StorageTek ®

4400 ACS Preconfigured VM-based Library Control System

Installation and Operations Guide

Release 2.4.0

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Preface

This manual contains procedures for installing the preconfigured VM-based Library Control System. It also provides operation procedures unique to the preconfigured software environment.

Our goal was **not** to duplicate information that you could find elsewhere and that was readily available.

AUDIENCE

This manual is intended for the following audiences:

- StorageTek CSEs, SSRs, and others who install the VM-based Library Control System hardware and software.

- StorageTek customers who use the VM-based Library Control System product.

It is assumed that users of this document have elementary or higher knowledge of IBM data processing installations, practices, and VM operating systems; and can log on and off VM systems, use tapes, and ascertain unit addresses.

Readers' Comments

We would like to know what you think about this manual. For that purpose we have included a reader's comment form in the back of this book. Please copy the form, fill it out, and mail it to us.

If you prefer, you can e-mail your comments directly to Software Information Development. Our Internet address is:

   sid@stortek.com

Be sure to include the manual title and number with your comments.

ORGANIZATION

Chapter 1　　Introduction — general remarks and an overall installation checklist.

Chapter 2　　Library Control Processor Installation — instructions for installing the Library Control Processor for the VM-based Library Control System.

Chapter 3　　Software Installation—9221 Processor — steps for installing the VM-based Library Control System software on a 9221 processor.

Chapter 4　　Software Installation—9370 Processor — steps for installing the VM-based Library Control System software on a 9370 processor.

Chapter 5	Split Server Installation — how to set up the optional VM-based Library Control System split-server configuration on a 9370 processor.
Chapter 6	Dual Server Installation — how to set up the optional VM-based Library Control System dual-server configuration on a 9370 processor.
Chapter 7	Installation Verification — how to test the VM-based Library Control System software.
Chapter 8	Operations — techniques and considerations unique to preconfigured installations of the VM-based Library Control System, including commonly used procedures, recovery procedures, and tools for the system. This chapter also covers operation of the optional VM-based Library Control System split-server configuration.
Chapter 9	Managing System Resources — information for managing VM-based Library Control System resources.
Chapter 10	Recovery Procedures — procedures for recovering from single-server and split-server failures.
Chapter 11	Library Control System Tools — information about REXX execs provided to support VM-based Library Control System installation and operation.
Appendix A	Gathering Diagnostic Materials — diagnostic information that may be requested by StorageTek Software Support.
Appendix B	VMSS Messages Issued by VMSSINIT — lists messages output by VMSSINIT and offers possible solutions.
Appendix C	STKBKP and STKREST Utilities — provides technical background information about the utilities that are used for backing up and restoring customized databases during the installation of a new software release at an existing client site.

HOW TO USE THIS GUIDE

StorageTek CSEs and SSRs who install the VM-based Library Control System should read the following chapters:

- Chapter 1, Introduction

- Chapter 2, Library Control Processor Installation

- Chapter 3, VM-based Library Control System Software Installation—9221 Processor

- Chapter 4, VM-based Library Control System Software Installation—9370 Processor

- Chapter 5, Split Server Installation

- Chapter 6, Dual Server Installation

- Chapter 7, Installation Verification

StorageTek customers who use the VM-based Library Control System should read the following chapters:

- Chapter 1, Introduction

- Chapter 8, Operations

- Chapter 9, Managing System Resources

- Chapter 10, Recovery Procedures

- Chapter 11, Library Control System Tools

Customers should also read the first several pages of each installation chapter (chapters 2, 3, 4, 5, 6, and 7) for general information about each component of the VM-based Library Control System.

RELATED DOCUMENTS

You may find the following related documents useful.

StorageTek Publications

CLS Publications

- *CLS User's Guide*, Release 2.3.0.

- *CLS Messages and Codes Manual*, Release 2.3.0.

- *CLS Reference Manual*, Release 2.4.0.

- *CLS Reference Summary*, Release 2.3.0.

- *Preconfigured VM-based Library Control System Installation and Operations Guide*, Release 2.4.0.

- *Control Path Adaptor Technical and Operations Guide*.

VM/Host Software Component Publications

- *VM/Host Software Component Installation Guide*, Release 2.0.1.

- *VM/Host Software Component Differences Document*, Release 2.0.1.

- *VM/Host Software Component Interface to Tape Management Systems*, Release 2.0.1.

- *VM/Host Software Component Messages and Codes Manual*, Release 2.0.1.

- *VM SCP Messages and Codes Manual*, Release 2.0.1.

- *VM/Host Software Component Operator's Guide*, Release 2.0.1.

- *VM/Host Software Component Operator's Reference Summary*, Release 2.0.1.

- *VM/Host Software Component System Programmer's Guide*, Release 2.0.1.

- *VM/Host Software Component Programmer's Reference Summary*, Release 2.0.1.

IBM Manuals

The IBM manuals are necessary because we do not duplicate any information covered in IBM publications. If you have any questions regarding the IBM unit, **you must consult the appropriate IBM document**. IBM manuals can be ordered through your local IBM sales office.

- For the ES/9000:

    — *Installing the System.*

    — *Operating Your System, Volume I.*

    — *Operating Your System, Volume II.*

    — *I/O Subsystems Customizing Guide.*

    — *Customizing Your Workstation Subsystem.*

- For the ES/9370:

    — *Installing the System.*

    — *Operating Your System.*

    — *Using the Programmer Functions.*

    — *Work Station Subsystem Utilities Guide.*

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SOFTWARE RELEASE LEVELS

This manual describes the installation and operations of the VM-based Library Control System Release 2.4.0. For this release of the VM-based Library Control System the following software is supported.

System	Version Supported
VM/ESA (9221 platform) VM/SP (9370 platform)	Version 2, Release 2.0 Release 5
VM/Host Software Component	Release 2.0.1, PUT level 9701+
VM TCP/IP VM Pass Through Facility	Version 2.4 Version 2.1.1
4430 LMU 9315/9330 LMU	Microcode level 3.8 or higher Microcode 1.1 or higher

PRODUCT SUPPORT

See the *Requesting Help From Software Support* guide for information about contacting StorageTek for technical support and for requesting changes to software products.

See Appendix A, "Gathering Diagnostic Materials" on page A-1 for information about diagnostic materials that Software Support might request.

WHAT'S NEW IN THIS RELEASE?

CLS Release 2.4.0 provides the following new features:

- Support for Year 2000 requirements

Chapter 1. Introduction

This chapter provides an overview of the preconfigured VM-based Library Control System.

Chapter Contents

OVERVIEW

The VM-based Library Control System is a component of the set of software and hardware called the Nearline® Storage Server. The VM-based Library Control System allows Unisys®, DEC®, and/or Bull® client systems to use the automated tape cartridge services of the StorageTek 4400 Automated Cartridge System (ACS) and share data with IBM® or other processing environments.

The VM-based Library Control System is comprised of software products from both StorageTek and IBM. The IBM products are required to construct the platform necessary to execute the StorageTek products.

The following products constitute a preconfigured VM-based Library Control System:

- StorageTek VM/Host Software Component (VM/HSC) software

- StorageTek Common Library Services (CLS) software

- IBM VM/ESA or VM/SP software

- IBM TCP/IP for VM software

- IBM Pass-Through Facility™ (PVM) software

- A VM-capable processor: IBM ES/9000 (Models 120 through 170) or IBM ES/9370.

The VM-based Library Control System software essentially combines the StorageTek VM/Host Software Component (VM/HSC) and Common Library Services (CLS) products: the VM/HSC provides support for one or more 4400 ACSs, while the CLS provides support for one or more client systems.

The preconfigured VM-based Library Control System software is installed on an ES/9000 or an ES/9370 processor (called the Library Control Processor) that is connected to the client systems and to the Library Management Units (LMUs) of the 4400 ACSs the client systems will communicate with.

Figure 1-1 on page 1-3 shows this relationship.

Client Computing System

Client System
Component

Control Path

Cartridge Tape
I/O Driver

Data Path

TCP/IP for VM   PVM

Common
Library
Services

VM/HSC

Control
Dataset

VM/SP

VM-based Library Control System

Library
Management
Unit

Cartridge
Drive

CONTROL
UNIT

Library
Storage
Module

Library
Control
Unit

Cartridge
Drive

4400 ACS
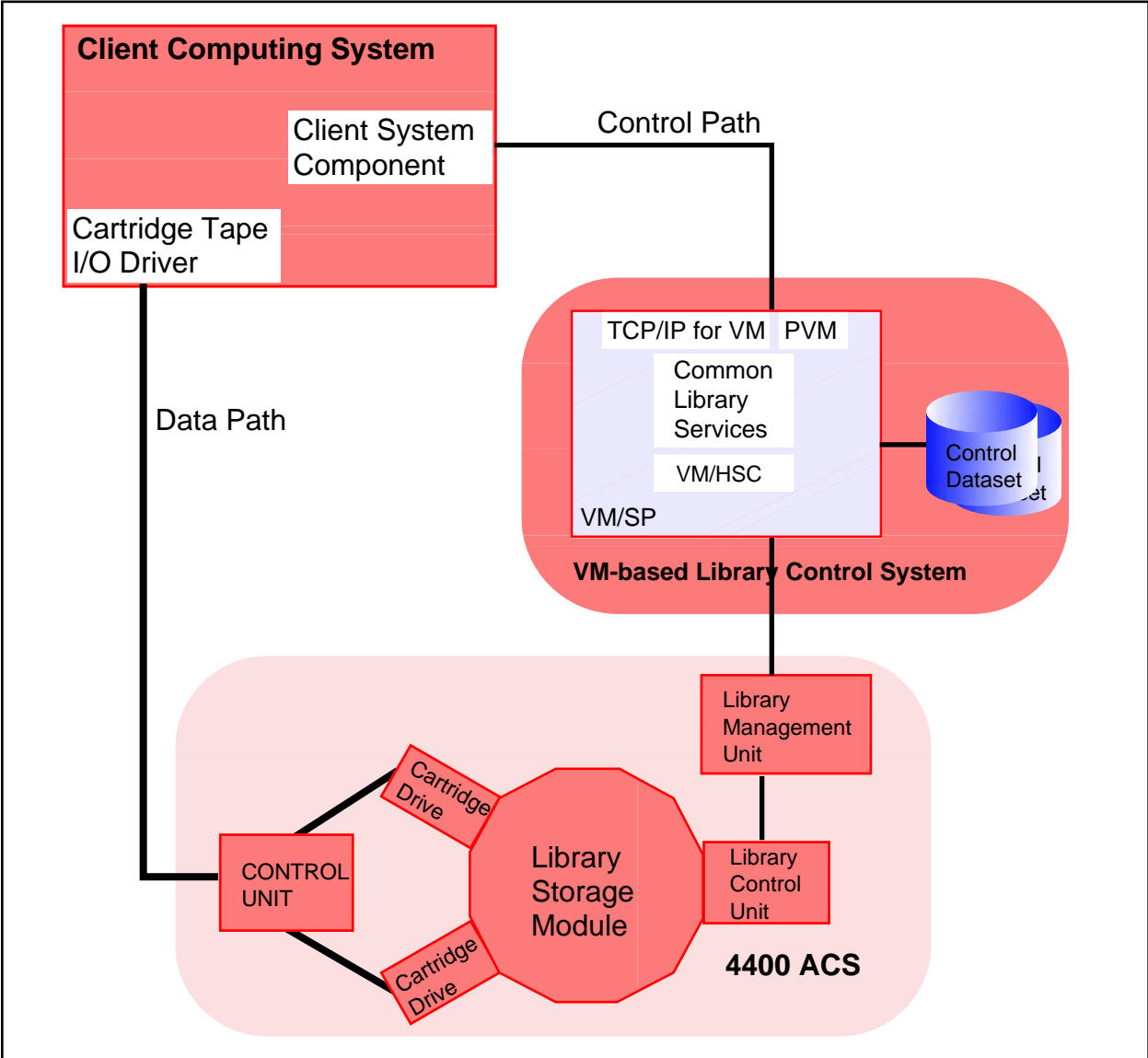
Figure   1-1. VM-based Library Control System Overview

THE VM/HOST SOFTWARE COMPONENT (VM/HSC)

The VM/Host Software Component provides the software required to automate the mounting and dismounting of cartridges. It intercepts operator mount/dismount messages and translates them into commands for the Library Storage Module's robotics so the correct cartridge can be located, removed from its cell, delivered to the nearest available cartridge drive and replaced in its cell upon completion of the task. To ensure system integrity and reliability, discrete paths enable the VM/Host Software Component to respond to mount/dismount messages independent of channel-to-drive communications.

The VM/Host Software Component uses a control dataset file, the library database (CDS), that is shared by all client systems that are attached to the library. The CDS maintains information about client system operation, library configuration, library work-in-progress, and the location and status of all volumes within the library.

The VM/Host Software Component provides a wide range of operator commands and utility functions that enable the operator to:

- Start and stop operations of a particular client system's CPU

- Allocate and deallocate library resources

- Recover library resources in the event of a client system failure

- Display status of all library components

- Locate a volume within a library

- Interface with the client system's tape management system to acquire scratch status information

- Redistribute scratch volumes

- Mount and dismount cartridges from a drive

- Enter, initialize, and eject cartridges from the library

- Audit the physical contents of storage cells

THE COMMON LIBRARY SERVICES (CLS) COMPONENT

The Common Library Services (CLS) is a logical extension of the VM/Host Software Component. Where the VM/Host Software Component manages the 4400 ACS environment, the CLS services the client environment by adding the additional resource management and serialization capabilities for sharing the 4400 ACS among multiple client systems. The CLS effectively moves tape processing requests from client systems to the Storage Server to be processed by the VM/Host Software Component.

The CLS offers a standard set of transaction messages for automating the handling of cartridge tapes. The message interface is transaction-oriented: the Client System Components on various client systems direct the CLS to return information about volumes and drives and to mount or dismount specific cartridges. The message interface allows for bilateral transfer of information regarding drives and cartridges, as well as status information regarding the operation of the Server itself.

The Common Library Services Manager (CLSM) is the primary processing component of the Library Control System. The CLSM manages the client environment and the VM/Host Software Component programmatic interface. This interface is the same one that is provided for use by tape management systems.

One CLSM exists per Library Control System. The CLSM acts as a router for messages and directives from connecting clients. The CLSM decodes and executes messages sent by the client systems. It also captures relevant data from the VM/Host Software Component and funnels the information back to the appropriate client system. The resource management of the system of the library complex is also implemented in the CLSM.

Communicating with the CLSM are CLS Operator Consoles (CLSOCs) and CLS Logical Ports (CLSLPs). One or more CLSLPs and CLSOCs can coexist. There is a one-to-one correspondence of CLSLPs to client systems.

- CLSLPs provide the connection between client systems and the server processor. The CLSLP is a pipe that delivers the messages to the CLSM for decoding and action. By using different CLSLP modules, one client system could communicate over Ethernet®, another client over a channel-to-channel adapter, and another over a telecommunication line.

- CLSOCs provide an interface for an operator to control the library environment. For example, if a client system was not up, a command could be issued directing the CLSOC to mount the boot tape on an appropriate drive to initiate a boot of the client system. All operations can be run from the connecting client consoles or the CLSOC. The CLSOC also provides the interface for handling diagnostic and configuration tasks.

Figure 1-2 on page 1-6 shows how the Common Library Services component appears in the VM-based Library Control System configuration.
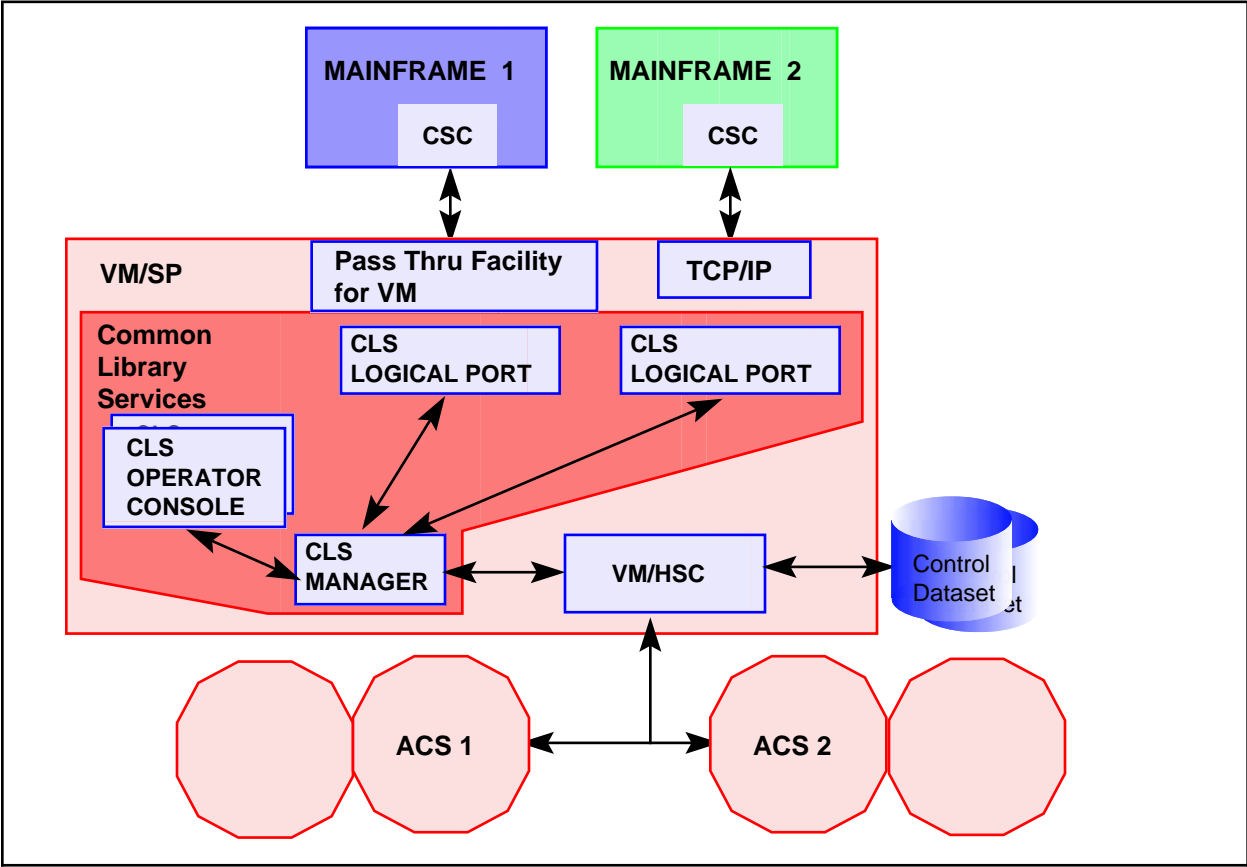
Figure   1-2. Common Library Services Component

INSTALLATION CHECKLIST

The following checklist highlights the major tasks involved with installing the VM-based Library Control System. The checklist is organized by the party responsible for accomplishing the task(s).

1. Customer responsibilities/tasks:

    ___ a. Provide appropriate AC power and outlets for the Library Control Processor(s) and associated consoles.

    ___ b. Provide and install communications hardware between the VM-based Library Control System and client systems. The hardware is either synchronous line hardware or Local Area Network (LAN) facilities hardware.

    ___ c. Install the Client System Component (CSC) on the client system(s).

2. IBM tasks:

    ___ a. Position and perform a basic installation of the Library Control Processor(s).

    ___ b. For a dual- or split-server configuration of the VM-based Library Control System, cable the shared disks (DASD) together.

    ___ c. Configure the microcode.

    ___ d. Copy the microcode from the primary volume to the backup volume.

3. StorageTek CSE tasks:

    ___ a. Connect the Library Control Processor to the LMUs. Instructions are in "Task 1: Connect the Library Control Processor to the LMU" on page 2-3.

    ___ b. Connect the VM-based Library Control System to a cartridge subsystem. Instructions are in "Task 2: Connect the VM-based Library Control System to a Cartridge Subsystem" on page 2-4.

    ___ c. Connect the VM-based Library Control System to the client processor(s). Instructions are in "Task 3: Connect the VM-based Library Control System to a Client System" on page 2-5.

    ___ d. Connect the auxiliary console to the VM-based Library Control System (if applicable). Instructions are in "Task 4: Connect the Auxiliary Console" on page 2-15.

    ___ e. Connect remote support hardware (if applicable). Instructions are in "Task 5: Connect for Remote Software Support" on page 2-16.

    ___ f. Customize the Library Control Processor microcode. Instructions are in "Task 6: Customize the Workstation Controller" on page 2-20.

4. StorageTek Software Support tasks:

    ___ a. Install software on the processor.

    ___ b. Perform functional tests.

Chapter 2. Library Control Processor Installation

This chapter describes how to install the Library Control Processor (ES/9000 or ES/9370) for the VM-based Library Control System, including installation requirements, detailed instructions, and an installation checklist.

Chapter Contents

OVERVIEW

Before getting started, you should be familiar with the information in the following IBM documents:

Table 2-1. Supporting IBM Hardware Documentation	
System	**Document Title**
ES/9000	*Operating Your System, Volume 1*
ES/9370	*Operating Your System*

The installation of the VM-based Library Control System involves both hardware and software components. Some of the software is installed by the customer, some of the hardware is installed by IBM, and the remaining hardware and software are installed by StorageTek.

INSTALLATION REQUIREMENTS

The following sections describe the feature and system requirements for a VM-based Library Control System installation.

Library Control Processor Features

The following features are required for VM-based Library Control System applications:

- Block Multiplexor Channel

- Communications Processor (one or more)

- CPU

- DASD Controller

- Integrated Communication Adapter (ICA), one or more — may consist of either a two-line communications adapter, 802.3 (Ethernet) LAN adapters, or both.

- 16 M Memory

- Workstation controller (WSC)

TASK 1: CONNECT THE LIBRARY CONTROL PROCESSOR TO THE LMU

Table 2-2 provides information for making a connection from the workstation controller of the Library Control Processor to the LMU.

Table 2-2. 9221 & 9370 Ports and Addresses		
Purpose	**ES/9000**	**ES/9370**
LMU 1	Either 9221 or 9370: Port 2 Address 001	Either 9221 or 9370: Port 2 Address 001
LMU 2	Either 9221 or 9370: Port 3 Address 002	Either 9221 or 9370: Port 3 Address 002
LMU 3	Either 9221 or 9370: Port 4 Address 008	Either 9221 or 9370: Port 4 Address 008
LMU 4 (if not using remote support)	• 9221: Port 5 Address 010 • 9370: Port 6 Address 018	• 9221: Port 5 Address 010 • 9370: Port 6 Address 018

1. Connect the LMU cable (RG-62/93 ohms) to the appropriate port on the workstation controller card.

    Note: All installations are shipped a 200-foot RG-62 coaxial cable. If a longer cable is required, it is the customer's responsibility to supply it.

2. Connect the free end of the LMU cable to the LMU, following the instructions in the *4400 Automated Cartridge System Assembly and Installation Manual* (PN 99606).

If there is more than one LMU to connect, use this procedure to connect each one using a different address, the one appropriate for that LMU. If you have more than four LMUs for an ES/9000 or an ES/9370, you need a 3299 multiplexer (or equivalent).

TASK 2: CONNECT THE VM-BASED LIBRARY CONTROL SYSTEM TO A CARTRIDGE SUBSYSTEM

Install the cartridge tape system attachment for the VM-based Library Control System. The attachment allows you to load new or updated software onto the VM-based Library Control System control processor.

Procedures for installing the attachment are detailed in the IBM manuals listed below:

Table 2-3. Supporting IBM Hardware Documentation	
System	**Document Title**
ES/9000	*Installing the System*
ES/9370	*Installing the System*

TASK 3: CONNECT THE VM-BASED LIBRARY CONTROL SYSTEM TO A CLIENT SYSTEM

This step involves establishing the physical communications connections between the Library Control Processor and one or more client processors. The method of the connection depends on the following factors:

- What you ordered for communications features

- The physical communications method

- The types and numbers of client processors

The types of physical communications methods available are:

- Synchronous communication lines with modems

- 802.3 (Ethernet) LANs

Table 2-4 lists the methods you can use to connect a client system to the Library Control Processor.

Table 2-4. Client-to-Library Control Processor Connection Methods	
Client System	**Available Connection Methods**
Bull GCOS8	• Synchronous communications lines and a special RS-232 crossover cable • Synchronous communications lines and a modem eliminator • Synchronous communications lines and short-haul modems • Synchronous communications lines and long-haul modems
DEC	• A LAN using TCP/IP
UNiSYS OS/1100	• A LAN using TCP/IP • Synchronous communications lines and a modem eliminator • Synchronous communications lines and short-haul modems • Synchronous communications lines and long-haul modems
MVS	• A LAN using TCP/IP • Synchronous communications lines using MVS/VTAM and a modem eliminator • Synchronous communications lines using MVS/VTAM and short-haul modems • Synchronous communications lines using MVS/VTAM and long-haul modems

Synchronous Connections

You can use synchronous lines to connect a UNiSYS OS/1100, Bull GCOS8, or MVS client to the Library Control System. Synchronous communications lines require one or more multiprotocol two-line communications adapters to be installed.

Unisys Client

To attach a UNiSYS 1100/2200™ processor to the VM-based Library Control System, use medium-speed, synchronous communications lines and a UNiSYS DCP. Additional information is available in the StorageTek publication *CSC/1100 Install Guide*.

Bull Client

To attach a Bull GCOS8 client to the VM-based Library Control System, use medium-speed, synchronous communications lines and a Bull DATANET. The StorageTek CSE will make all ICA cables available for connection from the Library Control Processor to the Bull DATANET®; this may require identifying the channel address on the ICA cable connector and communicating to the Bull CSE the correct order for client attachment. It is the responsibility of the Bull CSE for connecting the ICA cables. See the Bull System Release Bulletin (SRB) for GCOS8™ level SR40204 Software for more information.

General Information

For synchronous communications, the method you should use to connect the client system to the Library Control Processor depends on the distance between the two systems.

- For distances up to 50 feet (15 meters) use one of the following:

    — A synchronous Modem Eliminator that provides clocking and signalling between the Library Control Processor and the customer's UNiSYS Data Communications Processor (DCP) or Bull DATANET. Refer to "Step 1A: Attach Client via a Modem Eliminator" on page 2-8 for instructions.

