that must be executed with a CDS in 2.1 format. Specifically, the 5.1 BACKup, 5.1 RESTore, and 5.1 SET utilities should be executed against the 2.1 CDS. Execute 5.1 functions using the following procedures:

- verifying 5.1 functions at the Base service level (without library hardware). Refer to "Procedure to Verify HSC 5.1 Functions Without Library Hardware" on page 177 for detailed steps.
- verifying 5.1 functions at the Full service level (with library hardware). Refer to "Procedure to Verify 5.1 Functions With Library Hardware" on page 178 for detailed steps.

After the initial verification is successfully complete, the production CDS can be converted and you can perform more extensive investigation of 5.1 on a subsystem sharing a common 5.1 CDS with other hosts.

Procedure to Verify HSC 5.1 Functions Without Library Hardware

Table 21 describes the procedure to verify HSC 5.1 with the HSC initialized to the Base service level and without access to library hardware. You can perform this type of verification in parallel with your production systems executing against the library hardware. The 5.1 functions that require library hardware cannot be exercised, but many functions can be.

Table 21. Procedure to Verify 5.1 Functions without Library Hardware

Step	Description of Action	Verification
1	Create a separate 2.1 CDS by doing the following: • Run the 5.1 BACKup utility. • Run the 5.1 RESTore utility. For more information on these two utilities, refer to the *HSC System Programmer's Guide*.	
2	Verify the following 5.1 stand-alone utilities that do not require HSC services. • BACKup • RESTore • SET Verify remaining 5.1 stand-alone utilities: • ACTIvities report • Database Decompile • Journal OFFLoad (of 5.1 journals) • Scratch Conversion • VOLRpt	
3	Initialize a 5.1 subsystem to the Base service level (specify an EXEC PARM of BASE in the startup PROC): Exercise the following HSC operator commands. • CDs • COMMPath • Display – Display SCRatch – Display THReshld – Display UNITDEF – Display Volume • OPTion • UEXIT Verify the following utilities that require HSC services: • SCRAtch • UNSCratch • UNSElect Verify the MERGEcds utility, from a 2.1 (5.1) CDS to a 2.1 (5.1) CDS.	

Procedure to Verify 5.1 Functions With Library Hardware

Caution: HSC subsystems using the production CDS must not be active during these periods because HSCs running with separate CDSs cannot share the same library hardware.

The steps necessary to validate 5.1 functions with the library hardware are shown in Table 22.

Table 22. Procedure to Verify 5.1 Functions with Library Hardware

Step	Description of Action	Verification
1	• Terminate all HSC subsystems using the shared 2.1 CDS. • Back up the 2.1 CDS using a 5.1 BACKup utility. • Restore the backup of the 2.1 CDS to a separate data set using the 5.1 RESTore utility.	
2	• Initialize 5.1 subsystem(s) to the Full service level. Full service level is the default. • Set float off (MNTD Float OFf) via PARMLIB or the operator command.	
3	Enter test cartridges specifically used for performing the verifications identified in this procedure. **Note**: Verification should be done only with separate test cartridges, so the location of cartridges recorded in the production CDS will not change.	
4	Exercise any or all 5.1 functions, including enter, eject, automating mounts, and utilities.	
5	Eject all cartridges used for 5.1 verification. This ensures that the locations of cartridges recorded in the production CDS match the contents of the library.	
6	Terminate the HSC subsystems that were exercised against the library hardware.	
7	If desired, execute a 5.1 BACKup OPTion(Analyze) to compare the contents of the 2.1 CDS used above and the production CDS that was used to create the test CDS. The production CDS has not changed. The Discrepancy Report from the BACKup utility should not show any VOLSER or cell location discrepancies, as only test volumes were used in the above process. These test volumes were entered at the beginning and ejected at the end of the verification process.	
8	Initialize all production subsystems using the shared production CDS. Your library environment is back to its former configuration.	

Down-Level Migration

The step-by-step procedures presented in this section are a summary of the required steps to migrate HSC software from 5.1 to 4.0, 4.1, or 5.0.

De-installation of PTFs

It is not necessary, or advisable, to remove the HSC coexistence PTFs from 4.0, 4.1, 5.0, or 5.1 subsystems.

Procedure for 5.1 to 4.0/4.1/5.0 Down-Level Migration

Follow the steps listed in Table 23 to perform a down-level migration from 5.1 to 4.0, 4.1, or 5.0.

