StorageTek Host Software Component (VM Implementation)

Installation Guide

Version 6.2

Part Number: E21434-02
April, 2012
Revision 02

Submit comments about this document to STP_FEEDBACK_US@ORACLE.COM.

Host Software Component (HSC) Installation Guide

E21434-02

Oracle welcomes your comments and suggestions for improving this book. Contact us at STP_FEEDBACK_US@ORACLE.COM. Please include the title, part number, issue date, and revision.

Document Effectivity

EC Number	Date	Doc Kit Number	Type	Effectivity
132993	September, 2007		Revision A	This document applies to the Host Software Component for VM (VM/HSC), Version 6.2.
---	August, 2008	---	Revision B	
---	April, 2011	---	Revision 01	
---	April, 2012	---	Revision 02	

Contents

Figures

Tables

What's New With This Release?

HSC 6.2 includes the following enhancements and modifications:

Enhancement/Modification	Publication(s)/ Primary Locations
Revision 02:	
The SL8500 partitioning feature has been enhanced for users at firmware level 7.02 and above. Legacy partitioning procedures for users below this firmware level continue to appear in Appendix A, "HSC Support for the SL8500 Library." Enhanced partitioning procedures for both the SL8500 and SL3000 libraries are shown in a new appendix, Appendix C, "StreamLine Library Partitioning."	***System Programmer's Guide*** Appendix C, StreamLine Library Partitioning
The Display DRives command includes the SHOWSlot parameter, used to display the drive bay location (slot) for drives in SL3000 and SL8500 libraries.	***Operator's Guide*** Chapter 2, Display DRives command ***Messages and Codes Guide*** Changed messages: • SLS0041I • SLS2916I • SLS4633I
The Display EXceptns command reports errors in two formats: • LSM *AA:LL* • *AA:LL:CC*	***Operator's Guide*** Chapter 2, Display EXceptns command
The HSC Start procedure EXEC statement allows you to write HSC software events to the system LOGREC data set.	***Installation Guide*** Chapter 8, HSC Initialization ***System Programmer's Guide*** Chapter 3, HSC Control Statements and HSC Start Procedure

Enhancement/Modification	Publication(s)/ Primary Locations
Revision 01:	
Support for the T10000B and T10000C drives and cartridges.	***System Programmer's Guide*** Chapter 2, T10000 Drive Encryption Chapter 3, VOLATTR control statement Chapter 4, EJECt Cartridge and Scratch Redistribution utilities ***Interface to Tape Managment Systems Guide*** Chapter 3, MOUNT, QDRLIST, QSCRATCH, and SELSCR requests ***Operator's Guide*** Chapter 2, Display DRives, Display SCRatch, Display THReshld, EJect, Mount, Warn commands
Support for the SL3000 library Access Expansion Module (AEM).	***System Programmer's Guide*** Chapter 4, AUDIt, EJECt Cartridge, ENTEr Cartridges, and MOVe utilities Appendix C, Adding/Removing Expansion Modules - SL3000 Library, Appendix D, CAPid Formats ***Operator's Guide*** Chapter 1, SL3000 Library description Chapter 2, CAPid Formats, CAPPref, DRain, EJect, ENter, MODify, MOVe, RELease CAP, SENter
The SL8500 library now allows you to remove or add a partition.	***System Programmer's Guide*** Appendix A, HSC Support for the SL8500 Library: • Remove a Partition from the Library • Add a Partition to the Library.

Enhancement/Modification	Publication(s)/ Primary Locations
For SL8500 libraries, the Redundant Electronics (RE) feature minimizes control path downtime caused by an active Library Controller (LC) failure. The RE configuration provides a standby LC that acts as a back up to the active LC.	***System Programmer's Guide*** Chapter 3, HSC Control Statements and HSC Start Procedure • LMUPATH control statement Appendix A, HSC Support for the SL8500 Library: • TCP/IP Communications - Important Considerations • Multiple TCP/IP Redundant Electronics (RE) ***Operator's Guide*** Chapter 1, General Information • SL8500 Redundant Electronics (RE) Chapter 2, Commands, Control Statements, and Utilities • Display Acs • SWitch Chapter 3, Operating an Automated Cartridge System • SL8500 Redundant Electronics Environment • Redundant LC Operational Overview and Operation ***Messages and Codes Guide*** New messages: • SLS0692I • SLS0693I • SLS1666E • SLS1667I Changed messages: • SLS0699I • SLS1000I • SLS1003I • SLS1004I • SLS1007I

Enhancement/Modification	Publication(s)/ Primary Locations
For the SL3000 library, “Adding Resources to a Library” procedure, there is an additional optional step to modify CAPs online (step 7) after varying all ACSs online. For the SL3000 library, “Removing Resources from a Library” procedure, there is an additional optional step to modify CAPs offline (step 6) after varying RTDs offline to VTCS.	***System Programmer’s Guide*** Appendix B, HSC Support for the SL3000 Library • Adding Resources to a Library • Removing Resources from a Library
The Media Warranty Life feature shows the percentage of media life that has been used for a volume. The following transports are supported: • T9*x*40, excluding T9840B • T10000A • T10000B	***System Programmer’s Guide*** Chapter 4, Utility Functions • Volume Report Utility: MWL, MWLNA, and MWLGE parameters Chapter 6, Monitor Cartridges Nearing End of Life ***Messages and Codes Guide*** New message: • SLS2149I Changed message: • SLS0601I
The PING parameter on the LMUPATH control statement allows you to set the number of minutes in between requests sent from the HSC to the LMU. These requests are to keep the connection active, which prevents a firewall from closing the connection due to inactivity	***System Programmer’s Guide*** Chapter 3, HSC Control Statements and HSC Start Procedure • LMUPATH control statement
The Display DRives command adds the IDEntity parameter, which displays the World Wide Name transport identifier and the transport serial number. This update affects HSC 6.1 and later.	***Operator’s Guide*** Chapter 2, Display DRives

Enhancement/Modification	Publication(s)/ Primary Locations
Revision B:	
Support for the SL3000 library (HSC 6.1 and later).	***Installation Guide*** Chapter 2, Calculating DASD Space Chapter 6, SLILSM, SLIDRIVS macros Chapter 7, Storage Cell Capacity for StreamLine SL3000 Libraries Appendix B, Library Configurations ***Operator's Guide*** Chapter 2, CAPPref, DRAin, EJect, ENter, MODify, MOVe, RELease CAP, VIew commands ***System Programmer's Guide*** Chapter 2, Mixing Media Types and Recording Techniques Chapter 4, AUDIt , EJECt Cartridge, Initialize Cartridge utilities Appendix B, HSC Support for the SL3000 Library
Multiple connections to an SL8500 library (HSC 6.1 and later).	***System Programmer's Guide*** Appendix A, HSC Support for the SL8500 Library

Enhancement/Modification	Publication(s)/ Primary Locations
Support for T9840D drives (HSC 6.1 and later).	***Installation Guide*** Chapter 2, Unit Addresses Chapter 6, SLIDRIVS macro Chapter 12, External Media Requirements ***Operator's Guide*** Chapter 2, Display Drives, Display SCRatch, Display Mount, THReshld, EJect, Warn ***System Programmer's Guide*** Chapter 3, TAPEREQ, UNITATTR, VOLATTR Chapter 4, EJECt, SCRatch Redistribution ***Interface to Tape Management Systems Manual*** Chapter 3, MOUNT, QDRLIST, QSCRATCH, SELSCR requests
The SLILIBRY macro adds the FUTRACS parameter to allow new ACSs to be added to the library complex (HSC 6.1 and later).	***Installation Guide*** Chapter 6, SLILIBRY macro
The SLILSM macro adds the TYPE=3000 and DOOR=3000 parameters for the SL3000 library (HSC 6.1 and later).	***Installation Guide*** Chapter 6, SLILSM macro
The OPTion command DUPOFL parameter allows the duplicate VOLSER process to continue when the VOLSER being entered exists in an ACS that is disconnected or in an LSM that is offline (HSC 6.1 and later).	***Operator's Guide*** Chapter 4, OPTion command
The LMUPATH control statement PARTID parameter defines a partition ID for an SL3000 or SL8500 library (HSC 6.1 and later).	***System Programmer's Guide*** Chapter 3, LMUPATH control statement
The EJECt Cartridge utility SEQ parameter specifies whether or not CAP eject processing fills the CAP cells in the same order specified by the **VOLser** parameter (HSC 6.1 and later).	***System Programmer's Guide*** Chapter 4, EJECt Cartridge utility
The LIST diagnostic command has been expanded with more control blocks and enhanced storage dump capability (HSC 6.1 and later).	***System Programmer's Guide*** Chapter 5, LIST command

Enhancement/Modification	Publication(s)/ Primary Locations
Revision A:	
Guidelines to connect an SL8500 to the HSC.	***System Programmer's Guide*** Appendix A, Connecting the SL8500 to the HSC
SL8500 support for LSM partitioning.	***System Programmer's Guide*** Chapter 3, LMUPATH control statement Chapter 4, SET FREEZE utility Appendix A, Partitioning LSMs (main discussion) ***Operator's Guide*** Chapter 2, Display Acs, Display Cap, Display Exceptions, Display Lsm ***Messages and Codes*** Chapter 2, HSC System Messages *New:* SLS0073I, SLS0695I, SLS4232I, SLS4412I, SLS4413I, SLS4463I *Updated:* SLS0653I, SLS0663I, SLS1000I, SLS2008I, SLS4401I, SLS4407I, SLS4610I
Considerations for connecting an SL8500 to multiple hosts or to shared networks.	***System Programmer's Guide*** Appendix A, TCP/IP Communications - Important Considerations
Procedures to define dual IP connections for the SL8500.	***System Programmer's Guide*** Appendix A, Dual IP Connection
SLUADMIN output options, date field formats, and alphabetic data field formats have been expanded to include structured XML and comma-separated values (CSV).	***System Programmer's Guide*** Chapter 4, "SLUADMIN Output" and "Parameters Controlling Report Headings"
Support for the Unified User Interface (UUI) and CSV.	***System Programmer's Guide*** Chapter 4, "XML Tags - Commands and Utilities

Enhancement/Modification	Publication(s)/ Primary Locations
Support for T10000 drive encryption recording techniques and model types.	***System Programmer's Guide*** Chapter 2, T10000 Drive Encryption Chapter 3, VOLATTR control statement Chapter 4, EJECt Cartridge and Scratch Redistribution utilities ***Interface to Tape Management Systems Guide*** Chapter 3, MOUNT, QDRLIST, QSCRATCH, and SELSCR requests ***Operator's Guide*** Chapter 2, Display DRives, Display SCRatch, Display THReshld, EJect, Warn commands
The BACKup utility DD parameter allows a backup to be run on a selected CDS.	***System Programmer's Guide*** Chapter 4, BACKup utility
The EJECt utility WAITCAP parameter specifies whether a list of ejecting volumes waits for available CAP if one is not available.	***System Programmer's Guide*** Chapter 4, EJECt utility
The Volume Report utility NOVOL parameter displays summary and/or subpool totals without producing volume detail.	***System Programmer's Guide*** Chapter 4, Volume Report utility
The Display SCRatch command ALL parameter specifies that all scratch subpool totals, including 0 scratch count values, will be displayed.	***Operator's Guide*** Chapter 2, Display command
The SCRAtch and UNSCRatch operator commands have been added to allow you to scratch or unscratch up to 100 volumes.	***Operator's Guide*** Chapter 2, SCRAtch and UNSCRatch commands
Support for circumventing the IBM length restriction of 255 characters for a macro parameter.	***Installation Guide*** Chapter 6, SLIACS macro, LSM2, LSM3, and LSM4 parameters ***System Programmer's Guide*** Chapter 4, Reconfiguration utility
The starting column for the control statement information area has been changed from column 2 to column 1.	Control Statement Syntax Conventions, found in the following documents: ***System Programmer's Guide*** Appendix C ***Operator's Guide*** Appendix A

Preface

This guide provides information about Oracle's StorageTek Host Software Component (HSC) and its use with the Automated Cartridge System.

The *Installation 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.

Access to Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit http://www.oracle.com/support/contact.html or visit http://www.oracle.com/accessibility/support.html if you are hearing impaired.

Chapter 1. Overview

This chapter defines the procedures to plan and complete the installation of the Host Software Component (HSC) product.

Summary of Installation Tasks

There are a variety of installation tasks necessary to install the HSC software and prepare the library for use.

Figure 1 on page 5 illustrates the flow of the major tasks recommended for installing the HSC software. The order for performing the tasks may vary depending upon various circumstances, such as hardware availability. A summary description for each chapter contained in this installation guide follows:

- **Chapter 1, "Overview" —** Summarizes the steps in planning for and installing the HSC.
- **Chapter 2, "Configuration Planning" —** Planning the configuration consists of ensuring that all hardware installation/environmental provisions, software, and installation requirements are predetermined and complete before installation of the software.
- **Chapter 3, "HSC Software Preinstallation" —** Preinstallation of the HSC Software involves ensuring that the required virtual machine environment is prepared for the actual installation. These tasks include defining a maintenance user ID, defining the ACS service machine, and authorizing library users.
- **Chapter 4, "HSC Software Installation" —** Installation of the HSC software involves installing the Base function, installing the Product Update Tape (if applicable), and performing any required local customization.
- **Chapter 5, "Performing Preexecution Tasks" —** Preexecution tasks involve adding SMF parameters, defining ACF/VTAM communications, and adding a command list to the HSC.
- **Chapter 6, "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.

  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 6.1-level 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).*

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. Refer to “Defining HSC Control Statements” on page 103 for information about these tasks.

- **Chapter 7, “Allocating and Initializing Data Sets” —** Allocating library data sets involves using the SLIMDISK utility to format minidisks according to your installation requirements. Refer to “Allocate Library Data Sets” on page 105 for information about this task.

  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. Refer to “Data Set Initialization” on page 112 for information about this task.

- **Chapter 8, “HSC Initialization” —** The SLKJCL file loads the nucleus of the HSC into main storage, causes the operating system to allocate data sets, and invokes the library host software initialization routine. This chapter describes how to create the SLKJCL file and how to initialize the HSC to either the Full or Base service level.

- **Chapter 9, “HSC Termination” —** Terminating HSC software involves issuing the SCP 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. The process includes exercising the library tape transports which mount, read, write to, and dismount tape cartridges.

  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. Refer to Chapter 10, “Testing the Installation” on page 143 for more information about the tests recommended to verify the installation.

- **Chapter 11, “Planning Cartridge Migration into 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.

- **Chapter 12, “Other Activities”** — These activities include setting up PROP (VM Programmable Operator) message intercept, the VMOPERATOR message intercept, and the IUCV command interface. All of these installation activities are optional.
- **Appendix A, “Library Installation Checklist” —** A checklist is provided that describes the steps necessary to install the HSC.
- **Appendix B, “Library Configurations” —** Sample library configurations are shown to allow users to analyze hardware layouts and allow for future expansion.
- **Appendix C, “Macros, Control Statements, Utilities and Commands Syntax Conventions” —** An explanation of syntax requirements for macros, control statements, utilities, and operator commands.
- **Appendix D, “Migration and Coexistence Processes”** — Descriptions of requirements and procedures for migrating HSC software from downlevel releases.
- **Appendix E, “HSC Maintenance Installation Instructions” —** Discussions of maintenance facilities, corrective service, and emergency service, .

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.

Refer to 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.

Library Installation Checklist

A Library Installation Checklist is provided to help you identify all of the steps involved in the installation process for HSC software. This checklist is used to ensure that all of the tasks relating to the installation process are performed. Refer to Appendix A, "Library Installation Checklist" for the checklist.

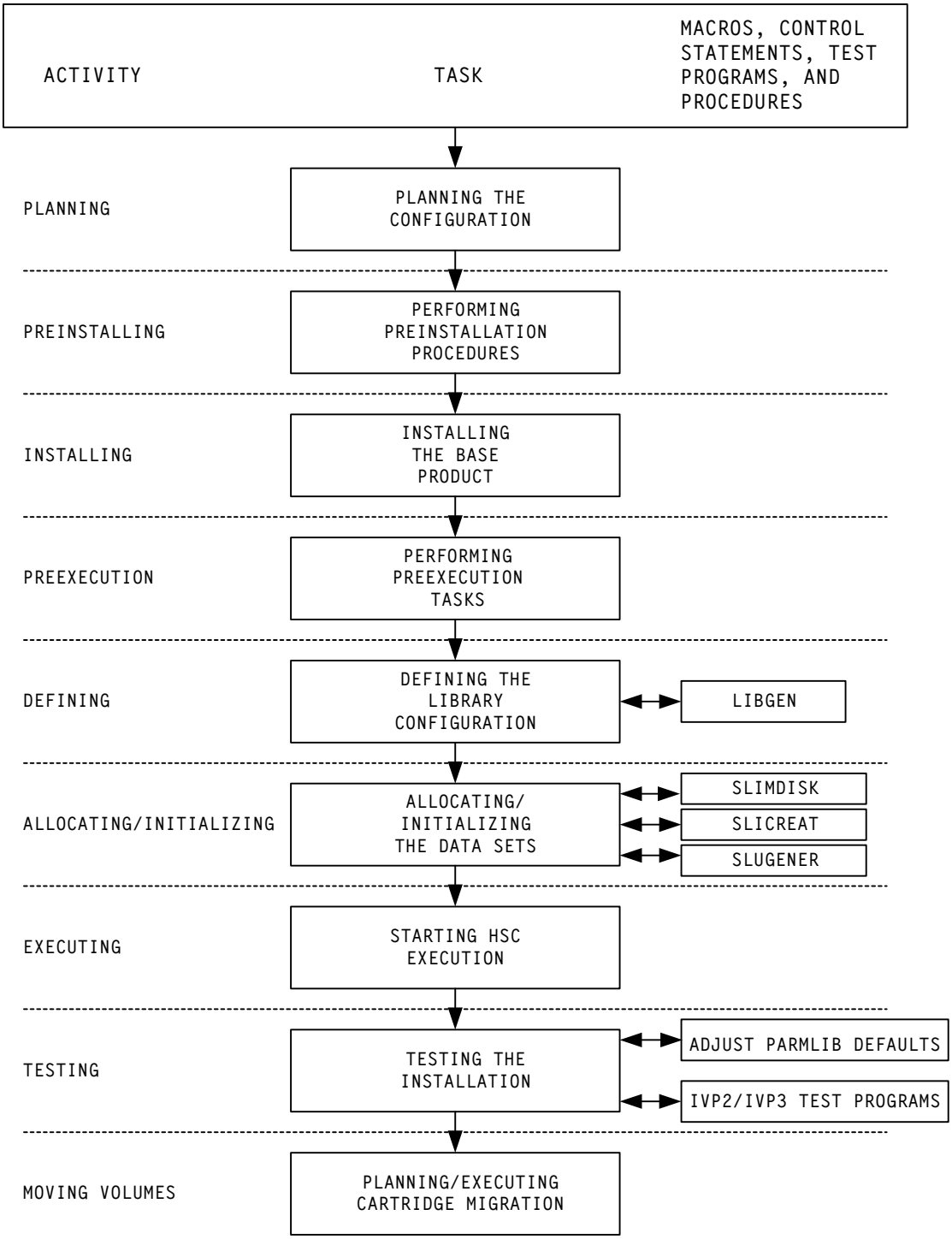


Figure 1. Installation Flow Diagram

Chapter 2. Configuration Planning

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

- physical plan verification
- system software verification
- application program interface verification
- verification of third-party software compatibility
- LSM/pass-thru port relationship definition(s)
- address configuration
- DASD planning
- 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 *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 VM version of the HSC system supports all current IBM VM levels. The specific VM 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.

Note: There may be releases of IBM-supplied maintenance (APARs and PTFs) that may be required in addition to the required operating system levels. Contact StorageTek Software Support for a list of all required APARs and PTFs. Ensure that all required APARs and PTFs are installed before attempting to install the VM HSC.

Application Program Interface Verification

If VMTAPE is being used as your tape management system, ensure that VMTAPE/E 1.1 or later, supporting the ACS, is installed.

Note: VMTAPE must be added to the authorized operators list in the HSC. Refer to "Parameter Definitions" on page 52 for more information on adding authorized operators.

If any other tape management system is currently installed, you may need to write special routines to communicate with the HSC. Refer to the *HSC Interface to Tape Management Systems Manual*, which defines the library interface to tape management systems. The information presented includes recommended allocation and message processing, commands and responses, data areas, and interrupt handling required to communicate with the library.

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 below are compatible for use with the HSC.

- ACF Virtual Telecommunications Access Method (ACF/VTAM)
- DF/SORT
- DYNAM/T VM
- EPIC VSE
- Multi-Image Manager (MIM)
- SYNCSORT
- VMTAPE
- IBM Tape Manager for z/VM

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 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.

All LSMs, except the SL8500, can only be a master of two PTPs. SL8500 libraries can control eight 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.

Notes:

- SL8500 libraries can control eight PTPs
- SL3000 libraries do not contain PTPs.

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

These relationships are identical to parameters selected and stipulated in LIBGEN macros. Refer to “SLILSM Macro” on page 83 for additional information about PTP and PTP relationship definition. LIBGEN examples are presented in Appendix B, “Library Configurations” on page 163.

Address Configuration

CP must contain definitions for the library hardware: LMU stations, transports, and DASD for control data sets. This section describes how to prepare the real I/O (RIO) SYSTEM CONFIG file to support library devices. Details on coding the RIO macros can be found in the following IBM manuals:

- *z/VM CP Planning and Administration*
- *z/VM Installation Guide.*

An LMU station emulates a 3278 model 2 terminal and is connected by coaxial cable

- to a port on a locally attached terminal control unit or,
- on some processors, to a port on a terminal adapter, or
- by TCP/IP attach.

Library tape control units and tape drives are plug-compatible with IBM model 3480, 3490, and 3590 units.

If the library is to be shared with another processor, then additional RIO configuration file changes may be necessary to satisfy shared DASD volume restrictions. Refer to “DASD Sharing” on page 14.

If the addresses are not defined in the configuration plan, cease all installation activities and define the addresses. If definitions are added, the VM system must be regenerated and re-IPLed.

LMU Status at IPL

When VM is IPLed, LMU stations must be ONLINE to CP. **Do not CP ENABLE any LMU stations.**

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
- optional TAPEREQ, UNITATTR, VOLATTR, SCRPDEF, and LMUPDEF data sets.

DASD space must also be allocated for several minidisks for the product's virtual machines. As a result, some DASD planning is required. The following considerations must be made for DASD planning:

- DASD sharing
- choosing DASD type
- DASD space planning
- data set placement.

Each of these requirements is described in the following sections.

If the library is to be shared with an MVS system, the processor's channel must support CKD devices. The library data sets may then only be placed on 3350, 3380-type, or 3390-type DASD units; otherwise, any CMS supported DASD device may be used.

Since the HSC uses hardware device reserve/release to control sharing, it is required that the user's I/O configuration allow device reserve/release to be issued when in a multiple-host environment.

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. 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 67 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 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 “SLIRCVRY Macro” on page 67 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 "SLIRCVRY Macro" on page 67 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 two or more hosts share 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:

- the 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.

The DASD containing these data sets must be configured in such a way that VM allows a real reserve CCW to be executed without translating it to a sense.

Refer to the section in the IBM manual *z/VM CP Planning and Administration* that describes operating with shared DASD volumes. The DASD volume must either be dedicated via a DEDICATE statement, or it must be a full-pack minidisk with SHARED status ON for the volume.

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.

Warning: If you place data sets on volumes that contain CDSs, you must ensure programs that interact with each other do not access multiple CDS volumes concurrently, or a ***deadly embrace*** scenario can occur. The best solution is for you to place data sets that require reserve/release functions on disks that do not contain HSC CDS data sets.

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 IBM *CP Command Reference manual* or *Quick 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 IECIOSxx PARMLIB member).
- IPL the system.

Choosing DASD Type

Determining the type of DASD to use involves several issues:

- availability of CKD DASD
- which hosts share the library (processor type, operating system)
- data set backup method (for VM hosts).

The options available are listed in Table 1.

Table 1. DASD Options

DASD Type	Device Types	Format
Full-volume CKD MDISK	3350, 3380, or 3390 only	OS
DEDICATEd full-volume CKD	3350, 3380, or 3390 only	OS
Partial-volume CKD MDISK	3350, 3380, or 3390 only	OS
CMS RESERVED MDISK	Any type supported by CMS	CMS ‘‘RESERVED’’ minidisk

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

Table 1 is a guide through the decision process.

Some of the considerations are:

- The library data sets are small (less than 20 cylinders), and the access rate is high. The volume on which the data set is placed should either contain no other data sets, or only seldom accessed data sets.
- If there are multiple processors sharing the volume, and there is a large differential in processor or channel speeds, then the slower CPU will often get a Control Unit Busy condition. If the ACS service machine accesses the disk via LINK, then it is non-dispatchable (to CP) until Control Unit End is received. The service machine cannot proceed with work that is unrelated to the I/O request. If it has the volume ATTACHed or DEDICATEd, then CP does not alter its dispatchability; however, it cannot be used by any other virtual machine on the same host.
- If the library is shared with an MVS host, the volume must be a full-volume 3350, 3380, or 3390 device.
- CMS RESERVED minidisks
    - This is the only way FBA (FB-512) devices are supported.
    - The data set on a minidisk can be manipulated (READ only) with standard CMS functions (i.e. COPYFILE, BROWSE, etc.).

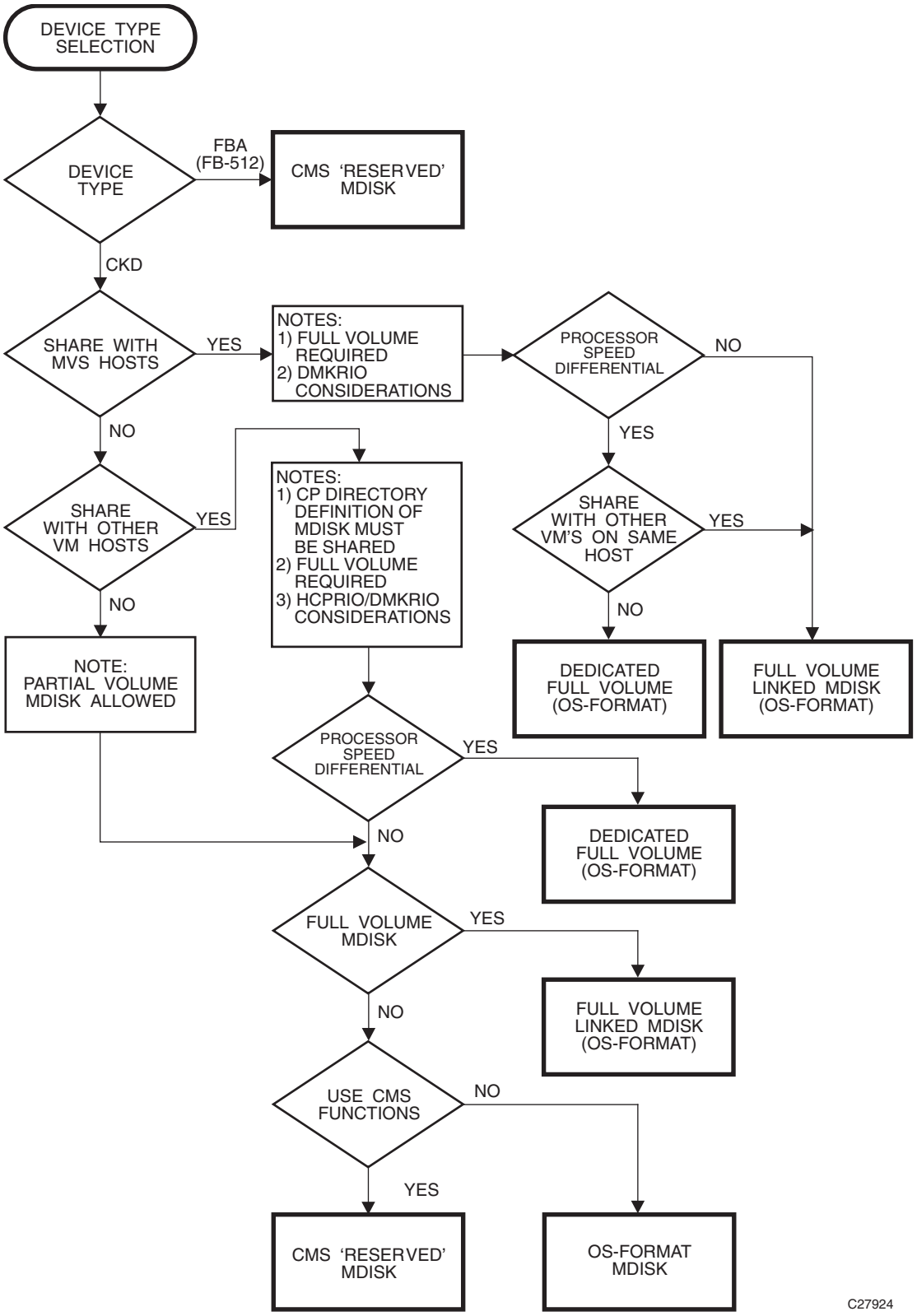


Figure 2. Device Type Selection

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.

Note: 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.

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 = 225 + (130 * splsm) + (70 * wlsm) + (50 * tlsm) + (25 * sl8lsm)
+ (25 * sl3lsm) + (25 * future-lsms)
```

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.

sl8lsm
the total number of real SL8500 LSMs. Each SL8500 library counts as four LSMs.

sl3lsm
the total number of real SL3000 LSMs.

future-lsms

This parameter applies to SL3000 and SL8500 libraries only. It is the sum of the following two values:

- Include planned SL3000 or SL8500 libraries as if they were physically present. Refer to the FUTRACS parameter in the "SLILIBRY Macro" on page 69.

  The value is the number of future ACSs times the number of future LSMs as specified in the FUTRACS parameter. Each FUTRACS value represents an SL3000 or an SL8500 library.

Note: To allow sufficient CDS space, assume each future ACS is an SL8500 and equals 4 LSMs.

- Include planned SL8500 libraries as if they were physically present. Refer to the FUTRLSM parameter in the "SLIACS Macro" on page 77.

  Each FUTRLSM value can represent only future SL8500 LSMs added to an existing ACS.

Notes:

- No additional space is required for an HSC 6.1 CDS.
- The "225" constant in the DASD space calculation accounts for hosts and ACSs. Drives are attributed in the constant multiplier for each LSM type, for example, the "25" in the `25 * slslsm` portion of the formula.

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

Beside 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 make sure that enough DASD space exists for HSC authorized target and distribution libraries.

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 Using SLICREAT” on page 115 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.

Cartridge Capacity Calculation - SL8500

Message SLS0557I displays the maximum cartridge capacity for the library. **For the SL8500 library only**, you must first vary the library online (Vary ACS command) to see the actual capacity of the library rather than the maximum capacity of the library.

The library type is specified in the SLILSM LIBGEN macro, however, the HSC cannot determine whether or not the SL8500 contains expansion panels. Until the library is varied online, the HSC assumes the maximum number of panels allowable.

After you vary the library online, enter the Display Acs or Display Lsm command to show the actual SL8500 library capacity. Refer to the *HSC Operator's Guide* for information about the Vary and Display commands.

Chapter 3. HSC Software Preinstallation

HSC Software Preinstallation Requirements

The following steps must be performed before installing the HSC software:

- verify installation materials and instructions
- define a maintenance user ID
- define the ACS service machine
- define the GCS component service machine
- authorize library users.

Verify Installation Materials and Instructions

Verify that the following installation materials, provided by StorageTek, are readily available for use:

- HSC base tape
- HSC accumulated PTF tape or PUT tape
- HSC product documentation:
  - *HSC System Programmer's Guide*
  - *HSC Operator's Guide*
  - *HSC Messages and Codes Guide*
  - *SCP Messages and Codes Manual*
  - *HSC Interface to Tape Management Systems Manual*

Note: For the latest information regarding installation or if any of the materials listed above were not received, contact StorageTek Software Support. Refer to the guide *Requesting Help from Software Support* for support contact information.

Define a Maintenance User ID

A virtual machine must be defined to hold and process all installation and maintenance materials. It is intended for use by the system programming staff and StorageTek Customer Services personnel.

The sample CP directory entry shown below should be used as an example. The sample file MAINTSTK DIRECT is loaded from the HSC distribution tapes.

Sample CP Directory for MAINTSTK

```
*-----------------------------------------*
* Storage Technology Corporation           *
* Software Product Maintenance Machine     *
*-----------------------------------------*
USER MAINTSTK pswd 32M 32M G
ACCOUNT xxxxxx
*
* The following line should be uncommented
* in VM/ESA Version 2 directory entries
* MACHINE XA
*
IPL CMS PARM AUTOCR
CONSOLE 009 3215
SPOOL 00C 2540 READER *
SPOOL 00D 2540 PUNCH A
SPOOL 00E 1403 A
*
LINK MAINT    190 190 RR
LINK MAINT    19D 19D RR
LINK MAINT    19E 19E RR
*
* IPCS Functions
LINK MAINT 193 193 RR
*
******** Minidisks of type 3350, 3380, or 3390 *******
********  (change 33x0 to correct type)        *******
MDISK 191 33x0 scyl 010 volser MR rpw wpw mpw
MDISK 250 33x0 scyl 050 volser MR rpw wpw mpw
MDISK 251 33x0 scyl 080 volser MR rpw wpw mpw
MDISK 252 33x0 scyl 040 volser MR rpw wpw mpw
MDISK 253 33x0 scyl 002 volser MR rpw wpw mpw
MDISK 254 33x0 scyl 050 volser MR rpw wpw mpw
MDISK 255 33x0 scyl 002 volser MR rpw wpw mpw
MDISK 256 33x0 scyl 040 volser MR rpw wpw mpw
MDISK 257 33x0 scyl 002 volser MR rpw wpw mpw
******** Minidisks of type FB-512 *****
MDISK 191 FB-512 sblk 12000 volser MR rpw wpw mpw
MDISK 250 FB-512 sblk 42000 volser MR rpw wpw mpw
MDISK 251 FB-512 sblk 84000 volser MR rpw wpw mpw
MDISK 252 FB-512 sblk 24000 volser MR rpw wpw mpw
MDISK 253 FB-512 sblk  2400 volser MR rpw wpw mpw
MDISK 254 FB-512 sblk 60000 volser MR rpw wpw mpw
MDISK 255 FB-512 sblk  2400 volser MR rpw wpw mpw
MDISK 256 FB-512 sblk 20800 volser MR rpw wpw mpw
MDISK 257 FB-512 sblk  2400 volser MR rpw wpw mpw
```

USER MAINTSTK *pswd* 32M 32M G

The virtual machine name may be anything. MAINTSTK is used in this document as the name of the maintenance virtual machine.

All minidisks should have read passwords, with the possible exception of the 254 disk. The minidisks are to be used for the following purposes:

CUU Type	Description
191 STK191	This is the MAINTSTL A-disk. It contains files which specify informaiton about the minidisks that the product uses.
250 BASE	All base product files are installed onto this disk. It contains” • All product installation and service EXECS • All product TEXT decks • Product sample materials equivalent to SAMPLIB members • All control files necessary to create the executable versions of the product.
251 DELTA	This disk is used to hold PTFs (fix packages).
252 MERGE	This disk contains selected maintenance from the DELTA-disk. the files on this disk are used instead of the corresponding BASE-disk files when building the RUN-disk (i.e., they supersede their BASE-disk counterparts). This Disk also contains updated sample materials equivalent to SAMPLIB members.
253 ZAP	This disk contains all ZAPs supplied by StorageTek to temporarily fix problems. It also contains any ZAPs created by the installation.
254 RUN	This disk contains all files necessary to run the product. It contains: • All LOADLIB and MODULE files creted by installation and maintenance • All non-installation EXECs • Sample materials • A maintenance log. • This disk might have a read password of ALL.
255 ACS191	This is the ACS service mahine’s 191 A-disk. During the install process, some product sample materials are copied here to be modified by the customer.

CUU Type	Description
256 IPCS	This minidisk may be used for storing IPCS dumps produced by the ACS service machine. A single dump, loaded onto a CMS mimidisk formatted in 4K blocks, requires the following space to be allocated: • 3350 = 4.76 cylinders • 3380 = 2.84 cylinders • 3390 = 2.5 cylinders • FB-512 = 5140 blocks
257 GCS191	This is the GCS service machine's 191 A-disk. During the install process, some product sample materials are copied here to be modified by the customer.

Define the ACS Service Machine

The ACS service machine must be defined in order to execute the library software. The following sample CP directory entry should be used. The sample file STKACS DIRECT is loaded from the HSC distribution tapes.

Sample CP Directory for ACS (Part 1 of 2)