    — For a Bull client only, a special RS-232 crossover cable can be used in conjunction with the clocking provided by the Bull DATANET.

- For distances over 50 feet (15 meters), there are two choices:

    — Two short-haul modems and a four-wire phone circuit (two pairs). Refer to "Step 1B: Attach Client via Short-haul Modems" on page 2-9 for instructions.

    — Long-haul modems and a leased telephone facility. Refer to "Step 1C: Attach Client via Long-haul Modems" on page 2-10 for instructions.

Multiprotocol two-line communications adapters are used to support binary synchronous communications between the Library Control Processor and client processors. Adapter parameters are set by the factory. The parameter settings are appropriate and do not need to be changed. However, if you think the settings have been changed, use Table 2-5 on page 2-7 to see what the settings should be.

Table 2-5. Valid Settings for Synchronous Communications Adapters	
Parameter	**Setting**
Clocking	DCE
Line Speed	9600
Switched Line	No
Select Standby	No
Modem Procedure	DTR
Permanent Request-to-Send	No
Line Code	EBCDIC
Include Header	No
Data Rate Select	Full
Line Utilization Buffer Length	24
Line Utilization Threshold Percentage	60
Tributary Station Address	4040

TCP/IP Connections

You can use TCP/IP with an 802.3 (Ethernet) (LAN) to connect a UNiSYS OS/1100 or MVS system. LAN communications require one or more 802.3 LAN adapters to be installed. One or more communications processor boards must also be present. See "Step 1D: Connect a Client System Via a TCP/IP LAN" on page 2-11 for instructions.

Step 1A: Attach Client via a Modem Eliminator

Since the customer is responsible for purchasing the Modem Eliminator, this procedure is general. You will probably need help from the customer to ensure proper connection to the Modem Eliminator.

1. Locate the Modem Eliminator that was installed by the customer.

   Note: The Modem Eliminator must be within 10 feet (3 meters) of the Library Control Processor. The Modem Eliminator should be configured for 9600 bps operation.

2. Ensure that the customer has connected an RS-232 cable between the Modem Eliminator and the UNiSYS DCP's Medium-Speed, Loadable-Line Module or Bull DATANET connector.

3. Locate the Library Control Processor's Integrated Communications Adapter for addresses B40 and B41 using the customization functions of your Library Control Processor. Procedures for locating cards are detailed in the IBM manuals listed below:

Table 2-6. Supporting IBM Hardware Documentation	
System	**Document Title**
ES/9000	*I/O Subsystems Customizing Guide*
ES/9370	*Using the Programmer Functions*

4. Locate the free end of the cable connected to Port 1 of the first communications adapter (address B40).

5. Attach the cable to the unused connector on the Modem Eliminator.

6. Repeat this procedure for each additional client system connection, but attach the cable as follows:

   a. For the second client, use Port 2 of the first communications adapter (address B41).

   b. For the third client, use Port 1 of the second communications adapter (address B42).

   c. For the fourth client, use Port 2 of the second communications adapter (address B43).

7. For BULL clients, go to "Step 2 — Install DATANET Software" on page 2-14. For UNiSYS clients, go to "Task 5: Connect for Remote Software Support" on page 2-16.

Step 1B: Attach Client via Short-haul Modems

Two synchronous short-haul modems and a telephone line will provide a communications path between the Library Control Processor and the client system for distances up to several miles.

Since the customer is responsible for purchasing the short-haul modems, the following procedure is general. You will probably need help from the customer to ensure proper connection to the short-haul modem.

1. Locate the closest short-haul modem that was installed by the customer and ensure that it is configured for 9600 bps operation and switched Request-to-Send.

   Note: The short-haul modem must be within 10 feet (3 meters) of the Library Control Processor.

2. Ensure that the customer has connected the other short-haul modem to the UNiSYS DCP's Medium-Speed, Loadable-Line Module or the Bull DATANET communications adapter.

3. Locate the Library Control Processor's Integrated Communications Adapter for addresses B40 and B41. Locate the card slots using the customization functions of your Library Control Processor. Procedures for locating cards are detailed in the IBM manuals listed below:

Table 2-7. Supporting IBM Hardware Documentation	
System	**Document Title**
ES/9000	*I/O Subsystems Customizing Guide*
ES/9370	*Using the Programmer Functions*

4. Locate the free end of the cable connected to Port 1 of the first communications adapter (address B40).

5. Attach the cable to the designated connector on the short-haul modem.

6. Repeat this procedure for each additional client system connection, but attach the cable as follows:

   a. For the second client, use Port 2 of the first communications adapter (address B41).

   b. For the third client, use Port 1 of the second communications adapter (address B42).

   c. For the fourth client (for an ES/9000 or ES/9370), use Port 2 of the second communications adapter (address B43).

7. For Bull clients, go to "Step 2 — Install DATANET Software" on page 2-14. For UNiSYS clients, go to "Task 5: Connect for Remote Software Support" on page 2-16.

Step 1C: Attach Client via Long-haul Modems

Two synchronous long-haul modems and a telephone line will provide a communications path between the Library Control Processor and the client system for unlimited distances.

Since the customer is responsible for purchasing the long-haul modems, the following procedure is general. You will probably need help from the customer to ensure proper connection to the long-haul modem.

1. Locate the closest long-haul modem that was installed by the customer and ensure that it is configured for 9600 bps operation. The modems should be installed to support the switched Request-to-Send operational mode (also called half-duplex). This setting is the reverse of the Clear-to-Send being continuously presented to the Library Control Processor. It allows the Library Control Processor to send data as if it were a 3270 cluster on a multipoint line.

   Note: The long-haul modem must be within 10 feet (3 meters) of the Library Control Processor.

2. Verify that the customer has connected the other long-haul modem to the UNiSYS DCP's Medium Speed Loadable Line Module or the Bull DATANET communications adapter.

3. Locate the Library Control Processor's Integrated Communications Adapter for addresses B40 and B41. Locate the card slots using the customization functions of your Library Control Processor. Procedures for locating cards are detailed in the IBM manuals listed below:

Table 2-8. Supporting IBM Hardware Documentation	
System	**Document Title**
ES/9000	*I/O Subsystems Customizing Guide*
ES/9370	*Using the Programmer Functions*

4. Locate the free end of the cable connected to Port 1 of the first communications adapter (address B40).

5. Attach the cable to the designated connector on the long-haul modem.

6. Repeat this procedure for each additional client system connection, but attach the cable as follows:

   a. For the second client, use Port 2 of the first communications adapter (address B41).

   b. For the third client, use Port 1 of the second communications adapter (address B42).

   c. For the fourth client, use Port 2 of the second communications adapter (address B43).

7. For Bull clients, go to "Step 2 — Install DATANET Software" on page 2-14. For UNiSYS clients, go to "Task 5: Connect for Remote Software Support" on page 2-16.

Step 1D: Connect a Client System Via a TCP/IP LAN

A UNiSYS 1100/2200 processor, MVS client, or DEC client can be attached to the Library Control Processor using an 802.3 (Ethernet) Local Area Network (LAN) and TCP/IP protocol.

It is the customer's responsibility, under StorageTek marketing direction, to acquire and set up the LAN communication hardware to prepare for the Library Control Processor connection.

LAN WITH UNISYS CLIENTS

For UNiSYS clients, this approach is known as the StorageTek Client Direct Interconnect (CDI). The elements of a CDI environment are:

- A StorageTek Control Path Adaptor (CPA) which attaches a UNiSYS 1100/2200 processor to a LAN transceiver. The CPA is described in the StorageTek publication *4400 Automated Cartridge System Control Path Adaptor Technical and Operations Guide*.

- An IBM 802.3 (Ethernet) LAN adapter that attaches the VM-based Library Control Processor to a LAN transceiver.

- Any necessary LAN hardware components.

- The appropriate software to do TCP/IP communications protocol over the LAN

Typically, the hardware consists of:

- Two LAN transceivers

- A properly terminated 802.3 (Ethernet) LAN coaxial cable

- Two transceiver cables—one for attaching one transceiver to the CPA and one for attaching the other transceiver to the Library Control Processor 802.3 LAN adapter.

Depending on your reliability requirements, you may want a fully redundant dual LAN environment:

1. Locate the LAN transceiver nearest the Library Control Processor. The transceiver should be configured for 802.3 operation by providing SQE or "heartbeat." The Library Control Processor requires this.

2. Verify that the transceiver is installed on the LAN coaxial cable.

3. Verify that the other transceiver is connected to the CPA.

4. Verify that the CPA is configured and attached to the UNiSYS channel. This verification is described in *4400 Automated Cartridge System Control Path Adaptor Technical and Operations Guide*.

5. Locate the Library Control Processor 802.3 LAN board using the customization functions of your Library Control Processor.

6. Attach the male end of the transceiver cable to the Library Control Processor LAN adapter.

7. Attach the female end of the transceiver cable to the transceiver.

LAN WITH DEC CLIENTS

The elements of a DEC attachment environment are:

- An IBM 802.3 (Ethernet) LAN adapter which attaches the VM-based Library Control System processor to a LAN transceiver

- Any necessary LAN hardware components

- The appropriate software to do TCP/IP communications protocol over the LAN

Typically, the hardware consists of:

- A LAN transceiver

- A properly terminated 802.3 LAN coaxial cable

- A transceiver cable used for attaching the transceiver to the Library Control Processor's 802.3 LAN adapter

Perform the following steps to connect the DEC client system via a TCP/IP LAN:

1. Locate the LAN transceiver for the Library Control Processor. The transceiver should be configured for 802.3 operation by providing SQE or "heartbeat."

2. Verify that the transceiver is installed on the LAN coaxial cable.

3. Locate the 802.3 LAN board using the customization functions of your Library Control Processor.

4. Attach the male end of the transceiver cable to the Library Control Processor LAN adapter.

5. Attach the female end of the transceiver cable to the transceiver.

LAN WITH MVS CLIENTS

The elements of an MVS system attachment are:

- StorageTek MVS/Client System Component (MVS/CSC) software

- StorageTek Library Communications Facility (LCF) software, to provide TCP/IP communications service on the MVS system, plus an appropriate network attachment device for the MVS system

- An IBM 802.3 (Ethernet) LAN adapter which attaches the VM-based Library Control System processor to a LAN transceiver

- Any necessary LAN hardware components

Typically, the hardware consists of:

- A LAN transceiver

- A properly terminated 802.3 LAN coaxial cable

- A transceiver cable used for attaching the transceiver to the Library Control Processor's 802.3 LAN adapter

Perform the following steps to connect the MVS client system via a TCP/IP LAN:

1. Locate the LAN transceiver for the Library Control Processor. The transceiver should be configured for 802.3 operation by providing SQE or "heartbeat."

2. Verify that the transceiver is installed on the LAN coaxial cable.

3. Locate the 802.3 LAN board using the customization functions of your Library Control Processor.

4. Attach the male end of the transceiver cable to the Library Control Processor LAN adapter.

5. Attach the female end of the transceiver cable to the transceiver.

6. Install the MVS/CSC and LCF software, as instructed in the following StorageTek documents:

    *   *Client System Component (MVS/SP Implementation) Installation Notes*

    *   *Client System Component (MVS/SP Implementation) User's Guide and Reference*

    *   *LCF Installation and Customization Notes*

Step 2 — Install DATANET Software

```
┌─── When to Perform This Step ──────────────────────────────────┐
│                                                                 │
│  This step applies to Bull clients only.  For other client systems, proceed to "Task 4: │
│  Connect the Auxiliary Console" on page  2-15.                  │
│                                                                 │
└─────────────────────────────────────────────────────────────────┘
```

The control communication link is a 3270 interactive binary synchronous connection
between the Library Control Processor ICA and the Bull DATANET8 (Bull
communications front-end processor). The DATANET8 requires a synchronous
communication interface adapter.

- On the newer MLC-16 communication interface board, you can add a DCF8073 to
  provide four ports; or you can use a DCF8053 and a DCF8055 with one port.

- On the older MLCP communication interface board, you can add a DCF8018 with
  two ports.

The Bull manual *DNS Installation and Generation* (DV39-01) can provide a more
detailed explanation of the individual components.

The software required for the DATANET8 to support the interface to the VM-based
Library Control System is DNS300 with basic functions (SNC8120), host connection
(SNC8123), and 3270 binary synchronous terminal support (SNC8127).

Figure 2-1 is an example of the DNS300 generation directives required to configure the
Automated Cartridge System (ACS) as a direct-connect 3270 device using a DCF8073
communications interface adapter.

```
   MD 3276-2E 3270
   DEVICE 3271 3270 -MD 3275-2E -PHAD 0 -CL 3271
   CL 3271 3270 -PHAD 0 -LL 3271
   LL 3271 3270 -SYN x'32' -NBYSN 4 -EBCD -PL 3271
   PL 3271 SYN -PHTP 2968 -Half -PHAD x'5900' -CT CT58 -DIRECT
```

Figure   2-1. Example DNS300 Generation Directives

TASK 4: CONNECT THE AUXILIARY CONSOLE

When to Perform This Task

Perform this task **only** if this is a 9370 installation and you are connecting an auxiliary console to the VM-based Library Control System. For all other configurations, proceed to "Task 5: Connect for Remote Software Support" on page 2-16.

---

1.   Position the terminal at the location designated by the client (usually close to the client system).

2.   Connect one end of the RG-62 cable to Port 5 on the Work Station Controller.

   Note: All installations are shipped a 200-foot (60 meters) RG-62 coaxial cable. If a longer cable is required, it is the customer's responsibility to supply it.

3.   Connect the other end of the RG-62 cable to the BNC connector at the rear of the auxiliary terminal.

4.   Connect the terminal's power cord to a proper power outlet (standard wall outlet).

5.   Activate the terminal's power switch.

TASK 5: CONNECT FOR REMOTE SOFTWARE SUPPORT

┌─── **When to Perform This Task** ──────────────────────────┐

This task enables dial-up capabilities between the Library Control Processor and StorageTek (or other remote locations). Perform it only for customer sites that have agreed to allow Remote Software Support.

└──┘

You will first connect the workstation controller on an ES/9000 or ES/9370 to the input of a Protocol Converter, as follows:

- For a 9221 installation, connect port 5 to the Protocol Converter.

- For a 9370 installation, connect port 6 to the Protocol Converter.

Next, you will connect a modem to the output of the Protocol Converter. This may require prior connection to a Machine Activated Routing Switch (MARS). The modem then needs to be reconfigured to support "autoanswer."

Note: Modem Junction Box (MJB) connections to modems are not supported for VM-based Library Control System configurations.

The Protocol Converter translates the workstation controller's output (3274 protocol) to ASCII for modem transmission to StorageTek. The modem receives responses from StorageTek and translates them from ASCII to 3274 protocol (by the Protocol Converter) for communication with the Library Control Processor.

The Protocol Converter (ADACOM CP-100) and the cable used to attach it to the Library Control Processor (a short RG-62 coaxial cable) are included in the ship group.

The field Customer Service Engineer (CSE) is responsible for obtaining appropriate cables and connectors to attach the Protocol Converter to the modem and, if applicable, a Machine Activated Routing Switch (MARS).

Part numbers for these items are provided in Table 2-9 on page 2-17.

This section provides instructions for two types of remote software support connections:

- For direct connections to the modem, use "Direct Connection to a Modem" on page 2-17. A phone line must be available for use with the modem (although no handset is required).

- For MARS to modem connections, use "MARS to Modem Connection" on page 2-18.

Table 2-9. Physical Specifications		
Attaching Hardware	**Description**	**Part Number**
Cable	RJ-45 20 feet (6 meters)	410828902
	RJ-45 50 feet (15 meters)	410828905
	RJ-45 100 feet (30 meters)	410828910
	RJ-45 150 feet (45 meters)	410828915
	RJ-45 200 feet (60 meters)	410828920
	RJ-45 250 feet (75 meters)	410828925
Adapter DB25 to RJ-45	Straight	10410552
	Special	10410624

Direct Connection to a Modem

1. Connect one end of the short RG-62 coaxial cable to the correct port (Figure 2-2):

    - For a 9221 installation, use Port 5, Address 010 on the workstation controller

    - For a 9370 installation, use Port 6, Address 018 on the workstation controller.
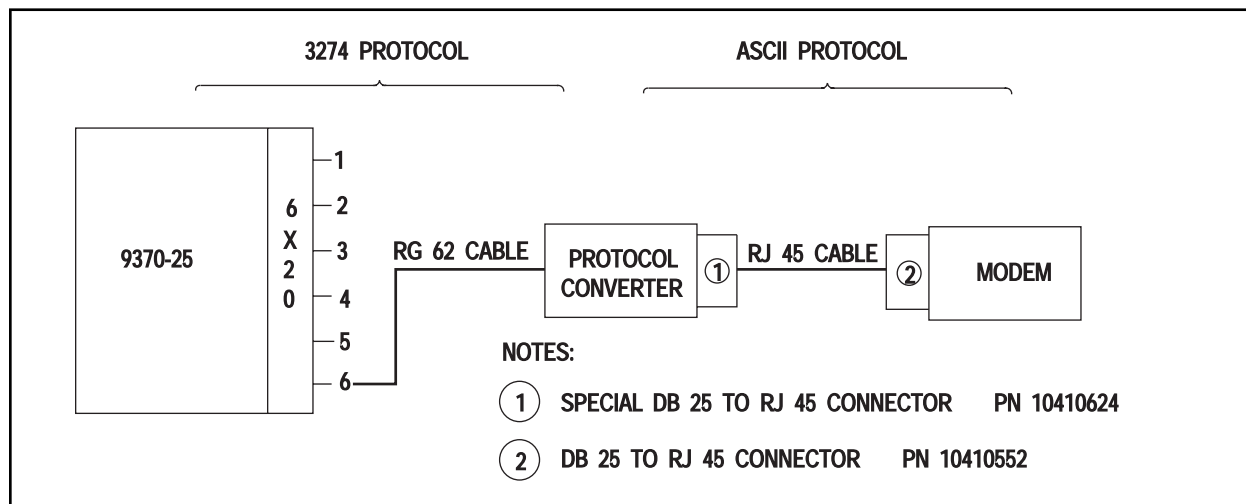
Figure 2-2. Direct Connection to Modem

2. Connect the other end of the RG-62 coaxial cable to the "CONTROLLER" connector (J3) on the Protocol Converter.

3. Insert the special DB-25 to RJ-45 adapter (PN 10410624) in the "TERMINAL" socket (25-pin D type) of the Protocol Converter.

4. Connect one end of the RJ-45 cable from Table 2-9 to the adapter (DB-25 to RJ-45) installed on the Protocol Converter.

5. Route the RJ-45 cable to the modem's location.

6. Insert the DB-25 to RJ-45 straight adapter (PN 10410552) in the socket (25-pin D type) of the modem.

7. Connect the free end of the RJ-45 cable to the DB-25 to RJ-45 adapter installed on the modem.

8. Change the modem options to enable "autoanswer" (set ATSO=1). Refer to the *ServiceTek™ Account Equipment Installation Manual* for details on changing modem options.

9. Connect the Protocol Converter's power cord to a proper, customer-provided power outlet (standard wall outlet).

10. Contact StorageTek and supply the modem number. This ensures that the customer database remains updated.

    See the *Requesting Help From Software Support* guide for information about contacting StorageTek for support in your country or geographical region.

11. Verify that the Protocol Converter is operational by dialing into it several times, either locally or from StorageTek.

    Note: When the phone line is disconnected, the modem must lower the Data Set Ready lead in the cable connected to the Protocol Converter. Otherwise, future reconnections to the modem and Protocol Converter will be unsuccessful. The modem should be shipped from the factory with this option set. However, if repeated reconnect attempts fail, verify that switch &S is set to 1 (&S=1) in the modem's AT command functions. Refer to the *ServiceTek Account Equipment Installation Manual* for details on setting modem options.

MARS to Modem Connection

1. Connect one end of the short RG-62 coaxial cable to the correct port (Figure 2-3):

    - For a 9221 installation, use Port 5, Address 010 on the workstation controller

    - For a 9370 installation, use Port 6, Address 018 on the workstation controller.
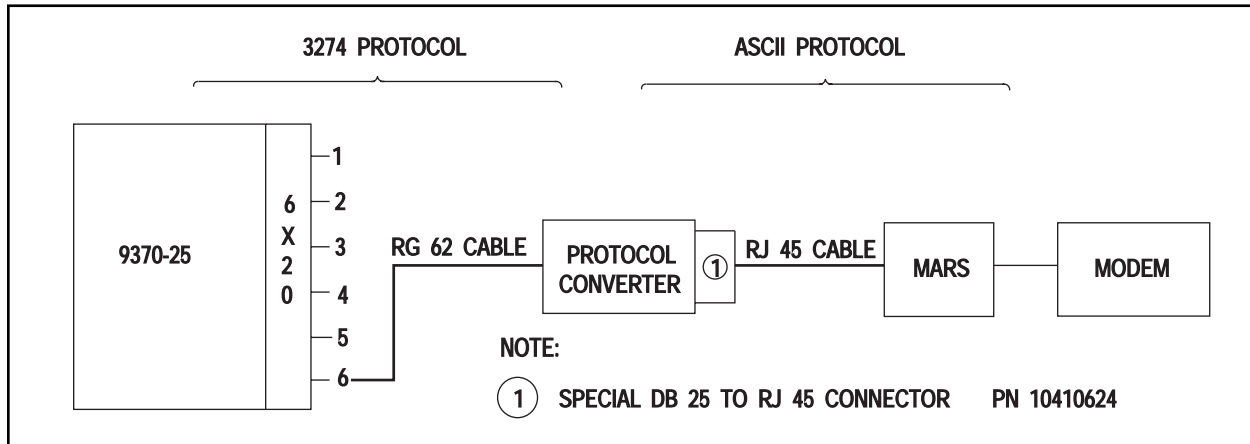
Figure 2-3. Connection Through MARS

2. Connect the other end of the RG-62 coaxial cable to the "CONTROLLER" connector (J3) on the Protocol Converter.

3. Insert the special DB-25 to RJ-45 adapter (PN 10410624) in the "TERMINAL" socket (25-pin D type) of the Protocol Converter.

4. Connect one end of the RJ-45 cable to the adapter (DB-25 to RJ-45) installed on the Protocol Converter.

5. Route the RJ-45 cable to the MARS box location.

6. Connect the free end of the RJ-45 cable to a connector on the MARS.

7. Connect the MARS to the modem as you normally would.

8. Connect the Protocol Converter's power cord to a proper customer-provided power outlet (standard wall outlet).

9. Verify that the Protocol Converter is operational by dialing into it several times, either locally or from StorageTek.

TASK 6: CUSTOMIZE THE WORKSTATION CONTROLLER

The Library Control Processor microcode frames must be modified before installing the VM operating system. Certain words in the library control processor microcode must be modified to provide support for an alternate keyboard and the LMU (via the workstation controller).

Step 1A — Configure the Workstation Controller—9221 Installations

> ┌─ **When to Perform This Step** ─────────────────
>
> Perform this step **only** if you are installing a 9221.
>
> If you are installing a 9370, use "Step 1B — Configure the Workstation Controller—9370 Installations" on page 2-23.

Table 2-10 shows the map of the workstation controller.

Table 2-10. 9221 Ports and Addresses		
Purpose	**ES/9000**	**ES/9370**
Processor Console	Port 1 Address 000	Port 1 Address 000
LMU	Port 2 Address 001	Port 2 Address 001
LMU	Port 3 Address 002	Port 3 Address 002
LMU	Port 4 Address 008	Port 4 Address 008
Fourth LMU for (ES/9000 or ES/9370), or Remote Support	Port 5 Address 010	Port 5 Address 010

Detailed instructions for customizing the workstation can be found in the following IBM manuals:

Table 2-11. Supporting IBM Hardware Documentation	
System	**Document Title**
ES/9000	*Customizing Your Workstation Subsystem*
ES/9370	*Workstation Subsystem Utilities Guide*

Use the following procedure to customize the workstation controller:

1. At the processor console, log on to the SYSPROG userid and enter the password (PASSWORD is the default password).

2. In the Monitor the System window, select `Customize-->Input/Output Controllers`.   .

    The Customize Input/Output Controllers window appears.

3. In the window, select `6120 Workstation Controller Adaptor`. Then, from the menu bar, select `Customize-->Input/Output Controller`.

    The Customize Workstation Controller dialog box appears.

4. In the dialog box, click the `Customize workstation controller` radio button, then click `Enter`.

    The next screen appears.

5. In the `Port address` field, type `20`, then click `Enter`.

    The Master Menu appears.

    Note: This may take up to a minute.

6. On the Master Menu, type `1` and click `Enter`.

    The Host/Attach screen appears.