Table 23. Procedure for 5.1 to 4.0/4.1/5.0 Down-Level Migration

Step	Description of Action	Verification
1	If compatibility and coexistence PTFs have been applied to hosts running 4.0, 4.1, or 5.0, do not remove them.	
2	Terminate the HSC on all hosts.	
3	Initialize HSC 4.0, 4.1, or 5.0 with tape activity suspended.	

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— A method used to identify an ACS. 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 HSC software for HSC 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 9840 transports have either 10 or 20 transports per panel; drive panels for all other transports contain up to four transports per panel.

drive prioritization— (previously referred to as *directed allocation*) refers to the Storage Management Component (SMC) function of influencing selection of a particular drive based on allocation criteria, including volume location. See the *SMC Configuration and Administration Guide* for more information.

DRIVEid— A DRIVEid uniquely defines the location of a tape transport by its location within an LSM. A DRIVEid is of the form *AAL:PP:NN* where *AA* is the ACSid, *L* is the LSM number, *PP* is the panel where the drive is located, and *NN* is the drive number within the panel.

DSI— Dynamic System Interchange (JES3).

dual LMU— A hardware/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

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 system identifier for JES2 or the main processor name for 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.

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 is composed of the ACSid concatenated with the LSM number.

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 0 (hexadecimal), the second LSM listed acquires a hexadecimal number of 1, and so forth, until all LSMs are identified (maximum of sixteen or hexadecimal F).

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.

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.

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.

POST— *See* Program for Online System Testing.

PowderHorn (9310) LSM— A high-performance LSM featuring a high-speed robot. The PowderHorn has a capacity of up to approximately 6000 cartridges.

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 for Online System Testing (POST)— A program in a host computer that allows it to test an attached subsystem while the subsystem is online.

Program Temporary Fix (PTF)— A unit of corrective maintenance delivered to a customer to repair a defect in a product, or a means of packaging a Small Programming Enhancement (SPE).

Program Update Tape (PUT)— A tape containing a collection of PTFs. PUTs are shipped to customers on a regular basis under the conditions of the customer's maintenance license.

PTF— *See* Program Temporary Fix.

PTP— *See* pass-thru port.

PUT— *See* Program Update Tape.

Q

QSAM— *See* Queued Sequential Access Method.

Queued Sequential Access Method (QSAM)— An extended version of the basic sequential access method (BSAM). When this method is used, a queue is formed of input data blocks that are awaiting processing or output data blocks that have been processed and are awaiting transfer to auxiliary storage or to an output device.

R

RACF— *See* Resource Access Control Facility.

RDC— *See* Remote Diagnostics Center.

Recording Density— The number of bits in a single linear track measured per unit of length of the recording medium.

RECtech— The parameter used to specify recording technique.

RedWood— (1) The program name of the StorageTek transport that supports a helical recording technique. (2) *See* SD-3.

Remote Diagnostics Center (RDC)— The Remote Diagnostics Center at StorageTek. RDC operators can access and test StorageTek systems and software, through telecommunications lines, from remote customer installations. Also referred to as the Central Support Remote Center (CSRC).

Resource Access Control Facility (RACF)— Security software controlling access to data sets.

S

SCP— *See* System Control Program.

scratch tape subpool— A defined subset of all scratch tapes. Subpools are composed of one or more ranges of VOLSERs with similar physical characteristics (type of volume {reel or cartridge}, reel size, length, physical location, etc.). Some installations may also subdivide their scratch pools by other characteristics, such as label type (AL, SL, NSL, NL).

The purpose of subpooling is to ensure that certain data sets are built only within particular ranges of volumes (for whatever reason the user desires). If a volume which does not belong to the required subpool is mounted for a particular data set, it is dismounted and the mount reissued.

SD-3— The model number of the StorageTek transport that supports a helical recording technique.

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.

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.

Silverton— *See* 4490 Cartridge Subsystem.

Small Programming Enhancement (SPE)— A supplement to a released program that can affect several products or components.

SMC— Storage Management Component.

SMF— System Management Facility. An MVS facility used to record system actions which affect system functionality.

SMP— System Modification Program.

SMP/E— *See* System Modification Program Extended.

SMS— Storage Management Subsystem.

SPE— *See* Small Programming Enhancement.

special use cartridge— A generic description for a type of cartridge used on 9840 drives. These include:

- 9840 cleaning cartridge
- 9840 microcode load cartridge
- 9840 dump collection cartridge.

When an attempt is made to mount a special use cartridge, LMU error response code 1012 is generated.

The error code is defined as ‘‘load failure for special use cartridge.’’

If the error code is received for a special use cleaning cartridge, it is either ejected or marked as unusable, and it is retained in the ACS (depending on the MNTD 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 9840 cartridges and recording techniques.