```
*----------------------------------------*
* Storage Technology Corporation         *
* Software Product Service Machine       *
*----------------------------------------*
USER STKACS pswd 8M 8M GB
ACCOUNT xxxxxx
OPTION MAXCONN 16 CONCEAL
*
* The following option line should be removed
* in VM/XA and VM/ESA directory entries
*
OPTION ECMODE BMX
*
* The following line should be uncommented
* in VM/ESA Version 2 directory entries
*
MACHINE XA
*
* Authorize IUCV Connections
IUCV ALLOW PRIORITY MSGLIMIT 255
*
IPL CMS PARM AUTOCR
CONSOLE 009 3215
SPOOL 00C 2540 READER *
SPOOL 00D 2540 PUNCH A
SPOOL 00E 1403 A
LINK MAINT 190 190 RR
LINK MAINT 19D 19D RR
LINK MAINT 19E 19E RR
*
* PROFILE EXEC, etc.
LINK MAINTSTK 255 191 RR
* ‘Run’ disk
LINK MAINTSTK 254 192 RR
*
```

Sample CP Directory for ACS (Part 2 of 2)

```
LINK MAINTSTK 254 192 RR
*
* Other MDISK/LINK entries for library data sets
*        vaddr usage.............................
*         500 primary control data set
*         501 secondary control data set
*         502 standby control data set
*         503/504 journal 1 & 2
*         505/506 journal offload 1 & 2
*         507 backup of primary control data set
*         508 RECONFIG new primary control data set
*         509 RECONFIG new secondary control data set
*         50A primary CDS copy for BACKUP utility with OPT(ANAL)
*         50B secondary CDS copy for BACKUP utility with OPT(ANAL)
*         50C TAPEREQ data set
*         50D VOLATTR data set
*         50E UNITATT data set
*         50F LMUPATH data set
*         511 LKEYINFO data set
*
LINK USERID vaddr 5xx MW
    -and/or-
MDISK 5xx dtype scyl ncyl volser MWV rpw wpw mpw
    -and/or-
MDISK 5xx FB-512 sblk nblk volser MWV rpw wpw mpw
    -and/or-
DEDICATE vaddr raddr volser
*
* Optionally DEDICATE LMU Stations:
DEDICATE vaddr raddr
```

The 191 and 192 minidisks are owned and maintained by the maintenance virtual machine (MAINTSTK).

Details on coding directory control statements can be found in the following IBM manuals:

- *Planning Guide and Reference* for VM/SP and VM/SP HPO
- *Planning and Administration* for VM/XA SP
- *CP Planning and Administration* for VM/ESA.

USER STKACS *pswd* **8M 8M G[B]**

The virtual machine name may be anything. In this document, STKACS is used as the name of the ACS virtual machine.

A storage definition of 8M is usually sufficient for the ACS service machine to execute. If you encounter problems from lack of storage available, increase the storage definition to meet your site's requirements.

The HSC can execute successfully with only privilege class G. However, it is recommended that the HSC be allowed to issue the CP MSGNOH command. This can be accomplished either by adding privilege class B to the USER control

statement, or by adding an installation-defined privilege class letter that permits the MSGNOH CP command.

Details on setting up an installation-defined privilege class that permits only theMSGNOH CP command can be found in the following IBM manuals:

- *System Programmer's Guide* for VM/SP Release 4 and VM/SP HPO Release 4.2
- *CP for System Programming* for VM/SP and VM/SP HPO Release 5
- *Administration* for VM/SP and VM/SP HPO Release 6
- *Planning and Administration* for VM/XA SP
- *CP Planning and Administration* for VM/ESA.

OPTION MAXCONN 16 CONCEAL
OPTION ECMODE BMX

The MAXCONN option defines the maximum number of IUCV connections to be permitted for this virtual machine. The minimum number required may be calculated as follows:

maxconn = 2

+ maximum number of IUCV paths open at any given time to all TMS service machines

+ number of unique library DASD volumes

+ maximum number of IUCV paths open at any given time using the ‘‘CMDIUCV’’ interface.

The CONCEAL option allows CP to re-IPL the service machine, instead of entering CP READ state, on occurrence of certain error conditions.

ECMODE and BMX are required for VM/SP and VM/SP HPO systems, but are invalid and must not be specified for VM/XA SP and VM/ESA systems.

IUCV ALLOW PRIORITY MSGLIMIT 255

This optional statement specifies that any virtual machine is allowed to request a connection to the ACS service machine. At run time, the SCP AUTHorize command further restricts the actual connections allowed by the ACS service machine.

If this statement is omitted, then any virtual machine that needs to establish a connection must specify the ACS service machine in its own CP directory entry. For example:

```
IUCV acsname MSGLIMIT 255
```

IPL CMS PARM AUTOCR

This required statement causes the ACS service machine to automatically IPL CMS at log on.

LINK MAINTSTK 255 191 RR *pswd*

Defines this virtual machine's 191 A-disk as being the 255 disk of MAINTSTK, in read-only mode. This disk contains customer-modified sample materials (such as a PROFILE EXEC).

LINK MAINTSTK 254 192 RR

Defines this virtual machine's 192 D-disk as being the 254 disk of MAINTSTK, in read-only mode. This RUN-disk contains the required executable functions.

LINK *userid vaddr* **5***xx* **MW**
MDISK 5*xx dtype scyl ncyl volser* **MWV** *rpw wpw mpw*
MDISK 5*xx* **FB-512** *sblk nblk volser* **MWV** *rpw wpw mpw*
DEDICATE *vaddr raddr* [*volser*]

One of the above statements must be used for each of the DASD volumes or minidisks where the library control data sets and journals are located. There must be one such statement for each volume used. Refer to "Choosing DASD Type" on page 15 and "Calculating DASD Space" on page 18.

Caution: The virtual device address/number (vaddr) must be in the range 090 through FFF.

When the library control data sets will be shared with an HSC running on another processor, then the DASD must be defined to the STKACS virtual machine in one of the following ways so that real RESERVE/RELEASE support can be provided:

- DEDICATE statement- is the preferred method because the STKACS virtual machine remains dispatchable when the DASD is RESERVEd by the other processor.
- MDISK statement that covers the entire DASD volume, beginning with cylinder or block 0 - this method is used when the DASD must also be shared with other virtual machines.

When an MDISK statement is used, be sure that the access mode is specified as MWV.

DEDICATE *vaddr raddr*

One DEDICATE statement is needed for each 3270 connected LMU station. Recall that LMU stations were defined to CP via RDEVICE macros as 3278 model 2 terminals or as TCP/IP devices.

Caution: The virtual device address/number (vaddr) must be in the range 090 through FFF.

Define the GCS Component Service Machine

To allow using VTAM for host-to-host communications, a service machine must be defined to run as part of a GCS group. The following sample CP directory entry should be used. The sample file STKGCS DIRECT is loaded from the HSC distribution tapes.

Sample CP Directory Entry for GCS Component Service Machine

```
*-----------------------------------------------*
* Storage Technology Corporation                *
* Software Product GCS Component Service Machine*
*-----------------------------------------------*
USER STKGCS pswd 3M 3M G[B]
ACCOUNT xxxxxx
OPTION MAXCONN 16 CONCEAL
*
* The following option line should be removed
* in VM/XA and VM/ESA directory entries
*
* OPTION ECMODE REALTIMER
*
* Authorize IUCV Connections
IUCV   ALLOW     PRIORITY MSGLIMIT 255
*
IPL GCS PARM AUTOLOG
CONSOLE 009 3215
SPOOL 00C 2540 READER *
SPOOL 00D 2540 PUNCH A
SPOOL 00E 1403 A
LINK MAINT    190 190 RR
LINK MAINT    19D 19D RR
LINK MAINT    19E 19E RR
LINK MAINT    595 595 RR
*
* PROFILE EXEC, etc.
LINK MAINTSTK 257 191 RR
* 'Run' disk
LINK MAINTSTK 254 192 RR
```

USER STKGCS *pswd* **3M 3M G[B]**

The virtual machine name may be anything. In this document, STKGCS is used as the name of the GCS component service machine.

The HSC can execute successfully with only privilege class G. However, it is recommended that the HSC be allowed to issue the CP MSGNOH command. This can be accomplished either by adding privilege class B to the USER control statement, or by adding an installation-defined privilege class letter that permits the MSGNOH CP command.

Details on setting up an installation-defined privilege class that permits only the MSGNOH CP command can be found in the IBM manual *z/VM CP Planning and Administration*.

OPTION MAXCONN 16 CONCEAL

The MAXCONN option defines the maximum number of IUCV connections to be permitted for this virtual machine. The minimum number required may be calculated as follows:

maxconn = 1

+ maximum number of HSCs to be supported for host-to-host communications.

The CONCEAL option allows CP to re-IPL the service machine, instead of entering CP READ state, on occurrence of certain error conditions.

OPTION ECMODE REALTIMER

ECMODE and REALTIMER are required for VM/SP and VM/SP HPO systems, but are invalid and must not be specified for VM/XA SP and VM/ESA systems.

IUCV ALLOW PRIORITY MSGLIMIT 255

This optional statement specifies that any virtual machine is allowed to request a connection to the GCS component service machine.

If this statement is omitted, then any virtual machine wishing to establish a connection must specify the GCS component service machine in its own CP directory entry:

```
IUCV stkgcs MSGLIMIT 255
```

IPL GCS PARM AUTOLOG

Specifies the name of a saved GCS.

Note: Do not specify IPL GCS PARM AUTOCR. AUTOCR causes the service machine's virtual console to lock in a CP ''NOT ACCEPTED'' state when logged on after being AUTOLOGed.

LINK MAINTSTK 257 191RR

Defines this virtual machine's 191 A-disk as being the 257 disk of MAINTSTK, in read-only mode. This disk contains customer-modified sample materials (such as a PROFILE EXEC).

LINK MAINTSTK 254 192 RR

Defines this virtual machine's 192 D-disk as being the 254 disk of MAINTSTK, in read-only mode. This RUN-disk contains the required executable functions.

Authorize the GCS Component Service Machine for GCS

The GCS component service machine must be authorized to execute under GCS. Refer to the appropriate IBM manual for a description of how to use the GROUP EXEC to accomplish the GCS authorization.

Authorize Library Users

Authorizing library users consists of the following:

- authorize operators and administrators
- enable IUCV communications with the ACS service machine
- enable IUCV communications with the GCS service machine

These procedures are described in the following sections.

Authorize Operators and Administrators

All virtual machines which are to call the ACS functions should be authorized to CP LINK to the MAINTSTK 254 disk. This may entail providing passwords or otherwise enabling link permission through a security function.

At this time, list those virtual machines in the RSCS network which are allowed command, utility, and message access to the ACS service machine. At a later installation step, these are authorized to the ACS service machine's control program.

Enable IUCV Communications With the ACS Service Machine

All virtual machines that communicate by means of IUCV with the ACS service machine must have a CP directory statement enabling them to initiate IUCV communication with the service machine, unless an IUCV ALLOW statement is included in the ACS service machine's CP directory entry (see "IUCV ALLOW PRIORITY MSGLIMIT 255" on page 28). This includes the local TMS service machine and all virtual machines using IUCV to issue operator commands or requests to the tape management system interface.

Substitute the name of the ACS service machine (ACSNAME parameter from the system profile, described in "System Profile (ACS SYSPROF)" on page 39 for *acsname*:

```
IUCV acsname MSGLIMIT 255
```

This is not required to be able to issue commands via CP SMSG.

Enable IUCV Communications With the GCS Component Service Machine

All ACS service machines which communicate via IUCV with the GCS component service machine must have a CP directory statement enabling them to initiate IUCV communication with the service machine, unless an IUCV ALLOW statement is included in the GCS component service machine's CP directory entry (see "IUCV ALLOW PRIORITY MSGLIMIT 255" on page 28).

Substitute the name of the GCS service machine (the user ID specified on the FILE HCOMM IUCV statement in the system definition file, described in "System Definition File (ACS SYSDEF)" on page 51 for *stkgcs*:

```
IUCV stkgcs MSGLIMIT 255
```

This is not required to be able to issue commands via CP SMSG.

Chapter 4. HSC Software Installation

Installing the HSC Software

The following sections describe the procedures for installing the HSC. It is important that you refer to the procedures listed throughout this manual when installing the HSC for the first time, or refer to the Product Update Tape (PUT) installation instructions when installing a product update. You must be familiar with and understand all of the steps and details necessary to execute a successful installation of the software prior to actually executing the installation procedures.

Installing the Base Product

Before proceeding with installation, verify that the following materials (provided by StorageTek) are on hand:

- VM/HSC Release 6.2 manuals
- base installation tape
- most recent cumulative PTF or PUT tape, if available.

Installing the HSC software consists of several tasks:

- determining the type of installation
- calling StorageTek Software Support
- loading files from the distribution tapes
- modifying performance log header/trailer JCL (optional)
- defining system profiles
- verifying the SCP - Installation Verification Program 1 (IVP1).

Determining the Type of Installation

There are two types of installation instructions for the HSC. You must determine the type that you are attempting and proceed accordingly.

HSC Base Release

The installation instructions contained in this guide are prepared specifically for installing the HSC. Procedures describing how to install the contents of the software base tape containing a base release are contained in this section.

Product Update

Product updates are prepared primarily to correct problems with the software. Each product update tape (PUT) for the HSC software is issued with a separate set of installation instructions prepared specifically for installing the update tape. This guide does not contain information about installing update tapes; refer to the instructions issued with each PUT.

Calling StorageTek Software Support

StorageTek Software Support maintains information about known HSC 6.2 problems and their corrections. Before installing this product, call Software Support for the latest information available concerning product updates (documentation, known problems, PTFs) and possible IBM APARs required for VM. Refer to the guide *Requesting Help from Software Support* for instructions.

Loading Files From Distribution Tapes

1. Log on to the maintenance user ID (MAINTSTK).

2. If you are upgrading from a previous HSC release, be aware of the following:

   - **The installation process reformats the RUN-disk, as well as the DELTA-, MERGE-, and ZAP-disks. If you wish to retain anything from these disks (such as SYSDEF or SYSPROF files), save them now.**
   - **If you have any SLKJCL, or modified files (such as ACS SYSDEF or ACS SYSPROF) on the RUN-disk, COPY THEM TO THE ACS191-DISK NOW.**
   - **The RUN-disk is not for user-modified files (except for SYSDEF and SYSPROF).**

   Issue the following command to format the 191 disk (if not already formatted):

   ```
   FORMAT 191 A (BLKSIZE 1K
   ```

   You will be prompted to confirm the formatting operation and provide a disk label.

3. Gather both the base installation tape and the most recent cumulative service (PUT) tape, if available.
4. Get a tape drive attached as virtual device 181.
5. Mount the base installation tape on virtual device 181.

6. Enter the following commands to load the installation EXEC and its parameter files onto the A-disk:

```
ACCESS 191 A
VMFPLC2 REW
VMFPLC2 LOAD * * A (EOF 1
```

7. File SMS6200 VMFPARM A contains minidisk address definitions to tell the installation process where to put various files. Modify the virtual disk addresses in this file, if necessary, to conform to your installation.

SMS6200 VMFPARM Default Definitions

```
*
*        Automated Cartridge System
*          VM Host Software Component
*                (FMID=SMS6200)
*
* Maintenance service machine minidisk definitions
*
ADISK           191
BASE            250
DELTA           251
MERGE           252
ZAP             253
RUN             254
ACS191          255
IPCS            256
GCS191          257
```

8. Enter the following command to load the remainder of the product files, perform link-edits, copy files to the correct target disks, and process the latest PUT:

   ```
   EXEC ISMS6200
   ```

   This step could take several minutes.

   You will be prompted to allow the restoration of a pre-generated base system to the RUN-disk, and, at the appropriate time, to mount a PUT tape, if one is available.

   In most cases, you should answer ‘‘Yes’’ to the ISMS6200 prompts. However, if you do not have a PUT tape, but rather a cumulative PTF tape, you must answer ‘‘No’’ to the ISMS6200 prompt regarding the installation of a PUT tape. If you have a PUT tape, answer ‘‘Yes’’ to the ISMS6200 prompt.

   If you have a cumulative PTF, continue with the ISMS6200 process. When ISMS6200 completes, refer to “Corrective Service” on page 214 for instructions on installing the cumulative PTF tape.

9. When ISMS6200 completes issue the following command:

   ```
   EXEC ACSACC
   ```

10. If you copied any ACS SYSDEF or ACS SYSPROF files from the RUN-disk to the ACS191-disk, move them back to the RUN-disk at this time. You may then want to erase them from the ACS191-disk. Do **not** store any SLKJCL files on the RUN-disk.

Modifying Performance Log Header/Trailer JCL (Optional)

Skip this step if performance records are to be processed by a VM user ID.

If you want the library SMF records to be merged with data from other systems **on an MVS system**, then this sample file may be modified to contain JCL to perform that function.

A sample file (PERFLOG SAMPLE) is provided for modification on the MAINTSTK ACS191-disk. There are two sections to this file: header JCL and trailer JCL.

The header section is automatically written, before any data, to a newly opened or reopened performance log file by the system. The trailer section is automatically appended to the SMF data when the SCP SET PERFlog CLOSE operator command is issued.

The header JCL contains JOB information, and a step to convert the special format SMF data from a VM system into the original SMF record formats and lengths.

The header and trailer sections are separated by ten plus signs starting in column one. **Do not alter this line**.

The trailer JCL contains steps to merge the just-formatted data set with other MVS data sets and, optionally, to analyze the data.

Sample Performance Log JCL

```
//PERFLOG JOB (Accounting info),
// CLASS=x
//* - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
//* PERFLOG Formatter
//* Takes PERFLOG records in 80 column card images and rebuilds them
//* as SMF type records.
//* - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
//STEP01 EXEC PGM=SLUPERF,REGION=512K
//*STEPLIB DD DSN=your.hsc.loadlib,DISP=SHR
//SYSPRINT DD SYSOUT=A
//SLSSMF DD DSN=PERFLOG.FORMATED,DISP=(NEW,PASS,DELETE),
//          DCB=(BLKSIZE=3120,LRECL=16384,RECFM=VBS),
//          UNIT=SYSALLDA,SPACE=(CYL,(10,5))
//SYSIN DD *
++++++++++PERFLOG DATA GOES HERE++++++++++
//* - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
//* PERFLOG Merge
//* Takes the SMF type PERFLOG records and merges them with any other
//* records desired.
//* - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
//STEP02 EXEC PGM=merge,REGION=512K
//SYSPRINT DD SYSOUT=*
//PRINTER DD SYSOUT=*
//SYSUT1 DD DSN=PERFLOG.FORMATED,DISP=OLD
//SYSUT2 DD DSN=other.data,DISP=OLD
//SYSUT3 DD DSN=merged.data,DISP=(NEW,CATLG,DELETE),
//          UNIT=SYSALLDA,SPACE=(CYL,(10,5))
//
```

Defining System Profiles

You must modify several files. Log on to user ID MAINTSTK and update the following system profiles:

- PROFILE EXEC for MAINTSTK
- PROFILE EXEC for STKACS
- ACSAUTO EXEC
- PROFILE EXEC for STKGCS
- PROFILE GCS for STKGCS
- HSC Initialization parameters
- System profile (ACS SYSPROF)
- System definition file (ACS SYSDEF).

PROFILE EXEC for MAINTSTK

At this time, you may wish to modify file PROFILEM SAMPLE on MAINTSTK 191 to include PF key definitions and other installation specific functions, and rename it to PROFILE EXEC.

PROFILE EXEC for STKACS

Modify the file PROFILE SAMPLE for the ACS service machine, and rename it to PROFILE EXEC. It can be found on the MAINTSTK ACS191-disk.

ACSAUTO EXEC

Modify file ACSAUTO SAMPLE on MAINTSTK ACS191-disk and rename it to ACSAUTO EXEC. This EXEC is used to automatically start the ACS service machine software. It may be altered to include any other desired action at AUTOLOG time such as ATTACHing LMU stations.

PROFILE EXEC for STKGCS

If you are using GCS, modify file PROFILEX SAMPLE on MAINTSTK GCS191-disk and rename it to PROFILE EXEC.

PROFILE GCS for STKGCS

If you are using GCS, modify file PROFILEG SAMPLE on MAINTSTK GCS191-disk and rename it to PROFILE GCS.

HSC Initialization Parameters

At this time, decide what the HSC "EID" and "FID" values are to be. The default values may be taken since VM trace information is never processed in the MVS environment.

If you want to change the values, then the parameters are required later for the HSCPARM parameter in the ACS SYSPROF file (see "HSCPARM E(E086) F(23) MEMBER(xx)" on page 46). Also refer to "Creating an SLKJCL File for Starting the HSC" on page 129 and ''EXECParm Control Statement'' in the *HSC System Programmer's Guide* for additional information.

System Profile (ACS SYSPROF)

The system profile describes all of the system parameters that are not defined in the LIBGEN process. The default name of this file is ACS SYSPROF.

If you have more than one VM host sharing a library, you must have a separate ACS SYSPROF for each VM host. This file is used by the ACS EXEC and other functions to communicate with the library, create job streams for invoking library utilities, and start the HSC. Any virtual machine invoking these functions must have access to the ACS SYSPROF for the appropriate host.

The ACS SYSPROF is used by:

- the ACSINIT EXEC to define system-wide parameters for startup
- the ACSUTIL EXEC to generate JCL for utilities and the HSC startup SLKJCL.

ACSINIT EXEC

The ACSINIT EXEC uses the top portion of ACS SYSPROF to:

- define a name for the ACS service machine
- define a size for the Master Trace Table
- specify the host system
- define various system parameters
- authorize users for commands and messages
- define library parameters
- specify automatic startup jobs
- define LMU stations.

ACSUTIL EXEC

The ACSUTIL EXEC uses the bottom portion of ACS SYSPROF, and the LIBSUBSYS and HSCPARM parameters to generate /FILE statements for JCL jobs. The /FILE statements identify the control and journal data sets for:

- utility jobs such as BACKup, Journal OFFLoad, RESTore, and SLICREAT
- HSC startup ACS SLKJCL (see "Creating an SLKJCL File for Starting the HSC" on page 129).

/FILE statements are generated only for control data sets, journal data sets, and some utilities that are specified in ACS SYSPROF. For example, if primary and secondary control data sets are specified in ACS SYSPROF but a standby control data set and journal data sets are not, then /FILE statement are generated only for the primary and secondary control data sets.

Control and journal data sets are defined with the CDSDEF and JRNDEF control statements. Refer to the *HSC System Programmer's Guide* for information about these control statements.

Note: The data set names specified in ACS SYSPROF must be used when allocating the library data sets later in the installation (see "Allocate Library Data Sets" on page 105).

Sample ACS SYSPROF File

A sample ACS SYSPROF is provided in file SYSPROF SAMPLE on the MAINTSTK RUN-disk. You can modify this sample, leaving it on the RUN-disk, as follows to conform to your site requirements.

- Any line with an asterisk (*) in column one is a comment. You must delete the asterisk (*) to use the statement.
- Parameters enclosed by angle brackets "< >" are to be filled in by the installer. Remove the angle brackets at that time.
- You can allow optional parameters to default by leaving the line to the right of the parameter name blank, commenting out the entire line with an asterisk, or deleting the line altogether.

Several HSC and SCP commands are referenced in this section. Refer to the *HSC Operator's Guide* for complete explanations of commands.

Sample System Profile - SYSPROF SAMPLE (1 of 3)

```
*
*     SYSTEM-WIDE DEFINITIONS FOR THE ACS SERVICE MACHINE
*
* Name of the ACS service machine (node.userid)
ACSNAME <node.userid>

* Name of the performance log header/trailer data file
* PERFJCL PERFLOG SAMPLE*

* Master Trace Table size
MTTSIZE 64K

* System Identifier
HOSTID <hostid>

* Define some system parameters
CONSLOG  ON   (CLASS C TO <userid AT node>
PERFLOG  ON   (CLASS P TO <userid AT node>
PERFLOG  SMF  <subsystem name> <interval> <SUBTYPE(subtypelist)>
TRACE    OFF  (CLASS T TO <maintstk AT node>
MSGTYPE  MSGNOH
DUMPOPTS RESET 5Ø ( <maintstk>

* Authorized operators
AUTHORIZE <user-list> <maintstk> (CMDS
AUTHORIZE <user-list> <maintstk> (MSGS <routcde-list>
*-------------------------------------------------------
* Library Parameters
*-------------------------------------------------------

* Library Subsystem Name
LIBSUBSYS <subsystem name>

* Library Command Prefix Character
LIBPREFIX <libgen COMPRFX>

* Library HSC initialization parameters
* if modifying MEMBER parameter, see SLSSYSxx definition below
HSCPARM   E(EØ86) F(23) MEMBER(xx)
*
* Library Configuration File
LIBGEN    <fname>

* Library shared with other hosts
LIBSHARED <Yes|No>
```

Sample System Profile - SYSPROF SAMPLE (2 of 3)

```
*-------------------------------------------------
* Jobs to automatically submit when the service machine starts
*-------------------------------------------------
*AUTOJOB ACS SLKJCL * L
*-------------------------------------------------
* Define LMU stations
*-------------------------------------------------
*STATION <vaddr> <vaddr> ...
*-------------------------------------------------
* Define the data set names for Library data sets
*-------------------------------------------------
* Shared PARMLIB data set (as defined by HSCPARM MEMBER parameter)
*SLSSYSxx <vaddr> DSN <dsname><(member)>
*
* Primary Library Control Data Set (SLSCNTL, DBASEPRM)
*SLSCNTL 500 DSN <dsname> VOL <volser>
*
* Secondary Library Control Data Set (SLSCNTL2, SLSSHDW, DBASESHD)
*SLSCNTL2 501 DSN <dsname> VOL <volser>
*
*Standby Library Control Data Set (SLSSTBY)
*SLSSTBY 502 DSN <dsname> VOL <volser>
*
* Library Control Data Set journals for this host (SLSJRNxx, JOURNALx)
*SLSJRN01 503 DSN <dsname> VOL <volser>
*SLSJRN02 504 DSN <dsname> VOL <volser>
*
* Offloaded Library Journals for this host
*SLSOFF01 505 DSN <dsname> VOL <volser>
*SLSOFF02 506 DSN <dsname> VOL <volser>
* Backup of the Primary Library Control Data Set
*SLSBKUP 507 DSN <dsname>
*
* New primary, secondary data sets for Library RECONFIG utility
*DBPRMNEW 508 DSN <dsname> VOL <volser>
*DBSHDNEW 509 DSN <dsname> VOL <volser>
*
* Copy data sets for library BACKup utility
*SLSCOPY1 50A DSN <dsname>
*SLSCOPY2 50B DSN <dsname>
*
*TAPEREQ data set
*TREQDEF 50C DSN <dsname> VOL <volser>
*
*VOLATTR data set
*VOLDEF 50D DSN <dsname> VOL <volser>
*
*UNITATTR data set
*UNITDEF 50E DSN <dsname> VOL <volser>
*
```

Sample System Profile - SYSPROF SAMPLE (3 of 3)

```
*LMUPATH data set
*LMUPDEF 50F DSN <dsname> VOL <volser>
*
*LKEYINFO data set
*LKEYDEF 511 DSN <dsname> VOL <volser>
```

Parameter Definitions

ACSNAME <*node.userid*>

specifies the name of the ACS service machine. It may be on any VM host system in an RSCS network. This parameter is required.

node

optionally specifies the VM host system. If node is not specified or is specified as ‘‘*’’, the node defaults to the current node name as returned by the CMS IDENTIFY command.

userid

is the name of the ACS service machine. A userid is required.

PERFJCL PERFLOG SAMPLE *

specifies the CMS file name of the performance log header/trailer data file (see “Modifying Performance Log Header/Trailer JCL (Optional)” on page 37). If the listed file does not exist, the SCP abnormally terminates during initialization. This parameter is optional. There is no default.

MTTSIZE <*decimal*>**K**

specifies the storage size of the internal Master Trace Table. All interrupts, IUCV, I/O, and dispatch events are recorded here. All events (except USR) are always recorded in this table. The state of external event tracing has no effect on this tracing. This parameter is required.

decimal

is a decimal value for the size of the table. MTTSIZE must be greater than 1K. There are 32 trace entries per 1K of MTTSIZE. **The default is 64K.**

HOSTID <*hostid*>

specifies the host identifier for this system. The HOSTID is used by the control program for SMF processing and by the library to identify the current host system for the control data set. This parameter is required.

hostid

specifies a 1- to 4-character host identifier. It must match the HOSTID parameter in the LIBGEN SLILIBRY macro. **The default is the last four characters of the RSCS node name for the current host system.**

CONSLOG ON (CLASS C TO <*userid* **AT** *node*>
PERFLOG ON (CLASS P TO <*userid* **AT** *node*>
PERFLOG SMF <*subsystem name*> <***i****nterval*> <**SUBTYPE(***subtypelist***)**>

TRACE OFF (CLASS T TO <*maintstk* AT *node*>
MSGTYPE MSGNOH
DUMPOPTS RESET 50 (<*maintstk*>

These parameters define the initial console, performance, and trace logging parameters for the system.

PERFLOG SMF<*subsystem name*> <*interval*> <SUBTYPE(*subtypelist*)>

defines the SMF parameters for performance logging. PERFlog must be set ON for SMF recording to occur. Refer to the *HSC Operator's Guide* for an explanation of the SCP SET PERFlog operator command.

subsystem name

the value of the LIBSUBSYS parameter, which is normally the same as the job name of the startup SLKJCL.

interval

the SMF recording interval.

subtypelist

a list of the SMF subtypes being logged.

AUTHORIZE <*user-list*> <*maintstk*> **(CMDS**

specifies all virtual machines that are allowed to issue commands or to establish IUCV paths to the ACS service machine. These virtual machines must be authorized for CMDS privilege to the control program.

This parameter may be specified as many times as required to define all the virtual machines desired. Initially, only the ACS service machine and user ID OPERATOR are allowed command access. Refer to the *HSC Operator's Guide* for an explanation of the SCP AUTHorize command.

user-list

a list of virtual machine userids to be authorized.

maintstk

the userid for the MAINTSTK maintenance disk.

Note: All authorized users need link access to the RUN-disk.

AUTHORIZE <*user-list*> <*maintstk*> **(MSGS** <*routcde-list*>

specifies all virtual machines that are to receive system operator, tape operator, security, or system maintenance messages. These virtual machines **must** be authorized to receive the desired message route codes.

This parameter may be specified as many times as required to define all the virtual machines desired. The following initial values are observed. The ACS service machine receives all messages in the console log (if CONSlog is ON) and on the virtual console (if it is connected). Userid OPERATOR receives route codes 1, 2, 3, 5, 10, and 11. Refer to the *HSC Operator's Guide* for an explanation of the SCP AUTHorize command and route code definitions.

user-list
a list of virtual machine userids to be authorized.

maintstk
the userid for the MAINTSTK maintenance disk.

routcde-list
a list of route codes.

LIBSUBSYS <*subsystem name*>
specifies the library subsystem name.

subsystem name
is an arbitrary string of 1 to 4 characters.

LIBPREFIX <*libgen* **COMPRFX**>
specifies the library subsystem command prefix that is used by ACSPROP EXEC to issue commands to the library. This parameter is optional.

libgen
is the command prefix. If LIBPREFIX is specified, libgen must match the value specified by the COMPRFX parameter of the SLILIBRY macro (“SLILIBRY Macro” on page 69) in the LIBGEN source file.

HSCPARM E(E086) F(23) MEMBER(*xx*)
specifies the HSC initialization parameters. This statement is the default. If you want to modify the MEMBER parameter, see “SLSSYSxx <vaddr> DSN <dsname><(member)>” on page 47.

LIBGEN <*fname*>
specifies the CMS file name of the LIBGEN MODULE file, which defines the library configuration and parameters. This parameter is optional. This parameter is only required when performing SLICREAT from a LIBGEN module created on this host.

fname
is the file name.

LIBSHARED <Yes|No>
indicates whether the control data set is shared with other hosts. This parameter is optional. **The default is Yes**. Abbreviations (Y or N) are allowed.

If LIBSHARED is Yes, then a check is made during initialization to ensure that a ‘‘reserve’’ CCW can be successfully executed. All devices defined for the SLSCNTL, SLSCNTL2, SLSSTBY, SLSBKUP, DBPRMNEW, and DBSHDNEW data sets are tested. If the ‘‘reserve’’ fails, then initialization terminates.

Define the following statements, but leave them commented out (‘‘*’’ in column one) until you perform the installation step described in “Enable the Library Definitions in ACS SYSPROF” on page 112.

- AUTOJOB
- STATION
- SLSCNTL
- SLSCNTL2
- SLSSTBY
- SLSJRNxx
- SLSOFFxx
- SLSBKUP
- DBPRMNEW
- DBSHDNEW.

AUTOJOB ACS SLKJCL * *class*

specifies the file name of a CMS file that the ACS INIT function is to automatically submit to the control program when starting the control program. This parameter is optional.

class

must be one of the following in order to be automatically started when a job reader is ready:

D to start a generic non-authorized job.
L to start the library subsystem.
U to start a library utility job.

These classes are defined in the file ACS SYSDEF. Other classes wait in the virtual reader queue until the spool file class is changed or a new job reader is started.

STATION <*vaddr*> <*vaddr*> **...**

specifies the LMU station addresses. LMU station addresses must be specified in order for them to be included in the control program I/O configuration. This parameter is optional.

vaddr

the virtual address of the LMU station.

The following data set definitions must use the DDnames shown, although some processes may use different DDnames to access the definitions.

SLSSYS*xx* <*vaddr*> **DSN** <*dsname*><(*member*)>

defines the PARMLIB (parameter control statement library) data set if it resides on DASD. The ‘‘*xx*’’ suffix matches the MEMBER option of the HSCPARM parameter specified above.

SLSCNTL <*vaddr*> **DSN** <*dsname*> **[VOL** <*volser*>**]**

defines the library primary control data set referenced by DDnames SLSCNTL and DBASEPRM which are used in the HSC startup job (ACS SLKJCL) and the HSC utility jobs. The preferred method of defining the primary control data set is with the CDSDEF control statement in PARMLIB. This parameter is required.

vaddr

the virtual address of the ACS DASD on which the data set resides.

dsname

the data set name of that volume.

volser

the volume serial number of the volume on which the data set resides. The VOL parameter is optional.

SLSCNTL2 <*vaddr*> **DSN** <*dsname*> **[VOL** <*volser*>**]**

defines the library secondary control data set referenced by DDnames SLSCNTL2, SLSSHDW, and DBASESHD which are used in the HSC startup job (ACS SLKJCL) and the HSC utility jobs. This parameter is required if the LIBGEN specifies recovery TCHNIQE=BOTH, TCHNIQE=SHADOW, TCHNIQE=STANDBY, or TCHNIQE=ALL. The preferred method of defining the primary control data set is with the CDSDEF control statement in PARMLIB.

vaddr

the virtual address of the ACS DASD on which the data set resides.

dsname

the data set name of that volume.

volser

the volume serial number of the volume on which the data set resides. The VOL parameter is optional.

SLSSTBY <*vaddr*> **DSN** <*dsname*> **[VOL** <*volser*>**]**

specifies standby control data set known by the DDname: SLSSTBY. This parameter is required if the LIBGEN specifies recovery TCHNIQE=STANDBY or TCHNIQE=ALL. The standby control data set is defined with the CDSDEF control statement in PARMLIB.

vaddr

the virtual address of the ACS DASD on which the data set resides.

dsname

the data set name of that volume.

volser

the volume serial number of the volume on which the data set resides. The VOL parameter is optional.

SLSJRN01<*vaddr*>**DSN** <*dsname*>**[VOL**<*volser*>**]**
SLSJRN02 <*vaddr*> **DSN** <*dsname*> **[VOL** <*volser*>**]**

specify the journal data sets for all hosts. These data sets are known by the DDnames: SLSJRN*xx* where *xx* is 01 through 32. List the journals for the current host first as SLSJRN01 and SLSJRN02, then list (in any order) the journals for all other configured hosts.

This parameter is required if the LIBGEN specifies recovery TCHNIQE=BOTH, TCHNIQE=JOURNAL, or TCHNIQE=ALL. The journal data sets are defined with the JRNDEF control statement in PARMLIB.

vaddr

the virtual address of the ACS DASD on which the data set resides.

dsname

the data set name of that volume.

volser

the volume serial number of the volume on which the data set resides. The VOL parameter is optional.

SLSOFF01 <*vaddr*> **DSN** <*dsname*>
SLSOFF02 <*vaddr*> **DSN** <*dsname*>

specify all the data sets on which to copy the journal data sets when the Journal OFFLoad utility is invoked. These data sets are known by the DDnames: SLSOFF*xx*; where *xx* is 01 through 99. List the offload data sets for the current host first as SLSOFF01 and SLSOFF02, then list (in any order) the data sets for all other configured hosts. This parameter is required if the LIBGEN specifies recovery

```
TCHNIQE=BOTH, TCHNIQE=JOURNAL, or TCHNIQE=ALL.
```

vaddr

The virtual address of the ACS DASD on which the data set resides.

dsname

The data set name of that volume.

SLSBKUP <*vaddr*> **DSN** <*dsname*>

specifies the data set to be used for backing up the primary control data set. The BACKup utility copies the primary control data set to this data set, and the RESTore utility copies from this data set. This parameter is required.

vaddr

The virtual address of the ACS DASD on which the data set resides.

dsname

The data set name of that volume.

DBPRMNEW <*vaddr*> **DSN** <*dsname*> **[VOL** <*volser*>**]**
DBSHDNEW <*vaddr*> **DSN** <*dsname*> **[VOL** <*volser*>**]**

specify the new primary and secondary control data sets for the Reconfig utility. The DBPRMNEW parameter is required. The DBSHDNEW parameter is also required if the new LIBGEN specifies recovery