7. On the screen, modify the configurable word `101` to `0`, if necessary. Press F8 to proceed to the next screen.

8. Modify the configurable words to match the settings shown in Figure 2-4. When done, press F8 to proceed to the next screen.

```
110 - 1          116 - 1          121 - 01        123 - 0
125 - 00000100   127 - 0 0        132 - 0 0 0 0   136 - 1 1 1 1
137 - 0 0 0 0    138 - 0          141 - A         165 - 0
166 - B          168 - 0          173 - 00000000  175 - 000000
178 - 0
```

Figure   2-4. Workstation Controller Configurable Words Settings

9. Modify the port counts as shown in Figure 2-5 on page 2-22. When done, press F11 to proceed to the next screen.

```
 _____ 117: Port Assignment _____

 LT=                                                             116=1


      LT1 LT2 LT3 LT4 LT5                    LT1 LT2 LT3 LT4 LT5
 C@ #IS P   S1  S2  S3  S4         C@ #IS    P   S1  S2  S3  S4
 00  4  ___ ___ ___ ___ ___       01  1     ___ ___ ___ ___ ___
 02  1  ___ ___ ___ ___ ___       03  1     ___ ___ ___ ___ ___
 04  1  ___ ___ ___ ___ ___       05  1     ___ ___ ___ ___ ___
 06  1  ___ ___ ___ ___ ___       07  1     ___ ___ ___ ___ ___
 08  1  ___ ___ ___ ___ ___       09  1     ___ ___ ___ ___ ___
 10  1  ___ ___ ___ ___ ___       11  1     ___ ___ ___ ___ ___
 12  1  ___ ___ ___ ___ ___       13  1     ___ ___ ___ ___ ___
 14  1  ___ ___ ___ ___ ___       15  1     ___ ___ ___ ___ ___
 16  1  ___ ___ ___ ___ ___       17  1     ___ ___ ___ ___ ___
 18  1  ___ ___ ___ ___ ___       19  1     ___ ___ ___ ___ ___
 20  1  ___ ___ ___ ___ ___       21  1     ___ ___ ___ ___ ___
 22  1  ___ ___ ___ ___ ___       23  1     ___ ___ ___ ___ ___
 24  1  ___ ___ ___ ___ ___       25  1     ___ ___ ___ ___ ___
 26  1  ___ ___ ___ ___ ___       27  1     ___ ___ ___ ___ ___
```

Figure   2-5. Workstation Controller Port Assignments

10. Modify the remaining port counts as shown in Figure 2-6. When done, press F10 to
    return to the previous screen, then press F8 to proceed.

```
 _____ 117: Port Assignment _____

 LT=                                                             116=1


      LT1 LT2 LT3 LT4 LT5                    LT1 LT2 LT3 LT4 LT5
 C@ #IS P   S1  S2  S3  S4         C@ #IS    P   S1  S2  S3  S4
 28  1  ___ ___ ___ ___ ___       29  0     ___ ___ ___ ___ ___
 30  0  ___ ___ ___ ___ ___       31  0     ___ ___ ___ ___ ___
```

Figure   2-6. Workstation Controller Port Assignments

11. Modify the address settings as shown in Figure 2-7 on page 2-23. When done,
    press F8 to proceed.

```
                         118: Port Address _____

   LT= 032

   00  4  00   1D  1E  1F     01  1  01   ___  ___  ___
   02  1  02   ___  ___  ___  03  1  03   ___  ___  ___
   04  1  04   ___  ___  ___  05  1  05   ___  ___  ___
   06  1  06   ___  ___  ___  07  1  07   ___  ___  ___
   08  1  08   ___  ___  ___  09  1  09   ___  ___  ___
   10  1  0A   ___  ___  ___  11  1  0B   ___  ___  ___
   12  1  0C   ___  ___  ___  13  1  0D   ___  ___  ___
   14  1  0E   ___  ___  ___  15  1  0F   ___  ___  ___
   16  1  10   ___  ___  ___  17  1  11   ___  ___  ___
   18  1  12   ___  ___  ___  19  1  13   ___  ___  ___
   20  1  14   ___  ___  ___  21  1  15   ___  ___  ___
   22  1  16   ___  ___  ___  23  1  17   ___  ___  ___
   24  1  18   ___  ___  ___  25  1  19   ___  ___  ___
   26  1  1A   ___  ___  ___  27  1  1B   ___  ___  ___
```

Figure   2-7. Workstation Controller Port Addresses

12. Press F12 to save the changes. This returns you to the Selection Menu you saw in
    Step 6 on page 2-21.

13. Press F12 to activate the changes.

    Note: This may take up to two minutes.

14. Exit the windows to return to the Monitor the System window.

Step 1B — Configure the Workstation Controller—9370 Installations

┌─ **When to Perform This Step** ───┐

 Perform this step **only** if you are installing a 9370.

 If you are installing a 9221, use "Step 1A — Configure the Workstation
 Controller—9221 Installations" on page 2-20.

└──┘

Table 2-12 shows the map of the workstation controller.

Table 2-12 (Page 1 of 2). 9370 Ports and Addresses		
Purpose	**ES/9000**	**ES/9370**
Processor Console	Port 1 Address 000	Port 1 Address 000
LMU	Port 2 Address 001	Port 2 Address 001
LMU	Port 3 Address 002	Port 3 Address 002
LMU	Port 4 Address 008	Port 4 Address 008
Alternate Console	Port 5 Address 010	Port 5 Address 010

Table 2-12 (Page 2 of 2). 9370 Ports and Addresses		
Purpose	**ES/9000**	**ES/9370**
Fourth LMU for (ES/9000 or ES/9370), or Remote Support	Port 6 Address 018	Port 6 Address 018

Detailed instructions for customizing the workstation can be found in the following IBM manuals:

Table 2-13. Supporting IBM Hardware Documentation	
System	**Document Title**
ES/9000	*Customizing Your Workstation Subsystem*
ES/9370	*Workstation Subsystem Utilities Guide*

Use the following procedure to customize the workstation controller:

1. Configure the workstation controller to use the Library Control Processor:

   - Enter 0 for the channel address to control customization.

   - Enter 20 to have the system console port control customization.

   - Enter 0 for the channel address to receive customization.

   Note: If the system is running when you do this, everything on channel 0 will go offline.

2. Set word 125 to

   `0000 0100`

   to enable file transfer.

3. Set word 136 to

   `1111`

   to support typewriter keyboard, APL keyboard, data entry keyboard, and IBM enhanced keyboard.

Step 2 — Activate Automatic IPL

To set up the microcode for automatic re-IPL, you must be in System Programmer mode for an ES/9370, or in Customize mode for an ES/9000. Procedures for setting up automatic re-IPL are detailed in the IBM manuals listed below:

Table 2-14. Supporting IBM Hardware Documentation	
System	**Document Title**
ES/9000	*Operating Your System, Volume 1*
ES/9370	*Using the Programmer Functions*

Activating auto-IPL enables the processor to recover both hardware and software after a power outage. The operator is neither prompted for the time/date, nor for the restart mode.

The AUTOLOG1 virtual machine takes care of starting the necessary service machines that attempt recovery actions. The machine behaves in much the same way as if the operator had entered "SHUTDOWN REIPL." The major difference is that there is a "CHECKPOINT" restart instead of a "WARM" restart. The system has been modified so that the operator is not disconnected during an auto-IPL. A normal shutdown does not result in an auto-IPL at restart time.

Auto-IPL requires both hardware microcode and software system generation changes. The software change is already installed; it may be necessary to change the microcode as described in the documents in Table 2-7.

Step 3 — IML the Library Control Processor

For an ES/9370 processor, perform a "NORMAL IML" of the system. For an ES/9000 processor, perform a "POWER ON RESET" of the system. Refer to the following documents for instructions.

Table 2-15. Supporting IBM Hardware Documentation	
System	**Document Title**
ES/9000	*Operating Your System, Volume 1*
ES/9370	*Operating Your System*

Chapter 3. Software Installation—9221 Processor

This chapter describes how to install the VM Storage Server software **on a 9221 processor using either the TCP/IP or the PVM communications protocol**. These procedures are required regardless of whether you are installing a single- or dual-server configuration.

> **Important**
>
> If you are installing the VM Storage Server software on a 9370 processor, use the instructions in Chapter 4, "Software Installation—9370 Processor" on page 4-1.

Chapter Contents

OVERVIEW

The VM Storage Server Version 2.4.0 consists of several software components that have been packaged together for quick installation. The major components are:

- VM/ESA Version 2.2

- One or both of the following communications software packages:

    — IBM TCP/IP Version 2.4

    — IBM Pass-Through (PVM) Version 2.1.1

- The VM/Host Software Component (VM/HSC) Version 2.0.1, PUT level 9701+, with a control data set (CDS)

- The Common Library Services (CLS) Version 2.4.0, with a configuration data base (CDB)

VM STORAGE SERVER DISKS

Each server includes six disk volumes (eight for dual server). The CLS software is configured to use four disk volumes (six for dual server), leaving two volumes for backup in case of disk failure.

Figure 3-1 on page 3-4 shows the addresses and associated volume serial numbers for the disks.

Note: The CDSPRM, PRMNEW, CDSSHD, and SHDNEW volumes do not apply to single-server configurations.

The distribution tapes supplied (see "Distribution Tapes" on page 3-6) contain data to be loaded to the "primary" disks only. The "backup" disk volumes are generated during the installation process by using a supplied program that copies the primary disk in its entirety to the backup disk.

Use of Standard Addresses

We highly recommend the use of standard addresses, as shown in Figure 3-1 on page 3-4. Standard addresses greatly simplify system installation and maintenance.

If your hardware is **not** configured with the standard addresses you have the following options:

- You can have IBM change the addresses to the standard configuration.

- You can leave the addresses in the non-standard configuration. If so, you will have to modify your VMSSBLD CONFIG file to reflect your configuration. This file may be subject to change in future releases and will require special attention for non-standard configurations.

    You can use the worksheet in Table 3-1 on page 3-4 to keep track of your non-standard device addresses.
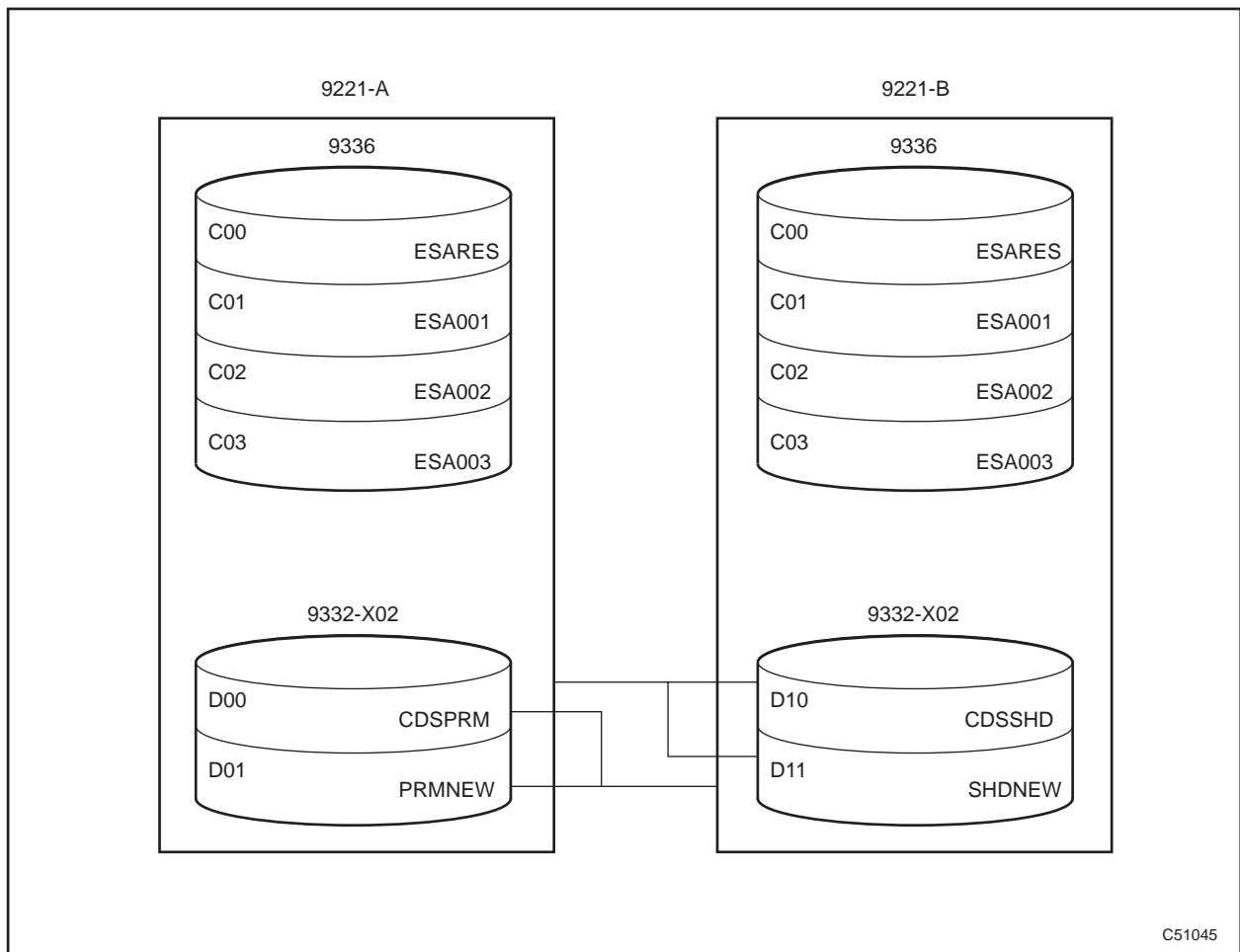
Figure   3-1. VM Storage Server Disk Addresses and VOLSERs

Table 3-1. Volume Descriptions				
Volser	**Description**	**System**	**Standard Address**	**Non-Standard Address**
ESARES	VM/ESA system residence volume	Primary/ standby	C00	
ESA001	VM/HSC services and spool	Primary/ standby	C01	
ESA002	Backup VM/ESA system residence volume	Primary/ standby	C02	
ESA003	Backup of ESA001	Primary/ standby	C03	
CDSPRM	Primary control data set	Primary	D00	
PRMNEW	Spare control data set	Primary	D01	
CDSSHD	Shadow control data set	Standby	D10	
SHDNEW	Spare control data set	Standby	D11	

ABOUT THE INSTALLATION PROCEDURE

This procedure is written specifically for installing Version 2.4.0 of the VM Storage Server **on a 9221 processor using either the TCP/IP or the PVM communications protocol**. The procedure can be used for either new installations or upgrades from prior versions.

Before Beginning the Procedure

Before you begin the procedure, you should perform the following activities:

- **Read and become familiar with the entire procedure.**

- Contact StorageTek Software Support during planning and just before installing the product. StorageTek maintains information about known problems and associated corrections, has Program Temporary Fixes (PTFs), and maintains information on possible IBM APARs for VM.

  International customers, please contact your distributor or StorageTek subsidiary.

- Contact the StorageTek CSE who installed the hardware to determine the tape transport addresses. You will need one tape transport during this installation.

Assumptions

The installation procedure is written with the following assumptions:

- You will complete all tasks in the order they appear in the procedure, except for optional tasks which may be skipped.

- Unless instructed otherwise, you will use the A-A-3270 emulator on the 9221 processor to enter all commands.

- You will use standard addresses for disks and tapes. If you want to use non-standard addresses you must substitute your volume label or addresses where appropriate. Refer to Table 3-1 on page 3-4, if necessary.

Notes on the Emulator Environment

The following notes apply when you are working anywhere in the A-A-3270 emulator environment.

- On the 9221 console keyboard, the **<Esc>** key is used for the clear function and the **<Ctrl>** key is used for reset.

- Anytime the status line at the bottom right corner of the screen is blank, press **<Enter>** or **<Esc>** to get the system's attention.

- Whenever the status line displays HOLDING or MORE, press **<Esc>** to clear the screen.

Distribution Tapes

Table 3-2 describes the tapes that are shipped with the VM Storage Server.

Table 3-2. VM Storage Server Distribution Tapes	
Tape	**Contents**
SYSTEM	VM system software required to run the VM Storage Server. The first two files on this tape are used to format disks and to restore the remainder of the tape to disk.
PRODUCT	CLS and VM/HSC software.
COMMUNICATIONS	TCP/IP or PVM communications software.
BACKUP UTILITIES (upgrades only)	Updated versions of the backup utilities; used for upgrading from prior releases.
CUSTOMIZED DATA (optional)	Customized configuration data required by the VM Storage Server.

Related Documentation

The following IBM publications provide detailed instructions on using your processor and operating system. You should be familiar with them and have copies on-hand for reference.

- *Operating Your System, Volume I*, SA24-4350

- *VM/ESA CMS Command Reference*, SC24-5461

- *VM/ESA CP Command Reference*, SC24-5433

TASK 1 — BACK UP THE VM/HSC CONTROL DATA SET

When to Perform This Task

You **must** perform this task if you are upgrading an existing installation running VM/HSC. This task backs up the VM/HSC control data set (CDS) to disk.

You do **not** need to perform this task if this is a new installation; proceed to "Task 3 — Prepare the System" on page 3-15.

---

1. Log on to the STKACS userid. (VMSS is the default password.)

2. At the `CP READ` prompt, type **B <Enter>** to resume execution of the STKACS userid.

3. If VM/HSC is running, shut it down.

   ```
   You:      STOPSCP <Enter>
   System:   (messages about the system quiescing)
             SLKTKW531I ACS system shutdown is complete
   ```

4. Restart VM/HSC, disallowing library tape movements.

```
System:    Ready;
   You:    ACS INIT (NOJOBS <Enter>
System:    (messages)
```

5. Disconnect your terminal from STKACS.

    ```
    System:    Waiting for work
       You:    CP DISC <Enter>
    ```

6. Log on to the MAINTSTK userid. (VMSS is the default password.)

7. Build a control file for the CDS backup utility.

    ```
    System:    Ready;
       You:    ACSACC <Enter>
               ACS UTIL BACKUP <Enter>
    ```

8. You will be in XEDIT in the JCL file. Remove the asterisk (*) from the beginning of the line containing the BACKUP statement. When you are finished, at the XEDIT command line, type **FILE <Enter>** to save the changes and submit the job for processing.

9. The backup will take several minutes. You can periodically check on the status of the job by typing:

    ACS Q A <Enter>

    When the job completes, view the returned output in your Reader to verify that the job completed successfully.

10. Log the STKACS userid off the system.

    ```
       You:    CP SMSG STKACS STOPSCP <Enter>
    System:    (messages about the system quiescing)
                SLKTKW531I ACS system shutdown is complete
    ```

11. Copy the 506 disk (containing the CDS) to the 406 disk (containing the backup CDS).

    ```
    System:    Ready;
       You:    VMSSCOPY STKACS 506 STKACS 406 <Enter>
    System:    (messages)
               Ready;
    ```

12. Log off MAINTSTK.

TASK 2 — BACK UP THE EXISTING LIBRARY CONTROL SYSTEM

When to Perform This Task

You **must** perform this task if you are upgrading an existing VM Storage Server installation. This task backs up the CLS system and all your data to tape.

You do **not** need to perform this task if this is a new installation; proceed to "Task 3 — Prepare the System" on page 3-15.

Step 1 — Return to a Single-Server Configuration

When to Perform This Step

You **must** perform this step if you are in either split- or dual-server mode. This step puts both servers in single-server mode before installing new software. It is important that both servers be upgraded to the same level of software.

You do **not** need to use this step if you do not have a split- or dual-server configuration; proceed to "Step 2 — Back Up Primary System Volumes" on page 3-9.

---

1. On the **standby** server, log on to the MAINT userid. (VMSS is the default password.)

2. Make sure that CLS and the VM/Host Software Component are shut down.

   ```
   System:      Ready;
      You:      SMSG CLSM STOP ALL <Enter>
   System:      (messages about the system quiescing)
                Common Library Services Termination complete
      You:      CP SMSG STKACS STOPSCP <Enter>
   System:      (messages about the system quiescing)
                 SLKTKW531I ACS system shutdown is complete
   ```

   Note: If shutdown is not successful, see "Shutting Down (9221 and 9370 systems)" on page 7-5 for further instructions.

3. To return to single-server mode, run VMSSBLD SINGLE.

   ```
   System:      Ready;
      You:      VMSSBLD SINGLE <Enter>
   System:      VMSSBLD: Started on mm/dd/yy at hh:mm:ss.
                VMSSBLD: Build type = SINGLE.

                VMSSBLD: You are about to return this system to "Single Server"
                VMSSBLD: mode. The CDS will be copied from shared DASD
                VMSSBLD: back to the local DASD of this system.

                VMSSBLD: Type YES to continue,
                VMSSBLD:  NOCOPY to only change the directory,
                VMSSBLD: or anything else to quit.
      You:      YES <Enter>
   System:      VMSSBLD: Returning the primary CDS to a single server volume...

                VMSSCOPY: ********
                VMSSCOPY: ******** Copying STKACS's 500 (CDSPRM) to STKACSSL's 500 (CDSPRM)
                VMSSCOPY: ********
                VM/ENTERPRISE SYSTEMS ARCHITECTURE DASD DUMP/RESTORE PROGRAM
                COPYING   CDSPRM
   ```

```
                       COPYING DATA  mm/dd/yy AT hh.mm.ss  GMT FROM CDSPRM TO CDSPRM
                       INPUT BLOCK EXTENTS            OUTPUT BLOCK EXTENTS
                          START       STOP               START       STOP
                       00000000  00024807            00000000   00024807
                       END OF COPY
                       END OF JOB

                        VMSSBLD: Returning the shadow CDS to a single server volume...

                        VMSSCOPY: ********
                        VMSSCOPY: ******** Copying STKACS's 501 (CDSSHD) to STKACSSL's 501 (CDSSHD)
                        VMSSCOPY: ********
                       VM/ENTERPRISE SYSTEMS ARCHITECTURE DASD DUMP/RESTORE PROGRAM
                       COPYING   CDSSHD
                       COPYING DATA mm/dd/yy AT hh.mm.ss  GMT FROM CDSSHD TO CDSSHD
                       INPUT BLOCK EXTENTS            OUTPUT BLOCK EXTENTS
                          START       STOP               START       STOP
                       00000000  00024807            00000000   00024807
                       END OF COPY
                       END OF JOB

                        VMSSBLD: Returning the directory to Single Server mode...

                        VMSSDIR: Building alternate system (ESA002) directory...

                        VMSSDIR: Updating directory on alternate system (ESA002)...
                       VM/ESA USER DIRECTORY CREATION PROGRAM - VERSION 2 RELEASE 2.0
                       EOJ DIRECTORY NOT UPDATED
                       VM/ESA USER DIRECTORY CREATION PROGRAM - VERSION 2 RELEASE 2.0
                       EOJ DIRECTORY UPDATED

                        VMSSDIR: Updating directory on running system (ESARES)...
                       VM/ESA USER DIRECTORY CREATION PROGRAM - VERSION 2 RELEASE 2.0
                       EOJ DIRECTORY NOT UPDATED
                       VM/ESA USER DIRECTORY CREATION PROGRAM - VERSION 2 RELEASE 2.0
                       EOJ DIRECTORY UPDATED AND ON LINE

                        VMSSBLD: The Single Server environment has been rebuilt on this
                        VMSSBLD: processor. Server operation will utilize the local
                        VMSSBLD: disks of this system only.  The shared DASD will not
                        VMSSBLD: be used.  To return to either Dual or Split Server
                        VMSSBLD: environment, use "VMSSBLD" command with the "dual" option.
                        VMSSBLD: Completed on dd mmm yyyy at hh:mm:ss.
                       Ready;
```

4.   Repeat steps 1 through 3, this time on the **primary** server.

Step 2 — Back Up Primary System Volumes

This step copies the two primary system volumes to tape. It also copies the utilities to restore the volumes as the first two files on the tape.

You will need two scratch tapes to perform this procedure.

Note: This backup will take <u>approximately</u> 10 to 15 minutes to complete. An EXEC has been provided to make the backup simple.

1.   Log on to the MAINT userid, if you are not there already. (VMSS is the default password.)

2.   If you have not done so already, make sure that CLS and the VM/Host Software Component are shut down.

```
System:    Ready;
   You:    SMSG CLSM STOP ALL <Enter>
System:    (messages about the system quiescing)
           Common Library Services Termination complete
```

```
You:      CP SMSG STKACS STOPSCP <Enter>
System:   (messages about the system quiescing)
           SLKTKW531I ACS system shutdown is complete
```

Note: If shutdown is not successful, see "Shutting Down (9221 and 9370 systems)" on page 7-5 for further instructions.

3. Vary on a tape drive, if you need to.

```
System:   Ready;
   You:   VARY ON cuu <Enter>
          (where cuu is the real address of the tape drive)
System:   1 device(s) specified; 1 device(s) successfully varied online.
```

4. Attach a tape drive as device 181.

```
System:   Ready;
   You:   ATTACH cuu * 181 <Enter>
          (where cuu is the real address of the tape drive)
System:   TAPE cuu ATTACHED TO MAINT 0181
```

5. Mount a scratch tape on the drive.

6. Back up the VM system volume. This will take <u>approximately</u> eight minutes.

Note: The byte counts may vary from the numbers shown below.

```
System:   Ready;
   You:   VMSSTAPE volid <Enter>
          Where volid is the label of the VMS system volume
          (VMSPRM if you are upgrading from a 9370;
          ESARES if you are upgrading from a 9221).
System:
           VMSSTAPE: Creating volid backup tape...
           VMSSTAPE: Merging ICKSADSF COREIMAG and IPL DDRXA
           VMSSTAPE: Moving merged DSF and DDR to tape
           VMSSTAPE: Dumping volid (C00) blocks 0 to 1299999...
          VM/ENTERPRISE SYSTEMS ARCHITECTURE DASD DUMP/RESTORE PROGRAM
          ENTER NEXT EXTENT OR NULL LINE
          DUMPING    volid
          DUMPING DATA  mm/dd/yy AT hh.mm.ss  GMT FROM volid
          INPUT BLOCK EXTENTS              OUTPUT BLOCK EXTENTS
            START        STOP                START        STOP
          00000000   01299999              00000000    01299999
          END OF DUMP
           BYTES IN 0665654240 BYTES OUT 0072654604
           BLOCKS NOT COMPACTED ON TAPE - 0000007672


           END OF JOB

           VMSSTAPE: Complete on mm/dd/yy at hh:mm:ss.
          (the tape will unload)
```

7. Remove the tape from the drive and label it externally as "VMSPRM BACKUP" or "ESARES BACKUP."

8. Mount another scratch tape on the drive.

9. Back up the CLS system volume. This will take <u>approximately</u> eight minutes.

Note: The byte counts may vary from the numbers shown below.

```
System:    Ready;
  You:     VMSSTAPE volid <Enter>
           Where volid is the label of the CLS system volume
           (CLSPRM if you are upgrading from a 9370;
           ESA001 if you are upgrading from a 9221).
System:     VMSSTAPE: Creating volid backup tape...
            VMSSTAPE: Merging ICKSADSF COREIMAG and IPL DDRXA
            VMSSTAPE: Moving merged DSF and DDR to tape
            VMSSTAPE: Dumping volid (C00) blocks 0 to 1299999...
           VM/ENTERPRISE SYSTEMS ARCHITECTURE DASD DUMP/RESTORE PROGRAM
           ENTER NEXT EXTENT OR NULL LINE
           DUMPING   volid
           DUMPING DATA  mm/dd/yy AT hh.mm.ss  GMT FROM volid
           INPUT BLOCK EXTENTS           OUTPUT BLOCK EXTENTS
              START        STOP             START         STOP
           00000000   01299999            00000000     01299999
           END OF DUMP
            BYTES IN 0665654240 BYTES OUT 0072654604
            BLOCKS NOT COMPACTED ON TAPE -  0000007672


            END OF JOB

            VMSSTAPE: Complete on mm/dd/yy at hh:mm:ss.
           Ready;
           (the tape will unload)
```

10. Remove the tape from the drive and label it externally as "CLSPRM BACKUP" or "ESA001 BACKUP."

11. Put the tapes in a safe place and retain them until you are satisfied that the installation was a success and the new software meets your needs.