STK1R— Value that can be specified on the MEDia and RECtech parameters and includes only the specified type of 9840 cartridge or recording technique. STK1R can be abbreviated as R.

STK1U— Value that can be specified on the MEDia parameter and includes only the specified type of 9840 cleaning cartridge. STK1U can be abbreviated as U.

STK2— A generic value that can be specified on the MEDia parameter and includes all types of 9940 cartridges and recording techniques.

STK2P— Value that can be specified on the MEDia and RECtech parameters and includes only the specified type of 9940 cartridge or recording technique. STK2P can be abbreviated as P.

STK2W— Value that can be specified on the MEDia parameter and includes only the specified type of 9940 cleaning cartridge. STK2W can be abbreviated as W.

storage class— A named list of storage attributes that identify performance goals and availability requirements for a data set.

storage group— A collection of storage volumes and attributes defined by the storage administrator.

Storage Management Component (SMC)— Required NCS software component that performs the allocation function for NCS, replacing the functions previously performed by HSC and MVS/CSC. The SMC resides on the MVS host with HSC and/or MVS/CSC, and communicates with these products to determine policies, volume locations, and drive ownership.

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

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 HSC 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.

Timberline— *See* 9490 Cartridge Subsystem.

Timberline EE— *See* 9490EE Cartridge Subsystem.

TimberWolf (9740) LSM— A high performance LSM that provides a storage capacity of up to 494 cartridges. Up to 10 drives (STD, 4490, 9490, 9490EE, 9840, and SD-3) can be configured. TimberWolf LSMs can only attach to other TimberWolfs.

TimberWolf CAP— The TimberWolf CAP contains either a 10-cell removable magazine or a 14-cell permanent rack. It is not necessary to define a configuration; the HSC receives CAP information directly from the LMU.

See also Cartridge Access Port, standard CAP, enhanced CAP, priority CAP, WolfCreek CAP, or WolfCreek optional CAP.

TP— Tape-to-Print.

transaction— A short series of actions with the control data set. These actions are usually related to a specific function (e.g., Mount, ENter).

transport— An electromechanical device capable of threading tape from a cartridge, moving the tape across a read/write head, and writing data onto or reading data from the tape.

TREQDEF— An HSC 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 HSC control statement that is contained in the definition data set specified by the **UNITDEF command—** A UNITATTR statement defines to the HSC the transport's media type and recording technique capabilities.

UNITDEF— An HSC command that is used to load the definition data set that contains UNITATTR control statements.

utilities— Utility programs. The programs that allow an operator to manage the resources of the library and to monitor overall library performance.

V

VAR— *See* Volume Attribute Record.

VAT— *See* Volume Attribute Table Entry.

Virtual Storage Manager (VSM)— A storage solution that virtualizes volumes and transports in a VTSS buffer in order to improve media and transport use.

Virtual Tape Control System (VTCS)— The primary host code for the Virtual Storage Manager (VSM) solution. This code operates in a separate address space, but communicates closely with HSC.

Virtual Tape Storage Subsystem (VTSS)— The DASD buffer containing virtual volumes (VTVs) and virtual drives (VTDs). The VTSS is a StorageTek RAID 6 hardware device with microcode that enables transport emulation. The RAID device can read and write "tape" data from/to disk, and can read and write the data from/to a real tape drive (RTD).

virtual thumbwheel— An HSC feature that allows read-only access to a volume that is not physically write-protected.

VOLATTR— An HSC control statement that is contained in the definition data set specified by the VOLDEF command. A VOLATTR statement defines to the HSC the media type and recording technique of the specified volumes.

VOLDEF— An HSC command that is used to load the definition data set that contains VOLATTR control statements.

VOLSER— A six-character alphanumeric label used to identify a tape volume.

volume— A data carrier that is mounted or dismounted as a unit. (*See* cartridge).

Volume Attribute Record (VAR)— An HSC internal record that contains the data base-resident information of a cartridge entered into the library.

Volume Attribute Table Entry (VAT)— An HSC internal table that contains entries to the intransit record token and the Volume Attribute Record (VAR). The VAT is used as the communications area for internal service calls.

W

WolfCreek (9360) LSM— A smaller capacity high-performance LSM. WolfCreek LSMs are available in 500, 750, and 1000 cartridge capacities (model numbers 9360-050, 9360-075, and 9360-100, respectively). WolfCreek LSMs can be connected by pass-thru ports to 4410, 9310, or other WolfCreek LSMs.

WolfCreek CAP— The standard WolfCreek CAP contains a 20-cell magazine-style CAP and a priority CAP (PCAP).