```
TCHNIQE=BOTH, TCHNIQE=SHADOW, TCHNIQE=STANDBY, or TCHNIQE=ALL.
```

vaddr

The virtual address of the ACS DASD on which the data set resides.

dsname

The data set name of that volume.

volser

The volume serial number of the volume on which the data set resides. The VOL parameter is optional.

SLSCOPY1 *vaddr* **DSN** <*dsname*>
SLSCOPY2 *vaddr* **DSN** <*dsname*>

specify the COPY data sets used by the BACKup utility Analyze option. The SLSCOPY1/SLSCOPY2 parameters are required.

vaddr

The virtual address of the ACS DASD on which the data set resides.

TREQDEF *vaddr* **DSN** <*dsname*> **[VOL** <*volser*>**]**

Specifies the data set that contains the TAPEREQ statements.

VOLDEF *vaddr* **DSN** <*dsname*> **[VOL** <*volser*>**]**

Specifies the data set that contains the VOLATTR statements.

UNITDEF *vaddr* **DSN** <*dsname*> **[VOL** <*volser*>**]**

Specifies the data set that contains the UNITATTR statements.

LMUPDEF *vaddr* **DSN** <*dsname*> **[VOL** <*volser*>**]**

Specifies the data set that contains the LMUPATH statements.

LKEYDEF *vaddr* **DSN** <*dsname*> **[VOL** <*volser*>**]**

Specifies the data set that contains LKEYINFO statements.

SCRPDEF *vaddr* **DSN** <*dsname*> **[VOL** <*volser*>**]**

Specifies the data set that contains SCRPOOL statements.

System Definition File (ACS SYSDEF)

The system definition file describes all of the system files and configurations that are static. If needed, modify this file to add more AUTHRDR statements, leaving it on the RUN-disk. The default name of this file is ACS SYSDEF. The sample ACS SYSDEF shown below is provided in file SYSDEF SAMPLE on the MAINTSTK RUN-disk.

This file is used in initializing the control program (SCP).

Any line with an asterisk (*) in column one is a comment.

All of the statements in this file are SCP operator commands that are executed during ACS service machine initialization. Refer to the *HSC Operator's Guide* for explanations of SCP commands syntax and parameters.

Sample System Definition - SYSDEF SAMPLE

```
*------------------------------
* SCP SYSTEM DEFINITION
*------------------------------
* Define the basic I/O configuration
  DEFINE DEV 009 3215 CONSOLE

* Define system files
  FILE CMDCONS   DEV    009        DSN SLS.CONSOLE.COMMANDS
  FILE CMDIUCV   IUCV   ANY        DSN SLS.LIB.COMMANDS
  FILE CMDSMSG   IUCV   *MSG       DSN SLS.SMSG.COMMANDS
  FILE CONSLOG   DEV    PRNT       DSN SLS.CONSOLE.LOG
* FILE HCOMM     IUCV   <stkgcs>   DSN <stkgcs>.HOST.COMM
  FILE LCOMM     IUCV   <tcpip>    DSN <tcpip>.LMU.COMM
  FILE PERFLOG   DEV    PNCH       DSN SLS.PERF.LOG
  FILE TRACE     DEV    PNCH       DSN SLS.TRACE.LOG
*Start job readers
 START JOBRDR    ID       40 (CLASS D
 START AUTHRDR   LIBRARY  30 (CLASS L
 START AUTHRDR   LIBUT1   50 (CLASS U
 START AUTHRDR   LIBUT2   50 (CLASS U
```

Parameter Definitions

DEFINE DEV 009 3215 CONSOLE
defines the virtual console device.

FILE CMDCONS DEV 009 DSN SLS.CONSOLE.COMMANDS
defines the virtual console command interface file.

FILE CMDIUCV IUCV ANY DSN SLS.LIB.COMMANDS
defines the IUCV command interface file.

FILE CMDSMSG IUCV *MSG DSN SLS.SMSG.COMMANDS
defines the CP SMSG command interface file.

FILE CONSLOG DEV PRNT DSN SLS.CONSOLE.LOG
defines the console log (CONSLOG) file.

FILE HCOMM IUCV <*stkgcs***> DSN <***stkgcs***>.HOST.COMM**
optionally defines the IUCV connection with the host communications component on GCS. stkgcs is the user ID of the GCS component service machine.

FILE LCOMM IUCV <*tcpip*> DSN <*tcpip*>.LMU.COMM
optionally defines the IUCV connection with the LMU communications component. *tcpip* is the user ID of the TCP/IP service machine.

FILE PERFLOG DEV PNCH DSN SLS.PERF.LOG
defines the performance log file.

FILE TRACE DEV PNCH DSN SLS.TRACE.LOG
defines the external trace file.

START JOBRDR ID 40 (CLASS D
START AUTHRDR LIBRARY 30 (CLASS L
START AUTHRDR LIBUT1 50 (CLASS U
START AUTHRDR LIBUT2 50 (CLASS U
START AUTHRDR LIBUT3 50 (CLASS U
start job initiators and define their job classes. A maximum of six AUTHRDR and six JOBRDR statements may be specified.

Multiple job initiators of the same class compete for newly arriving jobs.

Verifying the SCP - Installation Verification Program (IVP1)

The IVP1 EXEC is used to test the system control program (SCP). Execute IVP1 by performing the steps in the following procedure:

Note: Commands issued by IVP1 normally produce error messages, and one dump from a DUMP command.

1. Log on to the ACS service machine.
2. Enter the following command to start the control program:

   ```
   ACS INIT
   ```

   No jobs should start automatically. The following messages should be displayed:

   SLKBINIT
   describes initialization parameters.

   SLKTKM450I
   displays the copyright statement.

3. From a virtual machine authorized for CMDS in the SYSPROF file, link to the MAINTSTK RUN-disk (254) and enter the command:

   ```
   EXEC IVP1
   ```

   When XEDIT displays a file, modify it as desired, and enter “file” on the command line to save and submit the file.

   Execution of the command issues several other commands and submits two IEFBR14 jobs. Respond to the prompts as they are displayed.

4. Ensure that the jobs complete with return code of 0. IVP1 EXEC shuts down the ACS service machine.
5. If abnormal results are produced, check the ACS SYSPROF file for incorrect parameters.

If any input or execution files are not found when executing IVP1, check the DASD LINKs and ACCESSes.

If any other dumps are produced, contact StorageTek Software Support.

Chapter 5. Performing Preexecution Tasks

The following tasks must be performed as preexecution tasks:

- adding SMF parameters
- adding definitions for ACF/VTAM communications (optional)
- adding a command list to the HSC.

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 SMF Parameters

The PERFLOG SMF statement in the ACS SYSPROF file (see "System Profile (ACS SYSPROF)" on page 39) defines the following SMF parameters for performance logging:

- The HSC subsystem name. This is a 1- to 4-character name that corresponds to the LIBSUBSYS parameter in the ACS SYSPROF.
- The HSC performance recording interval.
- The HSC SMF record subtypes to be recorded.

The SCP SET PERFlog operator command is used to enable/disable performance logging, and can also be used to specify the HSC SMF record subtypes to be recorded. Refer to the *HSC Operator's Guide* for an explanation of the SET PERFlog command syntax and parameters.

HSC SMF Record Subtypes

HSC can generate the SMF record subtypes listed in Table 2 on page 56.

If you do not specify the SUBTYPE parameter in your SMF options, HSC generates subtypes 1 through 6. You must code a SUBTYPE parameter and include subtypes 7 and 8 to generate cartridge move and view records.

For more information on the SMF records, see the *HSC System Programmer's Guide*.

Table 2. HSC SMF Record Subtypes

Subtype	Description
1	LSM operations statistics
2	Vary Station command
3	MODify LSM command
4	LMU read statistics
5	Cartridge eject
6	Cartridge enter
7	Cartridge move
8	VIew

Adding Definitions for ACF/VTAM Communications

Ensure that you are familiar with the information presented in "Communications 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 file HSCAPPL COPY. Assuming your HSC application program minor node (APPLID) is APHSC1, the sample APPL statement shows the recommended operands:

Sample APPL Statement for HSC

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

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.

Adding a Command List to the HSC

You may optionally execute a set of HSC commands during initialization by placing them in the startup ACS SLKJCL file, or by placing them in a file that is pointed to by the /FILE SLSSYSxx statement in the startup ACS SLKJCL. (Refer to “Creating an SLKJCL File for Starting the HSC” on page 129). These commands are referred to as PARMLIB entries. They may also be placed in a sequential data set or partitioned data set (PDS).

Files SLSSYS00 COPY, SLSSYS12 COPY, and SLSSYS20 COPY contain sample command lists that issue various HSC commands to set options to default values. You may copy one of these samples and modify it to fit your site requirements. Add any other commands that you may need for HSC initialization.

Chapter 6. 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.

The HSC verification process (see Chapter 10, “Testing the Installation” on page 143) 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 60. Sample LIBGEN files are contained in Appendix B, “Library Configurations” on page 163.

   In CMS, the file must have the characteristics as defined in the following table

Table 3. Requirements for LIBGEN Assembler Statements

Characteristic	Requirement
Filename	Any valid CMS filename
Filetype	ASSEMBLE
Record Format (recfm)	F
Logical Record Length (lrecl)	80
Truncation (trunc)	72

2. Assemble and link-edit the LIBGEN file, and move the CMS MODULE file to the correct minidisk. This is accomplished by the LIBGEN EXEC (refer to “Assemble the LIBGEN File” on page 101).

3. Allocate and initialize the library control data sets (see “Allocate Library Data Sets” on page 105 and “Data Set Initialization” on page 112).

Note: If you are migrating from a prior release of the HSC, refer to Appendix D, “Migration and Coexistence Processes” on page 197.

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 SLSMAC MACLIB on the MAINTSTK RUN-disk.

Sample LIBGEN source files are on the MAINTSTK MERGE-disk or BASE-disk. Issue the following command to locate them:

```
LISTFILE LIBGEN* SAMPLE *
```

The samples are also shown in Appendix B, “Library Configurations”.

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 3 on page 63 illustrates a list of LIBGEN macros in required order.

LIBGEN Macro Relationship to a Library Configuration

Figure 4 on page 64 is an example of a typical library configuration. Figure 5 on page 65 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 187 for an explanation of macro syntax conventions.

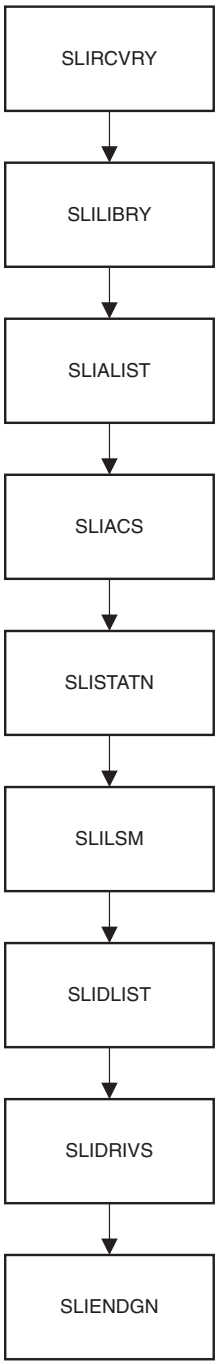


Figure 3. Required Order for Specifying the LIBGEN Macros

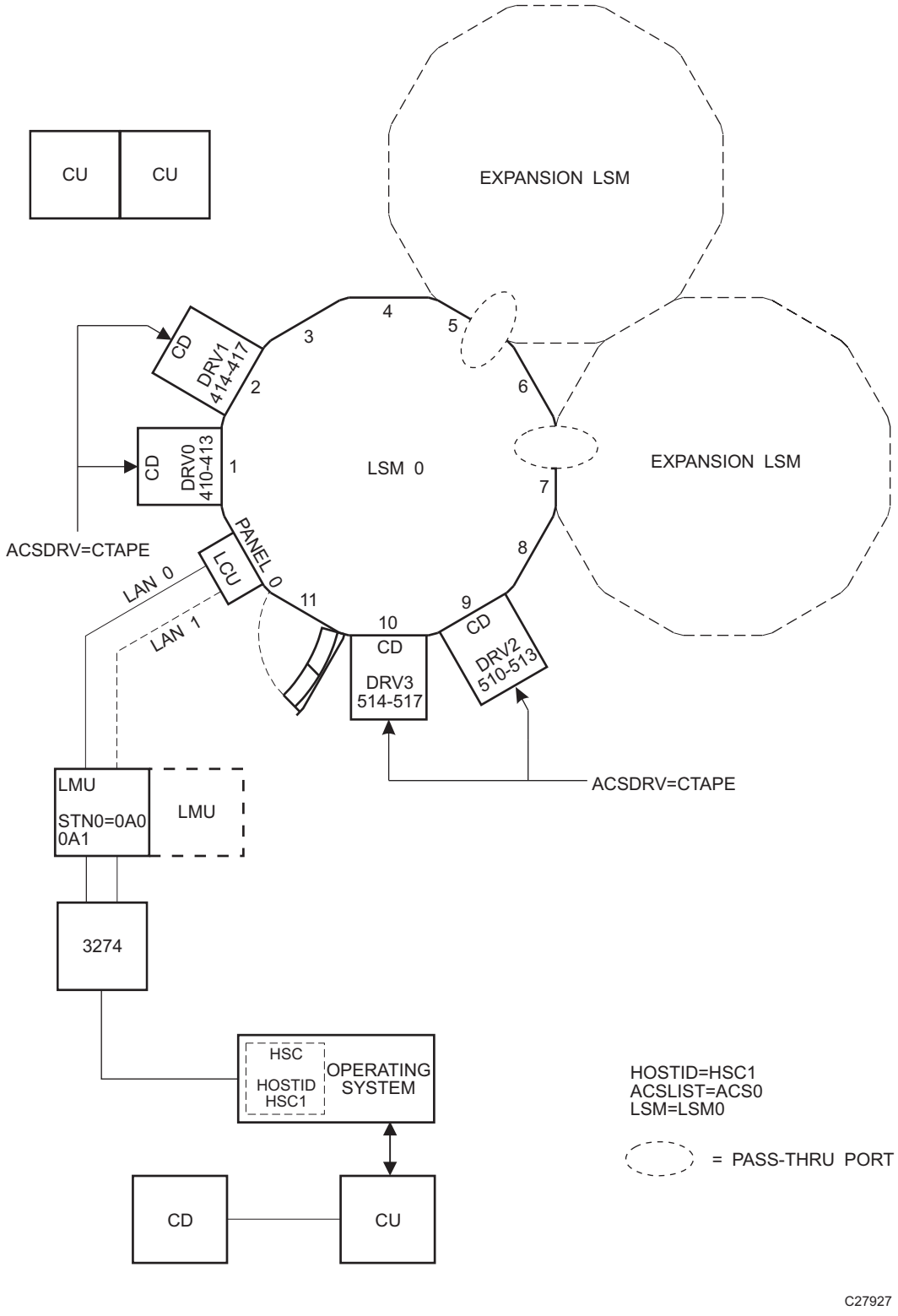


Figure 4. Sample Library Configuration

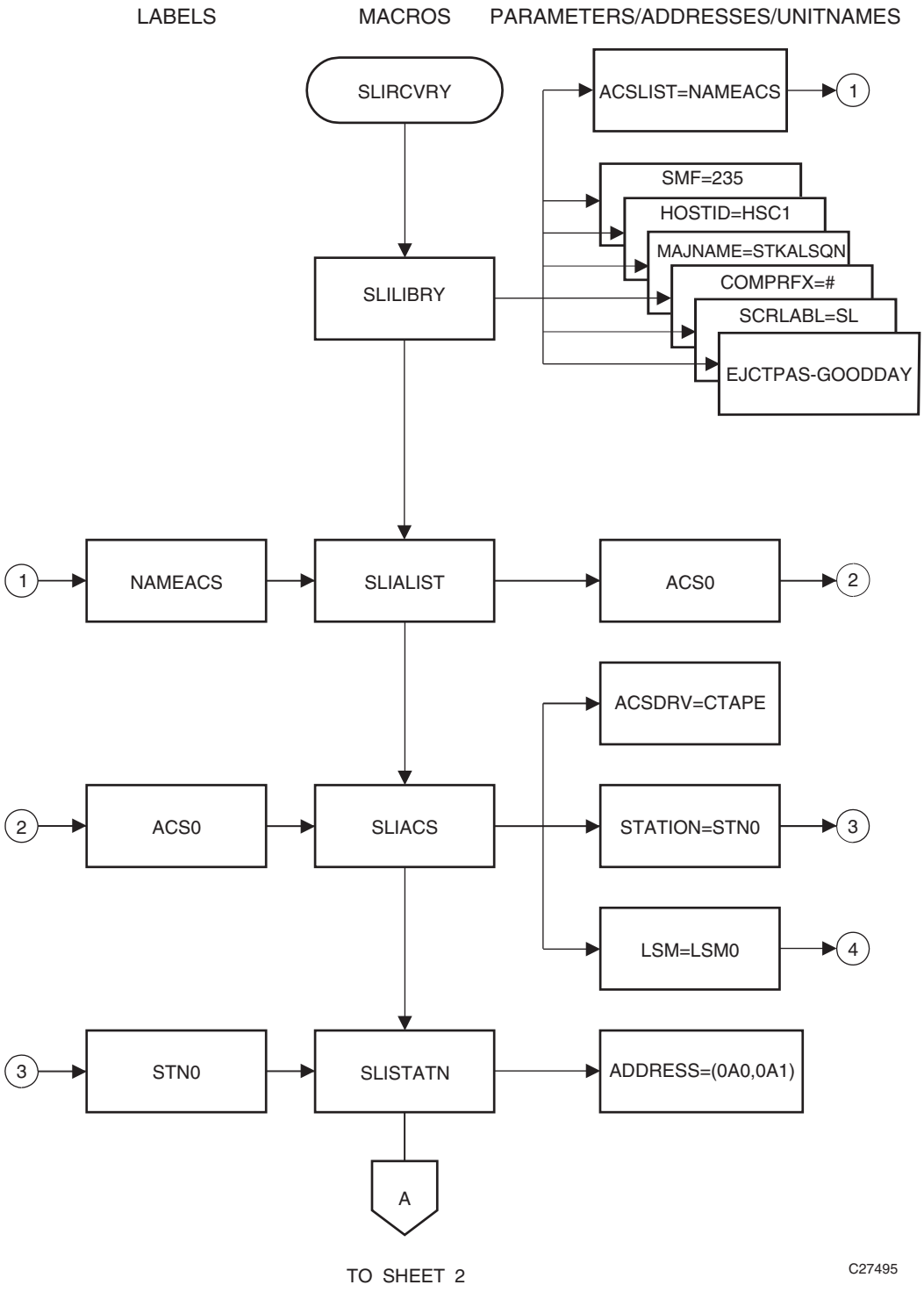


Figure 5. LIBGEN Macro Relationship (1 of 2)

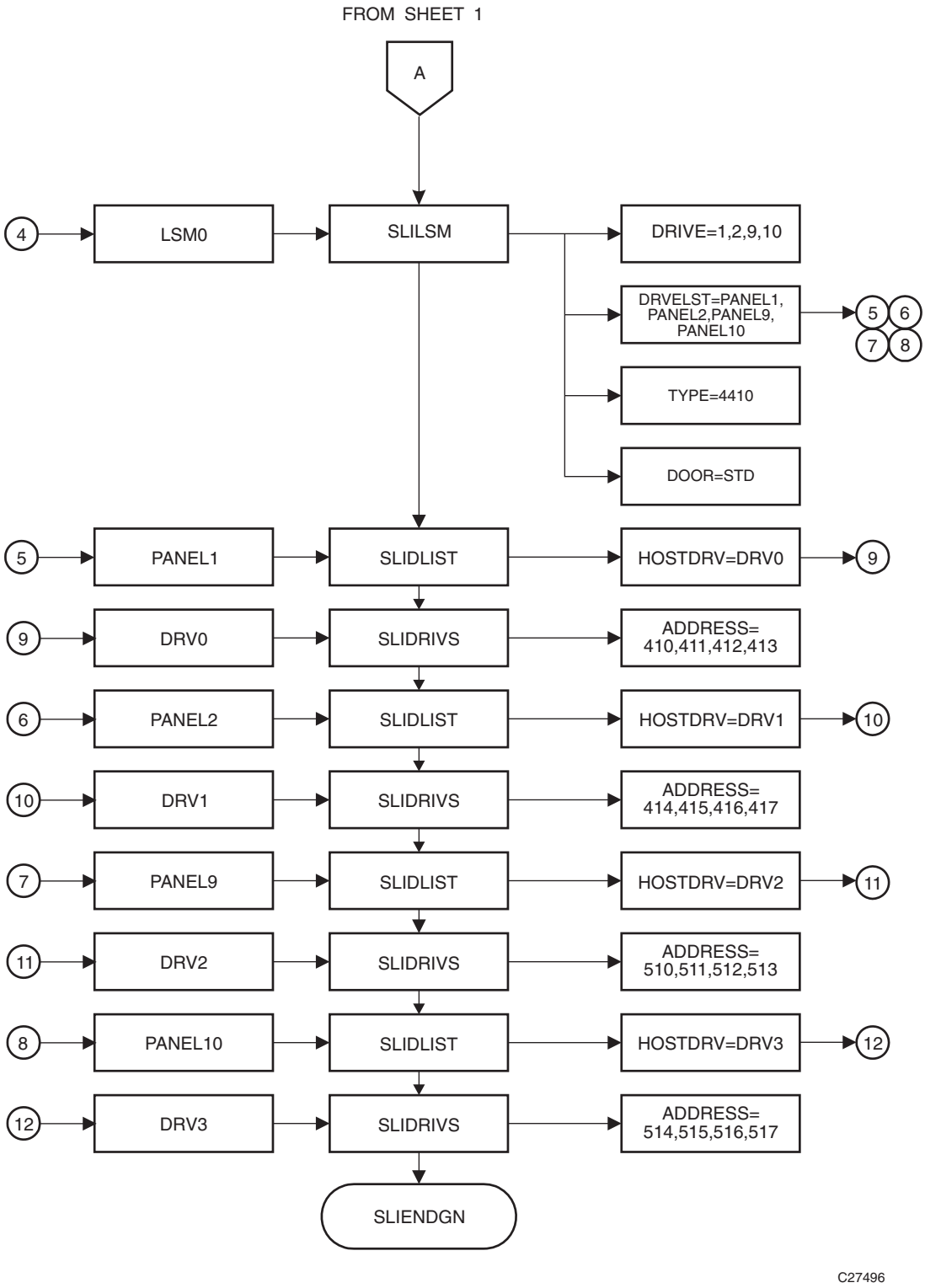
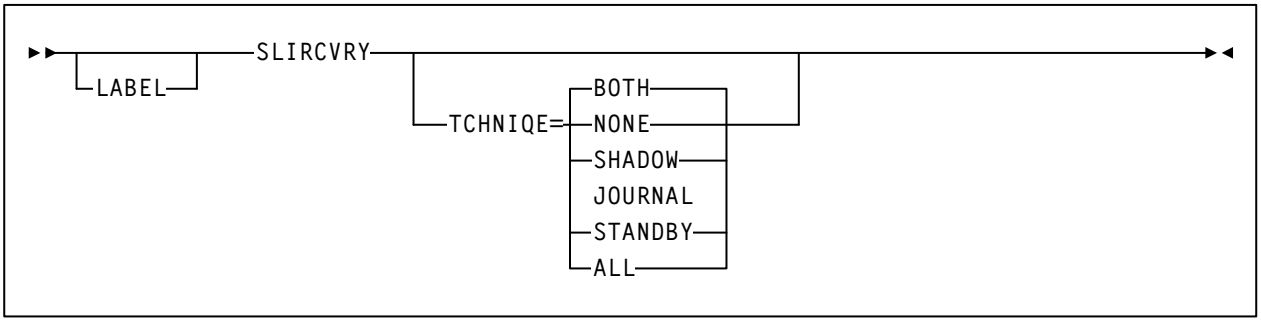


Figure 5. LIBGEN Macro Relationship (2 of 2)

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



Parameters

label

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

SLIRCVRY

name of this macro.

TCHNIQE=

this parameter 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. **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

```
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 the SMF System ID. Valid characters for a HOSTID are A-Z, 0-9, #, $, and @. The HOSTID for VM may be any arbitrary string of one to four characters. It also serves as the SMF system identifier.

Note: In configurations where both MVS and VM hosts access the library, the VM hosts are coded last for ease of coding, because of interactions with other LIBGEN macros.

```
VM Example:
          HOSTID=(VM81)

JES2 and VM Example:
          HOSTID=(MVSA,VMB)
                where: MVSA is Host0
                       VMB is Host1


JES3 and VM Example:
          HOSTID=(MVSXA81A,VMB)

                where: MVSXA81A is Host0
                       VMB is Host1


JES2 Example:
          HOSTID=(MVSA,MVSB)

                where: MVSA is Host0
                       MVSB is Host1


JES3 Example:
          HOSTID=(MVSXA81A,MVSXA81B)
                where: MVSXA81A is Host0
                       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 default is 255**.

```
Example: SMF=235
```

NNLBDRV=

This parameter is not used by VM hosts, but must be specified if there are MVS hosts with manual transports.

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
                    TTAPE is for Host2


    NNLBDRV=(CARTAPE,CARTAPE,CARTAPE)

             where: CARTAPE is used for all three hosts
```

Notes:

- An asterisk may be used to duplicate the preceding value. For example:

  ```
  NNLBDRV=(value1,*,*)
  ```

  is equivalent to:

  ```
  NNLBDRV=(value1,value1,value1)
  ```

- Each entry in the NNLBDRV parameter corresponds to a host ID. You can omit this parameter if only VM systems are accessing the library, or there are no nonlibrary transports for the MVS hosts.

DELDISP=

specifies how the library is to interpret the delete disposition on a dismount message. This parameter is not used by VM hosts.

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 SCP)
- any of the CP line editing symbols in effect (such as ''#,'' ''@,'' ''¢,'' or ''"''). Issue the CP QUERY TERM command to determine the line editing symbols in effect.

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 SCP modify command to issue commands to the HSC. Refer to ''Modify Command (SCP)'' in the *HSC Operator's Guide* for details on command syntax and parameters.

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. For example:

```
.DISPLAY CDS
```

- Specify an HSC command using the SCP modify command. This is done by prefixing the HSC command with the HSC task name. For example:

```
taskname DISPLAY CDS
```

The HSC task name is the job name specified by the /JOB statement in the startup SLKJCL. Refer to “HSC Startup Job (ACS SLKJCL)” on page 133 for additional information.

Table 4. Mapping of Command Prefix Codes to Characters

Hex	Character	Description
40	null	blank
4A	¢	cent
4B	.	period
4C	<	less than
4D	(	left parenthesis
4E	+	plus
4F	|	vertical bar
50	&	ampersand
5A	!	exclamation point
5B	$	dollar sign
5C	*	asterisk
5D	)	right parenthesis
5E	;	semicolon
5F	¬	not symbol
60	-	minus
61	/	slash
6B	,	comma
6C	%	percent
6D	_	underscore
6E	>	greater than
6F	?	question mark
7A	:	colon
7B	#	crosshatch

Table 4. Mapping of Command Prefix Codes to Characters

Hex	Character	Description
7C	@	at sign
7E	=	equals sign
7F	“	double quote

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

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
```

FUTRACS=

This parameter is used when new ACSs are to be added to the library complex. ***x*** specifies the number of ACSs, and ***y*** optionally specifies the number of LSMs to add for each added ACS (i.e., ***x*** times ***y***).

Caution: The additional CDS records you create can cause your system to generate an 878-10 ABEND error if there is not enough space to hold the internal records for some operations. If you run out of space during the HSC INIT, you need to re-create your LIBGEN and lower these numbers.

Notes:

- The number of ACSs specified can be between 1 and 255, but the total number of real ACSs and FUTRACS must not exceed 255.
- The number of LSMs for each FUTRACS must be a multiple of 4 and range between 4 and 40.
- If you do not specify LSMs (*y*), it defaults to 12.
- FUTRACSs are generic, meaning you can use them to dynamically add an SL3000 or a string of SL8500 libraries, not to exceed the number of LSMs generated. The total number of LSMs represented by this parameter is used in the CDS size calculation *future-lsms* parameter discussed on page 18.

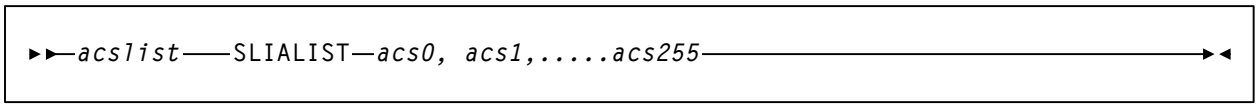
Example

```
SLILIBRY HOSTID=(MVSA,MVSB),                                    X
         ACSLIST=LACSLIST,                                      X
         CLNPRFX=CLN,                                           X
         SMF=235,                                               X
         NNLBDRV=(CARTAPEA,),                                   X
         DELDISP+SCRTCH,                                        X
         MAJNAME=STKALSQN,                                      X
         COMPRFX=1,                                             X
         SCRLABL=NSL,                                           X
         EJCTPAS=GOODDAY,
```

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



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

```
ACSLIST SLIALIST ACS0,ACS1
```

SLIACS Macro

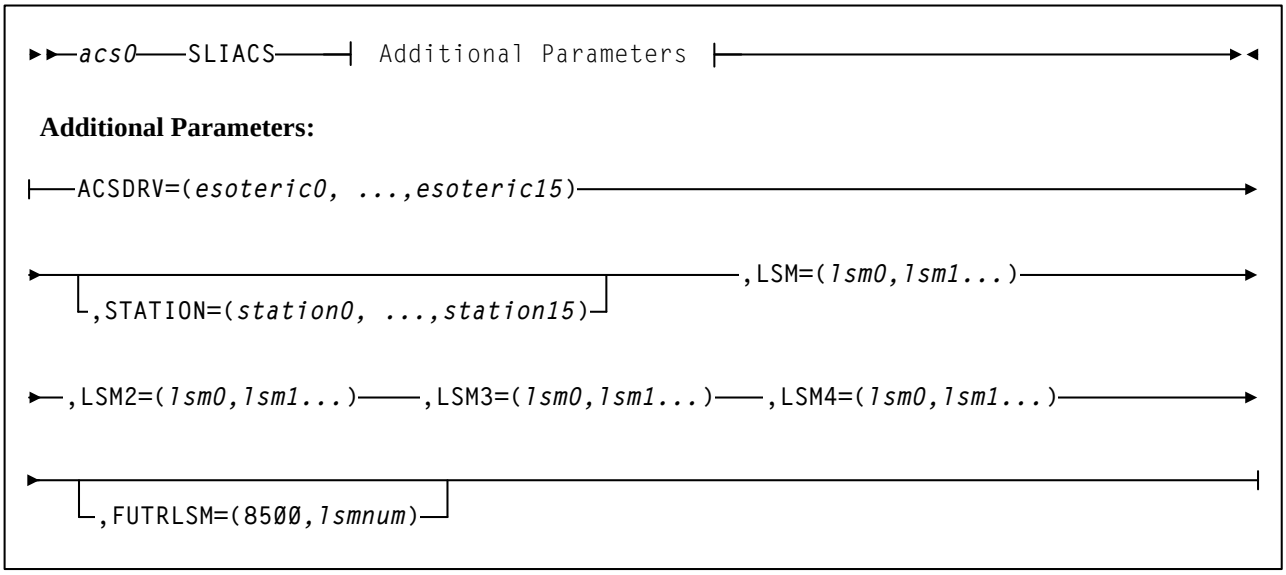
The SLIACS macro defines the following items:

- the esoteric unit name used by tape transports attached to an ACS
- the communication paths between a host (or hosts) and an ACS
- the LSMs attached to an ACS
- preallocating space in the CDS for additional SL8500 LSMs.

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



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. Esoterics are omitted for VM hosts. 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:

- 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
       CTAPEB corresponds to Host1
```

- 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.

The ACSDRV parameter is required but can be specified as an asterisk if only VM hosts are defined. For example:

```
ACSDRV=*,
or
ACSDRV=(*,*)
```

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.

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.

Note: Users running TCP/IP LMU network attachment are not required to supply either SLIACS station number or SLISTATN station address statements. However, if you intend to transition between TCP/IP and 3270 station connections, you should specify both the SLIACS STATION labels and SLISTATN ADDRESS settings.

If STATION is omitted, the ACS has no defined 3270 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 6.2 LIBGEN macros without STATION definitions, then HSC 6.0 and 6.1 systems cannot operate with this CDS.

Examples:

If the SLILIBRY macro has been entered as:

```
SLILIBRY HOSTID(MVSØ,MVS1)
```

and , if the STATION parameter is specified as:

```
STATION=(STNØ),
```

STN0 corresponds to MVS0.

If STATION is specified as:

```
STATION=(STNØ,STN1),
```

STN0 corresponds to MVS0, and STN1 corresponds to MVS1.

LSM, LSM2, LSM3, LSM4=

lsm0,lsm1 ... are the assembler labels of the SLILSM macros that define each LSM configured within the ACS.

The number of assembler labels that can be specified on an **LSM, LSM2, LSM3**, or **LSM4** parameter is variable and depends on the length of each label, the number of imbedded commas, and the opening and closing parentheses.

The total number of characters specified cannot exceed the IBM limitation of 255 characters. The **LSM2, LSM3**, and **LSM4** are optional parameters not required if the number of LSMs in the ACS and your naming convention results in a string length less than 255 characters.

For example, if each assembler label is four characters long, a maximum of 50 assembler labels can be specified on the **LSM** parameter:

```
200 label characters + 49 imbedded commas + 2 parentheses =
251 characters
```

Adding another assembler label results in a LIBGEN assembly error. To resolve this problem, add an **LSM2** parameter on the SLIACS macro and specify the fifty-first assembler label on that parameter.

In general, if the ACS contains more LSMs (assembler labels) than can be supported by the **LSM** parameter, you must code **LSM2**, **LSM3**, or **LSM4** parameters, as necessary, for the other LSMs. It is recommended that you code additional **LSM*x*** parameters in ascending order for easier maintainability. Also, note that there is an architectural limit of 256 LSMs for each ACS.

Examples:

```
LSM=(L000)
LSM=(L000,L001,L002)
```

FUTRLSM=

8500 indicates to preallocate space in the CDS for SL8500 LSMs. This space is used when new LSMs are to be added to the ACS through PTP connections.

lsmnum defines the number of future preformatted LSM records written to the CDS. The number specified must be between 4 and 124.

This parameter is optional.

Notes:

- An SL8500 library contains four rails (LSMs), thus the *lsmnum* value must be in multiples of four (4, 8, 12, 16, and so on).
- If the number specified in *lsmnum* is too small, another LIBGEN will be required to add additional LSMs. If the number entered for *lsmnum* is too large, the result is unused CDS space reserved for future expansion.
- The total number of LSMs represented by this parameter is used in the CDS size calculation *future-lsms* parameter shown on page 18.

Example

SLIACS Statement

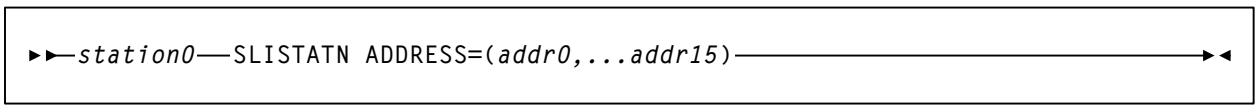
```
ACS0  SLIACS   ACSDRV=(CTAPEA,CTAPEB),                          X
               STATION=(STN0,STN1),                            X
               LSM=(LSM0,LSM1,LSM2),                           X
               FUTRLSM=(8500,16)
```

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.

Note: If you are using only TCP/IP LMU connections, you can omit this macro statement, but if you are using 3270 or a combination of 3270 with TCP/IP, then you need to include the SLISTATN macro.