Step 3 — Load Backup Program and Back Up Customized Data

This step saves to tape any files uniquely customized for your installation. You will restore the files in a later step, after the new system is installed. Be sure to back up both servers if you have a split- or dual-server configuration.

You will need one or more scratch tapes to perform this procedure.

Important

The backup utility used in this step (STKBKP BACKUP) uses an input file (BACKUP BACKCTL) which lists the files to be backed up.

BACKUP BACKCTL should meet the needs of most installations just as it is shipped. However, if your location has customized files which are not included in BACKUP BACKCTL, you will need to add those filenames to the file or they will not be restored after the new system is installed. See Step 8 on page 3-12.

Note: If you get any error messages during this procedure, check the causes, rewind the tape, and restart the job.

1. Vary on a tape drive, if you need to.

```
System:    Ready;
   You:    VARY ON cuu <Enter>
           (where cuu is the real address of the tape drive)
System:    1 device(s) specified; 1 device(s) successfully varied online.
```

2. Attach a tape drive as device 181.

```
System:    Ready;
   You:    ATTACH cuu * 181 <Enter>
           (where cuu is the real address of the tape drive)
System:    TAPE cuu ATTACHED TO MAINT 0181
```

3. Mount the VM Storage Server "BACKUP UTILITIES" distribution tape on *cuu*.

4. Load the backup program.

```
System:    Ready;
   You:    VMFPLC2 LOAD * * (EOT <Enter>
System:     Loading.....
           STKBKP    ++HDR++  A1
           STKINST  EXEC     A1
           End-of-file or end-of-tape
           STKREST  EXEC     A1
           End-of-file or end-of-tape
           BACKUP    ++RCTL++ A1
           End-of-file or end-of-tape
           BACKUP   BACKCTL  A1
           End-of-file or end-of-tape
           STKBKP   EXEC     A1
           STKREST  EXEC     A1
           STKINST  EXEC     A1
           VMSSGRAB EXEC     A2
           End-of-file or end-of-tape
           End-of-file or end-of-tape
           Ready;
```

5. Unload the tape.

```
System:    Ready;
   You:    VMFPLC2 RUN <Enter>
```

6. Remove the VM Storage Server "BACKUP UTILITIES" distribution tape from *cuu*.

7. Mount a scratch tape to receive the backups.

8. If you have customized files, use XEDIT to modify the BACKUP BACKCTL file to match your installation. See Figure 3-2 for a listing of the file, as it is shipped.

    Notes:

    a. Due to release changes, the VMSSBLD CONFIG file will not be backed up. If you are using non-standard device addresses, you will need to modify this file later in the installation, as instructed in "Step 1 — Modify VMSSBLD CONFIG for Non-Standard Addresses" on page 3-28.

    b. If you are upgrading from a 9370 to a 9221 server, you must comment out the following lines in the BACKUP BACKCTL file:

        *   `TAPEDUMP TCPIP 191 PROFILE EXEC`
        *   `DDRDUMP USERAREA 100`
        *   `TAPEDUMP MAINT CF1 SYSTEM CONFIG (RESTORETO MAINT 191`

- TAPEMARK (the line immediately following the one containing "TAPEDUMP MAINT CF1")

System: Ready;
   You: **XEDIT BACKUP BACKCTL * <Enter>**

When you are finished making your changes, at the XEDIT command line, type
FILE <Enter> to save the changes and exit XEDIT.

```
ID BKP240
*
*
* Save the CDB
TAPEDUMP CLSM 500
TAPEMARK
* Save the CDS
DDRDUMP STKACS 500
* Save the CDS RECONFIG DISK
DDRDUMP STKACS 401
* Save the CDS BACKUP/RESTORE DISK
DDRDUMP STKACS 406
* Save CLSM customized files
TAPEDUMP CLSM 191 PROFILE CLSM
TAPEMARK
* Save Host Software Component LIBGEN files
TAPEDUMP MAINTSTK 191 LIBSLSF ASSEMBLE
TAPEMARK
TAPEDUMP MAINTSTK 255 LIBSLSF ASSEMBLE
TAPEDUMP MAINTSTK 255 ACS     SLKJCL
TAPEMARK
TAPEDUMP MAINTSTK 254 ACS     SYSPROF
TAPEDUMP MAINTSTK 254 LIBSLSF MODULE
TAPEMARK
* Save TCP/IP files
TAPEDUMP TCPIP 191 HOSTS *
TAPEDUMP TCPIP 191 PROFILE TCP*
TAPEDUMP TCPIP 191 PROFILE EXEC                           ***
TAPEMARK
TAPEDUMP TCPIP 192 HOSTS *
TAPEDUMP TCPIP 192 TCPIP DATA
TAPEMARK
* Save CLSCOMM files
TAPEDUMP CLSCOMM 191 PROFILE PVM
TAPEDUMP CLSCOMM 191 PVM CONFIG
TAPEMARK
* Save all of HSCUTIL's files
TAPEDUMP HSCUTIL 191 * *
TAPEMARK
* SAVE ALL OF PERFDATA'S FILES
TAPEDUMP PERFDATA 191 * PERFDATA
TAPEMARK
```

Figure   3-2 (Part 1 of 2). Listing of BACKUP BACKCTL

```
     * BACKUP USERAREA..
     DDRDUMP USERAREA 100                                        ***
     * Save VMSSBLD config file and SYSTEM CONFIG
     *TAPEDUMP MAINT 192 VMSSBLD CONFIG
     *TAPEMARK
     TAPEDUMP MAINT CF1 SYSTEM CONFIG ( RESTORETO MAINT 191  ***
     TAPEMARK                                                    ***
     * Save AUTOLOG1 customized files
     TAPEDUMP AUTOLOG1 191 AUTOEX* EXEC
     TAPEMARK
     *
     * Any user "defined" users or special files can be added
     * here as well.
     *
```

Figure   3-2 (Part 2 of 2). Listing of BACKUP BACKCTL

9. Save the customized files specified in BACKUP BACKCTL.

    Note: If the USERAREA 100 is not formatted you will see error message
    DMSARE069E (filemode not accessed).

    | System: | Ready; |
    | You: | **STKBKP BACKUP <Enter>** |
    | System: | ----------------------- |

    ```
             Processing: BKP230

             DUMPING CLSM 500 * *
             DUMPING STKACS 500
             DUMPING STKACS 401
             DUMPING STKACS 406
             DUMPING CLSM 191 PROFILE CLSM
             DUMPING MAINTSTK 191 LIBSLSF ASSEMBLE
             DUMPING MAINTSTK 255 LIBSLSF ASSEMBLE
             DUMPING MAINTSTK 255 ACS SLKJCL
             DUMPING MAINTSTK 254 ACS SYSPROF
             DUMPING MAINTSTK 254 LIBSLSF MODULE
             DUMPING TCPIP 191 HOSTS *
             DUMPING TCPIP 191 PROFILE TCP*
             DUMPING TCPIP 191 PROFILE EXEC
             DUMPING TCPIP 192 HOSTS *
             DUMPING TCPIP 192 TCPIP DATA
             DUMPING CLSCOMM 191 PROFILE PVM
             DUMPING CLSCOMM 191 PVM CONFIG
             DUMPING HSCUTIL 191 * *
             DUMPING PERFDATA 191 * PERFDATA
             DUMPING USERAREA 100
             DUMPING MAINT CF1 SYSTEM CONFIG
             DUMPING AUTOLOG1 191 AUTOEX* EXEC
             Backup Complete
             Ready;
    ```

    Note: See Appendix C, "STKBKP and STKREST Utilities" for additional
    information about how STKBKP works.

10. Remove the tape and apply an external label that identifies the contents, such as
    "STKBKP BACKUP #1 of *n*."

Step 4 — Shut Down the System

1. Log off the MAINT userid.

2. Log on to the OPERATOR userid. (VMSS is the default password.)

3. Shut down the system.

   ```
   System:    Ready;
      You:    SHUTDOWN <Enter>
   System:    SYSTEM SHUTDOWN STARTED.
              SYSTEM TERMINATION COMPLETE.
   ```

TASK 3 — PREPARE THE SYSTEM

Step 1 — Bring Up the System Console

┌─── **When to Perform this Step** ─────────────────────────────────┐
│   │
│ You must perform this step if this is a new installation.   │
│   │
│ If this is an upgrade to an existing installation the console should already be on, so │
│ you can proceed to "Step 2 — IPL the SYSTEM Tape."   │
│   │
└───┘

1. Power on the console.

   Wait for the software to load and the Log On the Processor Console window to appear.

2. Log on to the SYSPROG userid. (PASSWORD is the default password.)

Step 2 — IPL the SYSTEM Tape

> **Note:** At any time during this process, if an error occurs the Messages icon will flash. Open the icon to view the error message(s).

1. Mount the SYSTEM tape on an available drive.

2. In the Monitor the System window, select `Operate-->Recover` from the menu bar.

   The Recover dialog box appears.

3. In the dialog box, select `Load clear`, then click `OK`.

   The Selected Action Initiating popup window appears with the message `The action that you selected is starting`. Then the Load dialog box appears.

4. In the `Load address` field of the Load dialog box, type the drive address where the SYSTEM tape is mounted. Leave the `Load parameter` field blank. Then click `OK`.

   The Confirm the Action popup window appears.

5. In the popup, click `Load`.

The system loads the ICKDSF utility into memory This will take <u>approximately</u> two minutes. When the load completes, the Load popup window appears with the message `The Load Completed Successfully`.

Note: If the tape does not IPL, take all other tape control unit ports offline, leaving your host as the only one attached.

6. In the popup, click OK.

7. Open the A-A-3270 Emulator icon. Maximize the emulator window size by clicking the up arrowhead in the right corner of the window.

8. If the screen does not respond press **<Ctrl>**, then press **<Esc>** (one after the other, <u>not</u> simultaneously) to get the system's attention. You may need to do this a second time.

Step 3 — Format the System Volume

1. Indicate that you want to enter commands at the console:

   System: `ICK005E DEFINE INPUT DEVICE, REPLY 'DDDD,CUU' OR 'CONSOLE'`
             `ENTER INPUT/COMMAND:`
   You: **`CONSOLE <Enter>`**

2. Indicate that you want system output displayed at the console:

   System: `ICK006E DEFINE OUTPUT DEVICE, REPLY 'DDDD,CUU' OR 'CONSOLE'`
             `ENTER INPUT/COMMAND:`
   You: **`CONSOLE <Enter>`**

3. Specify that you want to format disk C00 with volume label ESARES.

   System: `ICKDSF - SA/XA/ESA  DEVICE SUPPORT FACILITIES 15.0  TIMEhh:mm:ss`
             `mm/dd/yy Page n`
             `ENTER INPUT/COMMAND:`
   You: **`CPVOL FORMAT UNIT(C00) NVFY VOLID(ESARES) <Enter>`**
   System: `ICK00700I DEVICE INFORMATION FOR 0C00 IS CURRENTLY AS FOLLOWS:`
             `          PHYSICAL DEVICE = 9336-20`
             `          STORAGE CONTROLLER = 6310`
             `          STORAGE CONTROL DESCRIPTOR = 80`
             `          DEVICE DESCRIPTOR = 10`
             `ICK03020I CPVOL WILL PROCESS C00 FOR VM/ESA MODE`
             `ICK03090I VOLUME SERIAL = volid`
             `ICK03011I PAGE RANGE TO BE FORMATTED IS 0 - 209109`

4. Confirm the information and begin the format. This will take <u>approximately</u> 10 minutes.

   Note: The page numbers may vary from the numbers shown below.

   System: `ICK003D REPLY U TO ALTER VOLUME C00 CONTENTS, ELSE T`
   You: **`U <Enter>`**
   System: `ICK03000I CPVOL REPORT FOR cuu FOLLOWS:`

             `          FORMATTING OF PAGE 0 STARTED AT: hh:mm:ss`
             `          FORMATTING OF PAGE 10000 ENDED AT: hh:mm:ss`
             `          FORMATTING OF PAGE 20000 ENDED AT: hh:mm:ss`
             `          FORMATTING OF PAGE 30000 ENDED AT: hh:mm:ss`
             `          FORMATTING OF PAGE 40000 ENDED AT: hh:mm:ss`
             `          FORMATTING OF PAGE 50000 ENDED AT: hh:mm:ss`

```
                    FORMATTING OF PAGE 60000 ENDED AT: hh:mm:ss
                    FORMATTING OF PAGE 70000 ENDED AT: hh:mm:ss
                    FORMATTING OF PAGE 80000 ENDED AT: hh:mm:ss
                    FORMATTING OF PAGE 90000 ENDED AT: hh:mm:ss
                    FORMATTING OF PAGE 100000 ENDED AT: hh:mm:ss
         ICKDSF - SA/XA/ESA  DEVICE SUPPORT FACILITIES 15.0
                 hh:mm:ss   mm/dd/yy   PAGE n
                    FORMATTING OF PAGE 110000 ENDED AT: hh:mm:ss
                    FORMATTING OF PAGE 120000 ENDED AT: hh:mm:ss
                    FORMATTING OF PAGE 130000 ENDED AT: hh:mm:ss
                    FORMATTING OF PAGE 140000 ENDED AT: hh:mm:ss
                    FORMATTING OF PAGE 150000 ENDED AT: hh:mm:ss
                    FORMATTING OF PAGE 160000 ENDED AT: hh:mm:ss
                    FORMATTING OF PAGE 170000 ENDED AT: hh:mm:ss
                    FORMATTING OF PAGE 180000 ENDED AT: hh:mm:ss
                    FORMATTING OF PAGE 190000 ENDED AT: hh:mm:ss
                    FORMATTING OF PAGE 200000 ENDED AT: hh:mm:ss
                    FORMATTING OF PAGE 209109 ENDED AT: hh:mm:ss

                    VOLUME SERIAL NUMBER IS NOW = ESARES

                    PAGE ALLOCATION CURRENTLY IS AS FOLLOWS:
                    TYPE     START     END     TOTAL
                    ----     -----     ---     -----
                    PERM     4         209109  209106

           ICK00001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0
                 hh:mm:ss        mm/dd/yy
```

Step 4 — Label the Remaining Volumes

Note: Perform the following steps once for each volume listed in Table 3-3. Volumes D00 through D11 do not apply to single-server configurations. Substitute the appropriate device address and label each time. Each volume will take up to 15 seconds.

Table 3-3. Volume Addresses and Labels	
Address	**Label**
C01	TMP001
C02	TMP002
C03	TMP003
D00	TMP004
D01	TMP005
D10	TMP006
D11	TMP007

1. Assign a label to a remaining volume.

    System: ENTER INPUT COMMAND:
    You: **CPVOL FORMAT UNIT(***cuu***) NVFY VOLID(***volid***) RANGE(0,1) <Enter>**
            (where *cuu* is the real address of the volume, such as C01, and
            volid is the volume label, such as TMP001)
    System: ICK00700I DEVICE INFORMATION FOR *cuu* IS CURRENTLY AS FOLLOWS:

```
                        PHYSICAL DEVICE = 9336-20
                        STORAGE CONTROLLER = 6310
                        STORAGE CONTROL DESCRIPTOR = 80
                        DEVICE DESCRIPTOR = 10
          ICK03020I CPVOL WILL PROCESS cuu FOR VM/ESA MODE
          ICK03090I VOLUME SERIAL = old_label
          ICK03011I PAGE RANGE TO BE FORMATTED IS 0 - 1
```

2. Confirm the information and begin the label process.

    Note: The page numbers may vary from the numbers shown below.

    System: ICK003D REPLY U TO ALTER VOLUME cuu CONTENTS, ELSE T
       You: **U <Enter>**
    System: ICK03000I CPVOL REPORT FOR cuu FOLLOWS:

    ```
              FORMATTING OF PAGE 0 STARTED AT: hh:mm:ss
              FORMATTING OF PAGE 1 ENDED AT: hh:mm:ss

              VOLUME SERIAL NUMBER IS NOW = volid

              PAGE ALLOCATION CURRENTLY IS AS FOLLOWS:
              TYPE     START    END     TOTAL
              ----     -----    ---     -----
              PERM     4        209109  209106


      ICK00001I FUNCTION COMPLETED, HIGHEST CONDITION CODE WAS 0
              hh:mm:ss        mm/dd/yy
    ```

3. Repeat steps 1 and 2 for each remaining volume.

    Note: Volumes D00 through D11 do not apply to single-server configurations.

TASK 4 — RESTORE BASE VM/ESA SYSTEM

Step 1 — IPL the SYSTEM Tape Again

Note: At any time during this process, if an error occurs the Messages icon will flash. Open the icon to view the error message(s).

1. Minimize the A-A-3270 Emulator window by clicking the down arrowhead in the right corner of the window.

2. Verify that the SYSTEM tape is still loaded in the drive and positioned where it was left at the end of step "Step 2 — IPL the SYSTEM Tape" on page 3-15.

3. In the Monitor window, select Operate-->Recover from the menu bar.

    The Recover dialog box appears.

4. In the dialog box, select Load clear, then click OK.

    A popup window appears with the message The action that you selected is starting. Then the Load dialog box appears.

5. In the Load address field of the Load dialog box, type the drive address where the SYSTEM tape is mounted. Leave the Load parameter field blank. Then click OK.

The Confirm the Action popup window appears.

6. In the popup, click Load.

7. The system loads the DASD dump/restore (DDR) utility into memory. When the load completes, the Load popup window appears with the message The Load Completed Successfully.

   In the popup, click OK.

8. Open the A-A-3270 Emulator icon. Maximize the emulator window size by clicking the up arrowhead in the right corner of the window.

Step 2 — Restore the Primary System Residence Volume

> **Important**
>
> In this step do not ignore any system error messages; call StorageTek Software Support if you see any messages.

1. Press **<Esc>** or **<Enter>** to get the system's attention.

2. Indicate that you want system messages displayed on the console.

   System: VM/ENTERPRISE SYSTEMS ARCHITECTURE DASD DUMP/RESTORE PROGRAM
             ENTER CARD READER ADDRESS OR CONTROL STATEMENTS
             ENTER:
   You: **SYSPRINT CONS <Enter>**

3. Indicate you want the input to come from tape.

   System: ENTER:
   You: **INPUT** *cuu drive-type* **<Enter>**
             (where *cuu* is the real address of the tape drive,
             and *drive-type* is the type of drive, such as 3480, 3490, etc.)

4. Indicate you want the output to go to disk.

   System: ENTER:
   You: **OUTPUT** *cuu* **FB-512 ESARES <Enter>**
             (where *cuu* is the real address of ESARES, normally C00)

5. Begin the restore. This will take <u>approximately</u> 17 minutes.

   System: ENTER:
   You: **RESTORE ALL <Enter>**
   System: RESTORING ESARES
             DATA DUMPED *mm/dd/yy* AT *hh.mm.ss* GMT FROM ESARES RESTORED TO ESARES
             INPUT BLOCK EXTENTS   OUTPUT BLOCK EXTENTS
                START   STOP   START   STOP
                00000000   01299999   00000000   01299999
             END OF RESTORE
             BYTES RESTORED 0659270616

             ENTER:

Notes:

    a. The byte counts may vary from the numbers shown above.

    b. If you press **<Enter>** while the restore utility is running it will display the block it is currently on.

Step 3 — IPL VM

Note: At anytime during this process, if an error occurs the Messages icon will flash. Open the icon to view the error message(s).

1.   Minimize the A-A-3270 Emulator window by clicking the down arrowhead in the right corner of the window.

2.   In the Monitor window, select `Operate-->Recover` from the menu bar.

    The Recover dialog box appears.

3.   In the dialog box, select `Load clear`, then click `OK`.

    A popup window appears with the message `The action that you selected is starting`. Then the Load dialog box appears.

4.   In the `Load address` field of the Load dialog box, type the address of the ESARES volume (normally C00). Leave the `Load parameter` field blank. Then click `OK`.

    The Confirm the Action popup window appears.

5.   In the popup, click `Load`.

    The system loads VM. When the load completes, the Load popup window appears with the message `The Load Completed Successfully`.

6.   In the popup, click `OK`.

7.   Open the A-A-3270 Emulator icon. Maximize the emulator window size by clicking the up arrowhead in the right corner of the window.

Step 4 — Start VM

1.   Initiate a cold start.

```
System:      VM/ENTERPRISE SYSTEMS ARCHITECTURE   VERSION 2 RELEASE 2.0 SERVICE LEVEL
             SYSTEM NUCLEUS CREATED ON mm/dd/yy AT hh:mm:ss, LOADED FROM ESA

             **************************************************************
             * LICENSED MATERIALS - PROPERTY OF IBM*                      *
             *                                                            *
             * 5684-112 (C) COPYRIGHT IBM CORP. 1983, 1994. ALL RIGHTS    *
             * RESERVED. US GOVERNMENT USERS RESTRICTED RIGHTS - USE,     *
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             * CONTRACT WITH IBM CORP.                                    *
             *                                                            *
             * * TRADEMARK OF INTERNATIONAL BUSINESS MACHINES.            *
             **************************************************************

             HCPZCO6718I Using parm disk 1 on volume ESARES (device C00).
             HCPZCO6718I Parm disk resides on blocks 100000 through 123992.
             HCPISU951I CP VOLID ESA001 NOT MOUNTED
```

```
                    HCPISU951I CP VOLID ESA002 NOT MOUNTED
                    HCPISU951I CP VOLID ESA003 NOT MOUNTED
                    Start ((Warm|Force|COLD|CLEAN) (DRain) (DIsable)  (NODIRect)
                          (NOAUTOlog)) or (SHUTDOWN)
        You:        COLD NOAUTOLOG <Enter>
```

2. Verify the system time and date.

   Note: If the time or date is incorrect, bypass changing it for now. You will have
   the opportunity to change it in "Step 7 — Change System Date and Time"
   on page 3-32.

```
   System:    COLD
              NOW hh:mm:ss MST FRIDAY mm/dd/yy
              Change TOD clock (Yes|No)
      You:    NO <Enter>
   System:    The directory on volume ESARES at address 0C00 has been brought
              online.
              HCPWRS2513I
              HCPWRS2513I Spool files available     NONE
              HCPWRS2513I
```

   Note: In some circumstances the following messages will appear and you will have
   to confirm the cold start.

```
   System:    HCPWRS2513I Spool files on offline volumes            NONE
              HCPWRS2513I Spool files with I/O errors               NONE
              HCPWRS2513I Spool files with control errors           NONE
              HCPWRS2513I Spool files to be discarded                  3
              HCPWRS2513I                                          ───────
              HCPWRS2513I Total files to be deleted                    3
              HCPWRS2511A
              HCPWRS2511A Spool files will be deleted because of COLD start.
              HCPWRS2511A No files have been deleted yet.
              HCPWRS2511A To continue COLD start and delete files, enter GO.
              HCPWRS2511A To stop COLD start without deleting files, enter STOP.
      You:    GO <Enter>
   System:    GO
```

3. Enable all terminals.

```
   System:    HCPWRS2512I Spooling initialization is complete.
              DASD 0C23 dump unit CP IPL pages 2559
              HCPLNM108E OPERATOR 0F91 not linked; volid ESA002 not mounted
              There is no logmsg data
              FILES:   NO RDR,   NO PRT,   NO PUN
              LOGON AT hh:mm:ss zone day mm/dd/yy
              GRAF  0000 LOGON  AS  OPERATOR USERS = 1
              HCPIOP951I USER VOLID CDSPRM NOT MOUNTED
              HCPIOP951I USER VOLID CDSSHD NOT MOUNTED
              HCPIOP951I USER VOLID PRMNEW NOT MOUNTED
              HCPIOP951I USER VOLID SHDNEW NOT MOUNTED
              HCPIOP952I 0016M system storage
              FILES: 0000002 RDR, 0000001 PRT,      NO PUN
              HCPCLT044E System CMS does not exist
              HCPCRC8082I EREP records are accumulating for userid EREP
      You:    #CP ENABLE ALL <Enter>
   System:    Command complete
```

Note: You are logged on to the OPERATOR userid at this point.

Step 5 — Create the CMS Saved System

1. Disconnect from the OPERATOR userid.

You:	**#CP DISC**
System:	CP DISCONNECT

2. Clear the screen.

System:	Press Enter or Clear Key to Continue.
You:	**<Esc>**

3. Log on to the MAINT userid. (VMSS is the default password.)

4. IPL the 190 disk.

System:	System CMS does not exist.
	System reset
	System = ESA
You:	**IPL 190 PARM AUTOCR <Enter>**

5. Begin the SAVECMS utility.

   Notes:

   a. This process will take **approximately** five minutes.

   b. You may see error messages regarding devices 111 and 112. You can ignore these messages.

System:	VM/ESA V2.2.0 *mm/dd/yy hh:mm*
	Ready;
You:	**SAVECMS <Enter>**
System:	EOJ OVERRIDE FILE UPDATED
	Class override file in effect after the next SYSTEM IPL.
	OWNERID FILE TYPE CL RECS DATE TIME FILENAME FILETYPE ORIGINID
	*UCR 0005 UCR D 0001 *mm/dd hh:mm:ss* ESARES OVERRIDE MAINT
	HCPNSD440I The Named Saved System (NSS) CMS was successfully
	defined in fileid 0001.
	HCPNSS440I Named Saved System (NSS) CMS was successfully saved
	in fileid 0001.
	VM/ESA V2.2.0 *mm/dd/yy hh:mm*
You:	Press the **<Enter>** key to clear the screen
	and display VM READ in the status line.