See also Cartridge Access Port, standard CAP, enhanced CAP, priority CAP, WolfCreek optional CAP, or TimberWolf CAP.

WolfCreek optional CAP— The WolfCreek optional CAP contains a 30-cell magazine-style CAP which is added to the standard WolfCreek CAP.

See also Cartridge Access Port, standard CAP, enhanced CAP, priority CAP, WolfCreek CAP, or TimberWolf CAP.

Write Tape Mark (WTM)— The operation performed to record a special magnetic mark on tape. The mark identifies a specific location on the tape.

WTM— *See* Write Tape Mark.

WTO— Write-to-Operator.

WTOR— Write-to-Operator with reply.

Z

ZCART— (1) Cartridge system tape with a length of 2200 feet that can be used only with 9490EE Cartridge Drives. (2) A value that can be specified on the MEDia parameter and that includes only 36-track 9490EE cartridge system tapes. (3) *See also* Extended Enhanced Tape.

Symbols

µ-software— Microprogram. A sequence of microinstructions used to perform preplanned functions and implement machine instructions.

Numerics

18-track— A recording technique that uses 18 tracks on the tape. The tape is written in only the forward motion.

18track— A generic value that can be specified on the RECtech parameter and includes all 18-track transports.

3480— (1) A value that can be specified on the MEDia parameter and that includes only standard capacity cartridge tapes. (2) An alias of Standard.

3480X— The 3480 upgrade that supports ICRC.

3490— The IBM cartridge drive that replaced the 3480X and supports ICRC but not 36-track or long tape. It is equivalent to the IBM 3480X.

3490E— (1) The IBM cartridge drive that replaced the 3490 and supports ICRC, 36-track, and long tape. It reads 18-track but does not write 18-track. (2) A value that can be specified on the MEDia parameter and that includes only enhanced capacity cartridge system tapes. (3) An alias of ECART.

3590— The IBM cartridge drive that supports 128-track recording and holds 10GB of uncompressed data. It has the same form factor as a 3490E.

36-track— A recording technique that uses 36 tracks on the tape. 18 tracks of data are written in the forward motion and then an additional 18 tracks in the backward motion for a total of 36.

36track— A generic value that can be specified on the RECtech parameter and includes all 36-track transports.

36Atrack— A value that can be specified on the RECtech parameter and includes only 4490 (Silverton) 36-track transports.

36Btrack— A value that can be specified on the RECtech parameter and includes only 9490 (Timberline) 36-track transports.

36Ctrack— A value that can be specified on the RECtech parameter and includes only 9490EE (Timberline EE) transports.

4410 LSM— *See* standard LSM.

4480 Cartridge Subsystem— Cartridge tape transports that provide read/write capability for 18-track recording format. The StorageTek 4480 Cartridge Subsystem is equivalent to a 3480 device.

4490 Cartridge Subsystem— Cartridge tape transports that provide read/write capability for 36-track recording format and extended capacity tape. 4490 transports can also read data recorded in

18-track format. The StorageTek 4490 Cartridge Subsystem is equivalent to a 3490E device.

9310 LSM— *See* PowderHorn LSM.

9360 LSM— *See* WolfCreek LSM.

9490 Cartridge Subsystem— Cartridge tape transports that provide read/write capability for 36-track recording format and extended capacity tape and provide improved performance over the 4490 Cartridge Subsystem. 9490 transports can also read data recorded in 18-track format. The StorageTek 9490 Cartridge Subsystem offers better performance (faster data transfer rate, faster load/unload) than a 3490E device.

9490EE Cartridge Subsystem— A high-performance tape transport that provides read/write capability for Extended Enhanced tape (EETape) cartridges. It is functionally equivalent to the IBM 3490E device.

9740 LSM— *See* TimberWolf LSM.

9840 Cartridge Subsystem— A high performance tape transport for enterprise and open systems environments that reads and writes 9840 cartridges. 9840s can be defined in 10-drive and 20-drive panel configurations. The 9840 can perform as a standalone subsystem with a cartridge scratch loader attached, or it can be attached to a StorageTek ACS.

T9840B—The StorageTek cartridge transport that reads and writes T9840B cartridges.

T9940A— The StorageTek capacity-centric cartridge transport capable of reading and writing 60GB T9940A cartridges.

T9940B— The StorageTek capacity-centric cartridge transport capable of reading and writing 200GB T9940B cartridges.

Index

Numerics

A

B

C

D

E

F

G

H

Q

R

S

T

U

V

W

Z

Printed in U.S.A.