Syntax



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=(0A0)
         ADDRESS=(0A0,0A1)
```

Example

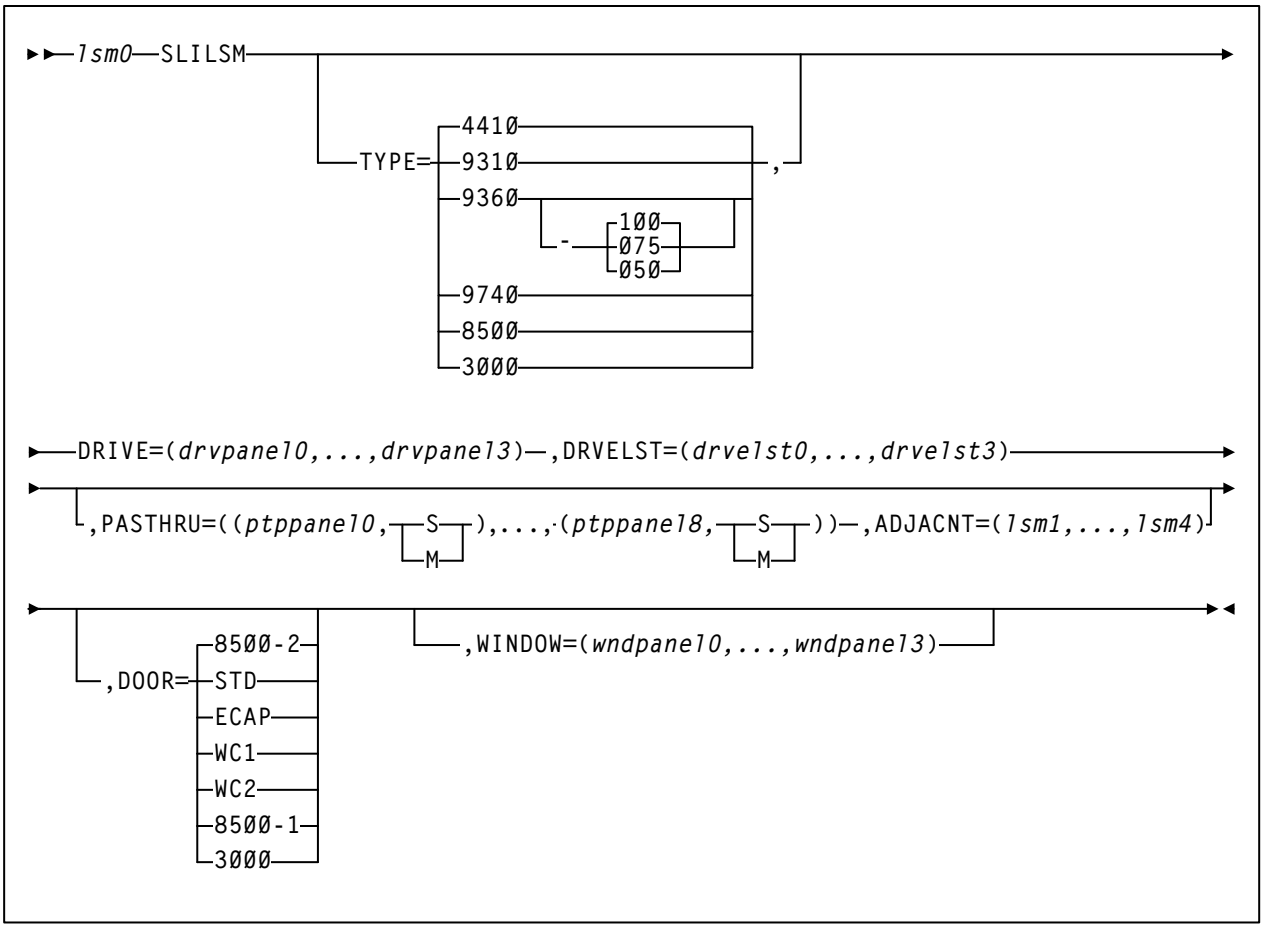
```
STN0   SLISTATN   ADDRESS=(0A0,0A1)
```

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.

8500

specifies an SL8500 library.

3000

specifies an SL3000 library.

Note: For the SL3000 library, the DRIVE and DRVELST parameters are optional. If you do not specify them, you must run the SET SLIDRIVS utility.

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.

The following are LSM-specific panel requirements:

- 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 94 for additional information).
- 9360 (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.
- For SL8500 libraries, panel 1 is the only drive panel.
- For SL3000 libraries, panels 10 and 12 are the only drive panels.

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,PANEL10)
```

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.
- For SL8500, valid values for *ptppanel0* are 0 and 1.
- For SL3000, this parameter is ignored because it does not contain pass-thru ports.

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, 9740, and SL8500 LSMs.

> **Note:** The SL8500 contains 3 internal PTPs (the elevator) that move cartridges between LSMs (rails).

A maximum of two master (M) pass-thru ports are allowed per LSM as shown in Figure 6 on page 86.

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.

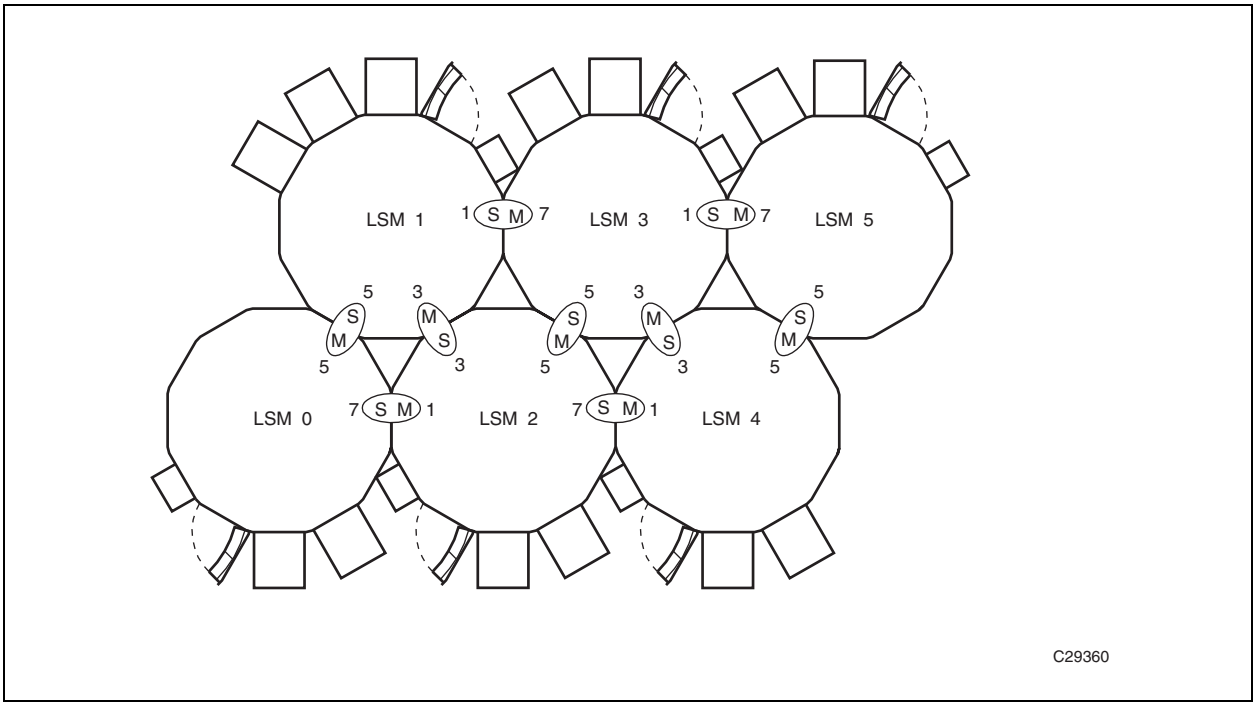


Figure 6. Example of Pass-thru Port Relationships

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

For SL8500 libraries, the lowest numbered LSM is always the master PTP.

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=((0,M),(2,S)) (WolfCreek Example)
PASTHRU=((2,M),(0,S)) (9740 Example)
PASTHRU=((0,M),(0,M),(0,M)) (SL8500 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.

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)

         where: LSM1 is ptppanel0

         ADJACNT=(LSM2,LSM0)

where: LSM2 is ptppanel0
       LSM0is ptppanel2
```

For the SL3000 library, this parameter is ignored because it does not contain pass-thru ports.

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).

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.

8500-1

indicates an SL8500 configured with one CAP (capacity of 39 cartridges).

8500-2

indicates an SL8500 configured with two CAPs (capacity of 39 cartridges each). **8500-2 is the default.**

3000

indicates an SL3000.

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)
- SL3000 - available only on panel 13. If not specified, the HSC self-discovers the window at HSC INIT.

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,LSM                                   X
              DOOR=STD
```

SLILSM Statement Specifying LSM Model 9310 - PowderHorn

```
LSM4  SLILSM  TYPE=9310                                           X
              DRVELST=(PANEL1,PANEL2,PANEL9,PANEL10),             X
              PASTHRU=((5,M),(7,S)),                              X
              ADJACNT=(LSM1,LSM2),                                X
              DOOR=ECAP
```

SLILSM Statement Specifying 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=ECAP,                                          X
              WINDOW=(4,8)
```

SLILSM Statement Specifying LSM Model 9360-100 WolfCreek

```
LSM4   SLILSM   TYPE=9360-100,                                    X
                DRIVE=(1)                                         X
                DRVELST=(PANEL1),                                 X
                PASTHRU=((0m)),                                   X
                ADJACNT=(LSM0),                                   X
                DOOR=WC2,                                         X
                WINDOW=(3)                                        X
```

SLILSM Statement Specifying LSM Model 9740 - TimberWolf

```
LSM0   SLILSM   TYPE=9740                                          X
                DRIVE=(1),                                        X
                DRVELST=(PANEL1),                                 X
                PASTHRU=((2,M)),                                  X
                ADJACNT=(LSM1),                                   X
                WINDOW=(3)
```

SLILSM Statement Specifying LSM Model SL8500 - StreamLine

```
LSM0  SLILSM   TYPE=8500,                                         X
               DRIVE=(1),                                         X
               DRVELST=(PANEL1),                                  X
               PASTHRU=((0,M),(0,M),(0,M)),                       X
               ADJACNT=(LSM1,LSM2,LSM3),                          X
               DOOR=8500-1
```

SLILSM Statement Specifying LSM Model SL3000 - StreamLine

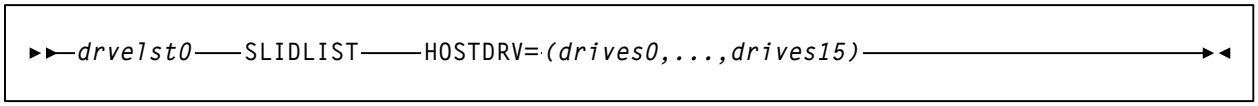
```
LSM0  SLILSM   TYPE=3000
```

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



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=(DRV0)

          where: DRV0 is for Host0

     HOSTDRV=(DRV0,DRV1)

          where:DRV0 is for Host0
                DRV1 is for Host1

     HOSTDRV=(DRV0,DRV0)

          where:DRV0s for Host0
                DRV0 is for Host1
```

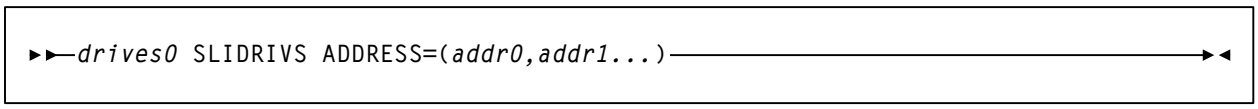
Example

```
PANEL1 SLIDLIST HOSTDRV=(DRV0,DRV0)
```

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



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

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, or T9940A 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, or T9940A device (20-drive panel)

`ADDRESS=(,,,,9A01,,,,9A02,,,,9A03,,,` `9A04)`	X	for an SL8500 device (16-drive panel)
`ADDRESS=(,,,,00CA,,,,00CB,,,,00CC,,,,` `00CD,,,,00CE,,,)`	X	for an SL3000 device (24-drive panel)

Notes:

- 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.

- 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.

Caution: If you fail to enter at least one drive address, the Database Decompile utility will fail against this CDS.

- The total number of drive positions, including position-holding commas, must be 4, 10, 16, 20, 24, or 32 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
  - SL3000: 32 drives per panel are supported for panel 10; 24 drives per panel are supported for panel 12
  - SL8500, 16-drive panels are supported.

- Outside and back of the SL3000 library, drive panel numbering proceeds from top to bottom, right to left. Figure 7 shows an example of drive numbering for drive addresses on panels 12 and 10.

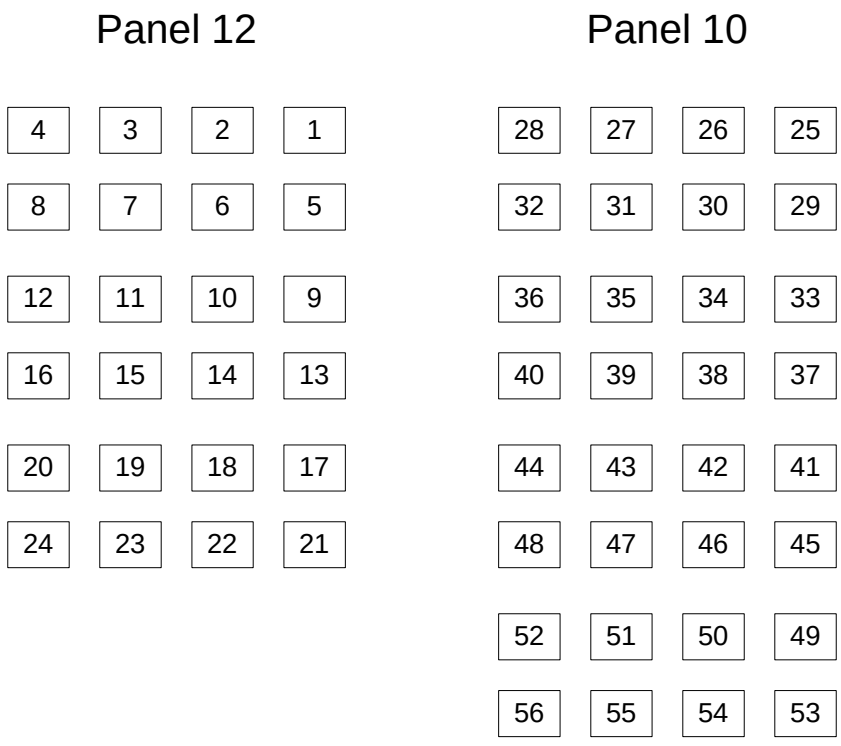


Figure 7. SL3000 Drive Panel Layout Example

Refer to Appendix B, “HSC Support for the SL3000,” in the *HSC System Programmer’s Guide* for more information.

- Outside the SL8500 library, drive panel numbering proceeds from top to bottom, right to left, as viewed outside the structure from the drive end. Table 5 shows an example of drive numbering for drives on one LSM (LSM0) and drive addresses on drives 3 and 15.

Table 5. SL8500 Drive Panel Layout Example - Outside Library

LSM	Drive Panel				Row
	+2	+1	-1	-2	
LSM0 (Rail 1)	12	8	4	0	**1**
	13	9	5	1	**2**
	14	10	6	2	**3**
	15 (1624)	11	7	3 (1621)	**4**

Inside the library, drive panel numbering is top to bottom, left to right, as viewed inside the library from the CAP end. Table 6 shows the same drive configuration as Table 5.

Table 6. SL8500 Drive Panel Layout Example - Inside Library

LSM	Drive Panel				Row
	-2	-1	+1	+2	
LSM0 (Rail 1)	0	4	8	12	**1**
	1	5	9	13	**2**
	2	6	10	14	**3**
	3 (1621)	7	11	15 (1624)	**4**

To specify the drives above, the SLIDRIVs statement is:

SLIDRIVS ADDRESS=(,,,1621,,,,,,,,,,1624)

Refer to Appendix A, “HSC Support for the SL8500,” in the *HSC System Programmer’s Guide* for more information.

- The total number of drive positions specified by all SLIDRIVS statements for a single panel must be the same.
- For an ExtendedStore library, panel 10 must be defined using commas to indicate nonexistent transports. Example:

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

- On all LSMs except the 9740, 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,BD0)
```

Examples

SLIDRIVS Statement

```
DRV0 SLIDRIVS ADDRESS=(410,411,412,413)
```

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=(10),                                          X
                PASTHRU=((1,S)),                                    X
                ADJACNT=(LSM0),                                     X
                DRVELST=(PANL110)                                   X
                TYPE=4410,                                          X
                DOOR=STD
PANL110  SLIDLIST HOSTDRV=(DRV110,DRV110,DRV110,DRV110)
DRV110   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.

```
LSM0   SLILSM   TYPE=9740                                           X
                DRIVE=(1),                                          X
                DRVELST=(PANEL1),                                   X
                PASTHRU=((2,M)),                                    X
                ADJACNT=(LSM1),                                     X
                WINDOW=(3)
PANEL1   SLIDLIST   HOSTDRV=(P10DRV0)
P10DRV0  SLIDRIVS   ADDRESS=(D19,D18,D17,D16,D15,D14,D13,D12,D11,D10
```

SLILSM, SLIDLIST, SLIDRIVS Statements for a 9310 LSM

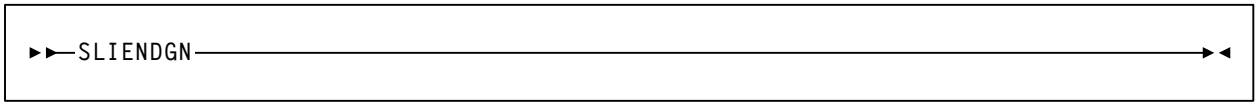
The following example illustrates how to code drive specifications for a 9310 LSM that contains a 20-drive 9840 panel.

```
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



Parameters

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

Assemble the LIBGEN File

Skip this step if the product is already installed on other host systems which share the library and the LIBGEN includes all planned host systems.

The LIBGEN macros must be assembled and link-edited into a load module used by data set initialization. The LIBGEN source file should be on the MAINTSTK ACS191-disk.

Log on to the MAINTSTK user ID and execute the following:

```
EXEC LIBGEN libgenname
```

where:

libgenname
: is the filename given to the CMS file containing the assembler statements for the LIBGEN.

For more information on this file, refer to “Procedure for Library Generation (LIBGEN)” on page 59.

This assembles and link-edits the named LIBGEN source file and places a MODULE file on the MAINSTK RUN-disk.

LIBGEN Outputs

LIBGEN EXEC return codes are listed in the following table.

Table 7. LIBGEN EXEC 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 Guide* for an explanation of any error message encountered while running LIBGEN.

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, or T9940A).

Definition data set control statements include:

- LMU Path (LMUPATH)
- LMU Path Definition (LMUPDEF)
- 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.

For more detailed information about definition data sets, refer to “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)
- Reconfiguration CDS Definition (RECDEF)
- Scratch Subpool (SCRPOOL).

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

- CAP Preference (CAPPref)
- Communications Path (COMMpath)
- MNTD
- OPTion.

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 "HSC Control Statements and HSC Start Procedure" in the *HSC System Programmer's Guide*.

Chapter 7. Allocating and Initializing Data Sets

Allocate Library Data Sets

Skip this step if the HSC is already installed on other host systems which share the library, and the LIBGEN includes all planned host systems.

Note: If you are not allocating the library data sets, make sure that you enable the library definitions in ACS SYSPROF before proceeding (see “Enable the Library Definitions in ACS SYSPROF” on page 112).

Allocate the library data sets according to the type of DASD and DASD space requirements determined earlier in this manual (see “Calculating DASD Space” on page 18). The following data set allocation procedures are described:

- allocation of MVS shared full-volume minidisk
- allocation of OS-formatted minidisk
- allocation of CMS RESERVED minidisk.

OS-formatted and CMS RESERVED minidisks must be allocated with the SLIMDISK utility provided by StorageTek.

Select the section below that meets your requirements.

Allocation of MVS Shared Full-volume Minidisk

If the library includes any MVS systems and the control data sets are to be on an MVS-controlled volume, then use regular MVS services to allocate the library data sets. The allocation parameters are:

- DCB parameters:

```
RECFM=F or RECFM=FB
BLKSIZE=4Ø96
LRECL=4Ø96
DSORG=PS
```

- Space parameters:

```
SPACE=(CYL,(ncyls,))
```

SLIMDISK Utility

The SLIMDISK utility is used to format the following:

- OS-formatted minidisks
- CMS RESERVED minidisks.

Minidisk Formatter Utility for OS-formatted Minidisks

To allow temporary exclusive access to certain library data sets in the mixed MVS/VM environment, the real volume must be formatted to contain a volume ID record and a VTOC. This volume ID and VTOC (on the real volume) are formatted as an OS volume.

In addition, there must be a format 1 data set control block (DSCB) record in the VTOC defining the location and attributes of the data set. This utility adds a FMT1 DSCB record in the VTOC of a real volume that has been formatted for VM use.

Note: The SLIMDISK utility, with the INIT parameter, should only be used if all of the following conditions are true:

- There is no OS (MVS, VS1, etc.) system available to create a VTOC entry on the target volume. (JCL or SPF may be used instead.)
- The target volume does not already possess an OS VTOC (MVS, VS1, etc.).

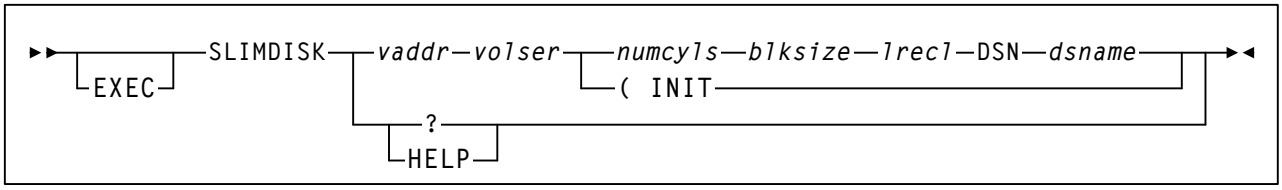
It is assumed that the invoking EXEC verifies that the parameter fields are correct (to the best of its ability). SLIMDISK checks the parameters for existence, but only does limited validation of the values.

Cylinder 0, Head 0, Record 3 of the specified volume is validated to ensure the volume was pre-formatted. Any I/O errors encountered place the condition of the VTOC for the volume into an unknown state.

Input

Prior to executing this function, the device to be formatted must be defined in read/write mode to the caller's virtual machine. Refer to "Calculating DASD Space" on page 18 for DASD space requirements.

Syntax



Note: There are no defaults. The caller is prompted to supply missing or corrected parameters.

Parameters

vaddr
Virtual address where the volume to be used has been attached. It must be a currently attached disk in R/W mode, and must be a 3350, 3380, or 3390.

volser
specifies the volume ID to be used. It must match the VOLSER of minidisk vdev. On initialization, the VOLSER to be built.

numcyls
specifies the number of cylinders (data set size). *numcyls* must be numeric, and can't be greater than the total cylinders on the device.

blksize
specifies the block size of the data set. It must be numeric (512 <= *blksize* <= 8K.) Control data sets must have *blksize*=4096; LKEYDEF, LMUPDEF, SCRPDEF, TAPEREQ, UNITATTR, and VOLATTR must specify *blksize*=4080.

lrecl
specifies the logical record length. It must be numeric and evenly divisible into *blksize*. *lrecl* must be 4 for a control data set; for LKEYDEF, LMUPDEF, SCRPDEF, TAPEREQ, UNITATTR, and VOLATTR, *lrecl* must be 80.

DSN
specifies the name to be assigned to the data set.

dsname
is the data set name. It must be preceded by the DSN keyword and cannot be greater than 44 characters in length. Index levels must be separated by periods.

INIT
invokes the LABEL/VTOC initialization program (SLIVINT).

? or HELP
requests a display explanation of the EXEC and parameters.

Output

- The following codes may be returned:

  0 formatting successful.
  4 formatting not attempted - invalid parameters.
  8 formatting failed.

- Records on Cylinder 0, Head 0 (INIT subfunction)

  - IPL1 record
  - IPL2 record
  - Volume ID
  - Padding record.

- Records on Cylinder 0, Head 1
  - VTOC record - Format 4 DSCB
  - VTOC record - Format 5 DSCB
  - VTOC record - Format 1 DSCB.

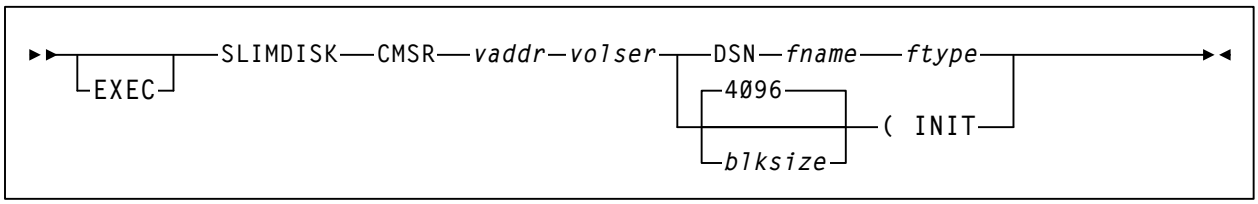
Minidisk Formatter Utility for Reserved Minidisks

To allow the use of FBA-512 or other valid CMS DASD devices for the ACS data sets, these disks may be formatted and defined as CMS RESERVED minidisks. Data sets defined in this manner may only be used by VM versions of the HSC. These minidisks have no VTOC, but instead have special blocks describing the volume. This format is described in the IBM manuals for your operating system.

Input

Prior to executing this function, the device to be formatted must be defined in read/write mode to the caller's virtual machine. Refer to "Calculating DASD Space" on page 18 for DASD space requirements.

Syntax



Note: The caller is prompted to supply missing or corrected parameters.

Parameters

vaddr
specifies the virtual address where the volume to be used has been attached. It must be a currently attached disk in R/W mode, and must be a 3350, 3380, or 3390.

volser
specifies the volume ID to be used. It must match the VOLSER of minidisk vdev. On initialization, the VOLSER to be built.

DSN
specifies the name to be assigned to the data set.

fname
specifies the file name of reserved minidisk file.

ftype
specifies the file type of reserved minidisk file.

blksize

specifies the block size of the data set. It must be a valid block size for the CMS FORMAT command. Library data sets must have *blksize*=4096.

INIT

invokes the FORMAT command.

Output

The following codes may be returned:

0 formatting successful.
4 formatting not attempted - invalid parameters.
8 formatting failed.

Allocation of OS-formatted Minidisk

If the library data sets are being placed on OS-formatted minidisks, then the data sets must be allocated with the SLIMDISK utility provided with this product.

Note: Each volume is reserved by SLIMDISK during processing.

1. Log on to user ID STKACS.
2. For each (uninitialized) volume you want to initialize, either
   - Execute DSF to provide an OS label and VTOC, or
   - Issue the following command from the ACS service machine:

     ```
     EXEC SLIMDISK vaddr volser (INIT
     ```

     where:

     vaddr
     is the virtual address.

     volser
     is the DASD volume serial number.
3. For each data set to be allocated, issue the following command from the ACS service machine:

   ```
   EXEC SLIMDISK vaddr volser numcyls 4096 4096 DSN dsname
   ```

   where:

   vaddr
   is the virtual address.

   volser
   is the DASD volume serial number.

numcyls
is the number of cylinders to allocate.

Note: For LKEYDEF, LMUPDEF, SCRPDEF, TAPEREQ, UNITATTR, and VOLATTR, the block size must be specified as 4080 and the number of cylinders as 80.

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

Allocation of CMS RESERVED Minidisk

If the library data sets are being placed on CMS RESERVED minidisks, then the data sets must be allocated with the SLIMDISK utility provided with this product.

1. Log on to user ID STKACS.
2. For each (uninitialized) volume to be initialized, either
   - Issue the CMS FORMAT command, or
   - Issue the following command from the ACS service machine:

     ```
     EXEC SLIMDISK CMSR vaddr volser 4096 ( INIT
     ```

     where:

     vaddr
     is the virtual address.

     volser
     is the DASD volume serial number.

Note: For LKEYDEF, LMUPDEF, SCRPDEF, TAPEREQ, UNITATTR, and VOLATTR, the block size must be specified as 512.

3. For each data set to be allocated, either
   - Issue the CMS RESERVE command, or
   - Issue the following command from the ACS service machine:

     ```
     EXEC SLIMDISK CMSR vaddr volser DSN fname ftype
     ```

     where:

     vaddr
     is the virtual address.

     volser
     is the DASD volume serial number.

     fname
     is the file name of the data set.

ftype
is the file type of the data set.

Note: The data set name for SLKJCL /FILE statements and SYSPROF data set definitions must be specified as *fname*.*ftype*. For example:

```
/FILE SLSCNTL DEV 500 DSN dbase.primary
```

The data set name for the SLIMDISK utility must be specified as *fname ftype*, without the period.

Enable the Library Definitions in ACS SYSPROF

At this time log on to the maintenance machine and edit file ACS SYSPROF on the RUN-disk. Remove the asterisk and any blanks preceding the following statements if they apply:

- AUTOJOB
- STATION
- SLSCNTL
- SLSCNTL2
- SLSSTBY
- SLSJRNxx
- SLSOFFxx
- SLSBKUP
- DBPRMNEW
- DBSHDNEW
- TREQDEF
- UNITDEF
- VOLDEF.

Keep any AUTOJOB statements commented out. If you are using OS-formatted PARMLIB data sets, remove the asterisk before SLSSYSxx.

Data Set Initialization

Skip this step if the library control data sets have already been initialized from another system.

Note: If you are not initializing the library data sets, make sure that you enable the library definitions in ACS SYSPROF before proceeding (see “Enable the Library Definitions in ACS SYSPROF” on page 112).

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

Steps required to initialize the library control data sets are:

1. Create the job file to be used to initialize the library control data sets.
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.

Creating Only the Standby Control Data Set

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.

SLICREAT /PARM Statement to Create Standby CDS

```
/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 for enabling, if the standby control data set is used when running the HSC.

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

Creating a Job File to Initialize Control Data Sets

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

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

   ```
   ACS UTIL SLICREAT (NOSEND
   ```

3. When XEDIT displays the SLICREAT SLKJCL file, modify it as necessary. A sample follows

```
/JOB  jobname SLICREAT
/PARM libgenname
/FILE SYSPRINT DEV PRNT CLASS A
/FILE SLSCNTL  DEV <vaddr> DSN <dsname>
/FILE SLSCNTL2 DEV <vaddr> DSN <dsname>
/FILE SLSSTBY  DEV <vaddr> DSN <dsname
/FILE SLSJRNØ1 DEV <vaddr> DSN <dsname>
/FILE SLSJRNØ2 DEV <vaddr> DSN <dsname>
  .
  .
  .
/FILE SLSJRN32 DEV <vaddr> DSN <dsname>
```

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

libgenname
is the file name given to the CMS file containing the assembler statements for the LIBGEN. For more information on this file, refer to “Procedure for Library Generation (LIBGEN)” on page 59.

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 14 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 12 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 119).

SLSJRNnn

specifies the two journal /FILE statements for each host. This is required only if the SLIRCVRY macro TCHNIQE parameter is JOURNAL, BOTH, or ALL. The range of '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.

4. The SLICREAT SLKJCL file is placed on the MAINTSTK 191 disk. Rename the file if desired, and copy it to the MAINTSTK ACS191-disk.

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.

Note: When an SL8500 is configured in LIBGEN, SLICREAT builds a 6.1-level CDS. If SL8500 is not specified, a 2.1 CDS is built as with previous releases.

Calculating Cartridge Capacity - SL8500 and SL3000

Message SLS0557I displays the total cartridge capacity for the library. **For the SL8500 and SL3000 libraries**, you must first vary the library online (Vary ACS command) to see the actual capacity of the library rather than the maximum capacity of the library. Before you vary the library, the maximum capacity is based on the highest possible number of panels that the HSC allows to be defined, not the number you defined in LIBGEN.

After you vary the library online, enter the Display Acs or Display Lsm command to show the actual SL8500 library capacity. Refer to the *HSC Operator's Guide* for information about the Vary and Display commands.

Executing the SLICREAT Program

The next step in initializing the control data sets is to execute the SLICREAT program. Figure 7-1 on page 7-11 illustrates execution of SLICREAT.

1. Initialize the SCP as follows:

   a. Log on to the service machine.

   b. If you did not specify the LIBGEN statement in ACS SYSPROF then issue the following command:

      ```
      NUCXLOAD libgenname
      ```

      where:

      libgenname
      is the file name given to the CMS module file created previously. For more information on this file, refer to "Procedure for Library Generation (LIBGEN)" on page 59.

   c. Issue the following command:

      ```
      ACS INIT (NOJOBS
      ```

2. Issue the following SCP command to make sure that the ACS service machine is running satisfactorily and there is an idle class U job initiator:

   ```
   Q ACTIVE
   ```

   If not, shutdown the service machine and make sure ACS SYSDEF is defined properly for class U initiators (see "System Definition File (ACS SYSDEF)" on page 51).

3. From any virtual machine authorized for commands, submit the SLICREAT job with the following command:

   ```
   ACS SUBMIT SLICREAT SLKJCL * U
   ```

4. Wait for the job to complete.

Notes:

- If the job is not successful, investigate the cause. The data sets may not have been pre-allocated as required.
- SLICREAT requires a LIBGEN load module assembled with the same level macros as the release LINKLIB. A LIBGEN load module created with earlier HSC releases cannot be used as input to a later release of 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 119 for more information about formatting journals.

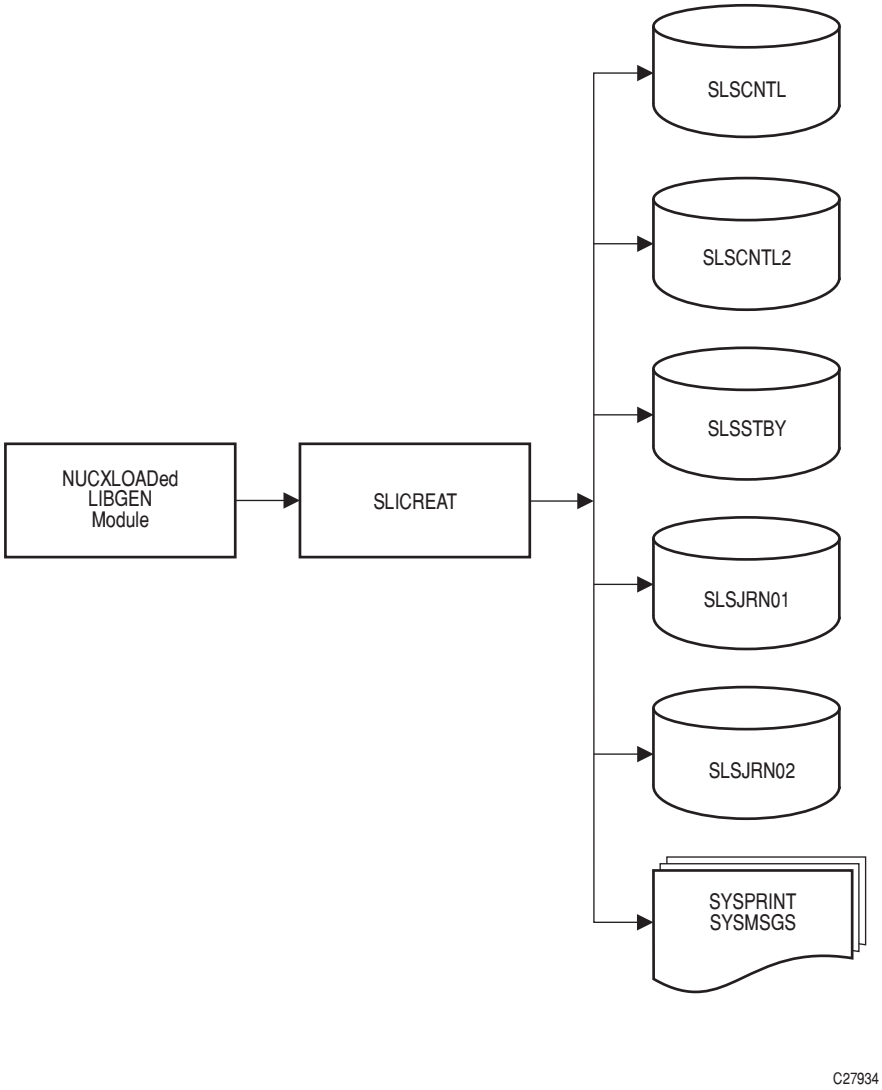


Figure 8. Data Set Initialization

Verifying Successful Completion of the SLICREAT Program

SLICREAT Success Status Message