Step 6 — Format and Allocate the TMPxxx Volumes as ESAxxx

Note: This utility will take approximately 90 minutes.

1. Press **<Esc>** or **<Enter>** to get the system's attention.

2. Display the TMPxxx volumes and verify that the disks have been labelled correctly.

   Note: You may see messages regarding offline devices, depending on how your system is configured. You can ignore these messages.

System:	Ready;
You:	**Q DA ALL <Enter>**
System:	DASD 0C00 CP OWNED ESARES 73
	DASD 0C01 TMP001 , DASD 0C02 TMP002 , DASD 0C03 TMP003
	DASD 0D00 TMP004 , DASD 0D01 TMP005 , DASD 0D10 TMP006
	DASD 0D11 TMP007

```
                          An offline DASD was not found.
                          Ready;
```

3. Format and allocate the TMPxxx volumes.

```
System:    Ready;
   You:    CLSALLOC <Enter>
System:    CLSALLOC: CLSALLOC beginning.  This process may take up to
                     90 minutes.
           CLSALLOC: Now processing volume TMP001 (1 of 7).
           CLSALLOC: Volume ESA001 formatted and attached to the system.
           CLSALLOC: Now processing volume TMP002 (2 of 7).
           CLSALLOC: Volume ESA002 formatted and attached to the system.
           CLSALLOC: Now processing volume TMP003 (3 of 7).
           CLSALLOC: Volume ESA003 formatted and attached to the system.
           CLSALLOC: Now processing volume TMP004 (4 of 7).
           CLSALLOC: Volume CDSPRM formatted and attached to the system.
           CLSALLOC: Now processing volume TMP005 (5 of 7).
           CLSALLOC: Volume CDSSHD formatted and attached to the system.
           CLSALLOC: Now processing volume TMP006 (6 of 7).
           CLSALLOC: Volume PRMNEW formatted and attached to the system.
           CLSALLOC: Now processing volume TMP007 (7 of 7).
           CLSALLOC: Volume SHDNEW formatted and attached to the system.
           CLSALLOC: CLSALLOC complete. 7 of 7 volumes successfully
                     processed.
```

TASK 5 — RESTORE CLS COMPONENTS

Step 1 — Load the PRODUCT and COMMUNICATIONS Tapes

Use the following steps to restore the CLS PRODUCT and COMMUNICATIONS tapes.

Note: This step will take **approximately** ten minutes.

1. Vary on a tape drive, if you need to.

```
System:    Ready;
   You:    VARY ON cuu <Enter>
           (where cuu is the real address of the tape drive)
System:    1 device(s) specified; 1 device(s) successfully varied online.
```

2. Attach a tape drive as device 181.

```
System:    Ready;
   You:    ATTACH cuu * 181 <Enter>
           (where cuu is the real address of the tape drive)
System:    TAPE cuu ATTACHED TO MAINT 0181
```

3. Mount the PRODUCT tape on the attached tape drive.

4. Start the restore utility.

```
System:    Ready;
   You:    RESTTAPE <Enter>
System:    Processing 3 components named:
              CLS     MAINTSTK HSC
           Installing all components: all disks will be formatted,
```

```
                                      all modified files overwritten and it is expected that a
                                      matching system has been installed.
```

5. Install all components.

    System: Ensure that all service machines are shut down and logged off.
              Then press ENTER to continue, anything else to quit
       You: **<Enter>**

    You will see messages as the system restores the tape you have mounted. When
    finished, the system will display:

    ```
    Tape contained nn files
    Completed dd mmm yyyy at hh:mm:ss
    DMSACP113S C(194) not attached or invalid device address
    ```

6. Remove the PRODUCT tape from the drive (it should be rewound and unloaded).

7. Mount either the TCPIP or the CLSCOMM (PVM) tape on the drive, depending on
    the communications protocol(s) you will be using.

    System: Tape restore complete. Mount communications tape and press ENTER
              to install tape or type anything else to complete install.
       You: **<Enter>**
    System: Processing 1 component named:
                protocol
              Installing all components: all disks will be formatted,
              all modified files overwritten and it is expected that a
              matching system has been installed.

8. Verify the information and begin restoring the tape.

    System: Ensure that all service machines are shut down and logged off.
              Then press ENTER to continue, anything else to quit
       You: **<Enter>**

    You will see messages as the system restores the tape you have mounted. When
    finished, the system will display:

    ```
    Tape contained nn files
    Completed dd mmm yyyy at hh:mm:ss
    DMSACP113S C(194) not attached or invalid device address
    ```

9. Remove the tape from the drive (it should be rewound and unloaded).

10. If you want to restore the other communications tape (CLSCOMM or TCPIP), repeat
    steps 7 and 8.

11. When you are finished restoring tapes, terminate the installation.

    System: Tape restore complete. Mount communications tape and press ENTER
              to install tape or type anything else to complete install.
       You: **N <Enter>**
    System: Restore ending at hh:mm:ss dd mmm yyyy
              DMSACP113S C(194) not attached or invalid device address

              Process completed successfully
              Tape unloading

Step 2 — Load Custom Data

1. If this is a new installation, mount the CUSTOMIZED DATA tape supplied by
   StorageTek. If this is an upgrade, mount the STKBKP BACKUP tape you created
   in "Step 3 — Load Backup Program and Back Up Customized Data" on page 3-11.

2. Load the backup program.

   ```
   System:    Ready;
      You:    STKINST <Enter>
   System:    Backup created on dd mmm yyyy hh:mm:ss

              Components selected to restore:
              label
              (where label is the label assigned to your custom tape)
   ```

3. Begin restoring the selected components.

   ```
   System:    Press -ENTER- to restore selected components.
              Type "ALL" to select all components.
              Enter a new  list of components
              -OR- type "Exit" to terminate restore.
      You:    <Enter>
   System:    --------------------
              Processing component volid
              Restoring volid cuu
              Restore Complete
              Ready;
   ```

4. Log off MAINT.

Step 3 — Configure the System

1. Log on to the MAINTSTK userid. (VMSS is the default password.)

2. Update the LIBSLSF ASSEMBLE file to the appropriate configuration. See the
   VM/HSC Installation Guide for detailed instructions.

3. Update the LIBGEN to match your system configuration. See the *VM/HSC
   Installation Guide* for detailed instructions.

4. XAUTOLOG to the CLSM userid.

```
System:   Ready;
   You:    XAUTOLOG CLSM <Enter>
System:   Ready;
```

5. Run the CLS Configuration Management (CLSCM) program to update the CLS data base (CDB). See "Using Configuration Management (CLSCM)" in the *CLS User's Guide* for detailed instructions.

6. Log off MAINTSTK.

7. Log on to the MAINT userid. (VMSS is the default password.)

TASK 6 — CUSTOMIZE THE SYSTEM

Step 1 — Configure TCP/IP

┌─ **When to Perform This Step** ──────────────────────────────────┐
│   │
│ If you are upgrading from a 9370 to a 9221 server you **must** use Step 5 on │
│ page 3-27 of this step. Otherwise, this step is optional; use it if you are using the │
│ TCP/IP communications protocol and you want to change the default pool sizes or IP │
│ addresses.   │
│   │
└──┘

1. Clear the screen.

2. Display the channel IP addresses.

```
System:   CMS
   You:    VMSSTCP <Enter>
System:   CPU Channel address defined: x00
          CPU Channel address defined: x00
          IP address defined: ddd.ddd.ddd.ddd
          IP address defined: ddd.ddd.ddd.ddd
```

3. Verify the information. If it is correct, type **Y <Enter>**. If it is not correct, type **N <Enter>**; you will be given the opportunity to change it, as follows:

```
System:   Is this information correct?
          Enter 'Y', 'N' or 'Quit' to exit.
   You:    N <Enter>
System:   How many Ethernet address do you have?
   You:    nnn <Enter>
System:   Enter the address for channel 1 (format x00):
   You:    x00 <Enter>
System:   Type in the IP address in the form ddd.ddd.ddd.ddd
   You:    ddd.ddd.ddd.ddd <Enter>
System:   Enter the address for channel 2 (format x00):
   You:    x00 <Enter>
System:   Type in the IP address in the form ddd.ddd.ddd.ddd
   You:    ddd.ddd.ddd.ddd <Enter>
System:   CPU Channel address defined: x00
          CPU Channel address defined: x00
          IP address defined: ddd.ddd.ddd.ddd
          IP address defined: ddd.ddd.ddd.ddd

          DASD 0111 detached.
```

4. If you want to modify any of the TCP/IP pool sizes, edit the TCP/IP profile file.

System: Ready;
   You: **VMSSTCP (EDIT <Enter>**

You will be in XEDIT. Modify the pool sizes according to the following guidelines. When you are finished, at the XEDIT command line type **FILE <Enter>** to save the changes and exit XEDIT.

ACBPOOLSIZE	200
CCBPOOLSIZE	# OBEY statements + # INFORM statements + # LPs in configuration + 7
DATABUFFERPOOLSIZE	160 buffers, each 8K
ENVELOPEPOOLSIZE	100
SCBPOOLSIZE	Default (256) or the same size as CCBPOOLSIZE.
TCBPOOLSIZE	Default (256) or the same size as CCBPOOLSIZE.

Notes:

a. For more detailed information, refer to the IBM manual *TCP/IP Version 2 Release 2 for VM: Planning and Customization* (SC31-6082).

b. To check performance at any time, issue the NETSTAT POOLS command. If the low watermark for any of these approaches 0, adjust them as necessary.

5. If you are upgrading from a 9370 to a 9221 server, you **must** modify the addresses for the network cards in the TCP/IP profile file.

System: Ready;
   You: **VMSSTCP (EDIT <Enter>**

You will be in XEDIT. Change all references to CETI300, ETH300, and ELANS300 from 300 to 100. (The 9370 server used addresses 300 and 400 for the network cards, whereas the 9221 server uses addresses 100 and 400.) When you are finished, at the XEDIT command line type **FILE <Enter>** to save the changes and exit XEDIT.

Step 2 — Make Directory Changes

> ── **When to Perform This Step** ───────────────────
>
> This step is optional; use it if you want to customize any of the CLS or VM/HSC directory entries, such as LP names. (The STKBKP BACKUP utility does not save LP or other customized data in MAINT's directory.)

1. To add an LP use the following command:

System: Ready;
   You: **VMSSDIR ADDLP** *lp-id* **<Enter>**
          (where *lp-id* is the LP you want to add)

```
System:    VMSSDIR: LP lp-id added to ESARES's directory.
           VMSSDIR: Run VMSSDIR DIRECT to put directory online.
```

2. To change LP names, or to change dedicate statements for STKACS, edit the system directory.

```
System:    Ready;
   You:    VMSSDIR EDIT <Enter>
```

You will be in XEDIT. Make the appropriate directory changes. When you are finished, at the XEDIT command line type **FILE <Enter>** to save the changes and exit XEDIT.

3. Activate all your changes.

```
System:    VMSSDIR: Type 'DIRECT' to place it online now.
           VMSSDIR: Type 'SAVE' to quit without putting it online.
           VMSSDIR: Type 'RESTORE' to backout the changes you made.
   You:    DIRECT <Enter>
```

Note: You may see error messages about the backup volume; these can be ignored.

Step 1 — Modify VMSSBLD CONFIG for Non-Standard Addresses

> **When to Perform This Step**
>
> You **must** use this step if your installation uses non-standard DASD addresses. This step modifies the VMSSBLD CONFIG file to reflect your DASD addresses.
>
> Do **not** use this step if your installation uses standard addresses.

Note: The VMSSBLD CONFIG file is located on your 192 disk which is currently in read-only mode. In this step you will re-access the disk in read/write mode before making the necessary modifications to the file. When you are done, you will return the disk to read-only mode.

1. Refer to your worksheet from Table 4-1 on page 4-4 and compare it to Table 3-4 on page 3-29, which shows the contents of a VMSSBLD CONFIG file.

    The file contains a list of VM Storage Server volume serial numbers and their corresponding real addresses. Associated with each real address and volser is a logical name. The logical name is used by VMSSBLD.

2. Log on to the MAINT userid. (VMSS is the default password.)

3. Release and detach the 192 disk.

```
System:    Ready;
   You:    REL 192 (DET <Enter>
System:    DASD 192 DETACHED
```

4. Re-link to the 192 disk in read/write mode.

```
System:    Ready;
   You:    LINK * 192 192 MR <Enter>
System:    DASD 192 LINKED R/W; R/O BY OPERATOR
```

5. Access the 192 disk as "D."

```
System:     Ready;
   You:     ACC 192 D <Enter>
```

6. Use XEDIT to edit the VMSSBLD CONFIG file.

```
System:     Ready;
   You:     XEDIT VMSSBLD CONFIG D <Enter>
```

7. Look for lines in the file that have the same information as Table 3-4, and modify them appropriately. You can modify the real addresses to match your site's hardware configuration. However, the logical name **must not** be changed.

Table 3-4. VMSSBLD CONFIG File Contents		
Real Address	**Volser**	**Logical Name**
C00	ESARES	esares
C01	ESA001	esa001
C02	ESA002	esa002
C03	ESA003	esa003
Note: The following addresses apply to dual-server environments only and are from the view of the standby server.		
D00	CDSPRM	cdsprm
D01	PRMNEW	prmnew
D10	CDSSHD	cdsshd
D11	SHDNEW	shdnew

When you are finished, at the XEDIT command line, type **FILE <Enter>** to save the changes and exit XEDIT.

8. Release and detach the 192 disk.

```
System:     Ready;
   You:     REL 192 (DET <Enter>
System:     DASD 192 DETACHED
```

9. Re-link to the 192 disk in read-only mode.

```
System:     Ready;
   You:     LINK * 192 192 RR <Enter>
System:     DASD 192 LINKED R/O; R/O BY OPERATOR
```

10. Access the 192 disk as "D."

```
System:     Ready;
   You:     ACC 192 D <Enter>
System:     Ready;
```

Step 4 — Create Backup Volumes

Note: This step will take **approximately** 20 minutes.

Use this step to create the backup disk (default addresses C02 and C03).

1. Start the VMSSBLD utility to build the backup volumes.

    Notes:

    a. You will see device errors; these can be ignored.

    b. The byte counts may vary from the numbers shown below.

    c. The display below is only a partial list of the files you will see processed.

    ```
    System:    Ready;
      You:     VMSSBLD BKP <Enter>
    System:    VMSSBLD: Started on yyyymmdd at hh:mm:ss.
               VMSSBLD: Build type = BKP.

               Device 0F91 does not exist

                VMSSCOPY: Processing control file: BLDBKP VMSSCOPY A  at mm/dd/yy
                        hh:mm:ss.

                VMSSCOPY: ********
                VMSSCOPY: ******** Copying AUTOLOG1's 191 (AUT191) to AUTOLOG1's
                        F91 (AUT191)
                VMSSCOPY: ********
               VM/ENTERPRISE SYSTEMS ARCHITECTURE DASD DUMP/RESTORE PROGRAM
               COPYING    AUT191
               COPYING DATA  mm/dd/yy AT hh.mm.ss GMT FROM AUT 191 TO AUT191
               INPUT BLOCK EXTENTS            OUTPUT BLOCK EXTENTS
                  START        STOP                START          STOP
               00000000   00000099               00000000    00000099
               END OF COPY
               END OF JOB

               ...
               ...     additional messages
               ...

               DMSACP112S Z(119) device error

                VMSSCOPY: ********
                VMSSCOPY: ******** Copying USERAREA's 100 (SCRTCH) to USERAREA's
                        200 (SCRTCH)
                VMSSCOPY: ********
               VM/ENTERPRISE SYSTEMS ARCHITECTURE DASD DUMP/RESTORE PROGRAM
               VOLID READ IS USRDAT NOT SCRTCH
               VOLID READ IS        NOT SCRTCH
               COPYING    USRDAT
               COPYING DATA  mm/dd/yy AT hh.mm.ss GMT FROM USRDAT TO
               INPUT BLOCK EXTENTS            OUTPUT BLOCK EXTENTS
                  START        STOP                START          STOP
               00000000   00099999               00000000    00099999
               END OF COPY
               END OF JOB

                VMSSCOPY: Copies in BLDBKP VMSSCOPY A  complete at yyyymmdd
                        hh:mm:ss.
                VMSSCOPY: Highest return code was: 0
               CP volume C02 now has volid ESA002
    ```

```
VMSSDIR: Building alternate system (ESA002) directory...

VMSSDIR: Updating directory on alternate system (ESA002)...
VM/ESA USER DIRECTORY CREATION PROGRAM - VERSION 2 RELEASE 2.0
EOJ DIRECTORY NOT UPDATED
VM/ESA USER DIRECTORY CREATION PROGRAM - VERSION 2 RELEASE 2.0
EOJ DIRECTORY UPDATED

VMSSDIR: Updating directory on running system (ESARES)...
VM/ESA USER DIRECTORY CREATION PROGRAM - VERSION 2 RELEASE 2.0
EOJ DIRECTORY NOT UPDATED
VM/ESA USER DIRECTORY CREATION PROGRAM - VERSION 2 RELEASE 2.0
EOJ DIRECTORY UPDATED AND ON LINE

VMSSBLD: Completed on yyyymmdd at hh:mm:ss.
Ready;
```

Step 5 — Create Backup Tapes of the Primary Server

Perform the following steps to back up the primary server to tape.

1. Vary on a tape drive, if you need to.

   System: Ready;
      You: **VARY ON** *cuu* **<Enter>**
              (where *cuu* is the real address of the tape drive)
   System: 1 device(s) specified; 1 device(s) successfully varied online.

2. Attach a tape drive as device 181.

   System: Ready;
      You: **ATTACH** *cuu* **∗ 181 <Enter>**
              (where *cuu* is the real address of the tape drive)
   System: TAPE *cuu* ATTACHED TO MAINT 0181

3. Mount a scratch tape on the drive.

4. Back up the ESARES volume. This will take <u>approximately</u> 20 minutes.

   Note: The byte counts may vary from the numbers shown below.

   System: Ready;
      You: **VMSSTAPE ESARES <Enter>**
   System: VMSSTAPE: Creating ESARES backup tape...
              VMSSTAPE: File 1: Dasd Dump Restore (IPL DDR S)
              VMSSTAPE: Dumping ESARES (C00) blocks 0 to 1299999
              VM/ENTERPRISE SYSTEMS ARCHITECTURE DASD DUMP/RESTORE PROGRAM
              ENTER NEXT EXTENT OR NULL LINE

              DUMPING   ESARES
              DUMPING DATA *mm/dd/yy at hh:mm:ss* GMT FROM ESARES
              INPUT BLOCK EXTENTS   OUTPUT BLOCK EXTENTS
                   START   STOP   START   STOP
                 0000000   1299999   0000000   1299999
              END OF DUMP
              ENTER:
              END OF JOB

              VMSSTAPE: Complete on *mm/dd/yy at hh:mm:ss*.
              Ready;

5. Remove the tape from the drive and label it externally as "ESARES BACKUP."

6. Mount another scratch tape on the drive.

7. Back up the ESA001 volume. This will take <u>approximately</u> 20 minutes.

   Note: The byte counts may vary from the numbers shown below.

   ```
   System:    Ready;
      You:    LINK * C01 C01 <Enter>
   System:    Ready;
      You:    VMSSTAPE ESA001 <Enter>
              VMSSTAPE: Creating ESA001 backup tape...
              VMSSTAPE: File 1: Dasd Dump Restore (IPL DDR S)
              VMSSTAPE: Dumping ESA001 (C01) blocks 0 to 1299999
              VM/ENTERPRISE SYSTEMS ARCHITECTURE DASD DUMP/RESTORE PROGRAM
              ENTER NEXT EXTENT OR NULL LINE

              DUMPING    ESA001
              DUMPING DATA  mm/dd/yy at hh:mm:ss GMT FROM ESARES
              INPUT BLOCK EXTENTS          OUTPUT BLOCK EXTENTS
                    START      STOP       START       STOP
                 0000000    1299999    0000000    1299999
              END OF DUMP
              ENTER:
              END OF JOB

              VMSSTAPE: Complete on mm/dd/yy at hh:mm:ss.
              Ready;
   ```

8. Remove the tape from the drive and label it externally as "ESA001 BACKUP."

9. Log off MAINT.

Step 6 — Restart the System

1. Log on to the OPERATOR userid. (VMSS is the default password.)

2. Shut down and re-IPL the system.

   ```
   System:    Ready;
      You:    SHUTDOWN REIPL <Enter>
   System:    SYSTEM SHUTDOWN STARTED.
              SYSTEM TERMINATION COMPLETE, ATTEMPTING RESTART.
   ```

Step 7 — Change System Date and Time

When to Perform This Step

This step is optional; use it if the system date and/or time are not correct.

For detailed instructions on setting the date and time, see the IBM publication, *Operating Your System, Volume I* (SA24-4350).

TASK 7 — VERIFY THE INSTALLATION

Use the procedures outlined in Chapter 6, "Installation Verification" on page 6-1 to verify that the VM Storage Server software is working correctly.

Note: For a **single-server configuration**, you will be done with the installation after performing this task.

For a **dual- or split-server configuration**, proceed to "Task 8 — Convert to a Dual Configuration."

TASK 8 — CONVERT TO A DUAL CONFIGURATION

┌─ **When to Perform This Task** ──────────────────────────────────────┐

Perform this task only if you are installing a dual- or split-server configuration.

└──┘

Note: All the steps in this task are performed on the **primary server**.

1. Log on to the MAINT userid. (VMSS is the default password.)

2. Make sure that CLS and the VM/Host Software Component are shut down.

```
System:     Ready;
   You:     SMSG CLSM STOP ALL <Enter>
System:     (messages about the system quiescing)
            Common Library Services Termination complete
   You:     CP SMSG STKACS STOPSCP <Enter>
System:     (messages about the system quiescing)
            SLKTKW531I ACS system shutdown is complete
```

Note: If shutdown is not successful, see "Shutting Down (9221 and 9370 systems)" on page 7-5 for further instructions.

3. Run VMSSBLD with the DUAL option.

   Notes:

   a. If the DUAL option has been run previously on this server, VMSSBLD will fail with an error message indicating that the DUAL option cannot be run again.

   b. The NOCOPY option of VMSSBLD changes the directory, but it does not copy databases. This is useful for converting a server from a single to a dual configuration without overwriting existing data.

```
System:     Ready;
   You:     VMSSBLD DUAL <Enter>
System:     VMSSBLD: Started on dd mmm yyyy at hh:mm:ss.
            VMSSBLD: Build type = DUAL.

            VMSSBLD: You are about to build a Dual Server environment. The
            VMSSBLD: CDS volumes will be copied to the shared DASD

            VMSSBLD: Type YES to continue,
            VMSSBLD:  NOCOPY to only change the directory,
            VMSSBLD: or anything else to quit.
   You:     YES <Enter>
System:     CP volume D00 now has volid CDSPRM
            CP volume D10 now has volid CDSSHD
            CP volume D01 now has volid PRMNEW
            CP volume D11 now has volid SHDNEW

            VMSSBLD: Moving the primary CDS to CDSPRM...
```

```
 VMSSCOPY: ********
 VMSSCOPY: ******** Copying STKACS's 500 (CDSPRM) to STKACSDL's 500 (CDSPRM)
 VMSSCOPY: ********
VM/ENTERPRISE SYSTEMS ARCHITECTURE DASD DUMP/RESTORE PROGRAM
COPYING    CDSPRM
COPYING DATA  mm/dd/yy AT hh.mm.ss   GMT FROM CDSPRM TO CDSPRM
INPUT BLOCK EXTENTS              OUTPUT BLOCK EXTENTS
   START        STOP                START        STOP
00000000   00024807              00000000   00024807
END OF COPY
END OF JOB


 VMSSBLD: Moving the secondary CDS to CDSSHD...

 VMSSCOPY: ********
 VMSSCOPY: ******** Copying STKACS's 501 (CDSSHD) to STKACSDL's 501 (CDSSHD)
 VMSSCOPY: ********
VM/ENTERPRISE SYSTEMS ARCHITECTURE DASD DUMP/RESTORE PROGRAM
COPYING    CDSSHD
COPYING DATA  mm/dd/yy AT hh.mm.ss   GMT FROM CDSSHD TO CDSSHD
INPUT BLOCK EXTENTS              OUTPUT BLOCK EXTENTS
   START        STOP                START        STOP
00000000   00024807              00000000   00024807
END OF COPY
END OF JOB


 VMSSBLD: Creating backup CDB
DMSACP112S Z(114) device error

 VMSSCOPY: ********
 VMSSCOPY: ******** Copying CLSM's 500 (CDBPRM) to CLSMDL's 506 (SCRTCH)
 VMSSCOPY: ********
VM/ENTERPRISE SYSTEMS ARCHITECTURE DASD DUMP/RESTORE PROGRAM
COPYING    CDBPRM
COPYING DATA  mm/dd/yy AT hh.mm.ss   GMT FROM CDBPRM TO SCRTCH
INPUT BLOCK EXTENTS              OUTPUT BLOCK EXTENTS
   START        STOP                START        STOP
00000000   00001499              00000000   00001499
END OF COPY
END OF JOB
DMSACP112S Z(114) device error

 VMSSCOPY: ********
 VMSSCOPY: ******** Copying CLSM's 500 (CDBPRM) to CLSMDL's 406 (SCRTCH)
 VMSSCOPY: ********
VM/ENTERPRISE SYSTEMS ARCHITECTURE DASD DUMP/RESTORE PROGRAM
COPYING    CDBPRM
COPYING DATA  mm/dd/yy AT hh.mm.ss   GMT FROM CDBPRM TO SCRTCH
INPUT BLOCK EXTENTS              OUTPUT BLOCK EXTENTS
   START        STOP                START        STOP
00000000   00001499              00000000   00001499
END OF COPY
END OF JOB
Volume D00 now has volid CDSPRM
Volume D10 now has volid CDSSHD
CP volume D01 now has volid PRMNEW
CP volume D11 now has volid SHDNEW

 VMSSBLD: Rebuilding the directory for a Dual Server system...

 VMSSDIR: Building alternate system (ESA002) directory...

 VMSSDIR: Updating directory on alternate system (ESA002)...
VM/ESA USER DIRECTORY CREATION PROGRAM - VERSION 2 RELEASE 2.0
EOJ DIRECTORY NOT UPDATED
VM/ESA USER DIRECTORY CREATION PROGRAM - VERSION 2 RELEASE 2.0
EOJ DIRECTORY UPDATED

 VMSSDIR: Updating directory on running system (ESARES)...
VM/ESA USER DIRECTORY CREATION PROGRAM - VERSION 2 RELEASE 2.0
EOJ DIRECTORY NOT UPDATED
```

```
                 VM/ESA USER DIRECTORY CREATION PROGRAM - VERSION 2 RELEASE 2.0
                 EOJ DIRECTORY UPDATED AND ON LINE
                  VMSSBLD: The Dual Server environment has been built on this system.
                  VMSSBLD: Refer to the Turnkey Installation Guide for instructions
                  VMSSBLD: on how to install the Standby Server on the other processor.

                  VMSSBLD: Completed on dd mmm yyyy at hh:mm:ss.
                 COPYING DATA  mm/dd/yy AT hh.mm.ss  GMT FROM CDSPRM TO CDSPRM
                 COPYING DATA  mm/dd/yy AT hh.mm.ss  GMT FROM CDBPRM TO CDBPRM
                 COPYING DATA  mm/dd/yy AT hh.mm.ss  GMT FROM CDBPRM TO CDBPRM

                 Ready;
```

TASK 9 — BUILD THE STANDBY SERVER

┌─ **When to Perform This Task** ──────────────────────────────────────┐
│   │
│ Perform this task only if you are installing a dual-server configuration. │
│   │
└──┘

Note: All the steps in this task are performed on the **standby server**.