```
SLS0557I DATABASE SUCCESSFULLY INITIALIZED; TOTAL CARTRIDGE CAPACITY:
         DDDDDDDDDDDD VOLUMES
```

Note: Refer to “Calculating Cartridge Capacity - SL8500 and SL3000” on page 115 for information about how the total cartridge capacity is determined for SL8500 libraries.

Peek the RDR file of the completed job.

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 /FILE 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 /FILE 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.

Note: 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 /FILE 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 7-1 to determine the cartridge storage capacity of a 4410 standard, 9310 PowderHorn, and ExtendedStore LSM. Refer to Table 8, Table 9, and Table 10 to determine the cartridge storage capacity of the three WolfCreek LSM models.

Table 8. 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	5738	5554	5370
3	5898	5714	5530	5346
4	5874	5690	N/A	N/A

Notes:

- If you have installed an enhanced CAP, reduce the number of cartridges by 240 for any given scenario listed in the table above.
- 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 (WolfCreek) 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 9. 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 10. 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 11. 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 9740 (TimberWolf) 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 12. 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

Storage Cell Capacity for StreamLine SL8500 Libraries

Storage capacity for the SL8500 library varies depending on how many expansion frames are present. No viewing windows are included, and no PTPs exist for this release. The following table lists the storage capacity for the base library and expansion frames.

Table 13. Storage Cell Capacity of StreamLine (SL8500) Libraries

Module/Frame Type	Cartridge Capacity Per Module/Frame	Total Cartridge Capacity
Control Module/Tape Drive Frame	0	
Robotics Interface Module	800	
Customer Interface Module	648	
Base Library		**1448**
First Expansion Frame	1728	**3176**
Second Expansion Frame	1728	**4904**
Third Expansion Frame	1728	**6632**
Fourth Expansion Frame	1728	**8360**
Fifth Expansion Frame	1728	**10088**

Note: Refer to “Calculating Cartridge Capacity - SL8500 and SL3000” on page 115 for information about how the total cartridge capacity is determined for SL8500 libraries.

Storage Cell Capacity for StreamLine SL3000 Libraries

As with the SL8500 library, you can reconfigure the SL3000 library capacity by adding modules.This library can contain a viewing window. Table 14 shows storage capacity for each module.

Note: Refer to “Calculating Cartridge Capacity - SL8500 and SL3000” on page 115 for information about how the total cartridge capacity is determined for SL3000 libraries.

Table 14. Storage Cell Capacity of StreamLine (SL3000) Libraries

Module	Configuration	Total Cartridge Capacity
Access Expansion Module - Panels 0, 1, 22, 23		0
Base Drive Module - Panel 12		
	8 Drives	216
	16 Drives	150
	24 Drives	78
	Back Panel - Last on Left - 8 Drives	180
	Back Panel - Last on Left - 16 Drives	125
	Back Panel - Last on Left - 24 Drives	65
Base Drive Module - Panel 13		
	Front Panel - Full - With Window - With CAP	205
	Front Panel - Full - No Window - With CAP	228
	Front Panel - Last on Left - With Window - With CAP	153
	Front Panel - Last on Left - No Window - With CAP	176
Drive Expansion Module - Panel 10		
	Back Panel - Full - 8 Drives	216
	Back Panel - Full - 16 Drives	150
	Back Panel - Full - 24 Drives	78
	Back Panel - Full - 32 Drives	0
	Back Panel - Last on Left - 8 Drives	180
	Back Panel - Last on Left - 16 Drives	125
	Back Panel - Last on Left - 24 Drives	65
	Back Panel - Last on Left - 32 Drives	0

Table 14. Storage Cell Capacity of StreamLine (SL3000) Libraries

Module	Configuration	Total Cartridge Capacity
Drive Expansion Module - Panel 11		
	Front Panel - Full - With Window - With CAP	205
	Front Panel - Full - No Window - With CAP	228
	Front Panel - Full - With Window - No CAP	282
	Front Panel - Full - No Window - No CAP	305
	Front Panel - Last on Left - With Window - With CAP	153
	Front Panel - Last on Left - No Window - With CAP	176
	Front Panel - Last on Left - With Window - No CAP	230
	Front Panel - Last on Left - No Window - No CAP	253
Cartridge Expansion Module - Panels (L) 2, 4, 6, 8; (R) 14, 16, 18, 20		
	Back Panel - Full	308
	Back Panel - Last on Left	256
Cartridge Expansion Module - Panels (L) 3, 5, 7, 9; (R) 15, 17, 19, 21		
	Front Panel - Full - With CAP	234
	Front Panel - Full - No CAP	312
	Front Panel - Last on Left - With CAP	182
	Front Panel - Last on Left - No CAP	260

Backup Utility Recommendation

It is recommended that the BACKup utility be executed after data set initialization to maintain the integrity of the library system in the event of a DASD failure. 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*.

Allocating Data Sets

If the necessary TAPEREQ, UNITATTR, VOLATTR, LKEYDEF, LMUPDEF, and SCRPDEF data sets already exist (i.e., they were created from another system), you do not need to initialize them again. If these data sets do not exist in your system, use the SLIMDISK utility descibed in “SLIMDISK Utility” on page 106 to first initialize the OS-formatted or CMS reserved minidisk(s) and then to allocate the data sets. The record length of all data sets must be 80. For OS-formatted minidisks, the block size must be a multiple of 80, with a recommended size of 4080. For CMSR minidisks, the block size must be valid for the CMS FORMAT command, with a recommended size of 512.

Note: If you have anything other than standard media or 18-track devices, StorageTek strongly recommends that you code TAPEREQ, UNITATTR, VOLATTR, LKEYINFO, LMUPATH, and SCRPOOL statements. Failure to code these statements may cause unacceptable results with regard to the selection of media and/or tape devices.

Initializing Data Sets

If the necessary TAPEREQ, UNITATTR, VOLATTR, LKEYDEF, LMUPDEF, or SCRPDEF data sets reside on OS-formatted minidisk(s), use the SLUGENER utility with the /PARM RECCOPY option.

To create skeleton JCL that you can modify to meet your needs, use the ACS UTIL command with one or more of the following parameters:

- TREQCOPY
- UNITCOPY
- VOLCOPY
- LKEYCOPY
- LMUCOPY.

Sample Initialization JCL

```
/JOB  jobname SLUGENER
/PARM RECCOPY
/FILE SYSPRINT DEV PRNT CL A
/FILE SYSUT2   DEV <vaddr> DSN <dsname>
/FILE SYSUT1 *
<records to be written>
```

ACS UTIL TREQCOPY/VOLCOPY/UNITCOPY/LKEYCOPY/LMUCOPY create skeleton JCL that you can modify to meet your needs.

Sample UNITATTR Initialization JCL

```
/JOB  SLSVUTIL SLUGENER
/PARM RECCOPY
/FILE SYSPRINT DEV PRNT CL A
/FILE SYSUT2   DEV 503 DSN UNITATTR.PARMLIB
/FILE SYSUT1 *
UNITATTR ADDR(A20-A37) MOD(9840)
UNITATTR ADDR(A10-A17) MOD(9490EE)
UNITATTR ADDR(A1C-A1F) MOD(4490)
UNITATTR ADDR(A00-A0F) MOD(9490)
UNITATTR ADDR(A18-A1B) MOD(SD3)
```

Sample LMUPATH Initialization JCL

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

Sample LKEYINFO Initialization JCL

```
/JOB  SLSXUTIL SLUGENER
/PARM RECCOPY
/FILE SYSPRINT DEV PRNT CLASS A
/FILE SYSUT2   DEV <vaddr> DSN <dsname>
/FILE SYSUT1   *
LKEYINFO PROD=(VER0600) -
         CUST=('customer name') -
         SITE=(12345) -
         EXPRD=(2002365) -
         KEY=(DKEEXEDERTB3466)
```

Sample SCRPOOL Initialization JCL

```
/JOB  SLSXUTIL SLUGENER
/PARM RECCOPY
/FILE SYSPRINT DEV PRNT CLASS A
/FILE SYSUT2   DEV <vaddr> DSN <dsname>
/FILE SYSUT1   *
* Insert your parm file statements here
SCRPOOL NAME=400S,RANGE=(400568-400979),LABEL=SL
SCRPOOL NAME=302SE,RANGE=(302000-308999),LABEL=SL
SCRPOOL NAME=STK1,RANGE=(EAG111-EAG920),LABEL=SL
SCRPOOL NAME=STK2,RANGE=(012960-012969),LABEL=SL
```

Chapter 8. HSC Initialization

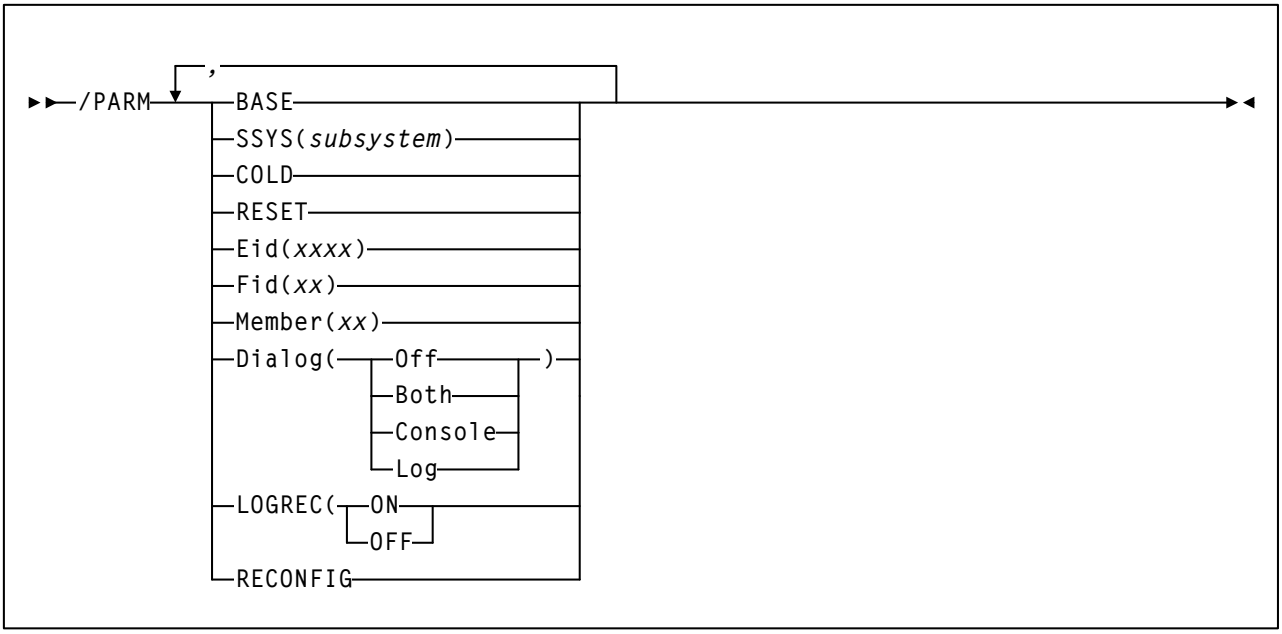
Creating an SLKJCL File for Starting the HSC

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

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

Note: ACS UTIL HSCINIT creates a skeleton SLKJCL file that can be modified to meet local requirements.

/PARM Statement Syntax



/PARM Statement Parameters

/PARM

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

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

BASE

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

SSYS

specifies that HSC initialization search for the subsystem name specified. If SSYS is specified, the name must match the LIBSUBSYS parameter value in the system profile (SYSPROF). If the name is not found or is not a valid name, the subsystem terminates. subsystem must be a 1- to 4-character name or problems can occur when initializing the HSC.

This parameter permits you to symbolically specify the subsystem if the job name in the startup SLKJCL file does not match the subsystem name.

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

COLD

Note: This parameter does not function in VM.

specifies that any permanent in-memory data structures previously allocated by HSC are reallocated and reinitialized. Use of this option may correct HSC problems caused by an in-memory data structure that has been corrupted.

On the first startup of the HSC after an IPL, this option is meaningless.

This parameter should only be used when absolutely necessary (i.e., when migrating from HSC 1.2 to HSC 2.0 and vice versa) and might not correct all error conditions. Contact StorageTek Software Support before using this parameter (see the Requesting Help from Software Support guide for more information).

RESET

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

One possible symptom of this situation is the message:

```
... ACS subsystem CCCC is ACTIVE
or
... ACS subsystem CCCC is TERMINATING
or
... ACS subsystem CCCC is INITIALIZING
```

at HSC startup, when a display of active jobs indicates that the subsystem is not, in fact, active.

This parameter should only be used in extreme situations and may not correct all error conditions. Contact StorageTek Software Support before using this parameter (see the Requesting Help from Software Support guide for more information).

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.

Refer to ‘‘EXECParm Control Statement’’ in the *HSC System Programmer’s Guide* for an alternative method of specifying GTF Eid and Fid parameters. See also “HSC Initialization Parameters” on page 39.

Member

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

```
/FILE SLSSYSXX *
```

‘‘M’’ is the abbreviation for this parameter.

Dialog

specifies that messages can be displayed on the operator console and/or written to the system log. 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.

LOGREC

specifies whether the HSC writes software events to the system LOGREC data set.

ON

specifies that HSC software events are written to the LOGREC data set.

OFF

specifies that HSC software events are not written to the LOGREC data set.

RECONFIG

specifies this execution of the HSC will only run the Reconfiguration utility.

HSC Startup Job (ACS SLKJCL)

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

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

   ```
   ACS UTIL HSCINIT (NOSEND
   ```

3. When XEDIT displays the file, modify it as desired.
   a. If the PARMLIB data set is shared with other hosts, specify the data set information and delete the remaining lines.

      or

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

Example

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

Sample ACS SLKJCL File

```
/JOB  jobname SLSBINIT
/PARM E(EØ86) F(17) MEMBER(xx)
/FILE SLSSYSXX DEV <vaddr> DSN <dsname><(member)>
/COMM If using a library with multiple hosts
/COMM   modify the /FILE SLSSYSXX statement above
/COMM   and delete the lines following it
/COMM Else delete the /FILE SLSSYSXX statement above
/COMM   and use the following for initial parameters
/FILE SLSSYSXX *
/************************************************
/*                                              */
/* Commands to execute automatically at startup:  */
/*                                              */
/************************************************/
/*          Set some options                    */
  OPTion Output=<Upper|Mixed>
  MNTD AUTocln=<OFf|ON>
  MNTD Dismount=<Auto|Manual>
  MNTD Scratch=<Auto|Man
/*           Set CAP preferences                */
  CAPPref <prefvalue>,<cap-list>
/*          Define control data sets            */
  CDSDEF DSN1=<prm.dsname>,VOL1=volunit1,UNIT1=unit1 -
         DSN2=<sec.dsname>,VOL2=volunit2,UNIT2=unit2 -
         DSN3=<stb.dsname>,VOL3=volunit3,UNIT3=unit3
/*          Define journal data sets            */
  JRNDEF DSN1=<jrn1.dsname>,VOL1=volunit1,UNIT1=unit1 -
         DSN2=<jrn2.dsname>,VOL2=volunit2,UNIT2=unit2 -
         HOSTID=<hostid>
/*          Define TCP/IP communications        */
  LMUPDEF DSN=<dataset.name>,VOLUME=volser,UNIT=vaddr
/*          Define host-to-host communications  */
  COMMPath HOSTid=<hostid> METHod=vtam VTAMpath=<applid1>LMUpath=<ØØ>
  COMMPath HOSTid=<hst2> METHod=vtam VTAMpath=<applid2> LMUpath=<**>
/*          Define scratch subpools             */
  SCRPDEF DSN='VOLDEF.DATA',VOLUME=VOLDEF,UNIT=50C
  SCRPOol NAME=<pool1> RANGE=<ØØØ3ØØ-ØØ32Ø> LABEL=<sl> HOSTID=<hostid>
/*          Define Scratch thresholds           */
  Warn SCRatch <pool1> SUBpool=<pool1> THReshld=<4ØØ>
/*          Get LSMs online                     */
  MODify <ØØØ> <ONline|OFFline>
  MODify <ØØ1> <ONline|OFFline>
/*          Display library status              */
  Display ALl
  Display CDS
```

Notes:

- The job name in the startup SLKJCL file must match the subsystem name specified with the LIBSUBSYS parameter in the SYSPROF or it must be specified with the SSYS parameter in the /PARM statement. Refer to “SSYS” on page 130 for more information.
- Control data sets are defined using the CDSDEF control statement. The CDSDEF statement **must** be present in your PARMLIB definitions. Control and journal data sets may no longer be defined in JCL. Refer to ‘‘CDS Definition (CDSDEF) Control Statement’’ in the *HSC System Programmer’s Guide* for more information.
- 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).
- Journals are defined using the JRNDEF control statement. The JRNDEF statement must be present in your PARMLIB definitions if you want to use journaling. Journal data sets may no longer be defined in JCL. Refer to ‘‘Journal Definition (JRNDEF) Control Statement’’ in the *HSC System Programmer’s Guide* for more information.
- TCP/IP dynamic LMU connection is defined by the LMUPDEF control statement. Refer to “LMUPDEF Command and Control Statement in the *HSC System Programmer’s Guide* for more information.
- 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.
- To take advantage of HSC support for mixed devices at startup, include the appropriate TREQDEF, VOLDEF, or UNITDEF statements.
- The SCRPDEF control statement is not supported in the ACS SYSPROF file, so the virtual address of the drive that contains the data set must be on a currently defined volume (UNITDEF, VOLDEF, etc.).

  SCRPDEF cannot be used with a TMS that sets the scratch pools by specifying the HSC TMI DEFSCR and DEFPOOL requests.

Description of /FILE Statement

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

SLSSYSXX
: statement that defines the sequential data set or PDS member containing the PARMLIB definitions. For more information, see “HSC Startup Job (ACS SLKJCL)” on page 133.

Executing the HSC Start Procedure

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. “Starting the HSC” on page 138 describes how to start execution of the HSC. During HSC initialization, messages inform you when HSC base service level initialization completes and when full service level initialization completes.

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

Modifying LSMs Online

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

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

Specifying CAP Preferences

When the CDS is initialized, all CAP preferences are zero (never selected). You must issue the CAPPREF command and control statement to establish a preference value for a CAP. The HSC selects CAPs based on the preference value. Refer to ‘‘CAP Preference (CAPPref) Command and Control Statement’’ in the *HSC Operator’s Guide* for more information.

Configuration Mismatches

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

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

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

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

Multiple Hosts Startup Considerations

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

Starting the HSC

The HSC software can be initialized in three ways:

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

Note: If you are not using PARMLIB member SLSSYSxx, you must uncomment the AUTOJOB parameter.

Parameters associated with the /PARM statement in the HSC startup SLKJCL (see "Creating an SLKJCL File for Starting the HSC" on page 129 can also be supplied via a PARM= option with the ACS INIT command and the ACS SUBMIT command. Specifying the PARM= option appends the parameters specified to the parameters on an existing /PARM statement, or creates a new /PARM statement. In this way, most of the startup parameters can be overridden.

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

Initializing the HSC to the Full Service Level

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

Syntax for Initializing HSC to Full Service Level

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

Initializing the HSC to the Base Service Level

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

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

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

Syntax for Initializing HSC to Base Service Level

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

After initializing to this point, the SRVlev command can be used to bring the subsystem up to full function.

Chapter 9. HSC Termination

Terminating the HSC

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

Orderly Termination of the HSC

You may terminate execution of the HSC in an orderly manner by issuing either the SCP STOP or STOPSCP command. The STOP command terminates the HSC but not the SCP. The STOPSCP command terminates both the HSC and the SCP.

An orderly termination causes the HSC to complete all outstanding library processing before termination occurs. 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 console indicating that the HSC is terminated.
5. If the STOPSCP command was issued, the SCP performs similar termination processes and depending on the options in effect, the HSC service machine may be logged off.

Restart of the HSC is achieved by one of the following:

- If the HSC service machine is not logged on, start the HSC service machine via either the CP LOGON or CP AUTOLOG command.
- If the HSC service machine is logged on but the SCP is not running, issue the ACS INIT command.
- If the HSC service machine is logged on and the SCP is running, submit the HSC startup SLKJCL from an authorized virtual machine.

After startup, the HSC executes and normal operation of the library occurs.

Forced Termination of the HSC

Warning: Forced termination of the HSC is not recommended by StorageTek as a normal form of termination and should be avoided. Automated mount/dismount processing is not performed during the period that the HSC is down.

You may force the immediate termination of the HSC by issuing the SCP CANCEL command, or the CP LOGOFF or FORCE command. The SCP CANCEL command terminates the HSC but not the SCP. The CP LOGOFF and FORCE commands terminate both the HSC and the SCP, and log off the HSC service machine.

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.

A message is displayed at the console indicating that the HSC subsystem was abnormally terminated or the HSC service machine has been logged off.

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 transports, the playground, CAP, 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 a file on the HSC Base tape.

The following verification tests are provided:

- verify library functionality (without hardware) - IVP2
- verify normal library functionality - IVP3.

Verify Library Functionality (Without Hardware) - IVP2

This test may be performed when the software is installed, but the hardware is not yet installed. The ability of the library subsystem to come up, to process commands, and to shutdown is tested.

Note: Error messages are normally produced by IVP2.

1. Allow the ACS virtual machine to be CP AUTOLOGed, but do not AUTOLOG it yet. Perform this step in the normal manner for your site.
2. Log on to any virtual machine authorized to receive system or tape operator messages.
3. Ensure that the ACS service machine is logged off.
4. From any virtual machine authorized by CP, issue the following command to test the automated initialization sequence:

   ```
   CP AUTOLOG stkacs
   ```

5. Ensure that the system/tape operator receives the copyright messages for the library.

6. From any virtual machine authorized in the system profile for CMDS, issue the following command to send a set of library commands to the ACS service machine:

   ```
   EXEC IVP2
   ```

   The EXEC prompts the user to supply VOLSER, LSMid, station, and drive information to be used when issuing commands.

7. When the EXEC terminates, issue the following command:

   ```
   ACS STOPSCP
   ```

8. After the service machine has shutdown, issue the following command from the virtual machine that executed IVP2:

   ```
   CP CLOSE CONS NAME IVP2 CONSOLE
   ```

If abnormal results are produced, check the SYSPROF, LIBGEN, and ACS SLKJCL files for incorrect parameters. Check the VM IOGEN (DMKRIO or HCPRIO) and CP directory entries, if required. If any input or execution files are not found when executing IVP2, check the DASD LINKS and ACCESSes. If any dumps are produced, contact StorageTek Software Support.

Verify Normal Library Functionality - IVP3

This test may be performed when the library software and hardware are all installed.

The following operations should be performed as part of the installation:

- verify stations online
- modify LSM online
- CAP preference specification.

Verify Stations Online

Ensure that LMU stations are:

- varied online to both the operating system and the HSC

Note: For a 3270 only, use the CP QUERY device and HSC Display Acs commands to determine the status of LMU stations.

- CP ATTACHed or DEDICATEd to the ACS service machine
- CP DISABLEd.

Modify LSM Online

The HSC MODify command varies each LSM online or offline to all host CPUs regardless of the particular host the command is issued on. LSMs start up offline, and the user must modify each LSM online at least once. Refer to ‘‘MODIFY Command’’ in the *HSC Operator’s Guide* for descriptions of command syntax and parameters.

CAP Preference Specification

Specifying CAP preferences allows the establishment of an ordered list of CAPs to use during cartridge entry and ejection. The HSC chooses an available CAP from the preference list by starting at the highest priority and working down the list until a nonbusy, nonzero CAP is identified. If CAP preferences are not specified, the CAP preference value is set to zero. The HSC never selects a CAP with a preference value of zero unless specifically requested to do so. Specify CAP preference values in the HSC startup job file (e.g., ACS SLKJCL) on the ACS191-disk.

Refer to ‘‘CAP Preference (CAPPref) Command and Control Statement’’ in the *HSC Operator’s Guide* for additional information on the CAPPref command.

Execute IVP3

1. AUTOLOG the ACS service machine.
2. From any virtual machine authorized for CMDS, issue the command:

   ```
   EXEC IVP3
   ```

   The EXEC will prompt the user to supply VOLSER, LSMid, station, and drive information to be used when issuing commands. IVP3 issues HSC commands DISMount, Display, DRAin, EJect, ENter, MODify, Mount, and Vary.

3. After the service machine has shutdown, issue the following command from the virtual machine that executed IVP3:

```
CP CLOSE CONS NAME IVP3 CONSOLE
```

If abnormal results are produced, check the SYSPROF, LIBGEN, and ACS SLKJCL files for incorrect parameters. Check your TMS installation if necessary. If any input or execution files are not found, check the DASD LINKs and ACCESSes. If any dumps are produced, contact StorageTek Software Support.

Test TMS-to-Library Communication

The procedure described here allows the user to ensure that the tape management system is communicating properly with the library.

Bring Up The TMS

Before proceeding with the installation, the customer's tape library management system must be fully installed and ready for library operations.

Ensure that the TMS service machine is authorized (by CP) to communicate with the ACS service machine by inserting the following line in the CP directory entry for the TMS service machine:

```
IUCV acsname MSGLIMIT 255
```

where:

acsname
is the ACSNAME parameter from file ACS SYSPROF.

VMTAPE

Ensure that the ACSDEVICE statement properly identifies the ACS service machine and library drive addresses. Refer to VMTAPE's installation document for further instructions.

Other Tape Management Systems

Review the procedures explained in the HSC Interface to Tape Management Systems Manual. Turn on the maximum amount of tracing, especially EXT and IUC. Refer to Chapter 5, "Performing Preexecution Tasks" on page 55 for more information on tracing facilities.

Test Full Library Functionality

Perform the following steps to test full library functionality:

1. Make sure that the TMS service machine is up and running.
2. Make sure that the ACS service machine is up and running.Test TMS communications with the library by using TMS commands to perform the following activities.
    a. Mount a specific library volume enabled for writing.
    b. Mount a specific library volume not enabled for writing.
    c. Dismount the library volumes.
    d. Mount a specific nonlibrary volume enabled for writing.
    e. Mount a specific nonlibrary volume not enabled for writing.
    f. Dismount the nonlibrary volumes.
    g. Mount a library scratch volume.
    h. Dismount the library scratch volume. The following steps do not apply for all customers:
    i. Mount a library ‘‘work’’ volume.
    j. Dismount the library ‘‘work’’ volume.
    k. Mount a library volume for a specific subpool.
    l. Dismount the volume.

Chapter 11. Planning Cartridge Migration into 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 9 on page 150 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).

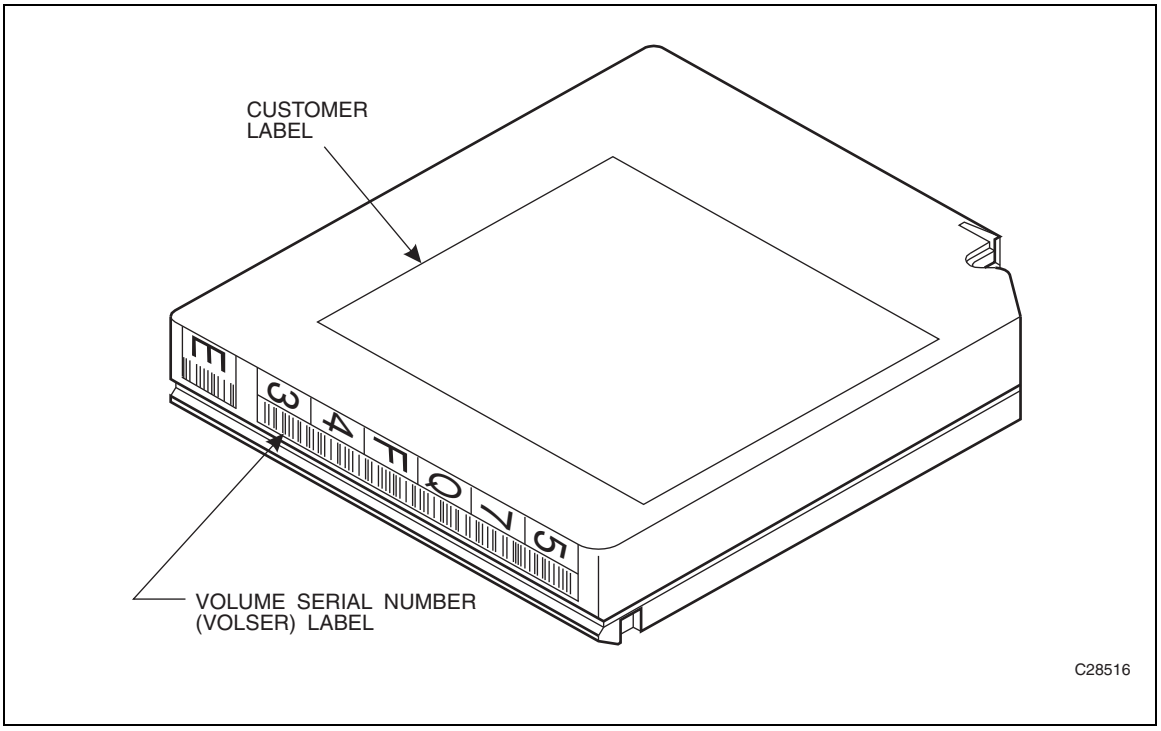


Figure 9. Cartridge with Tri-Optic label and ECART Media Type Indicator

STK1 (T9840A, T9840B, T9840C, or T9840D) 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 – T9840A, B, and C)
- Y (cleaning cartridge – T9840D).

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).

T10000 External Media Label and Media Domain Requirements

Every T10000 cartridge requires a volume serial number (VOLSER) in its external label. The VOLSER occupies the first six positions of the external label.

In addition, because the T10000 cartridges apply to non-legacy media types, media domains are supported in the HSC as a means to separate a logical collection of differing media into distinct pools known as a domain.

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

All legacy StorageTek media (e.g., ECARTs) belong to domain “0”; non-legacy media belong to other domains as defined in Table 15.

Table 15. Non-legacy Media Type/Domain Definitions

Media Name	Media Domain	Media Type
T10000T1	‘T’	‘1’
T10000TS	‘T’	‘S’
T10000CT	‘C’	‘T’
T10000T2	‘T’	‘2’
T10000TT	‘T’	‘T’
T10000CL	‘C’	‘L’
STK1R	‘0’	‘R’
STK1Y	‘0’	‘Y’

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.
- Use the ENTEr utility to load cartridges into the LSM.
- Manually load initialized cartridges into LSM and invoke the AUDIt utility
- Use an auto-mode CAP to load cartridges into an LSM without using HSC commands or utilities.

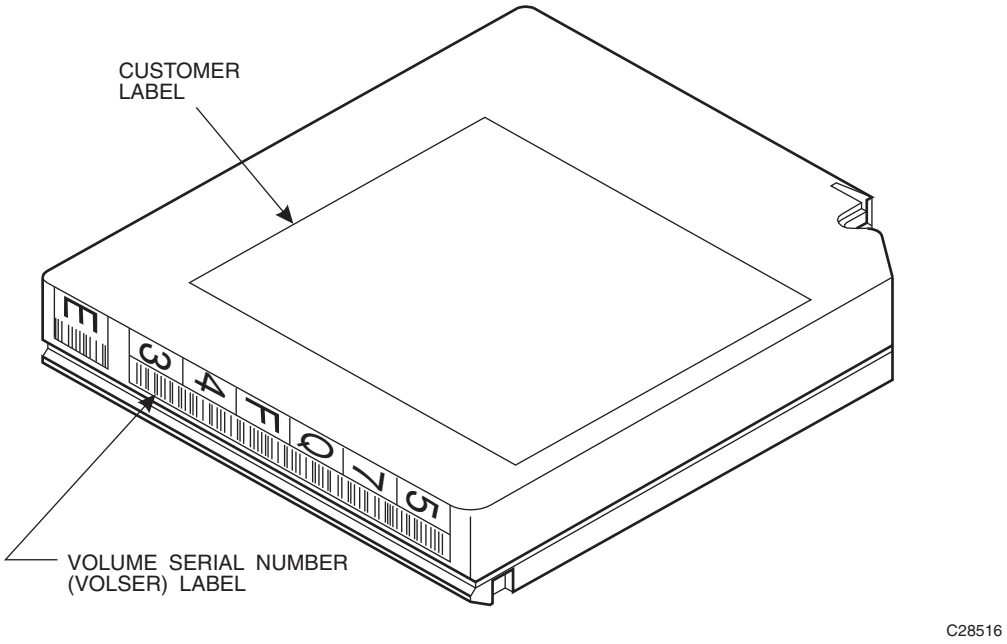


Figure 10. Cartridge with Tri-Optic Label

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. Refer to ‘‘Scratch Update Utilities’’ in the *HSC System Programmer’s Guide* for a description of utility syntax and parameters.

ENTEr Utility

The ENTEr utility may be used to enter cartridges into the library through a CAP, and produce a report of the VOLSERs entered. The HSC ENter command only displays entered volumes on the master console (ROUTCDE=2).

Scratch volumes can also be placed into the LSM by specifying the SCRatch parameter for the utility. The scratch status of volumes previously entered into the LSM may be changed using the SCRatch Update utility. Refer to ‘‘Scratch Update Utilities’’ in the *HSC System Programmer’s Guide* for a description of utility syntax and parameters.

The report produced by the ENTEr utility may be used (in conjunction with XEDIT, REXX, EXECIO, etc.) to drive cartridge initialization, scratch update (tape management system and/or HSC), or other desired processes.

Refer to ‘‘Enter Cartridges Utility’’ in the *HSC System Programmer’s Guide* for a description of utility syntax and parameters.

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 StorageTek 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 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.

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* for more information about using an auto-mode CAP.

Chapter 12. Other Activities

Overview

This section describes VM features that may optionally interact with the library.

- VM PRogrammable OPerator (PROP) message intercept
- VMOPERATOR Message Intercept
- Optional IUCV command interface.

PROP Message Intercept

This step is optional. The VM PRogrammable OPerator (PROP) feature may be used to intercept TAPE DETACHED messages from CP and dismount error messages from HSC, and to provide automatic responses to operator messages. The appropriate IBM manual for z/VM, or equivalent manual for your operating system, documents the usage of PROP.

Note: PROP uses the TELL facility to forward messages to the logical operator, informing it that PROP is installed on the operator ID defined in DMKSYS (or HCPSYS), of the string OPERATOR.

The VM manual also describes the use of action routines, including those that are system provided (i.e., DMSPOR and DMSPOS).

The action routines ACSPROP and SLSPROP (ACSPROP EXEC and SLSPROP EXEC) are REXX samples that may be modified to handle messages as desired.

A sample RTABLE (RTABLE SAMPLE) is also provided. It includes calls to these action routines as well as other useful techniques for users setting up their first PROP facility.

VMOPERATOR Message Intercept

This step is optional. The VMOPERATOR product from Systems Center, Inc., may be used to intercept TAPE DETACHED messages from CP and dismount error messages from HSC and to provide automatic responses to operator messages. The *VM OPERATOR System Administrator's Guide* documents the usage of VM OPERATOR.

The action routines ACSPROP and SLSPROP (ACSPROP EXEC and SLSPROP EXEC) are REXX samples that may be modified to handle messages as desired.

A sample LOGTABLE (LOGTABLE SAMPLE) is also provided. It includes calls to the action routines. The entries for HSC should be placed in the LOGTABLE before any other similar statements (or more general statements), as VMOPERATOR will stop its scan when it finds an entry that fits.

Optional IUCV Command Interface

Normally, commands are sent to the ACS service machine via CP SMSG, or by entering them from the service machine's virtual console. There is an additional interface defined for those who wish to send messages directly via IUCV.

To use IUCV to issue requests, follow these steps:

1. Establish a connection to the ACS service machine using the IUCV CONNECT function.
    a. Only authorized virtual machines may issue commands to the ACS service machine. To obtain permission, the virtual machine must be given command privilege by an SCP AUTHorize command issued to the service machine virtual machine.
    b. In addition, the virtual machine must have been authorized to CP via an IUCV control statement in its CP directory entry. This is typically done by a systems programmer or administrator. Make sure that the option MAXCONN specifies enough paths for your use.
    c. To establish this IUCV connection (path), the IUCV macro must be issued with the following parameters:

IUCV Macro Parameters

```
label IUCV CONNECT,
           PRMLIST=addr,              * address of IUCV parm list
           USERID=addr,               * address of CL8'userid'
           USERDATA=addr,             * address of CL16'ddname'
           PRMDATA=NO                 * no parm data in IPARML
```

where:

userid
specifies the name of the ACS service machine.

ddname
specifies the name of the ACS IUCV interface that is requested for connection. It is a 16-byte area:

```
DC CL8'CMDIUCV'     ddname
DS CL8              reserved
```

d. On execution of the function, check the PSW condition code. If the condition code is 0, save the pathid from the IPARML area passed to the macro. The program must wait for the ACS service machine to IUCV ACCEPT the pending connection before sending any messages. If no "connection complete" or "path severed" is returned, either the SCP is not fully initialized, or the IUCV CONNECT requestor specified invalid parameters.

2. Send the message to the ACS service machine using the IUCV SEND function. Specify the following parameters to the IUCV macro:

IUCV SEND Function Parameters

```
Label IUCV SEND,
           PATHID=adpid,
           TYPE=2WAY,
           BUFFER=buffer,
           BUFLEN=buflen,
           ANSBUF=0,
           ANSLEN=A(0)
```

where:

adpid
specifies the address of a data area containing the IUCV path ID.

TYPE=2WAY
specifies that an IUCV reply is expected. The SCP responds with a zero-length reply. The message is treated as if CP SMSG were used. The ACS service machine sends any output resulting from this command via CP MSG or CP MSGNOH (as determined during installation).

buffer
specifies the address of a buffer containing any valid SCP or HSC operator command.

buflen
specifies the address of a fullword or a register containing the length of buffer. It may be up to 132 bytes. Any longer buffer results in an IUCV REJECT of the message.

3. When done using a connection to the ACS service machine, release the path using the IUCV SEVER function.

Notes:

- A zero-length (null) reply is issued by the SCP when the command has been received.
- The following IUCV parameters are not supported for this interface:

TRGCLS=	is ignored by the SCP.
DATA=PRMMSG	CP does not allow the SEND to occur.
PRMMSG=*address*	CP does not allow the SEND to occur.
PRTY=YES	CP uses this to alter queuing to the ACS service machine. The SCP does not give the message any special handling

All other IUCV parameters may be used as desired.

Appendix A. Library Installation Checklist

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

Table 16. Library Installation Checklist

Step	Description of Action	Checkmark to Verify Completion	Person Responsible forTest/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 (including VMTAPE), verify that custom routines have been considered and that program routines conform to the requirements specified in the *HSC Interface to Tape Management systems Manual*.		
4	Verify that LSM/pass-thru port relations are properly defined.		
5	Verify that the real I/O configuration file is defined correctly.		
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 Preinitialization Procedures			
9	Verify that all installation materials and instructions are available for the installation process.		
10	Ensure that all of the necessary files are contained on the distribution tape.		
11	Define a maintenance user ID.		
12	Define the ACS service machine.		

Table 16. Library Installation Checklist (Continued)

13	Define the GCS component service machine (if used).		
14	Authorize library users.		
Installing the Base Product			
15	Determine the type of installation required.		
16	Call StorageTek Software Support.		
17	Load files from distribution tape.		
18	Modify performance log header/trailer JCL (optional).		
19	Define system profiles: • PROFILE EXEC for MAINSTK • PROFILE EXEC for STKACS • ACSAUTO EXEC • PROFILE EXEC for STKGCS (if used) • HSC initialization parameters • system profile (ACS SYSPROF) • system definition file (ACS SYSDEF)		
20	Verify the SCP (IVP1)		
21	Add SMF parameters: • HSC subsystem name • HSC performance recording interval • HSC SMF record subtypes		
22	Add definitions for ACF/VTAM communications (optional).		
23	Add a command list to the HSC.		
Defining the Library Configuration (LIBGEN)			
24	Prepare the library configuration (LIBGEN FILE).		
25	Assemble and link-edit the LIBGEN file		
26	Define PARMLIB control statements applicable for your installation: • CAP preference • control data set definition • communications path definition • GTF even and format IDs • journal data set definition • mount/dismount processing control • general purpose options • scratch subpool definitions.		
Allocating Library Data Sets			
27	Allocate library data sets.		

Table 16. Library Installation Checklist (Continued)

28	Allocate TAPEREQ, VOLATTR, UNITATTR, LKEYDEF, LMUPDEF, and SCRPDEF data sets.		
29	Enable library definitions in ACS SYSPROF.		
Initializing the Control Data Sets			
30	Create job file to initialize the library control data sets.		
31	Execute SLICREAT program to initialize the data sets.		
32	Verify completion of SLICREAT program.		
33	Verify the storage capacity of the LSMs in the installation.		
34	Execute the BACKup utility.		
35	Create TAPEREQ, VOLATTR, and UNITATTR data sets.		
Creating an SLKJCL File for Starting the HSC			
36	Create an SLKJCL file for starting the HSC.		
Starting HSC Execution			
37	Start HSC software.		
38	Modify LSMs and CAPs online.		
Testing the Installation (Recommended Testing)			
39	Perform each group of recommended test procedures. Verify completion of each test by comparing test output to sample output provided.		
40	Test TMS/libary communication.		
41	Test full library functionality.		
Planning and Executing Cartridge Migration into the Library			
42	Verify that the Tri-Optic labels are correctly placed on each cartridge.		
43	Load cartridges into the library.		
Other Activities			
44	PROP message intercept.		
45	VMOPERATOR message intercept.		
46	Optional IUCV command interface.		

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 SL3000 library configuration
- one host, two ACSs, one 9310 PowderHorn LSM, one SL8500 library configuration
- one host, one ACS, one 9310 LSM, one 9360-075 WolfCreek LSM configuration
- one host, one ACS, one 9360-050 LSM, one 9360-100 LSM configuration
- one host, one ACS, one 9310 LSM, dual LMU configuration
- two host, one ACS, two 9310 LSM 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 SL3000 Library Configuration

Hardware Components

This configuration consists of the following components:

- one host (EC20)
- one ACS (ACS00)
- library transport esoteric (TACS0) for ACS00
- one SL3000 standalone library containing one LSM (LSM000).

Figure 12 on page 165 illustrates a sample layout.

LIBGEN

An example LIBGEN for this configuration is shown in Figure 11.