Step 1 — Install the VM Storage Server on the Standby Server

On the standby server, perform all the steps in Tasks 1 through 8, **with the following exceptions**:

- When performing "Step 4 — Label the Remaining Volumes" on page 3-17, this time label volumes TMP001 – TMP003 **only**.

- When performing "Step 6 — Format and Allocate the TMPxxx Volumes as ESAxxx" on page 3-22, this time the CLSALLOC utility will format and allocate volumes TMP001 – TMP003 **only**.

- When performing "Task 8 — Convert to a Dual Configuration" on page 3-33, this time use the (NOCOPY option (that is, type: **VMSSBLD DUAL (NOCOPY <Enter>)**).

Step 2 — Configure the Standby Server

Modify the server configuration to designate it as the standby. This step makes the following modifications to the Library Control System software on the standby server:

- Modifies the ACS SYSPROF file by adding the "STBY" HOSTID. This allows the standby server to share the CDS with other hosts.

- Comments out the command in AUTOLOG's PROFILE EXEC file that automatically starts CLS. This disables the autostart function so the standby server does not automatically autolog CLS during startup.

Note: Perform this procedure on the **standby server**.

1. On the standby server, log on to the MAINT userid, if you are not there already. (VMSS is the default password.)

2. Run VMSSBLD with the STANDBY option.

```
        System:      Ready;
          You:      VMSSBLD STANDBY <Enter>
        System:      VMSSBLD: Started on mm/dd/yy at hh:mm:ss.
                     VMSSBLD: Build type = STANDBY.
```

```
                        VMSSBLD: You are about to make changes to this system which will
                        VMSSBLD: enable this processor to serve as the Standby processor.

                        VMSSBLD: Type YES to continue or anything else to quit.
        You:            YES <Enter>
        System:

                         VMSSBLD: The HSC's hostid (in ACS SYSPROF) has been
                         VMSSBLD: changed to STBY.

                         VMSSBLD: 'AUTOLOG CLSM' statement in AUTOLOG1's PROFILE EXEC
                         VMSSBLD: has been commented out. CLSM will no longer come up
                         VMSSBLD: automatically at IPL time on this processor.
                        CPRELEASE request for disk A scheduled.
                        CPRELEASE request for disk B scheduled.
                        CPRELEASE request for disk B completed.
                        CPRELEASE request for disk A completed.
                        2 occurrence(s) changed on 1 line(s)
                        DASD 0CF1 DETACHED
                        2 occurrence(s) changed on 1 line(s)
                        DASD 0CF2 DETACHED
                        CPACCESS request for mode A scheduled.
                        CPACCESS request for mode B scheduled.

                        CPACCESS request for MAINT's 0CF1 in mode A completed.
                        CPACCESS request for MAINT's 0CF2 in mode B completed.
                         VMSSBLD: Completed on dd mmm yyyy at hh:mm:ss.
```

3. Shutdown and re-IPL the system.

    System: Ready;
    You: **SHUTDOWN REIPL <Enter>**

    When the system comes back up, verify that "STBY" is displayed in the lower right
    corner of your screen.

Step 3 — Verify the Installation

Use the procedures outlined in Chapter 6, "Installation Verification" on page 6-1 to
verify that the standby server is working correctly.

Note: For a **dual-server configuration**, you will be done with the installation after
performing this step.

For a **split-server configuration**, perform "Task 6 — Set Up Split-Server
Configuration (optional)" on page 5-13.

Chapter 4. Software Installation—9370 Processor

This chapter describes how to install the VM Storage Server software **on a 9370
processor using either the TCP/IP or the PVM communications protocol**. These
procedures are required regardless of whether you are installing a single- or dual-server
configuration.

Important

If you are installing the VM Storage Server software on a 9221 processor, use the
instructions in Chapter 3, "Software Installation—9221 Processor" on page 3-1.

Chapter Contents

OVERVIEW

The VM Storage Server software consists of several software components which have been packaged together for quick installation. The major components are:

- VM/SP Release 5

- One or both of the following communications software packages:

  — IBM Pass-Through

  — IBM TCP/IP

- The VM/Host Software Component (VM/HSC) with a control data set (CDS)

- The Common Library Services (CLS) with a configuration data base (CDB)

VM STORAGE SERVER DISKS

The standard VM Storage Server includes four disk volumes; the dual-server configuration includes two additional shared volumes. CLS software is configured to use two volumes, leaving two for backup in case of disk failure.

Figure 4-1 shows the addresses and associated volume serial numbers for the two disks.
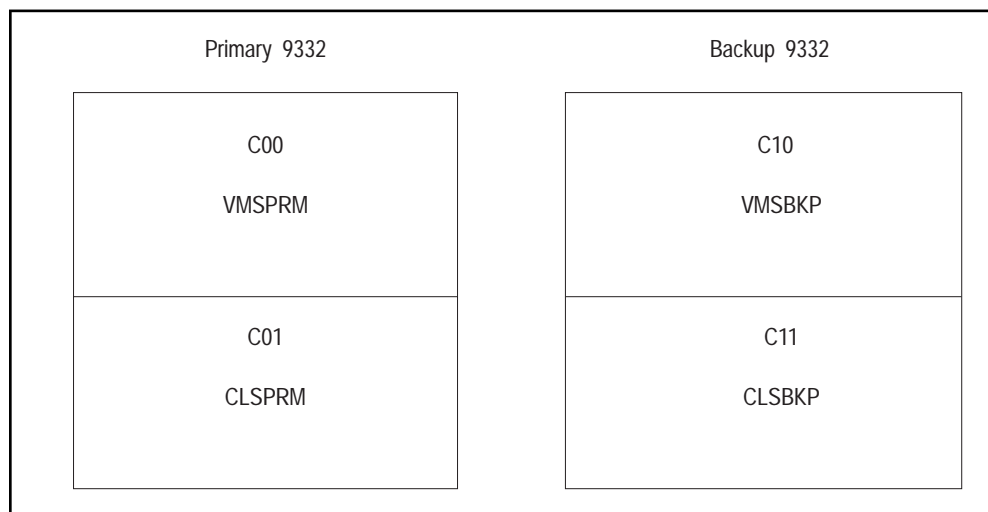
Figure   4-1. VM Storage Server Disk Addresses and VOLSERs

The distribution tapes supplied (see "Distribution Tapes" on page 4-5) contain data to be loaded to the "primary" disks only. The "backup" disk volumes are generated during the installation process by using a supplied program which copies the primary disk in its entirety to the backup disk.

Use of Standard Addresses

We highly recommend the use of standard addresses, as shown in Figure 4-1 on page 4-3. Standard addresses greatly simplify system installation and maintenance. If your hardware is **not** configured with the standard addresses you have the following options:

- You can have IBM change the addresses to the standard configuration shown in Figure 4-1 on page 4-3.

- You can leave the addresses in the non-standard configuration. If so, you will have to modify your VMSSBLD CONFIG file to reflect your configuration. This file may be subject to change in future releases and will require special attention for non-standard configurations.

  You can use the worksheet in Table 4-1 to keep track of your non-standard device addresses.

Table 4-1. Volume Descriptions				
Volser	Description	System	Default Address	Non-Standard Address
VMSPRM	VM system residence volume	Primary	C00	
CLSPRM	CLS and VM/Host Software Component	Primary	C01	
VMSBKP	VM system residence volume	Backup	C10	
CLSBKP	CLS and VM/Host Software Component	Backup	C11	

ABOUT THE INSTALLATION PROCEDURE

This procedure is written specifically for installing Version 2.3.0 of the VM Storage Server **on a 9370 processor using either the TCP/IP or the PVM communications protocol**. The procedure can be used for either new installations or upgrades from prior versions.

Upgrading to This Release

If you are currently running CLS 2.0.1 or above, you can upgrade directly to CLS 2.3.0 using the instructions in this chapter.

If you are currently running CLS 2.0.0 or earlier, contact StorageTek Software Support for assistance in upgrading to CLS 2.3.0.

Before Beginning the Procedure

Before you begin the procedure, you should perform the following activities:

- **<u>Read and become familiar with the entire procedure.</u>**

- If you are planning a dual-server configuration, read Chapter 5, "Dual Server Installation—9370 Processor" on page 5-1 also.

- Contact StorageTek Software Support during planning and just before installing the product. StorageTek maintains information about known problems and associated corrections, has Program Temporary Fixes (PTFs), and maintains information on possible IBM APARs for VM.

  International customers, please contact your distributor or StorageTek subsidiary.

- Contact the StorageTek CSE who installed the hardware to determine the tape transport addresses. You will need one tape transport during this installation.

Assumptions

The installation procedure is written with the following assumptions:

- You will complete all tasks in the order they appear in the procedure, except for optional tasks which may be skipped.

- You have two consoles available, one of which is always logged on to the OPERATOR userid. If you do not have two consoles, then whenever the instructions say to log on to a specific userid, you must first log off the userid you are currently logged on to.

- You will use standard addresses for disks and tapes. If you want to use non-standard addresses you must substitute your volume label or addresses where appropriate. Refer to Table 4-1 on page 4-4, if necessary.

Distribution Tapes

Table 4-2 describes the tapes that are shipped with the VM Storage Server.

Table 4-2. VM Storage Server Distribution Tapes	
Tape	**Contents**
SYSTEM	VM system software required to run the VM Storage Server. The first two files on this tape are used to format disks and to restore the remainder of the tape to disk.
PRODUCT	CLS and VM/HSC software.
COMMUNICATIONS	TCP/IP or PVM communications software.
BACKUP UTILITIES (upgrades only)	Updated versions of the backup utilities; used for upgrading from prior releases.
CUSTOMIZED DATA (optional)	Customized configuration data required by the VM Storage Server.

Related Documentation

The following IBM publications provide detailed instructions on using your processor and operating system. You should be familiar with them and have copies on-hand for reference.

- *Operating Your System*, SA24-4036

- *VM/SP CMS Command Reference*, SC19-6209

- *VM/SP CP Command Reference*, SC19-6211

TASK 1— BACK UP THE VM/HSC CONTROL DATA SET

When to Perform This Task

You **must** perform this task if you are upgrading an existing installation running VM/HSC. This task backs up the VM/HSC control data set (CDS) to disk.

You do **not** need to perform this task if this is a new installation; proceed to "Task 3 — Format and Restore Volumes" on page 4-14.

---

1. Log on to the STKACS userid. (VMSS is the default password.)

2. At the CP READ prompt, type **B <Enter>** to resume execution of the STKACS userid.

3. If VM/HSC is running, shut it down.

```
    You:      STOPSCP <Enter>
    System:   (messages about the system quiescing)
               SLKTKW531I ACS system shutdown is complete
```

4. Restart VM/HSC, disallowing library tape movements.

```
    System:   Ready;
       You:   ACS INIT (NOJOBS <Enter>
    System:   (messages)
```

5. Disconnect your terminal from STKACS.

```
    System:   Waiting for work
       You:   CP DISC <Enter>
```

6. Log on to the MAINTSTK userid. (VMSS is the default password.)

7. Build a control file for the CDS backup utility.

   Note: You can ignore the messages about the 256 and 257 disks not being attached.

```
    System:   Ready;
       You:   ACSACC <Enter>
    System:   DMSACP113S K(256) not attached
               DMSACP113S L(257) not attached
       You:   ACS UTIL BACKUP <Enter>
```

8. You will be in XEDIT in the JCL file. Remove the asterisk (*) from the beginning of the line containing the BACKUP statement. When you are finished, at the XEDIT command line, type **FILE <Enter>** to save the changes and submit the job for processing.

9. The backup will take several minutes. You can periodically check on the status of the job by typing:

    ACS Q A <Enter>

    When the job completes, view the returned output in your Reader to verify that the job completed successfully.

10. Log the STKACS userid off the system.

You:	**CP SMSG STKACS STOPSCP <Enter>**
System:	(messages about the system quiescing)
	SLKTKW531I ACS system shutdown is complete

11. Copy the 506 disk (containing the CDS) to the 406 disk (containing the backup CDS):

System:	Ready;
You:	**VMSSCOPY STKACS 506 STKACS 406 <Enter>**
System:	(messages)
	Ready;

12. Log off MAINTSTK.

TASK 2 — BACK UP THE EXISTING LIBRARY CONTROL SYSTEM

When to Perform This Task

You **must** perform this task if you are upgrading an existing VM Storage Server installation. This task backs up the CLS system and your data to tape.

You do **not** need to perform this task if this is a new installation; proceed to "Task 3 — Format and Restore Volumes" on page 4-14.

Step 1 — Return to a Single-Server Configuration

When to Perform This Step

You **must** use this step if you are in dual-server mode. This step puts both servers in single-server mode before installing new software. It is important that both servers be upgraded to the same level of software.

You do **not** need to use this step if you do not have a dual-server configuration; proceed to "Step 2 — Back Up Primary System Volumes" on page 4-9.

Note: You will perform this step twice: first on the **standby** server, then on the **primary** server.

1. On the **standby** server, log on to the MAINT userid. (VMSS is the default password.)

2. Make sure that CLS and the VM/Host Software Component are shut down.

System:	Ready;

```
     You:        SMSG CLSM STOP ALL <Enter>
     System:     (messages about the system quiescing)
                 Common Library Services Termination complete
     You:        CP SMSG STKACS STOPSCP <Enter>
     System:     (messages about the system quiescing)
                  SLKTKW531I ACS system shutdown is complete
```

Note: If shutdown is not successful, see "Shutting Down (9221 and 9370 systems)"
on page 7-5 for further instructions.

3. Run VMSSBLD with the SINGLE option to return to single-server mode.

   Notes:

   a. This command does the following:

      - Copies the shadow and primary copies of the control data set (CDS) onto
        local DASD (a single-server configuration).

      - For dual-server, also copies the configuration data base (CDB) in the same
        fashion.

   b. On the standby server you may see an error message as VMSSBLD tries to
      uncomment an AUTOLOG statement in AUTOLOG1's profile; you can ignore
      this message.

```
System:     Ready;
   You:     VMSSBLD SINGLE <Enter>
System:      VMSSBLD: Started on mm/dd/yy at hh:mm:ss.
             VMSSBLD: Build type = SINGLE.

             VMSSBLD: You are about to return this system to "Single Server"
             VMSSBLD: mode. The CDS and CDB will be copied from shared DASD
             VMSSBLD: back to the local DASD of this system.

             VMSSBLD: Type YES to continue,
             VMSSBLD:  NOCOPY to only change the directory,
             VMSSBLD: or anything else to quit.
   You:     YES <Enter>
System:      VMSSBLD: Returning the primary CDS to a single server volume...
             VMSSCOPY: ********
             VMSSCOPY: ******** Copying STKACS'S 500 (CDSPRM) to STKACSSL's 500 (CDSSHD)
             VMSSCOPY: ********

             VMSSCOPY: ********
             VMSSCOPY: ******** Copying STKACS'S 400 (CDSSHD) to STKACSSL's 400 (SHDNEW)
             VMSSCOPY: ********

             VMSSCOPY: ********
             VMSSCOPY: ******** Copying STKACS's 501 (CDSSHD) to STKACSSL's 501 (CDSSHD)
             VMSSCOPY: ********

             VMSSCOPY: ********
             VMSSCOPY: ******** Copying STKACS's 401 (CDBPRM) to STKACSSL's 401 (SHDNEW)
             VMSSCOPY: ********
             VMSSBLD: Returning the directory to Single Server mode...

             VMSSDIR: Building alternate system (VMSBKP) directory...

             VMSSDIR: Updating directory on alternate system (VMSBKP)...

             EOJ DIRECTORY NOT UPDATED

             EOJ DIRECTORY UPDATED AND ON LINE
              VMSSDIR: Updating directory on running system (VMSPRM)...

             EOJ DIRECTORY NOT UPDATED

             EOJ DIRECTORY UPDATED AND ON LINE
```

```
        VMSSBLD: The Single Server environment has been rebuilt on this
        VMSSBLD: processor. Server operation will utilize the local
        VMSSBLD: disks of this system only. The shared DASD will not
        VMSSBLD: be used. To return to Dual Server environment, use
        VMSSBLD: use "VMSSBLD" command with the "dual" option.
        VMSSBLD: Completed on dd mmm yyyy at hh:mm:ss.
        Ready;
```

4. Repeat Steps 1 through 3, this time on the **<u>primary</u>** server.

Step 2 — Back Up Primary System Volumes

This step copies the two primary system volumes to tape. It also copies the utilities to restore the volumes as the first two files on the tape.

You will need two scratch tapes to perform this procedure.

Note: This backup will take <u>approximately</u> 10 to 15 minutes to complete. An EXEC has been provided to make the backup simple.

1. Log on to the MAINT userid, if you are not there already. (VMSS is the default password.)

2. If you have not done so already, make sure that CLS and the VM/Host Software Component are shut down.

```
System:     Ready;
   You:     SMSG CLSM STOP ALL <Enter>
System:     (messages about the system quiescing)
            Common Library Services Termination complete
   You:     CP SMSG STKACS STOPSCP <Enter>
System:     (messages about the system quiescing)
             SLKTKW531I ACS system shutdown is complete
```

   Note: If shutdown is not successful, see "Shutting Down (9221 and 9370 systems)" on page 7-5 for further instructions.

3. Vary on a tape drive, if you need to.

```
System:     Ready;
   You:     VARY ON cuu <Enter>
            (where cuu is the real address of the tape drive)
System:     1 device(s) specified; 1 device(s) succesfully varied online.
```

4. Attach a tape drive as device 181.

```
System:     Ready;
   You:     ATTACH cuu * 181 <Enter>
            (where cuu is the real address of the tape drive)
System:     TAPE cuu ATTACHED TO MAINT 0181
```

5. Mount a scratch tape on the drive.

6. Copy the VMSPRM disk to tape (this will take <u>approximately</u> eight minutes).

   Note: The messages shown below may vary due to differences in disk size or operating system version.

```
System:     Ready;
   You:     VMSSTAPE VMSPRM <Enter>
System:     VMSSTAPE: Creating VMSPRM backup tape...
            VMSSTAPE: File 1: Format Allocate (IPL FMT S)
```

```
VMSSTAPE: File 2: Dasd Dump Restore (IPL DDR S)
VMSSTAPE: Dumping VMSPRM (C00) blocks ALL to ...
ENTER:
ENTER:
ENTER:
ENTER:
DUMPING    VMSPRM
DUMPING DATA mm/dd/yy AT hh.mm.ss GMT FROM VMSPRM
INPUT BLOCK EXTENTS          OUTPUT BLOCK EXTENTS
       START      STOP       START      STOP
    0000000   0360035    0000000    0360035
END OF DUMP
ENTER:
END OF JOB
VMSSTAPE: Complete on mm/dd/yy at hh:mm:ss.
(the tape will unload)
```

7. Remove the tape from the drive and apply an external label that identifies the contents, such as "VMSPRM BACKUP."

8. Copy the CLSPRM disk to tape (this will take approximately eight minutes).

   Note: The messages shown below may vary due to differences in disk size or operating system version.

```
System:    Ready;
  You:     VMSSTAPE CLSPRM <Enter>
System:    VMSSTAPE: Creating CLSPRM backup tape...
           VMSSTAPE: File 1: Format Allocate (IPL FMT S)
           VMSSTAPE: File 2: Dasd Dump Restore (IPL DDR S)
           VMSSTAPE: Dumping CLSPRM (C01) blocks ALL to ...
           ENTER:
           ENTER:
           ENTER:
           ENTER:
           DUMPING    CLSPRM
           DUMPING DATA mm/dd/yy AT hh.mm.ss GMT FROM CLSPRM
           INPUT BLOCK EXTENTS          OUTPUT BLOCK EXTENTS
                  START      STOP       START      STOP
               0000000   0360035    0000000    0360035
           END OF DUMP
           ENTER:
           END OF JOB

           VMSSTAPE: Complete on mm/dd/yy at hh:mm:ss.

           Ready;
           (the tape will unload)
```

9. Remove the tape from the drive and apply an external label that identifies the contents, such as "CLSPRM BACKUP."

10. Put the tapes in a safe place. Once you are satisfied the installation was a success and the new software meets your needs, re-use the tapes to back up the system.

Step 3 — Load Backup Program and Back Up Customized Data

This step saves to tape any files uniquely customized for your installation. You will restore the files in "Step 2 — Restore Customized Data" on page 4-22, after the new system is installed.

You will need one or more scratch tapes to perform this procedure.

Important

The backup utility used in this step (STKBKP BACKUP) uses an input file (BACKUP BACKCTL) which lists the files to be backed up.

BACKUP BACKCTL should meet the needs of most installations just as it is shipped. However, if your location has customized files which are not included in BACKUP BACKCTL, you will need to add those filenames to the file or they will not be restored after the new system is installed. See Step 8 on page 4-12.

Notes:

1. Be sure to back up both servers if you have a dual-server configuration.

2. If you get any error messages during this procedure, check the causes, rewind the tape, and restart the job.

1. Vary on a tape drive, if you need to.

   ```
   System:    Ready;
      You:    VARY ON cuu <Enter>
              (where cuu is the real address of the tape drive)
   System:    1 device(s) specified; 1 device(s) succesfully varied online.
   ```

2. Attach a tape drive as device 181.

   ```
   System:    Ready;
      You:    ATTACH cuu * 181 <Enter>
              (where cuu is the real address of the tape drive)
   System:    TAPE cuu ATTACHED TO MAINT 0181
   ```

3. Mount the VM Storage Server BACKUP UTILITIES distribution tape on the drive.

4. Load the backup program.

   ```
   System:    Ready;
      You:    VMFPLC2 LOAD * * (EOT <Enter>
   System:     LOADING.....
               STKBKP    ++HDR++  A1
               STKINST   EXEC     A1
               END-OF-FILE OR END-OF-TAPE
               STKREST   EXEC     A1
               END-OF-FILE OR END-OF-TAPE
               BACKUP    ++RCTL++ A1
               END-OF-FILE OR END-OF-TAPE
               BACKUP    BACKCTL  A1
               END-OF-FILE OR END-OF-TAPE
               STKBKP    EXEC     A1
               STKREST   EXEC     A1
               STKINST   EXEC     A1
               VMSSGRAB  EXEC     A2
   ```

```
                         END-OF-FILE OR END-OF-TAPE
                         END-OF-FILE OR END-OF-TAPE
                       Ready;
```

5. Unload the tape.

    System: Ready;
       You: **VMFPLC2 RUN <Enter>**

6. Remove the tape from the drive.

7. Mount a scratch tape to receive the backups.

8. If you have customized files, use XEDIT to modify the BACKUP BACKCTL file to
    match your installation. See Figure 4-2 for a listing of the file, as it is shipped.

    Notes:

    a. Due to release changes, the VMSSBLD CONFIG file will not be backed up. If
        you are using non-standard device addresses, you will need to modify this file
        later in the installation, as instructed in "Step 1 — Modify VMSSBLD
        CONFIG for Non-Standard Addresses" on page 4-27.

    b. The USERAREA 100 disk will not be backed up. If you are using this disk you
        will need to back it up on your own.