```
LIBGEN   SLIRCVRY TCHNIQE=SHADOW
*
         SLILIBRY SMF=245,                                          X
               ACSLIST=ACSLIST,                                     X
               FUTRACS=(3,12),                                      X
               HOSTID=(EC2Ø),                                       X
               DELDISP=SCRTCH,                                      X
               MAJNAME=TESTING,                                     X
               CLNPRFX=CLN,                                         X
               COMPRFX=-,                                           X
               SCRLABL=SL
*
ACSLIST  SLIALIST ACSØØ
*
ACSØØ    SLIACS ACSDRV=(TACSØ,TACSØ,TACSØ,TACSØ),                   X
                STATION=(ST ØØØ,ST ØØØ,ST ØØØ,ST ØØØ),              X
                LSM=(LSMØØØ)
*
ST ØØØ   SLISTATN ADDRESS=(ØØCC,ØØCD)
*
LSMØØØ   SLILSM TYPE=3ØØØ
*
         SLIENDGN ,
```

Figure 11. LIBGEN for One Host, One ACS, One SL3000 Library Configuration

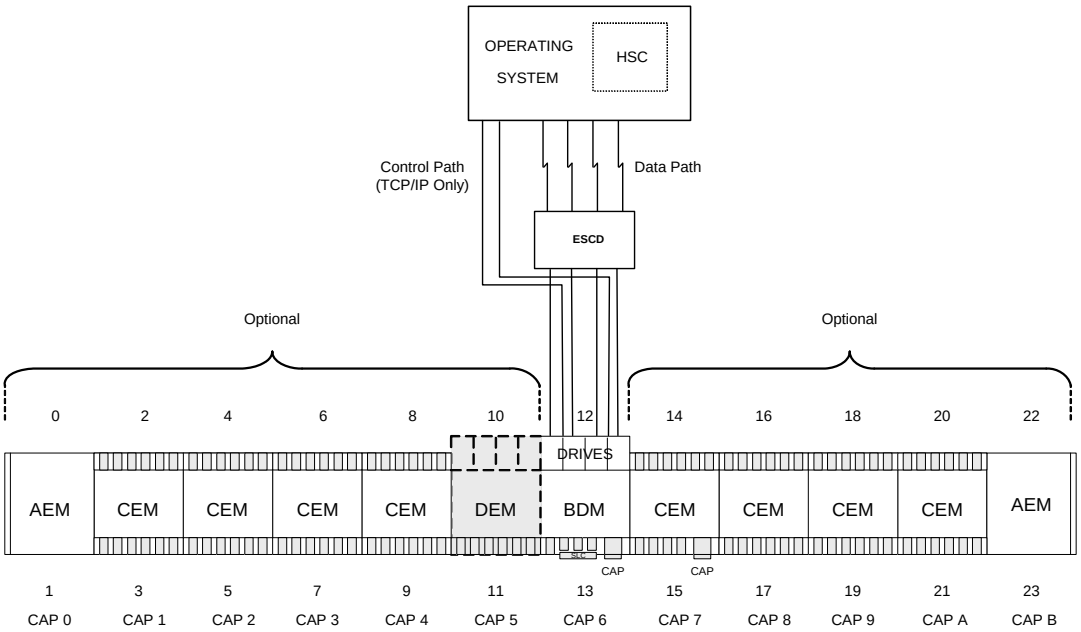


Figure 12. One Host, One ACS, One SL3000 Library Configuration

One Host, Two ACSs, One 9310 LSM, One SL8500 Library Configuration

Hardware Components

This configuration consists of the following components:

- one host (HSC1)
- manual transport esoteric (CARTAPE)
- two ACSs (ACS00 and ACS01)
- library transport esoteric (CTAPE) for ACS00
- one 9310 LSM with:
  - four cartridge drive panels (P000001, P000002, P000009, P000010) and an enhanced CAP
  - two station addresses (0A0,0A1)
  - sixteen transports (410-417 and 510-517)
- one SL8500 standalone library containing four LSMs (LSM0100, LSM0101, LSM0102, LSM0103) with:
  - four cartridge drive panels (P010001, P010101, P010201, P010301)
  - two station addresses (00CC, 00CD)
  - eight transports (9400-9407).

Figure 14 on page 170 illustrates the current layout for this configuration.

LIBGEN01

An example LIBGEN for this configuration is shown in Figure 13 on page 167.

```
*       Label definitions:
*
*       ACS     - 'ACSxx'     where 'xx' is the ACS number in printable hex.
*       LSM     - 'LSMxxyy'   where 'xx' is the ACS number in printable hex, and 'yy'
*                             is the LSM number within the ACS in printable hex.
*       STATION - 'STxxh'     where 'xx' is the ACS number in printable hex, and 'h'
*                             is the host index in printable hex.
*       PANEL   - 'Pxxyypp'   where 'xx' is the ACS number in printable hex,'yy' is
*                             the LSM number in printable hex, and 'pp' is the panel
*                             number in decimal.
*       DRIVE   - 'Dxxyypph'  where 'xx' is the ACS number in printable hex, 'yy' is
*                             the LSM number in printable hex, 'pp' is the panel
*                             number in printable hex, and 'h' is the host index in
*                             printable hex.
*********************************************************************************

LIBGEN01 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  ACS00,ACS01
*
ACS00    SLIACS    ACSDRV=CTAPE,                                        X
               STATION=ST000,                                           X
               LSM=(LSM0000)
*
LSM0000  SLILSM    DRIVE=(1,2,9,10),                                    X
               DRVELST=(P000001,P000002,P000009,P000010),               X
               TYPE=9310,                                               X
               DOOR=ECAP
*
P000001  SLIDLIST  HOSTDRV=D0000010
*
D0000010 SLIDRIVS  ADDRESS=(410,411,412,413)
*
P000002  SLIDLIST  HOSTDRV=D0000020
*
D0000020 SLIDRIVS  ADDRESS=(414,415,416,417)
*
P000009  SLIDLIST  HOSTDRV=D0000090
*
D0000090 SLIDRIVS  ADDRESS=(510,511,512,513)
*
```

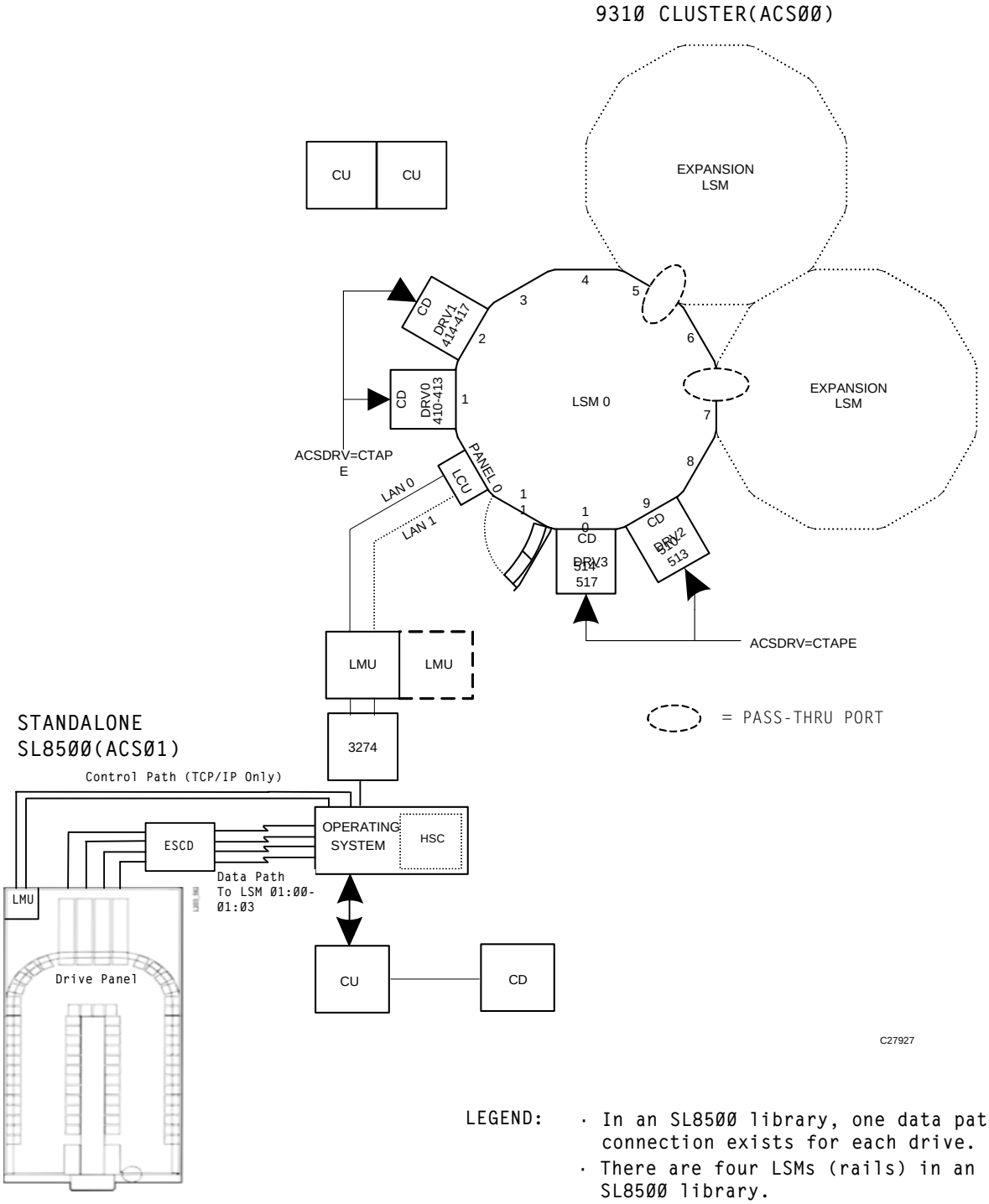
Figure 13. LIBGEN for One Host, Two ACSs, One 9310 LSM, One SL8500 Library Configuration (1 of 3)

```
P000010  SLIDLIST  HOSTDRV=D0000100
*
D0000100 SLIDRIVS  ADDRESS=(514,515,516,517)
*
ACS01    SLIACS ACSDRV=(SL8500,SL8500),                                  X
               FUTRLSM=(SL8500,16),                                     X
               LSM=(LSM0100,LSM0101,LSM0102,LSM0103)
*
LSM0100  SLILSM PASTHRU=((1,M),(2,M),(3,M)),                            X
               ADJACNT=(LSM0101,LSM0102,LSM0103),                       X
               DRIVE=(1),                                               X
               DRVELST=(P010001),                                       X
               TYPE=8500,                                               X
               DOOR=8500-1
*
P010001  SLIDLIST HOSTDRV=(D0100010,D0100011)
*
D0100010 SLIDRIVS ADDRESS=(,,,9400,,,,9401,,,,,,,,)

D0100011 SLIDRIVS ADDRESS=(,,,9400,,,,9401,,,,,,,,)

*
LSM0101  SLILSM PASTHRU=((0,S),(2,M),(3,M)),                            X
               ADJACNT=(LSM0100,LSM0102,LSM0103),                       X
               DRIVE=(1),                                               X
               DRVELST=(P010101),                                       X
               TYPE=8500,                                               X
               DOOR=8500-1
*
P010101  SLIDLIST HOSTDRV=(D0101010,D0101011)
*
D0101010 SLIDRIVS ADDRESS=(,,,,,,,,,,,9402,,,,9403)
D0101011 SLIDRIVS ADDRESS=(,,,,,,,,,,,9402,,,,9403)
*
LSM0102  SLILSM PASTHRU=((0,S),(1,S),(3,M)),                            X
               ADJACNT=(LSM0100,LSM0101,LSM0103),                       X
               DRIVE=(1),                                               X
               DRVELST=(P010201),                                       X
               TYPE=8500,                                               X
               DOOR=8500-1
*
P010201  SLIDLIST HOSTDRV=(D0102010,D0102011)
*
D0102010 SLIDRIVS ADDRESS=(,,,,,,,,,,,9406,,,,9407)
D0102011 SLIDRIVS ADDRESS=(,,,,,,,,,,,9406,,,,9407)
*
```

Figure 13. LIBGEN for One Host, Two ACSs, One 9310 LSM, One SL8500 Library Configuration (2 of 3)

```
LSM0103  SLILSM PASTHRU=((0,S),(1,S),(2,S)),                          X
               ADJACNT=(LSM0100,LSM0101,LSM0102),                     X
               DRIVE=(1),                                             X
               DRVELST=(P010301),
               TYPE=8500,                                             X
               DOOR=8500-1
*
P010301  SLIDLIST HOSTDRV=(D0103010,D0103011)
*
D0103010 SLIDRIVS ADDRESS=(,,,9404,,,,9405,,,,,,,,)
D0103011 SLIDRIVS ADDRESS=(,,,9404,,,,9405,,,,,,,,)
*
*
         SLIENDGN
```

Figure 13. LIBGEN for One Host, Two ACSs, One 9310 LSM, One SL8500 Library Configuration (3 of 3)



LEGEND:

- In an SL8500 library, one data path connection exists for each drive.
- There are four LSMs (rails) in an SL8500 library.
- ESCD = ESCON Director

DRIVES:

9400-9401 LSM 01:00,9402-9403 LSM 01:01,
9406-9407 LSM 01:02,9404-9405 LSM 01:03

Figure 14. One Host, Two ACSs, One 9310 LSM, One SL8500 Library Configuration

One Host, One ACS, One 9310, One 9360 LSM Configuration

Hardware Components

This configuration consists of the following components:

- one host (HSC1)
- manual transport esoteric (CARTAPE)
- one Automated Cartridge System (ACS00)
- library transport esoterics (CTAPEA) for ACS00
- Library Storage Modules
  - one 9310 LSM designated as LSM0000 with four cartridge drive panels (1,2,9,10) and a standard 21-cell CAP
  - one 9360-075 WolfCreek LSM designated as LSM01 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 16 on page 174 illustrates the layout for this configuration.

LIBGEN02

An example LIBGEN for this configuration is shown in Figure 15 on page 172.

```
*       Label definitions:
*
*       ACS     - 'ACSxx'     where 'xx' is the ACS number in printable hex.
*       LSM     - 'LSMxxyy'   where 'xx' is the ACS number in printable hex, and 'yy'
*                             is the LSM number within the ACS in printable hex.
*       STATION - 'STxxh'     where 'xx' is the ACS number in printable hex, and 'h'
*                             is the host index in printable hex.
*       PANEL   - 'Pxxyypp'   where 'xx' is the ACS number in printable hex,'yy' is
*                             the LSM number in printable hex, and 'pp' is the panel
*                             number in decimal.
*       DRIVE   - 'Dxxyypph'  where 'xx' is the ACS number in printable hex, 'yy' is
*                             the LSM number in printable hex, 'pp' is the panel
*                             number in printable hex, and 'h' is the host index in
*                             printable hex.
*********************************************************************************

LIBGEN02 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  ACS00
*
ACS00    SLIACS    ACSDRV=(CTAPEA),                                     X
               STATION=STN000,                                          X
               LSM=(LSM0000,LSM0001)
*
STN000   SLISTATN  ADDRESS=(0A0,0A1)
*
LSM0000  SLILSM    DRIVE=(1,2,9,10),                                    X
               DRVELST=(P000001,P000002,P000009,P000010),               X
               PASTHRU=((5,S)),                                         X
               ADJACNT=(LSM1),                                          X
               TYPE=9310,                                               X
               DOOR=STD
*
P000001  SLIDLIST  HOSTDRV=D0000000
*
D0000000 SLIDRIVS  ADDRESS=(410,411,412,413)
*
P000002  SLIDLIST  HOSTDRV=D0000010
*
D0000010 SLIDRIVS  ADDRESS=(414,415,416,417)
```

Figure 15. LIBGEN for One Host, One ACS, One 9310 LSM, One 9360 LSM Configuration (1 of 2)

```
P000009  SLIDLIST  HOSTDRV=D0000020
*
D0000020 SLIDRIVS  ADDRESS=(510,511,512,513)
*
P00001Ø  SLIDLIST  HOSTDRV=D0000030
*
D0000030 SLIDRIVS  ADDRESS=(514,515,516,517)
*
LSM0001  SLILSM    DRIVE=(1,3),                                        X
               DRVELST=(P000101,P000103),                            X
               PASTHRU=((Ø,M)),                                      X
               ADJACNT=(LSMØ),                                       X
               TYPE=9360-075,                                        X
               DOOR=WC1
*
P000101  SLIDLIST  HOSTDRV=D0000040
*
D0000040 SLIDRIVS  ADDRESS=(610,611,612,613)
*
P000103  SLIDLIST  HOSTDRV=D0000050
*
D0000050     SLIDRIVS  ADDRESS=(614,615,616,617)
*
         SLIENDGN
```

Figure 15. LIBGEN for One Host, One ACS, One 9310 LSM, One 9360 LSM Configuration (2 of 2)

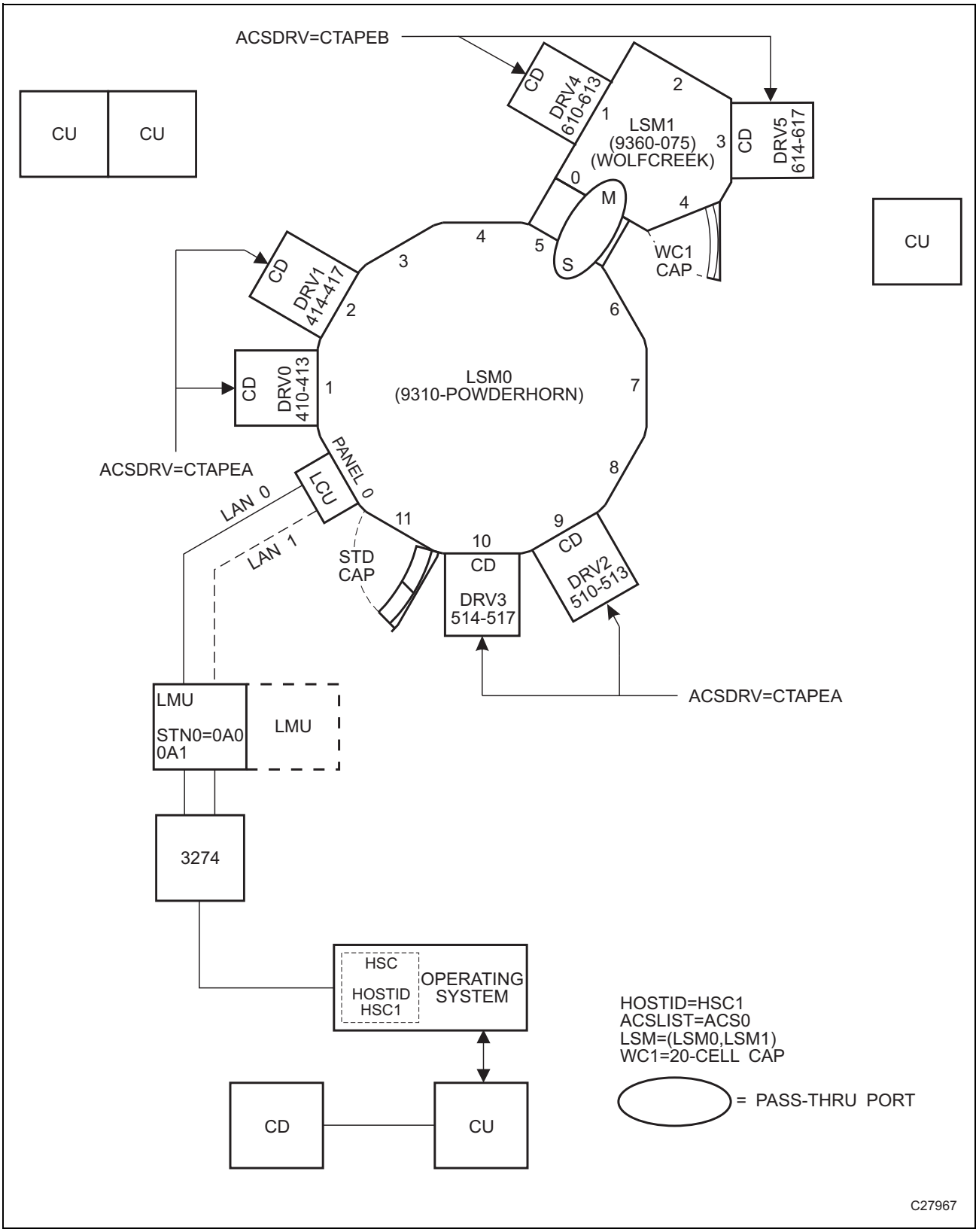


Figure 16. One Host, One ACS, One 9310 LSM, One 9360 LSM Configuration

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 (ACS00)
- library transport esoterics (CTAPEA) for ACS00
- Library Storage Modules
  - one 9360-050 WolfCreek LSM designated as LSM0000 with two cartridge drive panels (1,3) and a 20-cell CAP
  - one 9360-100 WolfCreek LSM designated as LSM0001 with two cartridge drive panels (1,3) and an optional 30-cell WolfCreek CAP
- two station addresses (0A0,0A1)

Figure 18 on page 178 illustrates the layout for this configuration.

LIBGEN03

An example LIBGEN for this configuration is shown in Figure 17 on page 176.

```
*       Label definitions:
*
*       ACS     - 'ACSxx'    where 'xx' is the ACS number in printable hex.
*       LSM     - 'LSMxxyy'  where 'xx' is the ACS number in printable hex, and 'yy'
*                            is the LSM number within the ACS in printable hex.
*       STATION - 'STxxh'    where 'xx' is the ACS number in printable hex, and 'h'
*                            is the host index in printable hex.
*       PANEL   - 'Pxxyypp'  where 'xx' is the ACS number in printable hex,'yy' is
*                            the LSM number in printable hex, and 'pp' is the panel
*                            number in decimal.
*       DRIVE   - 'Dxxyypph' where 'xx' is the ACS number in printable hex, 'yy' is
*                            the LSM number in printable hex, 'pp' is the panel
*                            number in printable hex, and 'h' is the host index in
*                            printable hex.
*********************************************************************************

LIBGEN03 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  ACS00
*
ACS00     SLIACS   ACSDRV=(CTAPEA),                                     X
               STATION=ST000,                                           X
               LSM=(LSM0000,LSM0001)
*
ST000     SLISTATN ADDRESS=(0A0,0A1)
*
LSM0000     SLILSM   DRIVE=(1,3),                                       X
               DRVELST=(P000001,P000003),                               X
               PASTHRU=((2,S)),                                         X
               ADJACNT=(LSM0001),                                       X
               TYPE=9360-050,                                           X
               DOOR=WC1
```

Figure 17. LIBGEN for One Host, One ACS, Two 9360 LSM Configuration (1 of 2)

```
*
P000001  SLIDLIST  HOSTDRV=D0000000

D0000000 SLIDRIVS  ADDRESS=(310,311,312,313)

P000003  SLIDLIST  HOSTDRV=D0000010

D0000010 SLIDRIVS  ADDRESS=(410,411,412,413)
*
LSM0001    SLILSM    DRIVE=(1,3),                                    X
               DRVELST=(P000101,P000103),                           X
               PASTHRU=((0,M)),                                     X
               ADJACNT=(LSM0000),                                   X
               TYPE=9360-100,                                       X
               DOOR=WC2
*
P000101  SLIDLIST  HOSTDRV=D0000020

D0000020 SLIDRIVS  ADDRESS=(510,511,512,513)

P000103  SLIDLIST  HOSTDRV=D0000030

D0000030 SLIDRIVS  ADDRESS=(610,,612,)
*
         SLIENDGN
```

Figure 17. LIBGEN for One Host, One ACS, Two 9360 LSM Configuration (2 of 2)

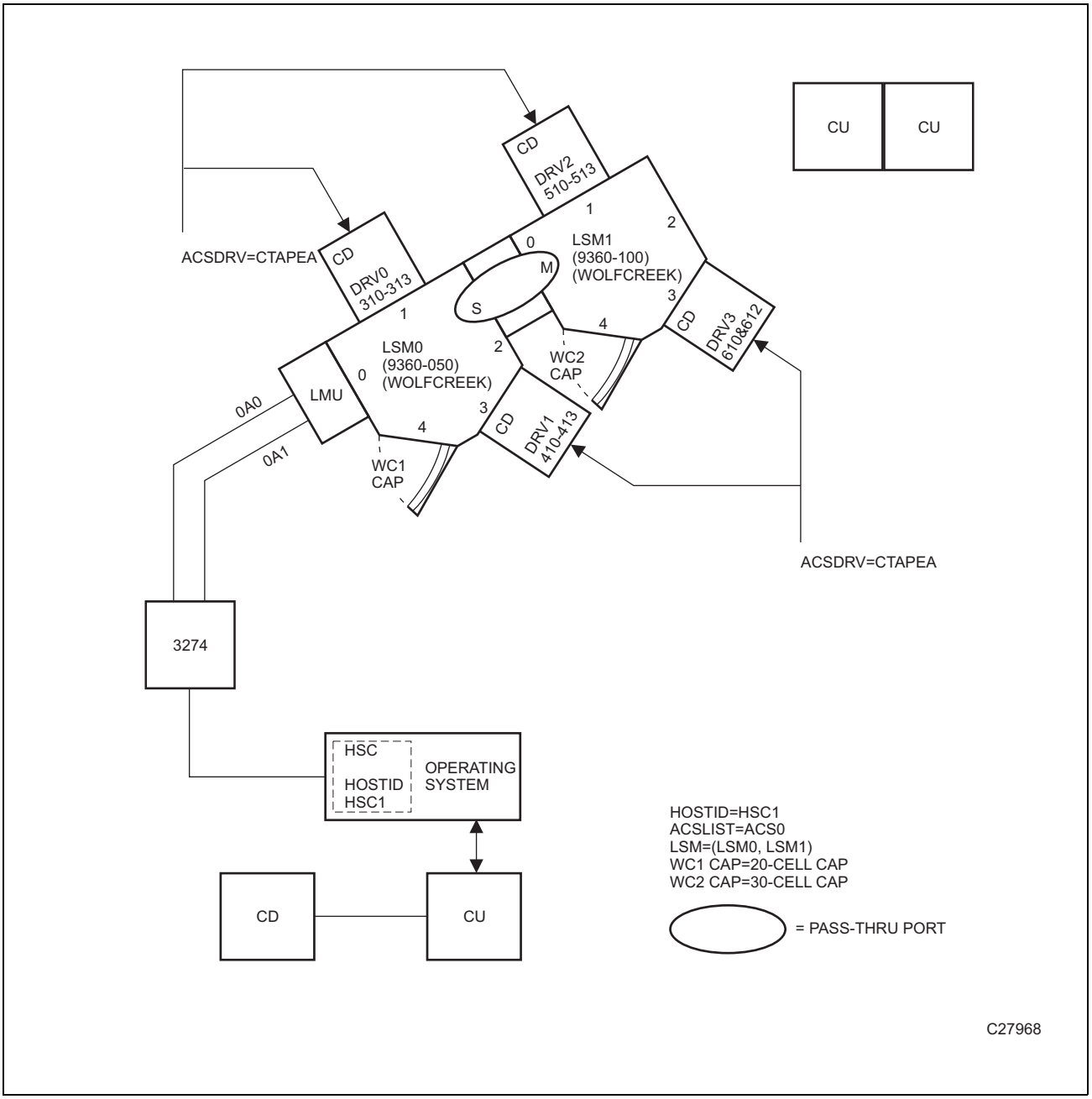


Figure 18. One Host, One ACS, Two 9360 LSM Configuration

One Host, One ACS, One 9310 LSM, Dual LMU Configuration

Hardware Components

This configuration consists of the following components:

- one host (HSC1)
- manual transport esoteric (CARTAPE)
- one Automated Cartridge System (ACS00) Library transport esoteric (CTAPE) for ACS00
- one 9310 Library Storage Module (LSM0000)
- four station addresses (0A0,0A1,0C0,0C1)
- four cartridge drive panels (1,2,9,10)
- sixteen transports (410-417 and 510-517).

Figure 20 on page 181 illustrates the layout for this configuration.

LIBGEN04

An example LIBGEN for this configuration is shown in Figure 19 on page 180.

```
*       Label definitions:
*
*       ACS     - 'ACSxx'    where 'xx' is the ACS number in printable hex.
*       LSM     - 'LSMxxyy'  where 'xx' is the ACS number in printable hex, and 'yy'
*                            is the LSM number within the ACS in printable hex.
*       STATION - 'STxxh'    where 'xx' is the ACS number in printable hex, and 'h'
*                            is the host index in printable hex.
*       PANEL   - 'Pxxyypp'  where 'xx' is the ACS number in printable hex,'yy' is
*                            the LSM number in printable hex, and 'pp' is the panel
*                            number in decimal.
*       DRIVE   - 'Dxxyypph' where 'xx' is the ACS number in printable hex, 'yy' is
*                            the LSM number in printable hex, 'pp' is the panel
*                            number in printable hex, and 'h' is the host index in
*                            printable hex.
*********************************************************************************

LIBGEN04 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  ACS00
*
ACS00    SLIACS    ACSDRV=CTAPE,                                        X
               STATION=ST000,                                           X
               LSM=(LSM0000)
*
ST000    SLISTATN  ADDRESS=(0A0,0A1,0C0,0C1)
*
LSM0000     SLILSM    DRIVE=(1,2,9,10),                                 X
               DRVELST=(P000001,P000002,P000009,P000010),               X
               TYPE=9310,                                               X
               DOOR=STD
*
P000001  SLIDLIST  HOSTDRV=D0000000
D0000000 SLIDRIVS  ADDRESS=(410,411,412,413)
P000002  SLIDLIST  HOSTDRV=D0000010
D0000010 SLIDRIVS  ADDRESS=(414,415,416,417)
P000009  SLIDLIST  HOSTDRV=D0000020
D0000020 SLIDRIVS  ADDRESS=(510,511,512,513)
P00010  SLIDLIST  HOSTDRV=D0000030
D0000030 SLIDRIVS  ADDRESS=(514,515,516,517)
*
         SLIENDGN
```

Figure 19. LIBGEN for One Host, One ACS, One 9310 LSM, Dual LMU Configuration

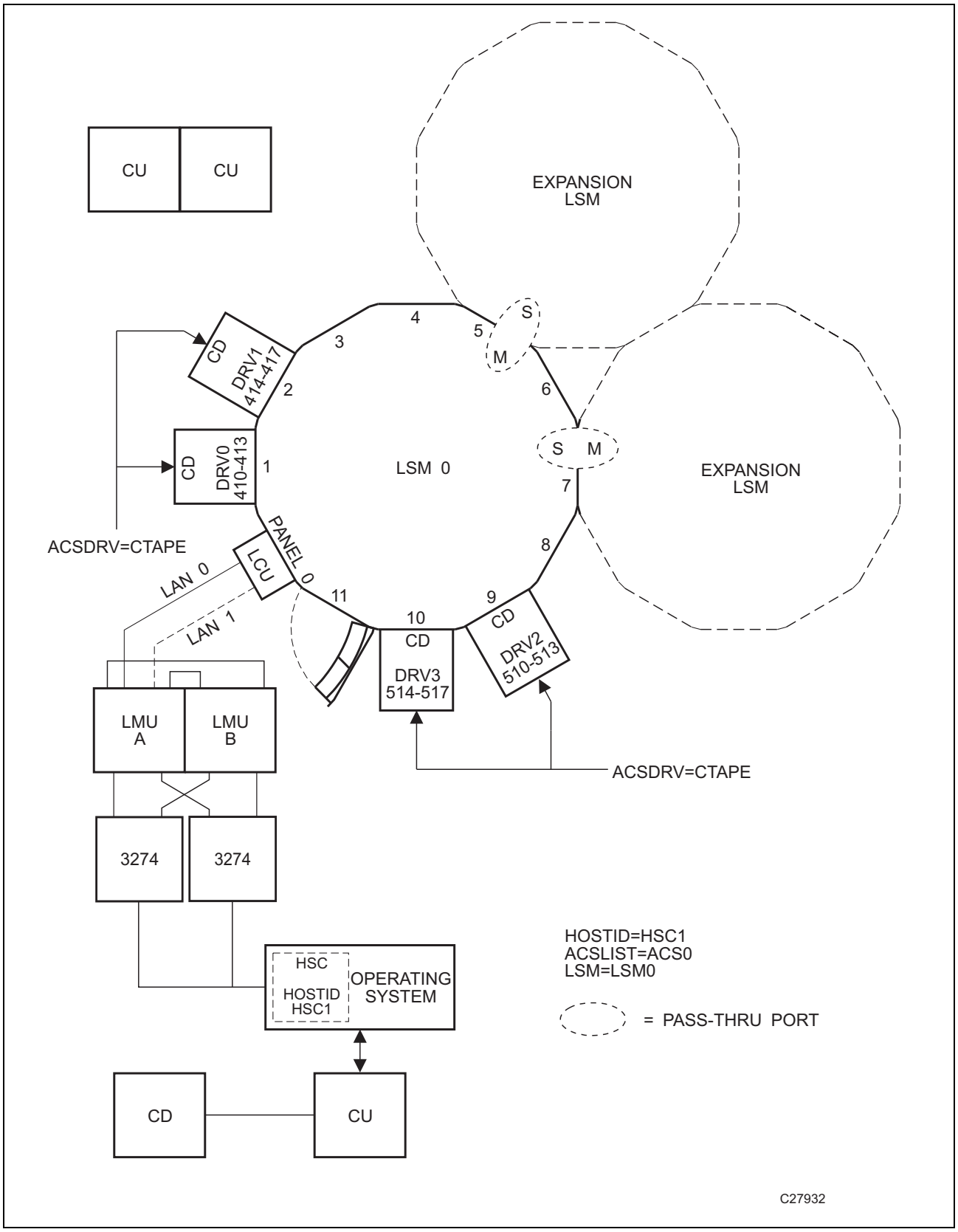


Figure 20. One Host, One ACS, One 9310 LSM, Dual LMU Configuration

Two Host, One ACS, Two 9310 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 (ACS00)
- two library transport esoterics (CTAPEA,CTAPEB) for ACS01
- Library Storage Modules
  - one 9310 LSM designated as LSM0000 with four cartridge drive panels (1,2,9,10) and a standard CAP.
  - one 9310 LSM designated as LSM0001 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 22 on page 185 illustrates the current layout for this configuration.

LIBGEN05

An example LIBGEN for this configuration is shown in Figure 21 on page 183.

```
*       Label definitions:
*
*       ACS     - 'ACSxx'     where 'xx' is the ACS number in printable hex.
*       LSM     - 'LSMxxyy'   where 'xx' is the ACS number in printable hex, and 'yy'
*                             is the LSM number within the ACS in printable hex.
*       STATION - 'STxxh'     where 'xx' is the ACS number in printable hex, and 'h'
*                             is the host index in printable hex.
*       PANEL   - 'Pxxyypp'   where 'xx' is the ACS number in printable hex,'yy' is
*                             the LSM number in printable hex, and 'pp' is the panel
*                             number in decimal.
*       DRIVE   - 'Dxxyypph'  where 'xx' is the ACS number in printable hex, 'yy' is
*                             the LSM number in printable hex, 'pp' is the panel
*                             number in printable hex, and 'h' is the host index in
*                             printable hex.
*********************************************************************************

LIBGEN05 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  ACS00
*
ACS00    SLIACS    ACSDRV=(CTAPEA,CTAPEB),                             X
               STATION=(ST000,ST001),                                   X
               LSM=(LSM0000,LSM0001)
*
ST000    SLISTATN  ADDRESS=(0A0,0A1)
ST001    SLISTATN  ADDRESS=(0A2,0A3)
*
LSM0000    SLILSM    DRIVE=(1,2,9,10),                                 X
               DRVELST=(P000001,P000002,P000009,P000010),               X
               PASTHRU=((5,M)),                                         X
               ADJACNT=(LSM0001),                                       X
               TYPE=9310,                                               X
               DOOR=STD
*
P000001  SLIDLIST  HOSTDRV=(D0000000,D0000000)
D0000000 SLIDRIVS  ADDRESS=(410,411,412,413)
P000002  SLIDLIST  HOSTDRV=(D0000010,D0000010)
D0000010 SLIDRIVS  ADDRESS=(414,415,416,417)
P000009  SLIDLIST  HOSTDRV=(D0000020,D0000020)
D0000020 SLIDRIVS  ADDRESS=(418,419,41A,41B)
P000010  SLIDLIST  HOSTDRV=(D0000030,D0000030)
D0000030 SLIDRIVS  ADDRESS=(41C,41D,41E,41F)
*
```

Figure 21. LIBGEN for Two Host, One ACS, Two 9310 LSM Configuration (1 of 2)

```
LSM0001    SLILSM    DRIVE=(7,8,9,10),                                  X
              DRVELST=(P000107,P000108,P000109,P000110),              X
              PASTHRU=((5,S)),                                        X
              ADJACNT=(LSM0000),                                      X
              TYPE=9310,                                              X
              DOOR=ECAP
*
P000107  SLIDLIST  HOSTDRV=(D0000040,D0000040)
D0000040 SLIDRIVS  ADDRESS=(510,511,512,513)
P000108  SLIDLIST  HOSTDRV=(D0000050,D0000050)
D0000050 SLIDRIVS  ADDRESS=(514,515,516,517)
P000109  SLIDLIST  HOSTDRV=(D0000060,D0000060)
D0000060 SLIDRIVS  ADDRESS=(518,519,51A,51B)
P000110  SLIDLIST  HOSTDRV=(D0000070,D0000070)
D0000070 SLIDRIVS  ADDRESS=(51C,51D,51E,51F)
*
         SLIENDGN
```

Figure 21. LIBGEN for Two Host, One ACS, Two 9310 LSM Configuration (2 of 2)

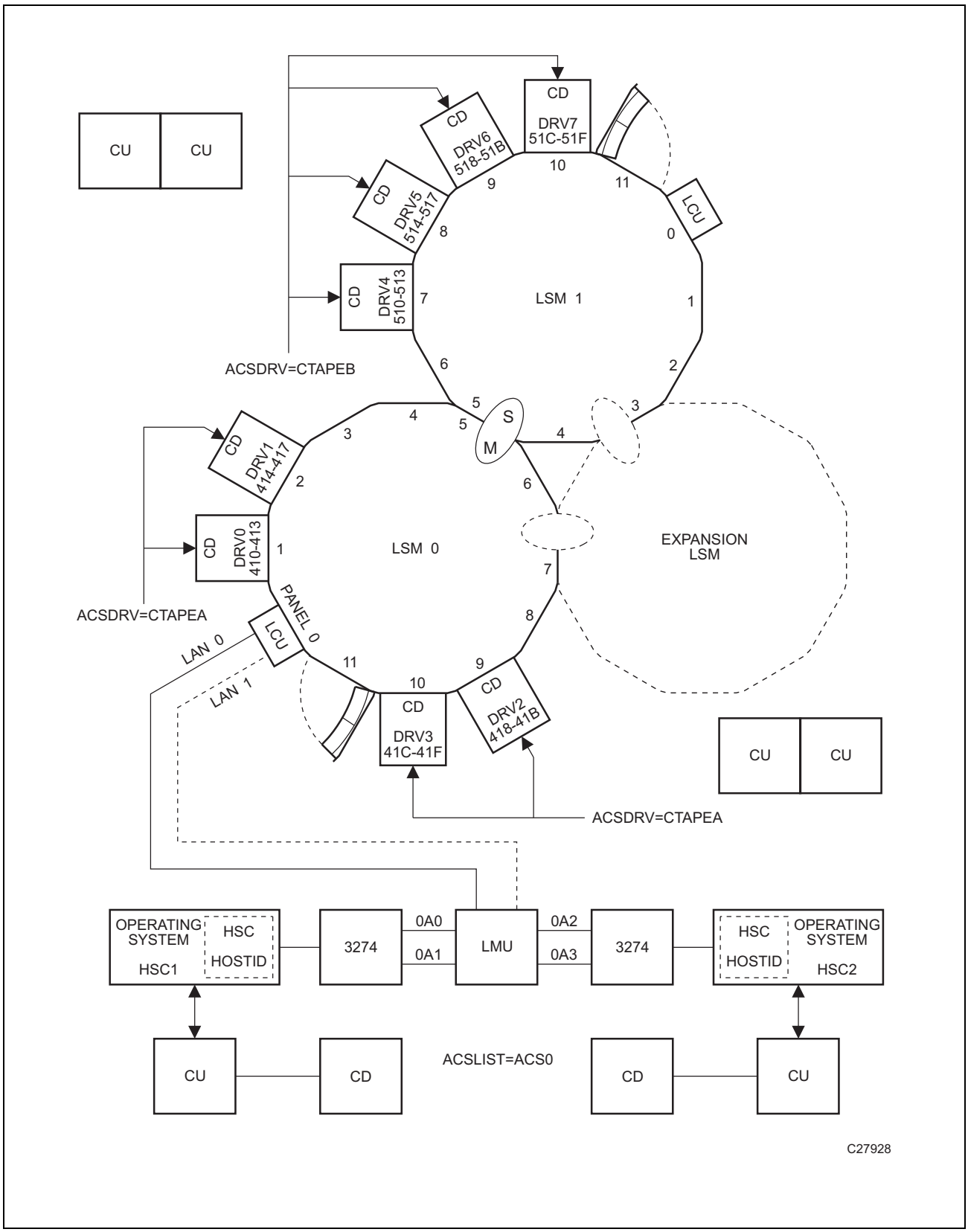


Figure 22. Two Host, One ACS, Two 9310 LSM Configuration

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

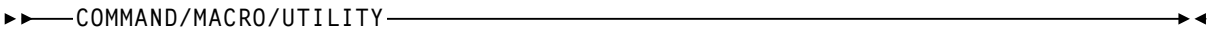
Variables are italicized.

Delimiters

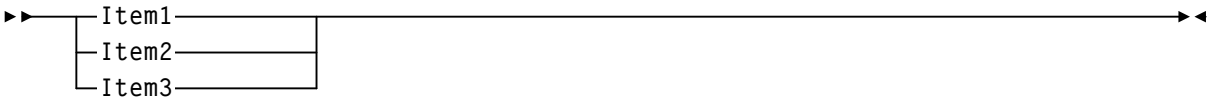
If a comma(,), a semicolon(;), or other delimiter is shown with an element of the syntax diagram, it must be entered as part of the statement or command.

Flow Lines

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

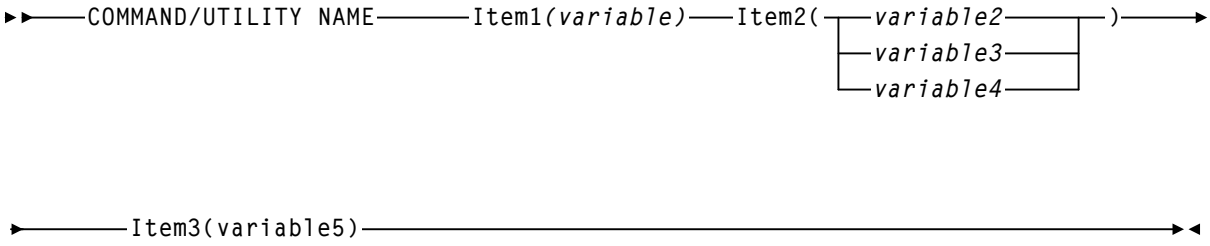


or



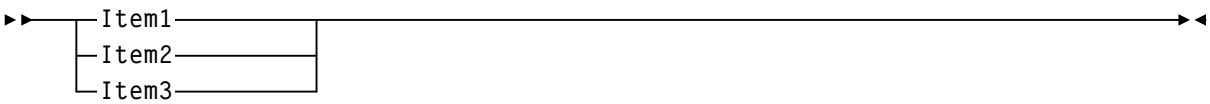
Diagrams are read left to right and top to bottom. Arrows show flow and direction.

- 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.

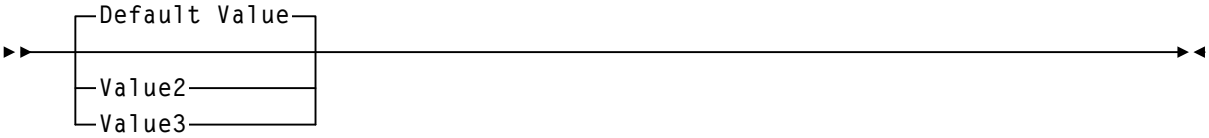


Single Optional Choice

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

Defaults

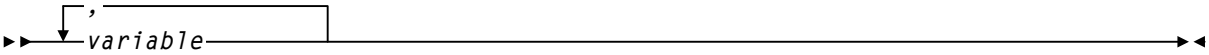
Default values and parameters appear above the syntax diagram line. In the following example, if a value is not specified with the command, Default Value is used by the HSC.



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.

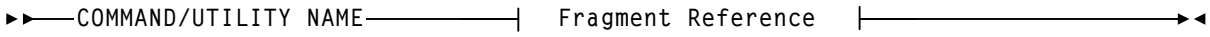
Repeat Symbol

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.

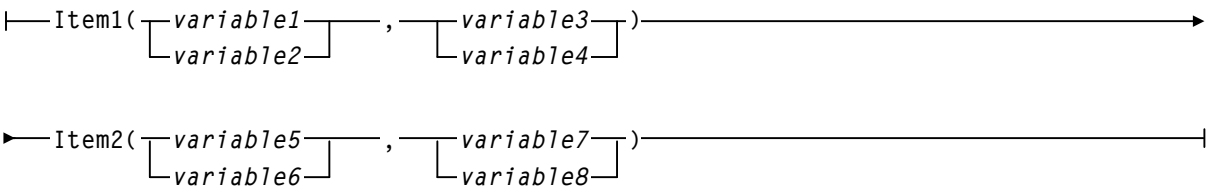


Syntax Continuation (Fragments)

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



Fragment:



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 "SLIALIST Macro" on page 76 for information about the SLIALIST macro. The first ACS listed in this macro acquires a hexadecimal identifier of 00, the second ACS listed acquires a hexadecimal identifier of 01, and so forth until all ACSs are identified.

- An LSM number (*ll*) is a hexadecimal value from 0 through 17. It differentiates an LSM from every other LSM connected to the same LMU.

  An LSM number is the result of defining the SLIACS macro LSM parameter. See "SLIACS Macro" on page 77 for information about the SLIACS macro. The first LSM listed for an ACS acquires a hexadecimal number of 00, the second LSM listed for an ACS acquires a hexadecimal number of 01, and so forth.

- An LSMid (*lsm-id*) is the concatenation of the ACSid and the LSM number separated by a colon (:). It differentiates an LSM from every other LSM in a library.
- A CAP number is a hexadecimal value from 00 to 02. The CAP number identifies a specific CAP in an LSM that has more than one CAP.
- A CAPid (*cap-id*) is a hexadecimal value made up of the LSMid and the CAP number separated by a colon.

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 **both** JES2 and 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, any portion is valid as the incremental range. For example:

A00B00	the largest range that can be specified is A00B00 through A99B99.
A0B0CC	the largest range that can be specified is A0B0CC through A9B9CC.
000XXX	the largest range that can be specified is 000XXX through 999XXX.

Note: A VOLSER range for most operator commands is limited to 100 entries. If a larger range is entered, only the first 100 VOLSERs in the range are acted on. If HSC utilities are used, the entire range is processed.

   - An alphabetic VOLSER range (*vol-range*) consists of a pair of VOLSER elements containing an incremental portion of 1 to 6 characters (for example, 000AAA-000ZZZ, or 9AAA55-9ZZZ55). This portion is referred to as an incremental range. The following additional restrictions apply:
     - The character positions of the incremental portion of both range elements must match.
     - The non-incremental characters of the first element must be identical to those of the second element.

- You cannot increment two portions of a range element. If 111AAA is the first element, you cannot specify 112AAB for the second element.
- The alphabetic portion of the VOLSER range is defined as being from character A to Z. To increment multi-character sequences, each character increments to Z. For instance, ACZ is part of the AAA-AMM range. Examples are:

A00A0-A99A0	increments VOLSERs A00A0 through A09A0, then A10A0 through A99A0.
9AA9A-9ZZ9A	increments VOLSERs 9AA9A through 9AZ9A, then 9BA9A through 9ZZ9A.
111AAA-111ZZZ	increments VOLSERs 111AAA through 111AAZ, then 111ABA through 111ZZZ.
999AM8- 999CM8	increments VOLSERs 999AM8 through 999AZ8, then 999BA8 through 999CM8
A3BZZ9- A3CDE9	increments VOLSERs A3BZZ9 through A3CAA9, then A3CAB9 through A3CDE9
AAAAAA-AAACCC	increments VOLSERs AAAAAA through AAAAAZ, then AAAABA through AAACCC
CCCNNN-DDDNNN	increments VOLSERs CCCNNN through CCCNNZ, then CCCNOA through DDDNNN*

* **Caution:** This is a very large range.

The number of volumes in an alphabetic VOLSER range depends on the number of elements in the incrementing portion of the VOLSER range. For an A to Z range in each character position, the number of volumes can be calculated by 26 to the power of the number of positions that are being incremented.

A-Z	26^1	26
AA-ZZ	26^2	676
AAA-ZZZ	26^3	17,576
AAAA-ZZZZ	26^4	456,976
AAAAA-ZZZZZ	26^5	11,881,376
AAAAAA-ZZZZZZ	26^6	308,915,776

Note: For most operator commands, a VOLSER range is limited to 100 entries. If a large range is entered, only the first 100 VOLSERs are acted upon. If HSC utilities are used, the entire range is processed.

2. A list consists of one or more elements. If more than one element is specified, the elements **must** be separated by a comma or a blank, and the entire list enclosed in parentheses.

    - For some HSC operator commands, an element may consist of a single item or a range. Refer to the individual command explanations for valid list entries.
    - In general, HSC utilities **do not allow** ranges to be specified in a list. The exception to this is a VOLSER list (*vol-list*) which does allow ranges to be specified. For VOLATTR control statements, you can use wildcard characters (%, ?, or *) to identify a list of VOLSERs.

Control Statement Syntax Conventions

The control statement for each utility program consists of a command (indicating the utility function) followed by parameters, as applicable, in 80-character card-image records. The standard syntax conventions for control statements are as follows:

- The only valid control statement information area is from column 2 to column 72. Columns 73-80 are ignored.
- Parameters are separated by one or more blanks or a comma.
- A value is associated with a parameter by an equal sign (=) or by enclosing the value in parentheses, and concatenating it immediately after the parameter.
- Case (upper or lower) is ignored in actual control statements.
- Control statements may be interspersed with comments designated by an asterisk (*) in column one.

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

- A control statement is terminated if the statement is not continued. Control statements must have a /*...*/ comment as the **first** control statement in the PARMLIB member. A PARMLIB member that does not begin with a /*...*/ style comment is assumed to be in the old format. Comments in old format members must begin with an asterisk in column 1.

  In contrast to utility control statements, PARMLIB control statements may begin in column 1. Columns 73-80 are ignored.

  To allow for continuation, comments in the job stream must start with /* and end with */. Comments cannot be nested, and mixing the two comment styles (* and /*) is not allowed.

- The 80-character card-image records use conventional continuation rules.
  - A space and a dash (-) following a parameter or parameter value indicates that a blank is to be inserted between the last nonblank character of this line and the first nonblank character of the next nonblank record.
  - A plus sign (+) specifies that the continued control information is to be concatenated directly after the character preceding the plus sign. The continued data starts at column two of the next nonblank record.

Note: You can use a continuation only after a new keyword or after the natural end of a value. Some examples follow.

The following examples illustrate continuations used correctly:

```
SCRPOOL NAME=STD36,RANGE+
(AAA000-AAA999,ZZZ000-ZZZ999)

SCRPOOL NAME=STD36,RANGE(AAA000-AAA999,-
ZZZ000-ZZZ999)
```

The following example illustrates a continuation used *incorrectly*:

```
SCRPOOL NAME=STD36,RANGE(AAA000-AAA999,ZZZ+
000-ZZZ999)
```

  - 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 6.0 and 6.1 to Release 6.2 (up-level migration), and, if required, from Release 6.2 to Releases 6.1 or 6.0 (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 6.0 or 6.1, *and* HSC 6.2 are installed and executing on separate hosts sharing the same library complex and CDS.

Note: A 2.1-level CDS format can run with HSC 6.0, 6.1, and HSC 6.2. A 6.0-level CDS is built automatically if you use 6.0 load libraries and specify an SL8500 library in the SLILSM macro. A 6.1-level CDS is always built if you use 6.2 load libraries.

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., 6.0 or 6.1) to HSC 6.2. 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., 6.0, 6.1, and 6.2) 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 6.0 to HSC 6.2
  - HSC 6.1 to HSC 6.2.
- Down-level:
  - HSC 6.2 to HSC 6.1
  - HSC 6.2 to HSC 6.0.

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 6.0 and 6.1 can coexist with HSC 6.2.

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 make sure 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 6.2 into a verification environment in your data center involves installing 6.2 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 6.2 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 this release.
- For more information about 6.2 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 6.0 or 6.1 to HSC 6.2 using a verification system. Refer to “Procedure to Verify HSC 6.2 Functions Against a Separate CDS” on page 207 for more information. Also included are procedures for temporarily terminating HSC 6.0 or 6.1; initiating a 6.2 verification subsystem; terminating the 6.2 subsystem; and returning back to your 6.0 or 6.1 system for production operations.

Direct Installation into a Production Environment

For data centers installing 6.2 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 6.0 or 6.1.

Migration

- No new LMU microcode is required for HSC 6.2 if you are migrating from HSC 6.0 or 6.1.
- Programs using the programmatic interface (PGMI) do not need to be recompiled for HSC 6.2.

Coexistence PTFS

Coexistence PTFs to HSC 6.0 and 6.1 allow HSC 6.0, 6.1, and 6.2 to run on multiple hosts sharing the same CDS.

A 2.1-level CDS format can run with HSC 6.0, 6.1, and HSC 6.2. A 6.0-level CDS is built automatically if you use 6.0 load libraries and specify an SL8500 library in the SLILSM macro. A 6.1-level CDS is always built if you use 6.2 load libraries.

Refer to “Control Data Set and Journal Requirements” on page 204 for more detailed information.

Notes:

- HSC 6.0, 6.1, and 6.2 will not initialize if any ACS is defined that does not include attached stations.
- HSC 5.1 can be active in the same host complex with HSC 6.0, 6.1, and 6.2, as long as compatibility PTFs have been installed.
- Coexistence PTFs to HSC 5.0, 5.1, and 6.0 do not allow dynamic hardware reconfiguration changes on a 6.1 or 6.2 system if the downlevel hosts are active. In this case, the downlevel hosts must be terminated until the changes are completed. They can then be restarted, and the CDS is updated at initialization to reflect the changes.

Coexistence

- Utilities that require HSC services must match the HSC release level. That is, a 6.0 utility must run with an active 6.0 subsystem, a 6.1 utility must run with an active 6.1 subsystem, and so forth. See “Utility Usage Requirements” on page 205 for additional information.
- Some stand-alone utilities (not requiring an active HSC) are dependent on the CDS level. HSC 6.0, 6.1, and 6.2 stand-alone utilities run with a CDS in 2.1 format, unless:
  - **6.0 load libraries are used and an SL8500 library has been specified on the SLILSM macro. In this case, a 6.0-level CDS is built.**
  - **6.1 or 6.2 load libraries are used, which results in a 6.1-level CDS being built.**

  Stand-alone utilities can be run from all of these releases. Refer to “Utility Usage Requirements” on page 205 for additional information.
- **If you run Database Decompile using HSC 6.2 load libraries, you must run the LIBGEN using HSC 6.2 load libraries.**

Hardware Support Dependencies Between HSC Releases

Library hardware support varies depending on the release level and composition of the library. Table 17 on page 203 lists the supported functionality for major library hardware components under 6.0, 6.1, and 6.2 subsystems.

Table 17. HSC Library Hardware Dependencies

Hardware Component	HSC 6.0	HSC 6.1	HSC 6.2
4410 (Standard) LSM	Supported	Supported	Supported
9310 (PowderHorn) LSM	Supported	Supported	Supported
9360 (WolfCreek) LSM	Supported	Supported	Supported
9740 (TimberWolf) LSM	Supported	Supported	Supported
SL8500 (StreamLine)	Supported	Supported	Supported
SL3000 (StreamLine)	Not Supported	Supported	Supported
4430 LMU	Supported for non-9840	Supported for non-9840	Supported for non-9840
9315 LMU	Supported	Supported	Supported
9330 LMU	Supported	Supported	Supported
4480 (18-track) Cartridge Subsystem	Supported	Supported	Supported
4490 (36-track) Cartridge Subsystem	Supported	Supported	Supported
9490 (36-track) Cartridge Subsystem	Supported	Supported	Supported
9490EE (36-track) Cartridge Subsystem	Supported	Supported	Supported
9840 Cartridge Subsystem	Supported	Supported	Supported
T9840B Cartridge Subsystem	Supported	Supported	Supported
T9840C Cartridge Subsystem	Supported	Supported	Supported
T9940A Cartridge Subsystem	Supported	Supported	Supported
T9940B Cartridge Subsystem	Supported	Supported	Supported
Virtual Tape Storage Subsystem	Supported	Supported	Supported

Control Data Set and Journal Requirements

The format of the HSC control data set is identified by the "CDS level."

For HSC 6.0, 6.1, and 6.2, the CDS level defaults to 2.1, unless 6.0 load libraries are used and an SL8500 library is specified in the SLILSM macro. In this case, the SLICREAT program used to create the control data sets automatically builds a 6.0-level CDS. SLICREAT automatically builds a 6.1-level CDS if 6.2 load libraries are used.

Notes:

- It is possible to remove LSMs from the SL8500 configuration without performing a LIBGEN, MERGEcds, and recycle of the HSC. However, **this operation requires assistance from StorageTek**.
- If you intend to add drives, run the SET SLIDRIVS utility to allow the HSC to recognize drive locations and associated UCB addresses and to ensure the CDS reflects the new tape drive configuration. Refer to the SET SLIDRIVS utility in the *HSC System Programmer's Guide.*

Caution: StorageTek recommends that you do not run CDS-related commands and utilities while dynamic hardware changes are being implemented.

Refer to the Appendix B, *HSC System Programmer's Guide*, "HSC Support for Near Continuous Operation (NCO)" for important procedural information, requirements, and warnings.

The CDS level is contained in the CDS and may be seen using the Display CDS command or by browsing the CDS. If you browse the CDS, the level is found in the first record (DHB) at columns 1725-1730 or in the second record (DPV) at columns 45-50. The CDS level is a 6-character field, 020100 for a 2.1-level CDS.

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

Backup Requirements

Use the HSC 6.0 or 6.1 BACKup utility before migrating, and the HSC 6.2 BACKup utility after migrating.

CDS Conversion Requirements (Up-Level Migration)

No CDS conversion is required to migrate from HSC 6.0 or 6.1 to 6.2.

CDS Conversion Requirements (Down-Level Migration)

No CDS conversion is required to migrate from HSC 6.2 to HSC 6.0 or 6.1.

MERGEcds Utility

The MERGEcds utility can merge volume and configuration information from a 2.1 CDS to a 6.0-level CDS or from a 6.0-level CDS to a 2.1 CDS.

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; 6.0, 6.1, and 6.2 stand-alone utilities are used with a 2.1 CDS, unless 6.0 load libraries are used and an SL8500 library has been specified in the SLILSM macro. In this case, a 6.0-level CDS is built automatically. If 6.1 load libraries are used, a 6.1-level CDS is created automatically.

- 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.

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 6.2 utility requiring an active HSC must execute against an active HSC 6.2 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 6.2 utility must execute with a 6.2 subsystem, a 6.1 utility must execute with a 6.1 subsystem, and so forth.

If a 6.2 utility is executed with a 6.0 or 6.1 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
- MERGEcds
- MOVe
- SCRAtch, UNSCratch, REPLaceall
- Scratch Redistribution (SCREdist)
- UNSElect.

Up-Level Migration

Up-level migration to 6.2 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 199).

Procedure for 6.0/6.1 to 6.2 Up-Level Migration

The step-by-step procedure presented in Table 18 is a summary of the required steps to migrate HSC software from 6.0 or 6.1 to 6.2.

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 18. Procedure for 6.0/6.1 to 6.2 Up-Level Migration

Step	Description of Action	Verification
1	Apply the coexistence PTFs on all 6.0 or 6.1 hosts.	
2	Identify the host(s) being migrated to 6.2. All active hosts must be running HSC 6.0 or 6.1 with the 6.2 coexistence PTF(s) applied.	
3	Install HSC 6.2.	
4	Initialize HSC 6.2 on any host to be migrated. See Chapter 8, “HSC Initialization” for more information.	
5	Exercise any or all 6.2 functions including enter, eject, automating mounts, and utilities.	

Host-by-host Migration - 6.0/6.1 to 6.2

If desired, users can migrate from 6.0 or 6.1 to 6.2 on a host-by-host basis without having to terminate the HSC on all hosts. HSC 6.0 or 6.1 hosts, with the 6.2 coexistence PTF(s) applied, will run with a 6.2 host initialized. The CDS does not need to be converted.

Procedure to Verify HSC 6.2 Functions Against a Separate CDS

This procedure permits you to perform initial 6.2 verification against a separate CDS before migrating the production CDS. Your initial verification of 6.2 should exercise the HSC 6.2 utilities that must be executed with a CDS in 2.1 format. Specifically, the 6.2 BACKup, 6.2 RESTore, and 6.2 SET utilities should be executed against the 2.1 CDS. Execute 6.2 functions using the following procedures:

- verifying 6.2 functions at the Base service level (without library hardware). Refer to "Procedure to Verify HSC 6.2 Functions Without Library Hardware" on page 208 for detailed steps.
- verifying 6.2 functions at the Full service level (with library hardware). Refer to "Procedure to Verify 6.2 Functions With Library Hardware" on page 209 for detailed steps.

After the initial verification is successfully completed, you can perform more extensive investigation of 6.2 on a subsystem sharing a common 6.1-level CDS with other hosts.

Procedure to Verify HSC 6.2 Functions Without Library Hardware

Table 19 describes the procedure to verify HSC 6.2 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 6.2 functions that require library hardware cannot be exercised, but many functions can be.

Table 19. Procedure to Verify 6.2 Functions without Library Hardware

Step	Description of Action	Verification
1	Create a separate 2.1 CDS by doing the following: • Run the 6.2 BACKup utility. • Run the 6.2 RESTore utility. For more information on these two utilities, refer to the *HSC System Programmer's Guide*.	
2	Verify the following 6.2 stand-alone utilities that do not require HSC services. • BACKup • RESTore • SET Verify remaining 6.2 stand-alone utilities: • ACTIvities report • Database Decompile • Journal OFFLoad (of 6.2 journals) • VOLRpt	
3	Initialize an HSC 6.2 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 (6.2) CDS to a 2.1 (6.2) CDS.	

Procedure to Verify 6.2 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 6.2 functions with the library hardware are shown in Table 20.

Table 20. Procedure to Verify 6.2 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 6.2 BACKup utility. • Restore the backup of the 2.1 CDS to a separate data set using the 6.2 RESTore utility.	
2	• Initialize a 6.2 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 6.2 functions, including enter, eject, automating mounts, and utilities.	
5	Eject all cartridges used for 6.2 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 6.2 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 6.2 to 6.0 or 6.1.

De-installation of PTFs

It is not necessary, or advisable, to remove the HSC coexistence PTFs from 6.0, 6.1, or 6.2 subsystems.

Procedure for 6.2 to 6.0/6.1 Down-Level Migration

Follow the steps listed in Table 21 to perform a down-level migration from 6.2 to 6.0 or 6.1.

Table 21. Procedure for 6.2 to 6.0/6.1 Down-Level Migration

Step	Description of Action	Verification
1	If compatibility and coexistence PTFs have been applied to hosts running 6.0, 6.1, or 6.2, do not remove them.	
2	Terminate the HSC on all hosts.	
3	Initialize HSC 6.0, 6.1, or 6.2 with tape activity suspended.	

Appendix E. HSC Maintenance Installation Instructions

Introduction

Maintaining the HSC in the VM environment follows the philosophy that VM established for the support of SNA products (e.g., VTAM, NCP). The following topics are discussed in this appendix: maintenance facilities, corrective service, and emergency service.

Maintenance Assistance

Before attempting to install HSC software maintenance, please call StorageTek Software Product Support for the latest information available concerning installation.

Customer Services has established an independent direct phone line to Level 1 Software Support. This number is available for domestic U. S. software customers. It is necessary for customers to know their site location number when calling. Customer Services is committed to providing excellent service and this is another step in improving our service capabilities.

Refer to the guide *Requesting Help from Software Support* for information about calling for assistance, and for additional information about StorageTek Software Support.

Maintenance Facilities

Functions and files used in the maintenance of the HSC include:

- VM-supplied maintenance facilities
- VMFPARM file
- Product-specific generate EXEC.

VM-Supplied Maintenance Facilities

VM provides a set of tools to use for object-level maintenance. The basic techniques and philosophy of object-level maintenance are documented in IBM manuals.

VM tools include:

VMFPLC2
copies files to/from tapes.

All StorageTek service for VM products utilizes the VMFPLC2 format.

VMFMERGE
manages PTFs and ensures that all prerequisites and corequisites have been properly applied.

VMFZAP
applies ZAPs to text files.

VMFPARM File

The StorageTek supplied file ‘‘SMS6200 VMFPARM A’’ contains the following minidisk address definitions required by installation and maintenance functions:

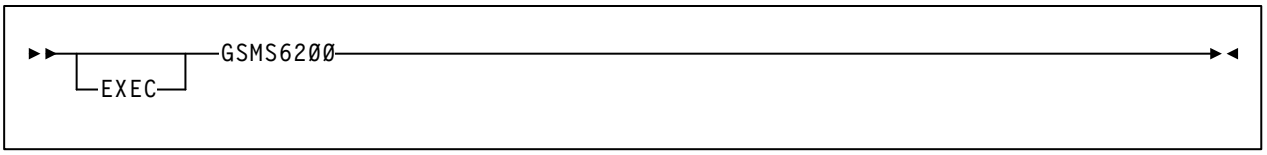
Minidisk	Address
ADISK	191
BASE	250
DELTA	251
MERGE	252
ZAP	253
RUN	254
ACS191	255
IPCS	256
GCS191	257

Product-Specific Generate EXEC

The generate EXEC - GSMS6200 EXEC - is distributed as part of the base product. GSMS6200 allows you to rebuild files on the product RUN-disk to incorporate maintenance produced by VMFMERGE and VMFZAP.

Issue the GSMS6200 command to execute the generate EXEC.

Syntax



Corrective Service

StorageTek provides Program Temporary Fixes (PTFs) to correct reported problems. When you order a PTF, you will receive a StorageTek corrective service tape containing the requested PTFs and all prerequisites.

Corrective Service Tape Contents

Corrective service PTFs are distributed on an unlabeled tape in VMFPLC2 format. The physical files included on the tape are:

- **File 1** Service document
- **File 2** Corrective service files.

Installing Corrective Service

To install corrective service, follow these procedures:

1. Log on to the maintenance virtual machine (e.g., MAINSTK).
2. Backup the maintenance machine's MERGE- and RUN-disks. SMS6200 VMFPARM contains the disk addresses.
3. Load the PTFs from the tape as follows:
   - Attach a tape drive as virtual device 181.
   - Mount the PTF tape on the selected drive.
   - Issue the following commands:

     ACCESS 191
     EXEC ACSACC
     VMFPLC2 REW
     VMFPLC2 FSF 1
     VMFPLC2 LOAD * * I (SELECT EOT

   - Detach the tape.
4. Use VMFMERGE to select the desired PTF from the DELTA-disk. Make sure that prerequisite PTFs are installed.

   To apply the corrective service, issue the following command:

   VMFMERGE SMS6200 PTFLIST SMS6200 EXCLUDE SMS6200

   During the VMFMERGE, messages may display for PTFs already merged or for any PTFs that are being superseded.

5. Issue the following command to generate the affected product files.

   EXEC GSMS6200

   Processing may take 30-40 minutes.

Emergency Service

StorageTek provides emergency fixes or ZAPs to correct problems needing immediate resolution. To request an emergency fix, follow these procedures:

1. Call the StorageTek Software Support phone number. A fix or ZAP may be provided in the form of

   - a ZAP number (i.e., Z00001)
   - ZAP control statements

Note: The following steps are paraphrased from the IBM manual VM/SP Installation Guide (SC24-5237).

2. Log on to the ACS maintenance machine and issue the command ACSACC
3. Create a ZAP control file (Z00001 ZAP) on the ZAP-disk.
4. Describe the ZAP in a ZAP list.

   - If file SMS6200 ZAPLIST already exists, add the ZAP number (Z00001) on a new line at the bottom of the file.
   - If SMS6200 ZAPLIST does not exist, create file SMS6200 ZAPLIST on a disk accessed in the SMS6200 VMFPARM file. Enter the ZAP number (Z00001) as the first word on the line. The rest of the information on each line is treated as a comment.

   Do not delete any ZAP numbers from the file unless you do not want them applied. The VMFZAP function erases all TEXT files that have been zapped for a product and then reapplies all ZAPs in the ZAPLIST file.

5. Enter VMFZAP SMS6200 to apply all selected ZAPs.
6. Enter GSMS6200 to regenerate the executable files.

Glossary

Terms are defined as they are used in the text. If you cannot find a term here, check the index.

A

AC— Alternating current.

access method— A technique for moving data between processor storage and I/O devices.

ACS— *See* Automated Cartridge System.

ACSid— An ACSid (*acs-id*) is a hexadecimal value from 00 through FF that identifies the LMU. An ACSid is the result of defining the SLIALIST macro during the library generation (LIBGEN) process. The first ACS listed in this macro acquires a hexadecimal identifier of 00, the second acquires a hexadecimal identifier of 01, and so forth, until all ACSs are identified.

allocation— The selection of a cartridge drive, either inside the library or outside (by the SMC software for SMC allocation, or MVS for MVS allocation without the HSC).

APF— Authorized Program Facility.

APPL— VTAM APPLID definition for the HSC.

archiving— The storage of backup files and associated journals, usually for a given period of time.

Automated Cartridge System (ACS)— The library subsystem consisting of one or two LMUs, and from 1 to 16 attached LSMs.

automated library— *See* library.

automatic mode— A relationship between an LSM and all attached hosts. LSMs operating in automatic mode handle cartridges without operator intervention. This is the normal operating mode of an LSM that has been modified online.

B

basic direct access method (BDAM)— An access method used to directly retrieve or update particular blocks of a data set on a direct access device.

basic sequential access method (BSAM)— An access method for storing and retrieving data blocks in a continuous sequence, using either a sequential access or direct access device.

BDAM— *See* Basic direct access method.

beginning-of-tape (BOT)— The location on a tape where written data begins.

block— A collection of contiguous records recorded as a unit. Blocks are separated by interblock gaps, and each block may contain one or more records.

BOT— *See* beginning-of-tape.

BSAM— *See* Basic Sequential Access Method.

buffer— A routine or storage used to compensate for a difference in rate of data flow, or time of occurrence of events, when transferring data from one device to another.

C

CA-1 (TMS)— Computer Associates Tape Management

System— Third-party software by Computer Associates International, Inc.

CAP— *See* Cartridge Access Port.

capacity— *See* media capacity.

CAPid— A CAPid uniquely defines the location of a CAP by the LSM on which it resides. A CAPid is of the form *AAL:CC* where *AA* is the ACSid, *L* is the LSM number, and *CC* is the CAP number. Some commands and utilities permit an abbreviated CAPid format of *AAL*.

cartridge— The plastic housing around the tape. It is approximately 4 inches (100 mm) by 5 inches (125 mm) by 1 inch (25 mm). The tape is threaded automatically when loaded in a transport. A plastic leader block is attached to the tape for automatic threading. The spine of the cartridge contains a Tri-Optic label listing the VOLSER.

Cartridge Access Port (CAP)— An assembly which allows an operator to enter and eject cartridges during automated operations. The CAP is located on the access door of an LSM.

See also standard CAP, enhanced CAP, priority CAP, WolfCreek CAP, WolfCreek optional CAP, or TimberWolf CAP.

Cartridge Drive (CD)— A device containing two or four cartridge transports with associated power and pneumatic supplies.

Cartridge Scratch Loader— An optional feature for the Cartridge Drive. It allows the automatic loading of premounted tape cartridges or the manual loading of single tape cartridges.

cartridge system tape— Also known as a Standard tape. The basic tape cartridge media that can be used with 4480, 4490, or 9490 Cartridge Subsystems. They are visually identified by a one-color cartridge case.

CAW— *See* Channel Address Word.

CD— *See* Cartridge Drive.

CDRM— Cross Domain Resource Manager definition (if not using existing CDRMs).

CDRSC— Cross Domain Resource definition.

CDS— *See* control data set.

CE— Channel End.

CEL— Customer Emulation Lab. cell. A storage slot in the LSM that is used to store a tape cartridge.

Central Support Remote Center (CSRC)— *See* Remote Diagnostics Center.

CFT— Customer Field Test.

channel— A device that connects the host and main storage with the input and output control units.

Channel Address Word (CAW)— An area in storage that specifies the location in main storage where a channel program begins.

channel command— A command received by a CU from a channel.

Channel Status Word (CSW)— An area in storage that provides information about the termination of I/O operations.

check— Detection of an error condition.

CI— Converter/Interpreter (JES3).

connected mode— A relationship between a host and an ACS. In this mode, the host and an ACS are capable of communicating (at least one station to this ACS is online).

control data set (CDS)— The data set containing all configuration and volume information used by the host software to control the functions of the automated library. Also known as a library control data set.

See also Primary CDS, Secondary CDS, and Standby CDS.

control data set allocation map— A CDS subfile that marks individual blocks as used or free.

control data set data blocks— CDS blocks that contain information about the library and its configuration or environment.

control data set directory— A part of the CDS that maps its subdivision into subfiles.

control data set free blocks— CDS blocks available for future subfile expansion.

control data set pointer blocks— CDS blocks that contain pointers to map data blocks belonging to a subfile.

control data set recovery area— A portion of the CDS reserved for maintaining integrity for updates that affect multiple CDS blocks.

control data set subfile— A portion of the CDS consisting of Data Blocks and Pointer Blocks containing related information.

Control Unit (CU)— (1) A microprocessor-based unit situated logically between a host channel (or channels) and from two to sixteen transports. It functions to translate channel commands into transport commands, send transport status to the channel(s), and pass data between the channel(s) and transport(s). (2) A device that controls I/O operations for one or more devices. cross-host recovery. The ability for one host to perform recovery for another host that has failed.

CSE— Customer Service Engineer.

CSI— Consolidated System Inventory.

CSL— *See* Cartridge Scratch Loader.

CSRC— Central Support Remote Center (*See* Remote Diagnostics Center)

CST— (1) A value that can be specified on the MEDia parameter and that includes only standard capacity cartridge tapes. (2) An alias of Standard. (3) *See* Cartridge System Tape.

CSW— *See* Channel Status Word.

CU— *See* Control Unit.

D

DAE— Dump Analysis Elimination.

DASD— Direct access storage device.

data— Any representations such as characters or analog quantities to which meaning is, or might be, assigned.

Database Heartbeat record (DHB)— The record that contains the names of the control data sets recorded by the HSC and identifies the correct primary, secondary, and standby CDS.

data class— A collection of allocation and space attributes, defined by the storage administrator, that are used to create a data set.

data compaction— An algorithmic data-reduction technique that encodes data from the host and stores it in less space than unencoded data. The original data is recovered by an inverse process called decompaction.

data-compaction ratio— The number of host data bytes mathematically divided by the number of encoded bytes. It is variable depending on the characteristics of the data being processed. The more random the data stream, the lower the opportunity to achieve compaction.

Data Control Block (DCB)— A control block used by access routines in storing and retrieving data.

data set— The major unit of data storage and retrieval, consisting of a collection of data in one of several prescribed arrangements and described by control information to which the system has access.

data streaming— A continuous stream of data being transmitted in character or binary-digit form, using a specified format.

DC— Direct current.

DCB— *See* Data Control Block.

DD3— A generic value that can be specified on the MEDia and RECtech parameters and includes all types of helical cartridges and recording techniques.

DD3A, DD3B, DD3C, DD3D— Values that can be specified on the MEDia parameter and include only the specified type of helical cartridge. Aliases are A, B, C, and D, respectively.

DDR— *See* Dynamic Device Reconfiguration.

default value— A value assumed when no value has been specified.

demand allocation— An MVS term meaning that a user has requested a specific unit.

device allocation— The HSC function of *influencing* the MVS device selection process to choose either a manual transport or a transport in a particular ACS, based on the location of the volume (specific requests) or the subpool rules in effect (scratch requests).

device group— A subset of the eligible devices. Device groups are defined by esoteric unit names but also may be created implicitly if common devices exist in different device groups.

device number— A four-digit hexadecimal number that uniquely identifies a device attached to a processor.

device separation— *See* drive exclusion.

DFP— Data Facility Product. A program that isolates applications from storage devices, storage management, and storage device hierarchy management.

DFSMS— Refers to an environment running MVS/ESA SP and DFSMS/MVS, DFSORT, and RACF. This environment helps automate and centralize the management of storage through a combination of hardware, software, and policies.

DFSMS ACS routine— A sequence of instructions for having the system assign data class, storage class, management class, and storage group for a data set.

DHB— *See* Database Heartbeat record.

directed allocation— *See* drive prioritization.

disconnected mode— A relationship between a host and an ACS. In this mode, the host and an ACS are not capable of communicating (there are no online stations to this ACS).

DOMed— Pertaining to a console message that was previously highlighted during execution, but is now at normal intensity.

drive exclusion— (previously referred to as *device separation*) refers to the Storage Management Component (SMC) function of excluding drives for an allocation request based on SMC exclusion criteria. See the *SMC Configuration and Administration Guide* for more information.

drive loaded— A condition of a transport in which a tape cartridge has been inserted in the transport, and the tape has been threaded to the beginning-of-tape position.

drive panel— A wall of an LSM that contains tape transports. Drive panels for T9840A transports have either 10 or 20 transports per panel; drive panels for all other transports contain up to four transports per panel.

drive prioritization— (previously referred to as *directed allocation*) refers to the Storage Management Component (SMC) function of influencing selection of a particular drive based on allocation criteria, including volume location. See the *SMC Configuration and Administration Guide* for more information.

DRIVEid— A DRIVEid uniquely defines the location of a tape transport by its location within an LSM. A DRIVEid is of the form *AAL:PP:NN* where *AA* is the ACSid, *L is* the LSM number, *PP* is the panel where the drive is located, and *NN* is the drive number within the panel.

DSI— Dynamic System Interchange (JES3).

dual LMU— A hardware/µ-software feature that provides a redundant LMU capability.

dual LMU HSC— HSC release 1.1.0 or later that automates a switch-over to the standby LMU in a dual LMU configuration.

dump— To write the contents of storage, or of a part of storage, usually from an internal storage to an external medium, for a specific purpose such as to allow other use of storage, as a safeguard against faults or errors, or in connection with debugging.

Dynamic Device Reconfiguration (DDR)— An MVS facility that allows a dismountable volume to be moved and repositioned if necessary, without abnormally terminating the job or repeating the initial program load procedure.

E

ECAP— *See* enhanced CAP.

ECART— (1) Cartridge system tape with a length of 1100 feet that can be used with 4490 and 9490 Cartridge Drives. These tapes are visually identified by a two-tone (black and tan) colored case. (2) A value that can be specified on the MEDia parameter and that includes only 36-track enhanced capacity cartridge system tapes. (3) *See* Enhanced Capacity Cartridge System Tape.

ECCST— (1) A value that can be specified on the MEDia parameter and that includes only enhanced capacity cartridge system tapes. (2) An alias of ECART. (3) *See* Enhanced Capacity Cartridge System Tape.

EDL— *See* eligible device list.

EDTGEN— Eligible Device Table Generation. A process used to replace an installation-defined and named representation of the devices that are eligible for allocation.

EETape— *See* Extended Enhanced Tape.

Effective Recording Density— The number of user bytes per unit of length of the recording medium.

eject— The process where the LSM robot places a cartridge in a Cartridge Access Port (CAP) so the operator can remove it from the LSM.

eligible device list— (1) A group of transports that are available to satisfy an allocation request. (2) For JES2 and JES3, a list of devices representing the UNIT parameter specified by way of invoking JCL. The EDL can contain both library and nonlibrary transports depending on the I/O GEN.

enable— The modification of system, control unit, or device action through the change of a software module or a hardware switch (circuit jumper) position.

enhanced CAP (ECAP)— An enhanced CAP contains two forty-cell magazine-style CAPs and a one-cell priority CAP (PCAP). Each forty-cell CAP holds four removable magazines of ten cells each. An LSM access door with an enhanced CAP contains no cell locations for storing cartridges.

See also Cartridge Access Port, standard CAP, priority CAP, WolfCreek CAP, WolfCreek optional CAP, or TimberWolf CAP.

Enhanced Capacity Cartridge System Tape— Cartridge system tape with increased capacity that can be used with 4490 and 9490 Cartridge Drives. These tapes are visually identified by a two-tone (black and tan) housing.

EOF— End-of-File.

EOT— End-of-Tape marker.

EPO— Emergency Power Off.

EREP— Environmental Recording, Editing, Printing.

ERP— *See* error recovery procedures.

error recovery procedures (ERP)— Procedures designed to help isolate and, where possible, to recover from errors in equipment.

esoteric— A user-defined name that groups devices into classes.

ETAPE— (1) A value that can be specified on the MEDia parameter and that includes only enhanced capacity cartridge system tapes. (2) An alias of ECART. (3) *See* Enhanced Capacity Cartridge System Tape.

Extended Capacity Tape— *See* Enhanced Capacity Cartridge System Tape.

Extended Enhanced Tape (EETape)— A synonym for a ZCART, which is a cartridge that can only be used with a 9490EE drive. An EETape (ZCART) provides greater storage capacity than an ECART.

ExtendedStore Library— One or more LSMs with no Cartridge Drives (CDs) that are attached by pass-thru ports to other LSMs (with CDs) in an ACS. These LSMs provide archive storage for cartridges containing less active data sets. Cartridges can be entered and ejected directly into and out of this LSM though either a standard CAP or an enhanced CAP.

F

FDRPAS™— A product from Innovation Data Processing, Inc. that allows two disk devices to be non-disruptively swapped with each other.

FIFO— First in, first out.

file protected— Pertaining to a tape volume from which data can be read only. Data cannot be written on or erased from the tape.

format— The arrangement or layout of data on a data medium.

frozen panel— A panel to which cartridges cannot be moved. This restriction includes allocating new cartridge locations on a panel as a result of:

- a MOVe command, utility, or PGMI request
- cartridge entry into the ACS
- float, scratch dismount, or scratch redistribution processing.

G

GB— Gigabyte, billion (10^9) bytes.

GDG— Generation Data Group. An MVS data set naming convention. Sequence numbers are appended to the basic data set name to track the generations created for that data set.

GDG Separation— Occurs when a Generation Data Group gets separated because the volumes of different generations reside in different locations. Usually, all generations of a GDG are mounted on a single drive to reduce the number of drives needed for a job.

GTF— Generalized Trace Facility. An MVS facility used to trace software functions and events.

H

HDA— Head/disk assembly.

Helical— A generic value that can be specified on the RECtech parameter and includes all helical transports.

HOSTid— A HOSTid is the host identifier specified in the HOSTID parameter of the SLILIBRY LIBGEN macro. The HOSTid is the SMF system identifier for both JES2 and JES3.

High Watermark Setup (HWS)— In JES3, a setting specified on the HWSNAME initialization statement that reduces the number of devices reserved for a job. JES3 accomplishes this task by assessing each jobstep to determine the maximum number of devices needed for each device type and reserving those devices.

Host Software Component (HSC)— That portion of the Automated Cartridge System which executes on host systems attached to an automated library. This component acts as the interface between the operating system and the rest of the automated library.

host system— A data processing system that is used to prepare programs and the operating environments for use on another computer or controller.

HSC— *See* Host Software Component.

HWS— *See* High Watermark Setup.

I

ICRC— *See* Improved Cartridge Recording Capability.

ID— Identifier or identification.

IDAX— Interpreter Dynamic Allocation Exit. This is a subfunction of the DFSMS/MVS subsystem request (SSREQ 55) that the MVS JCL Interpreter and dynamic allocation functions issue for calling DFSMS ACS routines for management of the data set requested.

IDRC— Improved Data Recording Capability.

IML— *See* Initial Microprogram Load.

Improved Cartridge Recording Capability (ICRC)— An improved data recording mode that, when enabled, can increase the effective cartridge data capacity and the effective data rate when invoked.

index— A function performed by the cartridge scratch loader that moves cartridges down the input or output stack one cartridge position. A scratch loader can perform multiple consecutive indexes.

INISH deck— A set of JES3 initialization statements.

Initial Microprogram Load (IML)— A process that activates a machine reset and loads system programs to prepare a computer system for operation. Processors having diagnostic programs activate these programs at IML execution. Devices running µ-software reload the functional µ-software usually from a floppy diskette at IML execution.

Initial Program Load (IPL)— A process that activates a machine reset and loads system programs to prepare a computer system for operation. Processors having diagnostic programs activate these

programs at IPL execution. Devices running µ-software reload the functional µ-software usually from a floppy diskette at IPL execution.

initial value— A value assumed until explicitly changed. It must then be explicitly specified in another command to restore the initial value. An initial value for the HSC is the value in effect when the product is installed.

inline diagnostics— Diagnostic routines that test subsystem components while operating on a time-sharing basis with the functional µ-software in the subsystem component.

input stack— The part of the cartridge loader where cartridges are premounted.

intervention required— Manual action is needed.

IPL— *See* Initial Program Load.

ips— Inches per second.

IVP— Installation Verification Programs. A package of programs that is run by a user after the library is installed in order to verify that the library is functioning properly.

J

JCL— *See* Job Control Language.

Job Control Language— Problem-oriented language designed to express statements in a job that are used to identify the job or describe its requirements to an operating system.

journal— The log associated with journaling. The log (stored in a data set) contains a record of completed work and changes to the control data set since the last backup was created.

journaling— A technique for recovery that involves creating a backup control data set and maintaining a log of all changes (transactions) to that data set.

JST— Job Summary Table (JES3).

K

KB— Kilobyte, thousand (10 3) bytes.

keyword parameter— In command and utility syntax, operands that include keywords and their related values (*See* positional parameter).

Values are concatenated to the keyword either by an equal sign, ‘‘KEYWORD=value,’’ or by parentheses, ‘‘KEYWORD(value).’’ Keyword parameters can be specified in any order. The HSC accepts (tolerates) multiple occurrences of a keyword. The value assigned to a keyword reflects the last occurrence of a keyword within a command.

L

LAN— *See* Local Area Network.

LCU— *See* Library Control Unit.

LED— *See* Light Emitting Diode.

LIBGEN— The process of defining the configuration of the automated library to the host software.

library— An installation of one or more ACSs, attached cartridge drives, volumes placed into the ACSs, host software that controls and manages the ACSs and associated volumes, and the library control data set that describes the state of the ACSs.

library control data set— *See* control data set.

Library Control Unit (LCU)— The portion of the LSM that controls the picking, mounting, dismounting, and replacing of cartridges.

Library Management Unit (LMU)— The portion of the ACS that manages from one to sixteen LSMs and communicates with the host CPU.

Library Storage Module (LSM)— The storage area for cartridges plus the robot necessary to move the cartridges. The term LSM often means the LCU and LSM combined.

Light Emitting Diode (LED)— An electronic device used mainly as an indicator on status panels to show equipment on/off conditions.

Linear Tape Open (LTO)— A technology developed jointly by HP, IBM, and Seagate for new tape storage options. LTO technology is an open format, which means that users have multiple sources of products and media.

LMU— *See* Library Management Unit.

LMUPATH— An HSC control statement contained in the definition data set specified by the LMUPDEF command. An LMUPATH statement allows users to define network LMU attachments.

LMUPDEF— An HSC command used to load the definition data set that contains LMUPATH control statements.

load point— The beginning of the recording area on magnetic tape.

loader— *See* Cartridge Scratch Loader.

Local Area Network (LAN)— A computer network in which devices within the network can access each other for data transmission purposes. The LMU and attached LCUs are connected with a local area network.

logical ejection— The process of removing a volume from the control data set without physically ejecting it from its LSM location.

Logical End Of Tape— A point on the tape where written data normally ends.

LONG— (1) A value that can be specified on the MEDia parameter and that includes only enhanced capacity cartridge system tapes (not to be confused with LONGItud). (2) An alias of ECART. (3) *See* Enhanced Capacity Cartridge System Tape.

LONGItud— (1) A generic value that can be specified on the RECtech parameter and includes all 18-track and 36-track devices. (2) A generic value that can be specified on the MEDia parameter and includes all standard and enhanced capacity cartridge system tapes.

LSM— *See* Library Storage Module.

LSMid— An LSMid (*lsm-id*) is a hexadecimal value that consists of the ACSid and LSM number separated by a colon (i.e., *AA*:*LL*, where *AA* is the ACSid and *LL* is the LSMid). The LSMid differentiates an LSM from every other LSM in a library.

LSM number— A method used to identify an LSM. An LSM number is the result of defining the SLIACS macro LSM parameter during a LIBGEN. The first LSM listed in this parameter acquires the LSM number of 00 (hexadecimal), the second LSM listed acquires a hexadecimal number of 01, and so forth, until all LSMs are identified (maximum of 24 or hexadecimal 17).

LTO— *See* Linear Tape Open.

LTO*x*— A media type designating either an LTO data cartridge with a capacity between 10GB and 400GB or an LTO cleaning cartridge.

M

machine initiated maintenance— *See* ServiceTek.

magnetic recording— A technique of storing data by selectively magnetizing portions of a magnetizable material.

magnetic tape— A tape with a magnetizable surface layer on which data can be stored by magnetic recording.

magnetic tape drive— A mechanism for moving magnetic tape and controlling its movement.

maintenance facility— Hardware contained in the CU and LMU that allows a CSE and the RDC to run diagnostics, retrieve status, and communicate with respective units through their control panels.

management class— A collection of management attributes, assigned by the storage administrator, that are used to control the allocation and use of space by a data set.

manual mode— A relationship between an LSM and all attached hosts. LSMs operating in manual mode have been modified offline and require human assistance to perform cartridge operations.

master LMU— The LMU currently controlling the functional work of the ACS in a dual LMU configuration.

MB— Megabyte, million (10^6) bytes.

MDS— Main Device Scheduler (JES3).

MEDia— The parameter used to specify media type.

This is not to be confused with MEDIA1 or MEDIA2, which are values that can be specified on the MEDia parameter.

MEDIA1— (1) A value that can be specified on the MEDia parameter and that includes only standard capacity cartridge tapes. (2) An alias of Standard.

MEDIA2— (1) A value that can be specified on the MEDia parameter and that includes only enhanced capacity cartridge system tapes. (2) An alias of ECART. (3) *See* Enhanced Capacity Cartridge System Tape.

media capacity— The amount of data that can be contained on storage media and expressed in bytes of data.

media mismatch— A condition that occurs when the media value defined in a VOLATTR control statement does not match the media value recorded in the CDS VAR record.

micro-software— *See* µ-software under Symbols.

MIM— Multi-Image Manager. Third-party software by Computer Associates International, Inc.

mixed configurations— Installations containing cartridge drives under ACS control and cartridge drives outside of library control. These configurations cause the Host Software Component to alter allocation to one or the other.

MODel— The parameter used to specify model number.

modem— Modulator/demodulator. An electronic device that converts computer digital data to analog data for transmission over a telecommunications line (telephone line). At the receiving end, the modem performs the inverse function.

monitor— A device that observes, records, and verifies selected system activities to determine significant departure from expected operation.

MSM— Multiple Sessions Management. Third-party software by Computer Associates International, Inc.

N

Near Continuous Operation (NCO) — Facilities and techniques that allow customers to make dynamic changes to the library that do not disrupt the library hardware and environment. In most cases, users can perform these procedures without requiring the HSC to be terminated and restarted.

O

OCR— Optical Character Recognition.

operating system (OS)— Software that controls the execution of programs that facilitate overall system operation.

output stack— The part of the cartridge loader that receives and holds processed cartridges.

over-limit cleaning cartridge— A cleaning cartridge that has been used more than the value (limit) specified by either the MNTD MAXclean or VOLATTR MAXclean settings. This kind of cartridge may not be able to adequately clean a tape transport, however, it can be mounted and will attempt to execute the cleaning process. *See also* spent cleaning cartridge.

over-use cleaning cartridge— A cartridge that has a usage (select) count over the MAXclean value (*see* over-limit cleaning cartridge) or that has used up its cleaning surface (see spent cleaning cartridge).

P

paired-CAP mode— The two forty-cell CAPs in an enhanced CAP function in paired-CAP mode as a single eighty-cell CAP.

PARMLIB control statements— Parameter library (PARMLIB) control statements allow you to statically specify various operation parameters which take effect at HSC initialization. Identifying your system requirements and then specifying the appropriate control statements permits you to customize the HSC to your data center.

pass-thru port (PTP)— A mechanism that allows a cartridge to be passed from one LSM to another in a multiple LSM ACS.

PCAP— *See* priority CAP.

P/DAS— Peer-to-Peer Remote Copy Dynamic Address Switching. An IBM capability to non-disruptively swap PPRC volumes.

Peer-to-Peer Remote Copy (PPRC)— An IBM capability to mirror disk volumes from one storage subsystem to another.

physical end of tape— A point on the tape beyond which the tape is not permitted to move.

playground— The playground is a reserved area of cells where the robot deposits cartridges that it finds in its hands during LSM initialization. Normal LSM initialization recovery processing moves cartridges from the playground cells to either their home cells or their intended destinations, but under abnormal circumstances cartridges may be left in playground cells.

positional parameter— In command and utility syntax, operands that are identified by their position in the command string rather than by keywords (*See* keyword parameter).

Positional parameters must be entered in the order shown in the syntax diagram.

PowderHorn (9310) LSM— A high-performance LSM featuring a high-speed robot. The PowderHorn has a capacity of up to approximately 6000 cartridges.

PPRC— *See* Peer-to-Peer Remote Copy.

primary CDS— The active control data set. It contains the inventory of all cartridges in the library, the library configuration, information about library hardware and resource ownership across multiple processors, and serves as a vehicle of communication between HSCs running on multiple processors.

priority CAP (PCAP)— A one-cell CAP that is part of an enhanced CAP. A PCAP allows a user to enter or eject a single cartridge that requires immediate action.

See also Cartridge Access Port, standard CAP, enhanced CAP, WolfCreek CAP, WolfCreek optional CAP, or TimberWolf CAP.

Program Temporary Fix (PTF)— A unit of corrective maintenance delivered to a customer to repair a defect in a product, or a means of packaging a Small Programming Enhancement (SPE).

Program Update Tape (PUT)— A tape containing a collection of PTFs. PUTs are shipped to customers on a regular basis under the conditions of the customer's maintenance license.

PTF— *See* Program Temporary Fix.

PTP— *See* pass-thru port.

PUT— *See* Program Update Tape.

Q

QSAM— *See* Queued Sequential Access Method.

Queued Sequential Access Method (QSAM)— An extended version of the basic sequential access method (BSAM). When this method is used, a queue is formed of input data blocks that are awaiting processing or output data blocks that have been processed and are awaiting transfer to auxiliary storage or to an output device.

R

RACF— *See* Resource Access Control Facility.

RDC— *See* Remote Diagnostics Center.

Recording Density— The number of bits in a single linear track measured per unit of length of the recording medium.

RECtech— The parameter used to specify recording technique.

RedWood— (1) The program name of the StorageTek transport that supports a helical recording technique. (2) *See* SD-3.

Remote Diagnostics Center (RDC)— The Remote Diagnostics Center at StorageTek. RDC operators can access and test StorageTek systems and software, through telecommunications lines, from remote customer installations. Also referred to as the Central Support Remote Center (CSRC).

Resource Access Control Facility (RACF)— Security software controlling access to data sets.

S

SCP— *See* System Control Program.

scratch tape subpool— A defined subset of all scratch tapes. Subpools are composed of one or more ranges of VOLSERs with similar physical

characteristics (type of volume {reel or cartridge}, reel size, length, physical location, etc.). Some installations may also subdivide their scratch pools by other characteristics, such as label type (AL, SL, NSL, NL).

The purpose of subpooling is to make sure that certain data sets are built only within particular ranges of volumes (for whatever reason the user desires). If a volume which does not belong to the required subpool is mounted for a particular data set, it is dismounted and the mount reissued.

SD-3— The model number of the StorageTek transport that supports a helical recording technique.

SDLT— *See* SuperDLT.

SDLT*x*— A media type designating an SDLT data cartridge with a capacity of either 125GB or 160GB.

secondary CDS— The optional duplicate copy of the primary CDS.

secondary recording— A technique for recovery involving maintaining both a control data set and a copy (secondary) of the control data set.

SEN — *See* Significant Event Notification.

SER— Software Enhancement Request.

ServiceTek (machine initiated maintenance)— A unique feature of the ACS in which an expert system monitors conditions and performance of subsystems and requests operator attention before a potential problem impacts operations. Customers can set maintenance threshold levels.

servo— A device that uses feedback from a sensing element to control mechanical motion.

Shared Tape Allocation Manager (STAM)— Third-party software by Computer Associates International, Inc.

Significant Event Notification (SEN) — An HSC facility that allows an application to request notification of specific HSC and VTCS events.

Silverton— *See* 4490 Cartridge Subsystem.

SL3000 library— *See* StreamLine (SL3000) library.

SL8500 library— *See* Streamline (SL8500) library.

Small Programming Enhancement (SPE)— A supplement to a released program that can affect several products or components.

SMC— Storage Management Component.

SMF— System Management Facility. An MVS facility used to record system actions which affect system functionality.

SMP— System Modification Program.

SMP/E— *See* System Modification Program Extended.

SMS— Storage Management Subsystem.

SPE— *See* Small Programming Enhancement.

special use cartridge— A generic description for a type of cartridge used on T9840A drives. These include:

- T9840A cleaning cartridge
- T9840A microcode load cartridge
- T9840A dump collection cartridge.

When an attempt is made to mount a special use cartridge, LMU error response code 1012 is generated.

The error code is defined as ‘‘load failure for special use cartridge.’’

If the error code is received for a special use cleaning cartridge, it is either ejected or marked as unusable, and it is retained in the ACS (depending on the MNTD EJctauto setting). The HSC does not mount unusable cartridges.

spent cleaning cartridge— A cleaning cartridge that has exhausted its cleaning material and can no longer be used to clean tape transports. *See also* over-limit cleaning cartridge.

SSD— Solid state disk.

STAM— *See* Shared Tape Allocation Manager.

Standard— (1) A value that can be specified on the MEDia parameter and that includes only standard capacity cartridge tapes. (2) *See* Cartridge System Tape.

standard CAP— A standard CAP has a capacity of twenty-one cartridges (three rows of seven cells

each). An LSM access door with a standard CAP contains cell locations for storing cartridges.

See also Cartridge Access Port, enhanced CAP, priority CAP, WolfCreek CAP, WolfCreek optional CAP, or TimberWolf CAP.

standard (4410) LSM— An LSM which provides a storage capacity of up to approximately 6000 cartridges.

standby— The status of a station that has been varied online but is connected to the standby LMU of a dual LMU ACS.

standby CDS— The optional data set that contains only one valid record, the Database Heartbeat (DHB). The DHB contains the names of the control data sets recorded by the HSC and is used to identify the correct primary, secondary, and standby CDS.

standby LMU— The redundant LMU in a dual LMU configuration that is ready to take over in case of a master LMU failure or when the operator issues the SWitch command.

station— A hardware path between the host computer and an LMU over which the HSC and LMU send control information.

STD— (1) A value that can be specified on the MEDia parameter and that includes only standard capacity cartridge tapes. (2) An alias of Standard.

STK1— A generic value that can be specified on the MEDia and RECtech parameters and includes all types of T9840A cartridges and recording techniques.

STK1R— Value that can be specified on the MEDia and RECtech parameters and includes only the specified type of T9840A cartridge or recording technique. STK1R can be abbreviated as R.

STK1U— Value that can be specified on the MEDia parameter and includes the specified types of T9840A, T9840B, and T9840C cleaning cartridges. STK1U can be abbreviated as U.

STK1Y— Value that can be specified on the MEDia parameter and includes only the specified type of T9840D cleaning cartridge. STK1Y can be abbreviated as Y.

STK2— A generic value that can be specified on the MEDia parameter and includes all types of 9940 cartridges and recording techniques.

STK2P— Value that can be specified on the MEDia and RECtech parameters and includes only the specified type of 9940 cartridge or recording technique. STK2P can be abbreviated as P.

STK2W— Value that can be specified on the MEDia parameter and includes only the specified type of 9940 cleaning cartridge. STK2W can be abbreviated as W.

storage class— A named list of storage attributes that identify performance goals and availability requirements for a data set.

storage group— A collection of storage volumes and attributes defined by the storage administrator.

Storage Management Component (SMC)— Required NCS software component that performs the allocation function for NCS, replacing the functions previously performed by HSC and MVS/CSC. The SMC resides on the MVS host with HSC and/or MVS/CSC, and communicates with these products to determine policies, volume locations, and drive ownership.

StreamLine (SL3000) library— A modular library that can scale from 200 to 4500 cartridges in mainframe, Windows, UNIX, and supercomputer environments.The SL3000 utilizes hot swap components and multiple robots.

StreamLine (SL8500) library— A modular library that can scale from 1,500 to over 200,000 cartridges in mainframe, Windows, UNIX, and supercomputer environments.The SL8500 utilizes hot swap components and multiple robots.

StreamLine CAP— The StreamLine CAP contains 3, 13-cell removable magazines. You can also add an optional CAP that has the same configuration.

SuperDLT— The next generation of DLT (Digital Linear Tape) products, which remains a standard for mid-range operating systems.

switchover— The assumption of master LMU functionality by the standby LMU.

SYNCSORT— Third-party software by Syncsort, Inc.; a sort, merge, copy utility program.

System Control Program— The general term to describe a program which controls access to system resources, and allocates those resources among executing tasks.

system-managed storage— Storage that is managed by the Storage Management Subsystem, which attempts to deliver required services for availability, performance, space, and security applications.

System Modification Program Extended— An IBM-licensed program used to install software and software maintenance.

T

T10000 Tape Drive— A cartridge tape drive that features a 500GB (T10000A), 1TB (T10000B), or 5TB (T10000C) cartridge capacity and data transfer rates up to 120MB/sec. In addition, the T10000 offers media reusability for at least two generations and device-based encryption.

tape cartridge— A container holding magnetic tape that can be processed without separating it from the container.

tape drive— A device that is used for moving magnetic tape and includes the mechanisms for writing and reading data to and from the tape.

tape unit— A device that contains tape drives and their associated power supplies and electronics.

TAPEREQ— An SMC control statement that is contained in the definition data set specified by the TREQDEF command. A TAPEREQ statement defines a specific tape request. It is divided into two parts, the input: job name, step name, program name, data set name, expiration date or retention period, and an indication for specific requests or nonspecific (scratch) requests; and the output: media type and recording technique capabilities.

TDMF™— Transparent Data Migration Facility. A product from Softek Storage Solutions Corp. that allows two disk devices to be non-disruptively swapped with each other.

Timberline— *See* 9490 Cartridge Subsystem.

Timberline EE— *See* 9490EE Cartridge Subsystem.

TimberWolf (9740) LSM— A high performance LSM that provides a storage capacity of up to 494 cartridges. Up to 10 drives (STD, 4490, 9490, 9490EE, T9840A, and SD-3) can be configured. TimberWolf LSMs can only attach to other TimberWolfs.

TimberWolf CAP— The TimberWolf CAP contains either a 10-cell removable magazine or a 14-cell permanent rack. It is not necessary to define a configuration; the HSC receives CAP information directly from the LMU.

See also Cartridge Access Port, standard CAP, enhanced CAP, priority CAP, WolfCreek CAP, or WolfCreek optional CAP.

TP— Tape-to-Print.

transaction— A short series of actions with the control data set. These actions are usually related to a specific function (e.g., Mount, ENter).

transport— An electromechanical device capable of threading tape from a cartridge, moving the tape across a read/write head, and writing data onto or reading data from the tape.

TREQDEF— An SMC command that is used to load the definition data set that contains TAPEREQ control statements.

Tri-Optic label— An external label attached to the spine of a cartridge that is both human and machine readable.

TT— Tape-to-Tape.

U

unit affinity— A request that all cartridges be mounted on a single drive (either for read or write purposes), usually to reduce the number of drives needed for a job.

unit parameter value— A JCL term meaning the value of a JCL UNIT parameter. The value can be a single address of a drive, an esoteric list, or a generic list.

UNITATTR— An SMC control statement that defines the transport's media type and recording technique capabilities.

utilities— Utility programs. The programs that allow an operator to manage the resources of the library and to monitor overall library performance.

V

VAR— *See* Volume Attribute Record.

VAT— *See* Volume Attribute Table Entry.

Virtual Storage Manager (VSM)— A storage solution that virtualizes volumes and transports in a VTSS buffer in order to improve media and transport use.

Virtual Tape Control System (VTCS)— The primary host code for the Virtual Storage Manager (VSM) solution. This code operates in a separate address space, but communicates closely with HSC.

Virtual Tape Storage Subsystem (VTSS)— The DASD buffer containing virtual volumes (VTVs) and virtual drives (VTDs). The VTSS is a 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.

3000 library— *See* StreamLine Library (SL3000).

8500 library— *See* StreamLine (SL8500) library.

9310 LSM— *See* PowderHorn LSM.

9360 LSM— *See* WolfCreek LSM.

9490 Cartridge Subsystem— Cartridge tape transports that provide read/write capability for 36-track recording format and extended capacity tape and provide improved performance over the 4490 Cartridge Subsystem. 9490 transports can also read data recorded in 18-track format. The StorageTek 9490 Cartridge Subsystem offers better performance (faster data transfer rate, faster load/unload) than a 3490E device.

9490EE Cartridge Subsystem— A high-performance tape transport that provides read/write capability for Extended Enhanced tape (EETape) cartridges. It is functionally equivalent to the IBM 3490E device.

9740 LSM— *See* TimberWolf LSM.

T9840A Cartridge Subsystem— A high performance tape transport for enterprise and open systems environments that reads and writes T9840A cartridges. T9840As can be defined in 10-drive and 20-drive panel configurations. The T9840A can perform as a standalone subsystem with a cartridge scratch loader attached, or it can be attached to a StorageTek ACS.

T9840B—The StorageTek cartridge transport that reads and writes T9840B cartridges.

T9840C— The StorageTek cartridge transport that reads and writes T9840C cartridges.

T9840D— The StorageTek cartridge transport that reads and writes T9840D 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

I

J

K

L

M

N

O

P

Q

R

S

T

U

V

W

Z