    System: Ready;
       You: **XEDIT BACKUP BACKCTL * <Enter>**

    When you are finished making your changes, at the XEDIT command line, type
    FILE <Enter> to save the changes and exit XEDIT.

```
 * Save the CDB
 TAPEDUMP CLSM 500
 TAPEMARK
 * Save the CDS
 DDRDUMP STKACS 500
 * Save the CDS RECONFIG DISK
 DDRDUMP STKACS 401
 * Save the CDS BACKUP/RESTORE DISK
 DDRDUMP STKACS 406
 * Save CLSM customized files
 TAPEDUMP CLSM 191 PROFILE CLSM
 TAPEMARK
 * Save Host Software Component LIBGEN files
 TAPEDUMP MAINTSTK 191 LIBSLSF ASSEMBLE
 TAPEMARK
 TAPEDUMP MAINTSTK 255 LIBSLSF ASSEMBLE
 TAPEDUMP MAINTSTK 255 ACS     SLKJCL
 TAPEMARK
 TAPEDUMP MAINTSTK 254 ACS     SYSPROF
 TAPEDUMP MAINTSTK 254 LIBSLSF MODULE
 TAPEMARK
```

Figure   4-2 (Part 1 of 2). Listing of BACKUP BACKCTL

```
     * Save TCP/IP files
     TAPEDUMP TCPIP 191 HOSTS *
     TAPEDUMP TCPIP 191 PROFILE TCP*
     TAPEDUMP TCPIP 191 PROFILE EXEC
     TAPEMARK
     TAPEDUMP TCPIP 192 HOSTS *
     TAPEDUMP TCPIP 192 TCPIP DATA
     TAPEMARK
     * Save CLSCOMM files
     TAPEDUMP CLSCOMM 191 PROFILE PVM
     TAPEDUMP CLSCOMM 191 PVM CONFIG
     TAPEMARK
     * Save all of HSCUTIL's files
     TAPEDUMP HSCUTIL 191 * *
     TAPEMARK
     * SAVE ALL OF PERFDATA'S FILES
     TAPEDUMP PERFDATA 191 * PERFDATA
     TAPEMARK
     * BACKUP USERAREA..Uncomment the following 2 linesif needed.
     * TAPEDUMP USERAREA 100
     * TAPEMARK
     * Save VMSSBLD config file
     * TAPEDUMP MAINT 192 VMSSBLD CONFIG
     * TAPEMARK
     * Save AUTOLOG1 customized files
     TAPEDUMP AUTOLOG1 191 AUTOEX* EXEC
     TAPEMARK
     * Save CP's I/O configuration
     * The following CMS statements will be executed by STKREST.
     * They are not executed by STKBKP.  In this case we are preserving
     * THE NEW DMKRIO ASSEMBLE.
     *
     CMS RENAME DMKRIO ASSEMBLE A DMKRIO NEWASM A
     TAPEDUMP MAINT 191 DMKRIO ASSEMBLE
     TAPEMARK
     CMS RENAME DMKRIO ASSEMBLE A DMKRIO OLDASM A
     CMS RENAME DMKRIO NEWASM A DMKRIO ASSEMBLE A
     *
     * Any user "defined" users or special files can be added
     * here as well.
     *
```

Figure 4-2 (Part 2 of 2). Listing of BACKUP BACKCTL

9. Save to tape the customized files specified in BACKUP BACKCTL.

```
System:    Ready;
   You:    STKBKP BACKUP <Enter>
System:    -----------------------
           Processing: BKP230

           DUMPING CLSM 500 * *
           DUMPING STKACS 500
           DUMPING STKACS 401
           DUMPING STKACS 406
           DUMPING CLSM 191 PROFILE CLSM
           DUMPING MAINTSTK 191 LIBSLSF ASSEMBLE
           DUMPING MAINTSTK 255 LIBSLSF ASSEMBLE
           DUMPING MAINTSTK 255 ACS SLKJCL
```

```
                        DUMPING MAINTSTK 254 ACS SYSPROF
                        DUMPING MAINTSTK 254 LIBSLSF MODULE
                        DUMPING TCPIP 191 HOSTS *
                        DUMPING TCPIP 191 PROFILE TCP*
                        DUMPING TCPIP 191 PROFILE EXEC
                        DUMPING TCPIP 192 HOSTS *
                        DUMPING TCPIP 192 TCPIP DATA
                        DUMPING CLSCOMM 191 PROFILE PVM
                        DUMPING CLSCOMM 191 PVM CONFIG
                        DUMPING HSCUTIL 191 * *
                        DUMPING PERFDATA 191 * PERFDATA
                        DUMPING AUTOLOG1 191 AUTOEX* EXEC
                        DUMPING MAINT 191 DMKRIO ASSEMBLE
                        Backup Complete
                        Ready;
```

See Appendix C, "STKBKP and STKREST Utilities" for additional information about how STKBKP works.

10. Remove the tape and apply an external label that identifies the contents, such as "STKBKP BACKUP #1 of *n*."

TASK 3 — FORMAT AND RESTORE VOLUMES

Use this task to format two disk volumes and restore the VM system volume.

> ┌─── **Important** ───
> The following steps assume you are installing a VM/SP system with standard addresses for disks and tapes. If you have non-standard addresses, substitute your volume label or addresses where appropriate. Refer to Table 4-1 on page 4-4, if necessary.

Step 1 — IPL the SYSTEM Tape

1. Log on to either the MAINT or OPERATOR userid. (VMSS is the default password.) (If this is an upgrade, you should be logged on to MAINT already.)

2. Shut down the server.

System:	`Ready;`
You:	**`SHUTDOWN <Enter>`**
System:	`(messages about the system quiescing)`
	`SYSTEM SHUTDOWN COMPLETE`

3. Mount the SYSTEM tape on an available drive.

4. At the processor console, perform a clear IPL of the SYSTEM tape to load the format utility.

   > ┌─── **Important** ───
   > After the IPL is complete and the screen clears, wait for the `W` to appear in the lower right corner of the screen, wait ten more seconds, then press **`<Enter>`**.

Note: If the tape will not IPL, take all other control unit ports offline, leaving your host as the only one attached.

See the IBM manual *Operating Your System* for detailed instructions.

Step 2 — Format the System Volume

Format the system volume, normally address C00, with disk label VMSPRM. This will take approximately five minutes.

```
System:    ENTER FORMAT OR ALLOCATE:
   You:    FORMAT <Enter>
System:    FORMAT FUNCTION SELECTED
           ENTER DEVICE ADDRESS (CUU):
   You:    cuu <Enter>
           (where cuu is the real address of VMSPRM, normally C00)
System:    ENTER DEVICE TYPE:
   You:    FB-512 <Enter>
System:    ENTER START PAGE NUMBER OR "LABEL":
   You:    <Enter>
System:    ENTER END PAGE NUMBER:
   You:    <Enter>
System:    ENTER DEVICE LABEL:
   You:    VMSPRM <Enter>
System:    FORMAT STARTED
           FORMAT DONE
           000 NO. PAGE RECORDS WITH READ-CHECK ERRORS
```

Step 3 — Format the CLSPRM Volume

Format the CLSPRM volume, normally address C01, with disk label CLSPRM. This will take approximately five minutes.

```
System:    ENTER FORMAT OR ALLOCATE:
   You:    FORMAT <Enter>
System:    FORMAT FUNCTION SELECTED
           ENTER DEVICE ADDRESS (CUU):
   You:    cuu <Enter>
           (where cuu is the real address of CLSPRM, normally C01)
System:    ENTER DEVICE TYPE:
   You:    FB-512 <Enter>
System:    ENTER START PAGE NUMBER OR "LABEL":
   You:    <Enter>
System:    ENTER END PAGE NUMBER:
   You:    <Enter>
System:    ENTER DEVICE LABEL:
   You:    CLSPRM <Enter>
System:    FORMAT STARTED
           FORMAT DONE
           000 NO. PAGE RECORDS WITH READ-CHECK ERRORS
```

Step 4 — Allocate the CLSPRM Volume

> ┌─ **Important** ───┐
> This step is required in order to prevent VM from using the volume for system
> spooling and paging. If this step is skipped then data that is restored in later steps
> may be overwritten, or the system may fail. The proper allocation will be done when
> you run CLSALLOC (in "Step 3 — Allocate Volumes" on page 4-22).
> └──┘

Note: In the step below, where **PERM 2** *end-page* is specified, *end-page* is the number
of the last allocatable page on the disk volume. The value of *end-page* depends
on the model of your disk. Table 4-3 lists page counts for commonly used
fixed-block-architecture (FBA) disks.

If your disk is not listed, enter **PERM 2 9999999**. The system will return a
message telling you the highest allocatable page; re-enter the perm statement,
using that number as *end-page*.

Table 4-3. Block and Page Counts for Various FBA Devices		
Device Model	**End Block**	**End Page**
9332-400/402	360036	45003
9332-600/602	554800	69349
9335	804714	100588
9336-10	920115	115013
9336-20	1672881	209109
0671	574560	71819

```
System:    ENTER FORMAT OR ALLOCATE:
   You:    ALLOCATE <Enter>
System:    ALLOCATE FUNCTION SELECTED
           ENTER DEVICE ADDRESS (CUU):
   You:    cuu <Enter>
           (where cuu is the real address of CLSPRM, normally C01)
System:    ENTER DEVICE TYPE:
   You:    FB-512 <Enter>
System:    ENTER DEVICE LABEL:
   You:    CLSPRM <Enter>
System:    ENTER ALLOCATION DATA FOR VOLUME CLSPRM
           TYPE PAGE PAGE
   You:    PERM 2 end-page <Enter> (see note above)
           END <Enter>
System:    ALLOCATION RESULTS
           PERM      2      end-page
           DEVICE C01 VOLUME CLSPRM ALLOCATION ENDED
           ENTER FORMAT OR ALLOCATE:
```

Step 5 — Change the Volume Label on Disk C10

This step is needed to keep VM from attaching the C10 volume to the system.

```
System:    ENTER FORMAT OR ALLOCATE:
  You:     FORMAT <Enter>
System:    FORMAT FUNCTION SELECTED
           ENTER DEVICE ADDRESS (CUU):
  You:     cuu <Enter>
           (where cuu is the real address of VMSTMP, normally C10)
System:    ENTER DEVICE TYPE:
  You:     FB-512 <Enter>
System:    ENTER START PAGE NUMBER OR "LABEL":
  You:     LABEL <Enter>
System:    ENTER DEVICE LABEL:
  You:     VMSTMP <Enter>
System:    LABEL IS NOW VMSTMP
           ENTER FORMAT OR ALLOCATE:
```

Step 6 — Change the Volume Label on Disk C11

This step is needed to keep VM from attaching the C11 volume to the system.

```
System:    ENTER FORMAT OR ALLOCATE:
  You:     FORMAT <Enter>
System:    FORMAT FUNCTION SELECTED
           ENTER DEVICE ADDRESS (CUU):
  You:     cuu <Enter>
           (where cuu is the real address of CLSTMP, normally C11)
System:    ENTER DEVICE TYPE:
  You:     FB-512 <Enter>
System:    ENTER START PAGE NUMBER OR "LABEL":
  You:     LABEL <Enter>
System:    ENTER DEVICE LABEL:
  You:     CLSTMP <Enter>
System:    LABEL IS NOW CLSTMP
           ENTER FORMAT OR ALLOCATE:
```

Step 7 — Change the Labels on the Dual-Server Disks

If you have a dual-server configuration, you will also need to label the remaining disks, as follows:

- D00 — cdsprm

- D01 — prmnew

- D10 — cdsshd

- D11 — shdnew

Repeat "Step 6 — Change the Volume Label on Disk C11" for each of these remaining disks.

Step 8 — IPL the SYSTEM Tape Again

At the processor console, perform another clear IPL of the SYSTEM tape, to load the restore (DDR) utility (the SYSTEM tape should be in place already).

Important

After the IPL is complete and the screen clears, wait for the W to appear in the lower right corner of the screen, wait ten more seconds, then press **<Enter>**.

See the IBM manual *Operating Your System* for detailed instructions.

Step 9 — Restore the Primary System Residence Volume

Important

In this step do not ignore any system error messages; call StorageTek Software Support if you see **any** messages.

```
System:    VM/370 DASD DUMP/RESTORE PROGRAM
           ENTER CARD READER ADDRESS OR CONTROL STATEMENTS.
           ENTER:
  You:     SYSPRINT CONS <Enter>
System:    ENTER:
  You:     INPUT cuu 3480 <Enter>
           (where cuu is the real address of the tape drive)
System:    ENTER:
  You:     OUTPUT cuu FB-512 VMSPRM <Enter>
           (where cuu is the real address of VMSPRM, normally C00)
System:    ENTER:
  You:     RESTORE 000000 007815 <Enter>
System:    ENTER NEXT EXTENT OR NULL LINE
           ENTER:
  You:     031446 031545 <Enter>
System:    ENTER NEXT EXTENT OR NULL LINE
           ENTER:
  You:     056354 064353 <Enter>
System:    ENTER NEXT EXTENT OR NULL LINE
           ENTER:
  You:     068752 076767 <Enter>
System:    ENTER NEXT EXTENT OR NULL LINE
           ENTER:
  You:     141768 157279 <Enter>
System:    ENTER NEXT EXTENT OR NULL LINE
           ENTER:
  You:     245280 331975 <Enter>
System:    ENTER NEXT EXTENT OR NULL LINE
           ENTER:
  You:     Press the <Clear> key, then press <Enter>.
System:    (messages)
           END OF JOB
```

TASK 4 — IPL VM

Use this task to begin system initialization.

1. Perform a clear IPL from the volume you restored in the previous task (normally address C00; refer to Table 4-1 on page 4-4 if necessary).

   Important

   After the IPL is complete and the screen clears, wait for the `W` to appear in the lower right corner of the screen, wait ten more seconds, then press **<Enter>**.

   See the IBM manual *Operating Your System* for detailed instructions.

2. Set the time-of-day, if necessary.

   ```
   System:    VM/SP Release 5, Service Level nnnn;
              created on mm/dd/yy at hh:mm:ss

              It is now hh:mm:ss X...X mm/dd/yy
              Change TOD clock (YES|NO) :
      You:    NO <Enter> (if the displayed time is acceptable)
              (If the displayed time is not acceptable, type YES <Enter>
              and see the appropriate IBM documentation for instructions
              on setting the clock.)
   System:    DMKCPI971I System is uniprocessor generated
              DMKUDR476I System directory loaded from volume VMSPRM
              DMKUDR476I System overrides loaded from volume VMSPRM

              DMKCPJ951I CP volid VMSBKP not mounted

              DMKCPJ951I CP volid CLSBKP not mounted
   ```

   Note: You can ignore the error messages for the devices.

3. Since this is the initial startup, perform a cold start.

   ```
   System:    Start ((WARM|CKPT|FORCE|COLD) (DRAIN))|(SHUTDOWN) :
      You:    COLD <Enter>
   System:    DMKLNM108E OPERATOR F91 not linked; volid VMSBKP not mounted
              AUTO LOGON  ***   OPERATOR USERS = 001  BY  SYSTEM

              DMKCPJ952I 04096K system storage

              DMKCPJ957I STORAGE SIZE = 04096 K,        NUCLEUS SIZE = 00464 K,
                         DYNAMIC PAGING SIZE = 03252 K, TRACE TABLE SIZE  = 0032 K,
                         FREE STORAGE SIZE = 0348 K,    VIRTUAL=REAL SIZE = 00000 K

              FILES:  NO RDR,  NO PRT,  NO PUN
              AUTO LOGON  ***   AUTOLOG1 USERS = 002  BY  SYSTEM
   ```

4. Stop system initialization by forcing AUTOLOG1 from the system.

   Important

   You **must** press **<PF3>** or type **FORCE AUTOLOG1** <u>as soon as</u> you see the `Initialization complete` message, or some userids will be logged on and the installation will not be able to proceed successfully. If this occurs, you will need to manually force the userids off the system before proceeding.

Note: Since the system is not completely installed at this point, you may notice system messages concerning device errors. This is not a cause for concern; it just means that a disk has not yet been formatted for use.

```
System:   DMKCPI/coldInitialization complete
   You:   <PF3>
System:   USER DSC LOGOFF AS AUTOLOG1 USERS = 001  FORCED
          4400 ACS VM STORAGE SERVER
          DMSACP112S M (293) Device error
          DMSACP112S N (292) Device error
          DMSACP723I V (291) R/O
          DMSACP112S H (254) Device error
          System id is: ACS4400  -- VMSS Version is: CLS 2.3.0

          STKACS is not active.
          CLSM is not active.
```

5. At this point you will be logged onto the OPERATOR userid. Enable the alternate console.

```
System:   Ready;
   You:   CP ENABLE ALL <Enter>
System:   COMMAND COMPLETE
```

TASK 5 — RESTORE THE CLS COMPONENTS

Use this task to restore the CLS components.

Step 1 — Restore the PRODUCT and COMMUNICATIONS Tapes

1. Disconnect from the OPERATOR userid.

```
System:   Ready;
   You:   DISC <Enter>
```

2. Log on to the MAINT userid. (VMSS is the default password.)

    Note: You can ignore any device error messages here; they may appear since the system is not yet fully installed.

3. Vary on a tape drive, if you need to.

```
System:   Ready;
   You:   VARY ON cuu <Enter>
          (where cuu is the real address of the tape drive)
System:   1 device(s) specified; 1 device(s) succesfully varied online.
```

4. Attach a tape drive as device 181.

```
System:   Ready;
   You:   ATTACH cuu * 181 <Enter>
          (where cuu is the real address of the tape drive)
System:   TAPE cuu ATTACHED TO MAINT 0181
```

5. Mount the PRODUCT tape on the drive.

6. Start the restoration.

```
System:   Ready;
```

```
You:       RESTTAPE <Enter>
System:    Processing 14 components named:
             HSC     MAINT   HSCUTIL EREP    DISKACNT CLS    PERFORM FTP
             CPWATCH SLUACTV MONITOR CLSOP1  CLSOP2  HSCDB
           Installing all components: all disks will be formatted,
           all modified files overwritten and it is expected that a
           matching system has been installed.
```

7. Install all components.

    Note: This process will take <u>approximately</u> 15 minutes.

    ```
    System:    Ensure that all service machines are shut down and logged off.
               Then press ENTER to continue, anything else to quit
      You:     <Enter>
    ```

    You will see messages as the system restores the tape you have mounted. When finished, the system will display:

    ```
    Tape contained nn files
    Completed dd mmm yyyy at hh:mm:ss
    ```

8. Remove the PRODUCT tape from the drive (it should be rewound and unloaded).

9. Mount either the TCPIP or the PVM tape on the drive, depending on the communications protocol(s) you will be using.

    ```
    System:    Tape restore complete. Mount communications tape and press ENTER
               to install tape or type anything else to complete install.
      You:     <Enter>
    System:    Processing 1 component named:
                 protocol
               Installing all components: all disks will be formatted,
               all modified files overwritten and it is expected that a
               matching system has been installed.
    ```

10. Verify the information and begin restoring the tape.

    Note: Each COMMUNICATIONS tape will take <u>approximately</u> five minutes.

    ```
    System:    Ensure that all service machines are shut down and logged off.
               Then press ENTER to continue, anything else to quit
      You:     <Enter>
    ```

    You will see messages as the system restores the tape you have mounted. When finished, the system will display:

    ```
    Tape contained nn files
    Completed dd mmm yyyy at hh:mm:ss
    ```

11. Remove the tape from the drive (it should be rewound and unloaded).

12. If you want to restore the other communications tape (PVM or TCPIP), repeat steps 9 and 10.

13. When you are finished restoring tapes, terminate the installation.

    ```
    System:    Tape restore complete. Mount communications tape and press ENTER
               to install tape or type anything else to complete install.
      You:     N <Enter>
    System:    Restore ending at hh:mm:ss dd mmm yyyy
    ```

```
                    Process completed successfully
                    Tape unloading
```

Step 2 — Restore Customized Data

┌─ **When to Perform This Step** ──────────────────────────────────────┐
│   │
│ You **must** use this step if this is an upgrade to an existing installation and you saved │
│ files in "Step 3 — Load Backup Program and Back Up Customized Data" on │
│ page 4-11.   │
│   │
│ Do **not** use this step if this is a new installation; proceed to "Step 3 — Allocate │
│ Volumes."   │
│   │
└──┘

This step restores saved files from tape. (See Appendix C, "STKBKP and STKREST
Utilities" for more information on the STKINST utility.)

1. Mount the backup tape you created in "Task 2 — Back Up the Existing Library
    Control System" on page 4-7.

2. Load the backup program.

    System: Ready;
       You: **STKINST <Enter>**
    System: Backup created on *dd mmm yyyy hh:mm:ss*

                  Components selected to restore:
                  label
                  (where *label* is the label assigned to your custom tape)

3. Begin restoring the selected components.

    System: Press -ENTER- to restore selected components.
                  Type "ALL" to select all components.
                  Enter a new list of components
                  -OR- type "Exit" to terminate restore.
       You: **<Enter>**
    System: --------------------
                  Processing component *volid*
                  Restoring *volid cuu*
                  ⋮
                  Restoring *volid cuu*
                  Restore Complete

4. To restore the proper disk linkages, log off MAINT.

Step 3 — Allocate Volumes

The CLSALLOC utility ensures that the volumes are allocated to the system properly.

1. Log on to the MAINT userid. (VMSS is the default password.)

2. Start the CLSALLOC utility.

    System: Ready;
       You: **CLSALLOC <Enter>**
    System: IPLing the CP FORMAT program. When it completes issue an IPL CMS

3. When the system enters the disabled wait state, re-IPL CMS.

    You: **CP I CMS PARM AUTOCR <Enter>**
    System: 4400 ACS VM STORAGE SERVER
              CMSACP723I D (192) R/O
              DMSACP723I M (115) R/O
              DMSACP723I N (116) R/O
              DMSACP723I R (193) R/O
              System id is: ACS4400 -- VMSS Version is: CLS 2.3.0

4. Format and label the VMSPRM and CLSPRM volumes.

    System: Ready;
    You: **CLSALLOC <Enter>**
    System: VM/370 FORMAT/ALLOCATE PROGRAM - VM/SP
              ENTER FORMAT OR ALLOCATE:
              FORMAT
              FORMAT FUNCTION SELECTED
              ENTER DEVICE ADDRESS (CUU):
              cuu (where *cuu* is the real address of
                  VMSPRM, normally C00)
              ENTER DEVICE TYPE:
              FB-512
              ENTER START PAGE NUMBER OR "LABEL":
              LABEL
              ENTER DEVICE LABEL:
              VMSPRM
              LABEL IS NOW VMSPRM
              ENTER FORMAT OR ALLOCATE:
              ALLOCATE
              ALLOCATE FUNCTION SELECTED
              ENTER DEVICE ADDRESS (CUU):
              cuu (where *cuu* is the real address of
                  VMSPRM, normally C00)
              ENTER DEVICE TYPE:
              FB-512
              ENTER DEVICE LABEL:
              VMSPRM
              ENTER ALLOCATION DATA FOR VOLUME VMSPRM
              TYPE PAGE PAGE
              PERM 2 45003
              TEMP 9596 17720
              TEMP 22535 30659
              TDSK 41497 45003
              DRCT 30660 30709
              OVRD 9594 9595
              END
              ALLOCATION RESULTS
              PERM   2   9593
              OVRD   9594   9595
              TEMP   9596   17720
              PERM   17721   22534
              TEMP   22535   30659
              DRCT   30660   30709
              PERM   30710   41496
              TDSK   41497   45003
              DEVICE *cuu* VOLUME VMSPRM ALLOCATION ENDED
              ENTER FORMAT OR ALLOCATE:
              FORMAT

```
                    FORMAT FUNCTION SELECTED
                    ENTER DEVICE ADDRESS (CUU):
                    cuu (where cuu is the real address of
                         CLSPRM, normally C01)
                    ENTER DEVICE TYPE:
                    FB-512
                    ENTER START PAGE NUMBER OR "LABEL":
                    LABEL
                    ENTER DEVICE LABEL:
                    CLSPRM
                    LABEL IS NOW CLSPRM
                    ENTER FORMAT OR ALLOCATE:
                    ALLOCATE
                    ALLOCATE FUNCTION SELECTED
                    ENTER DEVICE ADDRESS (CUU):
                    cuu (where cuu is the real address of
                         CLSPRM, normally C01)
                    ENTER DEVICE TYPE:
                    FB-512
                    ENTER DEVICE LABEL:
                    CLSPRM
                    ENTER ALLOCATION DATA FOR VOLUME CLSPRM
                    TYPE PAGE PAGE
                    PERM 2 45003
                    TEMP 2 8751
                    END
                    ALLOCATION RESULTS
                    TEMP        2      8751
                    PERM      8752    45003
                    DEVICE cuu VOLUME CLSPRM ALLOCATION ENDED
```

5. IPL CMS again.

    System: ENTER FORMAT OR ALLOCATE:

       You: **#CP I CMS PARM AUTOCR <Enter>**
    System: 4400 ACS VM STORAGE SERVER

               DMSACP723I M (115) R/O
               DMSACP723I N (116) R/O
               DMSACP723I R (193) R/O
               System id is: ACS4400 -- VMSS Version is: CLS 2.3.0

               Ready;

    ┌─ **Important** ──┐
    │   │
    │ The next step is critical. If you do not perform it, the system will not come up. │
    │   │
    └──┘

6. Execute the VMSSDIR utility with the DIRECT option to build the changes on the
    alternate disk volume.

    System: Ready;
       You: **VMSSDIR DIRECT <Enter>**
    System: DMSACP113S C(291) not attached

                VMSSDIR: Unable to access VMSBKP,
                VMSSDIR: Directory on VMSBKP will not be updated.

```
                     VMSSDIR: Updating directory on running system (VMSPRM)...
                     EOJ DIRECTORY NOT UPDATED
                     EOJ DIRECTORY UPDATED AND ON LINE
                     Ready;
```

(This attempt will fail, so execute the utility a second time.)

```
        You:    VMSSDIR DIRECT <Enter>
      System:   DMSACP113S C(291) not attached

                     VMSSDIR: Unable to access VMSBKP,
                     VMSSDIR: Directory on VMSBKP will not be updated.

                     VMSSDIR: Updating directory on running system (VMSPRM)...
                     EOJ DIRECTORY NOT UPDATED
                     EOJ DIRECTORY UPDATED AND ON LINE
                     Ready;
```

7. To restore the proper disk linkages, log off MAINT.

Step 4 — Make Directory Changes

> ┌─ **When to Perform This Step** ──────────────────────────────────────
> │
> │ This step is optional; use it if you want to customize any of the CLS or VM/HSC
> │ directory entries, such as adding LPs, changing LP names, or changing dedicate
> │ statements for the STKACS machine.
> │
> └──

1. Log on to the MAINT userid. (VMSS is the default password.)

2. Edit the system directory.

   ```
   System:    Ready;
     You:     VMSSDIR EDIT <Enter>
   ```

3. You will be in XEDIT. Make the directory changes you want. When you are
   finished, at the XEDIT command line, type **FILE <Enter>** to save the changes and
   exit XEDIT.

4. Activate the changes.

   ```
   System:    VMSSDIR: You have changed the source directory for the running system.

              VMSSDIR: Type 'DIRECT' to place it online now.
              VMSSDIR: Type 'SAVE' to quit without putting it online.
              VMSSDIR: Type 'RESTORE' to backout the changes you made.
     You:     DIRECT <Enter>
   System:    Ready;
              DMSACP113S C(291) not attached

               VMSSDIR: Unable to access VMSBKP,
               VMSSDIR: Directory on VMSBKP will not be updated.

               VMSSDIR: Updating directory on running system (VMSPRM)...
              EOJ DIRECTORY NOT UPDATED
              EOJ DIRECTORY UPDATED AND ON LINE
              Ready;
   ```

5. Log off MAINT.

TASK 6 — CHECK TCP/IP CONFIGURATION

Step 1 —Modify TCP/IP Configuration

```
┌─ When to Perform This Step ─────────────────────────────────────────┐
│                                                                      │
│  This step is optional; use it to verify and change your TCP/IP storage allocations if:
│                                                                      │
│  •   You use four or more logical ports, or                          │
│                                                                      │
│  •   You have made other configuration changes.                      │
│                                                                      │
└──────────────────────────────────────────────────────────────────────┘
```

1. Log on to the TCPIP userid. (VMSS is the default password.)

2. When prompted for TCPIP startup, bypass the startup by typing:

   HX <Enter>

3. Edit the PROFILE TCPIP file (on the TCPIP 191 disk).

   System: Ready**;**
     You: **XEDIT PROFILE TCPIP <Enter>**

4. Modify the file to change your pool sizes. When you are finished making your changes, at the XEDIT command line, type **FILE <Enter>** to save the changes and exit XEDIT.

ACBPOOLSIZE	200
CCBPOOLSIZE	# OBEY statements + # INFORM statements + # LPs in configuration + 7
DATABUFFERPOOLSIZE	160 buffers, each 8K
ENVELOPEPOOLSIZE	100
SCBPOOLSIZE	Default (256) or the same size as CCBPOOLSIZE.
TCBPOOLSIZE	Default (256) or the same size as CCBPOOLSIZE.

   Notes:

   a. For detailed information see the IBM manual *TCP/IP Version 2 Release 2 for VM: Planning and Customization*(SC31-6082).

   b. To check performance at any time, issue the NETSTAT POOLS command. If the low water mark for any of these approaches 0, adjust them as necessary.

   c. The TCP/IP service machine's virtual memory may also need to be increased.

Step 2 — Update TCP/IP Conventions (1.3.0 and 1.3.1 Users Only)

```
┌─ When to Perform This Step ──────────────────────────────────┐
│                                                               │
│  You must use this step if you are currently using:           │
│                                                               │
│  •   CLS 1.3.0 with TCP/IP (any level)                        │
│  •   CLS 1.3.1 with TCP/IP 2.1 or earlier                     │
│                                                               │
│  Do not use this step if you are currently using:             │
│                                                               │
│  •   CLS 1.3.1 with TCP/IP 2.2                                 │
│  •   CLS 2.0.0 or later                                       │
│                                                               │
└───────────────────────────────────────────────────────────────┘
```

This step modifies the PROFILE TCPIP file (on the TCPIP 191 disk) to use the conventions for TCP/IP Version 2.2.

1. Log on to the TCPIP userid, if you are not there already. (VMSS is the default password.)

2. Perform the conversion.

    System: Ready**;**
      You: **TCPCVT12 <Enter>**

    Comments in the file that were preceded by "*" are now preceded with ";" when TCPCVT12 has been run. Also, the INFORM, AUTOLOG, and OBEY commands are changed to include specific userids between the INFORM and ENDINFORM, AUTOLOG and ENDAUTOLOG, and OBEY and ENDOBEY statements, respectively.

    Note: TCPCVT12 creates a backup copy of the original profile. The backup copy is named TCPCVT12 SAVEPROF. This file may be erased when you are satisfied with the new profile.

3. Log off TCPIP.

TASK 7 — CREATE BACKUP VOLUMES

Use this task to create backup volumes of VMSPRM and CLSPRM.

Step 1 — Modify VMSSBLD CONFIG for Non-Standard Addresses

```
┌─ When to Perform This Step ──────────────────────────────────┐
│                                                               │
│  You must use this step if your installation uses non-standard DASD addresses. This │
│  step modifies the VMSSBLD CONFIG file to reflect your DASD addresses.  │
│                                                               │
│  Do not use this step if your installation uses standard addresses.  │
│                                                               │
└───────────────────────────────────────────────────────────────┘
```

Note: The VMSSBLD CONFIG file is located on your 192 disk which is currently in read-only mode. In this step you will re-access the disk in read/write mode before making the necessary modifications to the file. When you are done, you will return the disk to read-only mode.

1. Refer to your worksheet from Table 4-1 on page 4-4 and compare it to Table 4-4 on page 4-28, which shows the contents of a VMSSBLD CONFIG file.

   The file contains a list of VM Storage Server volume serial numbers and their corresponding real addresses. Associated with each real address and volser is a logical name. The logical name is used by VMSSBLD.

2. Log on to the MAINT userid. (VMSS is the default password.)

3. Release and detach the 192 disk.

   ```
   System:     Ready;
      You:     REL 192 (DET <Enter>
   System:     DASD 192 DETACHED
   ```

4. Re-link to the 192 disk in read/write mode.

   ```
   System:     Ready;
      You:     LINK * 192 192 MR <Enter>
   System:     DASD 192 LINKED R/W; R/O BY OPERATOR
   ```

5. Access the 192 disk as "D."

   ```
   System:     Ready;
      You:     ACC 192 D <Enter>
   ```

6. Use XEDIT to edit the VMSSBLD CONFIG file.

   ```
   System:     Ready;
      You:     XEDIT VMSSBLD CONFIG D <Enter>
   ```

7. Look for lines in the file that have the same information as Table 4-4, and modify them appropriately. You can modify the real addresses to match your site's hardware configuration. However, the logical name **must not** be changed.

Table 4-4. VMSSBLD CONFIG File Contents		
Real Address	**Volser**	**Logical Name**
C00	VMSPRM	vmsprm
C01	CLSPRM	clsprm
C10	VMSBKP	vmsbkp
C11	CLSBKP	clsbkp
Note: The following addresses apply to dual-server environments only and are from the view of the standby server.		
D00	CDSPRM	cdsprm
D01	PRMNEW	prmnew
D10	CDSSHD	cdsshd
D11	SHDNEW	shdnew

   When you are finished, at the XEDIT command line, type **FILE <Enter>** to save the changes and exit XEDIT.

8. Release and detach the 192 disk.

   ```
   System:     Ready;
   ```

```
    You:    REL 192 (DET <Enter>
 System:    DASD 192 DETACHED
```

9. Re-link to the 192 disk in read-only mode.

```
 System:    Ready;
    You:    LINK * 192 192 RR <Enter>
 System:    DASD 192 LINKED R/O; R/O BY OPERATOR
```

10. Access the 192 disk as "D."

```
 System:    Ready;
    You:    ACC 192 D <Enter>
 System:    Ready;
```

Step 2 — Reassemble Files and Regenerate Nucleus

┌─ **When to Perform This Step** ─────────────────────────────────┐
│   │
│ You **must** use this step **if and only if** you updated DMKRIO and/or DMKSYS when │
│ you installed the system. This step reassembles the files you have changed and │
│ regenerates the system nucleus.   │
│   │
│ Do **not** use this step if you have not made these changes.   │
│   │
└───┘

1. Perform this step once for each file you have changed.

```
 System:    Ready
    You:    VMSSASM filename PRM <Enter>
```

Where *filename* is the name of the file you changed (DMKRIO or DMKSYS).

Note: At this time the "BACKUP" volumes have not been built (see step 3).
VMSSASM will attempt to put the output on the backup volumes and the
COPYFILE will fail. This is not a problem, and you can ignore any
messages.

2. Perform this step once for each file you have changed.

```
 System:    Ready;
    You:    VMSSASM filename BKP <Enter>
```

Where *filename* is the name of the file you changed (DMKRIO or DMKSYS).

Note: At this time the "BACKUP" volumes have not been built (see step 3).
VMSSASM will attempt to put the output on the backup volumes and the
COPYFILE will fail. This is not a problem, and you can ignore any
messages.

3. Create the CP nucleus for the primary VM system residence volume.

```
 System:    Ready;
    You:    VMSSGEN VMSPRM <Enter>
 System:     VMSSGEN: ********
             VMSSGEN: ******** Creating CP nucleus for VMSPRM...
             VMSSGEN: ********

             DMSCPY721I Copy DMKSYS TXTPRM A1 to DMKSYS TEXT A1 (old file)
             DMSCPY721I Copy DMKSNT TXTPRM A1 to DMKSNT TEXT A1 (old file)
             DMSACP723I F (295) R/O
```

```
                          DMSACP723I G (294) R/O
                          DMSACP723I H (194) R/O
                          DMSACP723I J (193) R/O
                          SYSTEM LOAD DECK COMPLETE
                          PUN FILE nnnn  TO  MAINT    COPY 001    NOHOLD
                          NUCLEUS LOADED ON VMSPRM --- STARTING CYL/BLK=000016,
                                                       LAST CYL/BLK USED=nnnnnn
                          DMKDSP450W CP entered; disabled wait PSW '00020000 00000012'
```

Note: The DMKDSP450W message may not appear, depending on how you have
set error message handling (with the "CP SET EMSG" command). In this
case, verify that the PSW contains wait state 12 by typing:

CP D PSW <Enter>

The response should be:

```
PSW = 00020000 00000012
```

If the response contains wait state 12, proceed to Step 4. If the response
contains any other wait state, **do not** proceed; call StorageTek Software
Support for assistance.

4. IPL CMS.

```
System:   Ready;
   You:   CP I CMS PARM AUTOCR <Enter>
System:   4400 ACS VM STORAGE SERVER

          DMSACP723I D (192) R/O
          DMSACP723I M (113) R/O
          DMSACP723I N (114) R/O
          DMSACP723I R (193) R/O
          System id is: ACS4400  -- VMSS Version is: CLS 2.3.0

          Ready;
```

Step 3 — Configure the System

┌─ **When to Perform This Step** ─────────────────────────────────────┐

Perform this step only if this is a new installation and you have **not** been provided
with a CUSTOMIZED DATA tape.

If this is an upgrade to an existing installation, or if you have a CUSTOMIZED
DATA tape, proceed to "Step 4 — Create the Backup Volumes" on page 4-31.

└───┘

1. Log on to the MAINTSTK userid. (VMSS is the default password.)

2. Update the LIBSLSF ASSEMBLE file to the appropriate configuration. See the
   VM/HSC Installation Guide for detailed instructions.

3. Update the LIBGEN to match your system configuration. See the *VM/HSC
   Installation Guide* for detailed instructions.

4. AUTOLOG the CLSM userid.

   System: Ready;

```
     You:    AUTOLOG CLSM password <Enter> (VMSS is the default password.)
     System:  Ready;
```

5. Run the CLS Configuration Management (CLSCM) program to update the CLS data
    base (CDB). See "Using Configuration Management (CLSCM)" in the *CLS User's
    Guide* for detailed instructions.

6. Log off MAINTSTK.

Step 4 — Create the Backup Volumes

Use this step to create the backup disk (default addresses C10 and C11). This step will
take <u>approximately</u> 30 minutes.

1. Log on to the MAINT userid, if you are not there already. (VMSS is the default
    password.)

2. Start the VMSSBLD utility to build the backup volumes.

```
System:    Ready;
  You:     VMSSBLD BKP <Enter>
System:      VMSSBLD: Started on mm/dd/yy at hh:mm:ss.
             VMSSBLD: Build type = BKP.

             VMSSBLD:  *** Caution, C10 will be overlaid with the contents
             VMSSBLD:  *** of C00 (VMSPRM), and C11 will be overlaid
             VMSSBLD:  *** with the contents of C01 (CLSPRM).
             VMSSBLD:  *** Type "YES" to continue or hit enter to quit now.
  You:     YES <Enter>
             YES
System:      VMSSCOPY: ********
             VMSSCOPY: ******** Copying MAINT's C00 (VMSPRM) to MAINT's C10 (VMSTMP)
             VMSSCOPY: ********
             ENTER:
             ENTER:
             ENTER:
             ENTER:
             COPYING    VMSPRM
             COPYING DATA  mm/dd/yy AT hh.mm.ss  GMT FROM VMSPRM TO VMSTMP
              INPUT BLOCK EXTENTS        OUTPUT BLOCK EXTENTS
                    START      STOP      START      STOP
                 0000000    0360035    0000000    0360035
             END OF COPY
             ENTER:
             END OF JOB

             VMSSCOPY: ********
             VMSSCOPY: ******** Copying MAINT's C01 (CLSPRM) to MAINT's C11 (CLSTMP)
             VMSSCOPY: ********
             ENTER:
             ENTER:
             ENTER:
             ENTER:
             COPYING    CLSPRM
             COPYING DATA  mm/dd/yy AT hh.mm.ss  GMT FROM CLSPRM TO CLSTMP
              INPUT BLOCK EXTENTS        OUTPUT BLOCK EXTENTS
                    START      STOP      START      STOP
                 0000000    0360035    0000000    0360035
             END OF COPY
             ENTER:
             END OF JOB


             VMSSBLD: ********
             VMSSBLD: ******** Putting label CLSBKP on device C11.
             VMSSBLD: ********

             VMSSDIR: Building alternate system (VMSBKP) directory...
```

```
 VMSSDIR: Updating directory on alternate system (VMSBKP)...
EOJ DIRECTORY NOT UPDATED
EOJ DIRECTORY UPDATED AND ON LINE

 VMSSDIR: Updating directory on running system (VMSPRM)...
EOJ DIRECTORY NOT UPDATED
EOJ DIRECTORY UPDATED AND ON LINE

 VMSSGEN: ********
 VMSSGEN: ******** Creating CP nucleus for VMSBKP...
 VMSSGEN: ********

DMSCPY721I Copy DMKSYS TXTBKP A1 to DMKSYS TEXT A1 (old file)
DMSCPY721I Copy DMKSNT TXTBKP A1 to DMKSNT TEXT A1 (old file)
DMSACP723I B (194) R/O
DMSACP723I E (193) R/O
SYSTEM LOAD DECK COMPLETE
PUN FILE 0034  TO  MAINT     COPY 001    NOHOLD
NUCLEUS LOADED ON VMSBKP --- STARTING CYL/BLK=000016, LAST CYL/BLK USED=002471
DMKDSP450W CP entered; disabled wait PSW '00020000 00000012'
```

Note: The DMKDSP450W message may not appear, depending on how you have set error message handling (with the "CP SET EMSG" command). In this case, verify that the PSW contains wait state 12 by typing:

CP D PSW <Enter>

The response should be:

```
PSW = 00020000 00000012
```

If the response contains wait state 12, proceed to Step 3. If the response contains any other wait state, **<u>do not</u>** proceed; call StorageTek Software Support for assistance.

3. Re-IPL CMS.

```
System:    Ready;
   You:    CP I CMS PARM AUTOCR <Enter>
System:    4400 ACS VM STORAGE SERVER

           DMSACP723I D (192) R/O
           DMSACP723I M (113) R/O
           DMSACP723I N (114) R/O
           DMSACP723I R (193) R/O
           System id is: ACS4400  -- VMSS Version is: CLS 2.3.0

           Ready;
```

Step 5 — Create Backup Tapes of the Server

Perform the following steps to back up the server to tape.

1. Vary on a tape drive, if you need to.

```
System:    Ready;
   You:    VARY ON cuu <Enter>
           (where cuu is the real address of the tape drive)
System:    1 device(s) specified; 1 device(s) successfully varied online.
```

2. Attach a tape drive as device 181.

```
System:   Ready;
   You:   ATTACH cuu * 181 <Enter>
          (where cuu is the real address of the tape drive)
System:   TAPE cuu ATTACHED TO MAINT 0181
```

3. Mount a scratch tape on the drive.

4. Back up the VMSPRM volume. This will take <u>approximately</u> 20 minutes.

    Note: The byte counts may vary from the numbers shown below.

```
System:   Ready;
   You:   VMSSTAPE VMSPRM <Enter>
System:   VMSSTAPE: Creating VMSPRM backup tape...
          VMSSTAPE: File 1: Format Allocate (IPL FMT S)
          VMSSTAPE: File 2: Dasd Dump Restore (IPL DDR S)
          VMSSTAPE: Dumping VMSPRM (C00) blocks ALL to ...
          ENTER:
          ENTER:
          ENTER:
          ENTER:

          DUMPING    VMSPRM
          DUMPING DATA  mm/dd/yy at hh:mm:ss GMT FROM VMSPRM
          INPUT BLOCK EXTENTS          OUTPUT BLOCK EXTENTS
                  START      STOP      START      STOP
              0000000    0360035    0000000    0360035
          END OF DUMP
          ENTER:
          END OF JOB

          VMSSTAPE: Complete on mm/dd/yy at hh:mm:ss.
          Ready;
```

5. Remove the tape from the drive and label it externally as "VMSPRM BACKUP."

6. Mount another scratch tape on the drive.

7. Back up the CLSPRM volume. This will take <u>approximately</u> 20 minutes.

    Note: The byte counts may vary from the numbers shown below.

```
System:   Ready;
   You:   VMSSTAPE CLSPRM <Enter>
          VMSSTAPE: Creating CLSPRM backup tape...
          VMSSTAPE: File 1: Format Allocate (IPL FMT S)
          VMSSTAPE: File 2: Dasd Dump Restore (IPL DDR S)
          VMSSTAPE: Dumping VMSPRM (C00) blocks ALL to ...
          ENTER:
          ENTER:
          ENTER:
          ENTER:

          DUMPING    CLSPRM
          DUMPING DATA  mm/dd/yy at hh:mm:ss GMT FROM CLSPRM
          INPUT BLOCK EXTENTS          OUTPUT BLOCK EXTENTS
                  START      STOP      START      STOP
              0000000    1299999    0000000    1299999
          END OF DUMP
```

```
                         ENTER:
                         END OF JOB

                         VMSSTAPE: Complete on mm/dd/yy at hh:mm:ss.
                         Ready;
```

8.   Remove the tape from the drive and label it externally as "CLSPRM BACKUP."

9.   Log off MAINT.

Task 8 — Restart the System

Use this step to re-IPL VM and CLS.

1. Log on to the OPERATOR userid. (VMSS is the default password.)

2. Shut down and re-IPL the system.

   System: `Ready;`
      You: **`SHUTDOWN REIPL <Enter>`**
   System: `(messages)`

   > **Important**
   >
   > When the message `TO TERMINATE AUTOMATIC SYSTEM STARTUP, HIT PF3 NOW` appears, **do not** press **`<F3>`**. This would cause AUTOLOG1 to be forced from the system, thus preventing other machines from being started.

   Notes:

   a. When the automatic system startup begins, look at the Operator console. You will see, for both CLSM and STKACS, message VMSS007. This message tells you that a primary data base was found on the shadow (501) disk. This situation is normal and you should disregard the associated message(s).

   b. You may also see the message CLS3021. This is not an error; operation will continue normally.

3. Wait for system initialization to complete, then disconnect the OPERATOR userid.

   System: `Ready;`
      You: **`DISC OPERATOR`**

TASK 8 — CONVERT THE VM/HSC CONTROL DATA SET

> **When to Perform This Task**
>
> You **must** perform this task if you are upgrading an existing installation running VM/HSC 1.2. This task converts the VM/HSC control data set (CDS) from 1.2 to 2.0.1.
>
> Do **not** perform this task if:
>
> - You are running VM/HSC 2.00 or later; the CDS is already in the correct format; **or**
>
> - This is a new installation; proceed to "Task 9 — Verify the Installation" on page 4-38; **or**
>
> - This is the second part of a dual-server installation; the CDS has already been converted to the correct format.

Step 1 — Convert the CDS

1. Log on to the MAINTSTK userid. (VMSS is the default password.)

2. Build a control file for the CDS restore utility.

   Note: You can ignore the messages about the 256 and 257 disks not being attached.

   ```
   System:      Ready;
      You:      ACSACC <Enter>
   System:      DMSACP113S K(256) not attached
                DMSACP113S L(257) not attached
      You:      ACS UTIL RESTORE <Enter>
   ```

3. You will be in XEDIT in the JCL file. Remove the asterisk (*) from the beginning of the line containing the RESTORE statement. Also, add the word CONVERT to the end of the line, so it reads as follows:

   ```
   RESTORE APPLY(YES) GEN(NO) CONVERT
   ```

   When you are finished, at the XEDIT command line, type **FILE <Enter>** to save the changes and submit the job for processing.

4. When the job completes, view the returned output in your Reader to verify that the job completed successfully.

5. Log the STKACS userid off the system.

   ```
      You:      CP SMSG STKACS STOPSCP <Enter>
   System:      (messages about the system quiescing)
                 SLKTKW531I ACS system shutdown is complete
   ```

6. Log off MAINTSTK.

7. Log on to the MAINT userid. (VMSS is the default password.)

8. Start up the VM/Host Software Component.

   ```
   System:      Ready;
      You:      VMSSSTRT STKACS VMSS <Enter>
   System:      (messages)
   ```

9. Log off MAINT.

The VM/HSC CDS is now in 2.0.1 format. You can back up this data after completing the installation.

Step 2 — Update the ACS SLKJCL File

Use this step to update your ACS SLKJCL file (on the MAINTSTK 255 disk).

1. Log on to the MAINTSTK userid. (VMSS is the default password.)

2. Execute the VMSSJCL utility. This utility updates the JCL and saves a copy of the old JCL in file ACS SAVEJCL on the 255 disk.

   ```
   System:      Ready;
      You:      VMSSJCL <Enter>
   System:      (messages)
   ```

3. When the utility completes, log off MAINTSTK.

Step 3 — Update Custom VOLRPT SLKJCL Files

```
┌─ When to Perform This Step ─────────────────────────────────────┐
│                                                                 │
│  You **must** use this step if you have custom VOLRPT SLKJCL     │
│  files.  This step updates the files to current format.         │
│                                                                 │
│  Do **not** use this step if you do not have custom VOLRPT       │
│  SLKJCL files.                                                   │
│                                                                 │
└─────────────────────────────────────────────────────────────────┘
```

In this step you will determine the virtual address and data set name of the VM/HSC primary CDS (control data set) and use this information to modify your custom VOLRPT SLKJCL files.

1. Log on to the HSCUTIL userid. (VMSS is the default password.)

2. Delete the existing ACSUTIL SLKJCL file.

3. Build a control file for the VOLRPT utility.

    System: Ready**;**
    You: **ACSUTIL VOLRPT (ACS NOSEND <Enter>**

4. View the file. In the third line of the file (starting with `/FILE SLSCNTL`) note the values assigned after the `DEV` and `DSN` keywords. Write down these values. Exit the file.

5. Edit the custom VOLRPT SLKJCLnn file(s).

    System: Ready**;**
    You: **XEDIT VOLRPT SLKJCL**_nn_ **<Enter>**

    Where *nn* is the number of a custom JCL file (a number between 01 and 99).

6. Add the following line to the file, making it the **third** line:

    `/FILE SLSCNTL DEV` *nnn* `DSN` *dataset_name*

    Where:

    > *nnn* is the virtual address of the VM/HSC primary CDS.

    > *dataset_name* is the data set name of the VM/HSC primary CDS.

    (These parameters were determined in Step 4.) Figure 4-3 is an example of an updated VOLRPT SLKJCLnn file.

```
 /JOB  SLSXUTIL SLUADMIN
 /PARM MIXED
 /FILE SLSCNTL  DEV 500 DSN SLS.DBASEPRM
 /FILE SLSPRINT DEV PRNT CLASS A
 /FILE SLSIN    *
  VOLRPT
```

Figure 4-3. Sample Updated VOLRPT SLKJCLnn File

When you are finished, at the XEDIT command line, type **FILE <Enter>** to save the changes and exit XEDIT.

7.   Repeat Steps 5 through 6 for all other custom VOLRPT SLKJCL files.

8.   Log off HSCUTIL.

TASK 9 — VERIFY THE INSTALLATION

Follow the procedure outlined in Chapter 6, "Installation Verification" to verify that the library control software is working correctly.

TASK 10 — SET UP THE DUAL-SERVER CONFIGURATION

If you want to implement a dual-server configuration, follow the procedure in Chapter 5, "Dual Server Installation—9370 Processor."

Chapter 5. Dual Server Installation—9370 Processor

This chapter describes how to install the VM Storage Server dual-server option for the **9370 platform only**. For instructions on installing the dual-server option for the 9221 platform, see Chapter 3, "Software Installation—9221 Processor" on page 3-1.

Note: The installation tasks in Chapter 4, "Software Installation—9370 Processor" on page 4-1 must be completed prior to performing the tasks in this chapter.

Chapter Contents

DUAL SERVER OVERVIEW

The dual-server configuration provides both data and processor redundancy. The configuration consists of two ES/9000 or ES/9370 library control processors: a primary (or active) Library Control System and a standby. If the active processor fails or is unable to access the database, the standby can be activated to continue processing. Each processor has an additional 9332-402 disk that both processors can access. The shadow databases for both CLSM and STKACS are located on the additional disk in the standby processor.

Both library control processors run standard VM Storage Server software. They both run the VM/Host Software Component, but only the active processor actually processes requests. The active server also executes CLS and the appropriate logical ports.

The role of active or standby Library Control System can be played by either library control processor. Switching between the two is done by operator commands:

- The standby Library Control System is activated by the VMSSRUN command.

- The active CLS may have to be stopped if only the VM/Host Software Component has failed.

- The active logical ports on the downed server may have to be stopped.

- The client systems may have to be quiesced and restarted.

- The client systems may also have to be redirected to new TCP/IP addresses.

9332 DASD LAYOUT AND CONTENTS

Figure 5-1 and Figure 5-2 on page 5-4 show a comparison of the single-server and dual-server configurations on the 9370 platform.

- In the single-server configuration, the regular and shadow databases are both housed in the same library control processor.

- The dual-server configuration has the double redundancy not only of the shadow databases reflecting the active databases (the same as in the single server), but also the added safety of separate backup databases housed in a separate processor.

Note: Figure 5-1 and Figure 5-2 show the DASD addresses C00, C01, C10, C11, D00, D01, D10, and D11 which are standard on the 9370 platform. If you have non-standard DASD addresses at your installation, record your actual addresses in Figure 5-2 on page 5-4 and use that figure as a reference while installing the dual server.

Figure 5-1 on page 5-3 shows the single-server configuration, consisting of a single 9370 library control processor containing two 9332 DASD drives. One drive contains VMSPRM and CLSPRM, while the other drive contains the shadow backup copies, VMSBKP and CLSBKP.
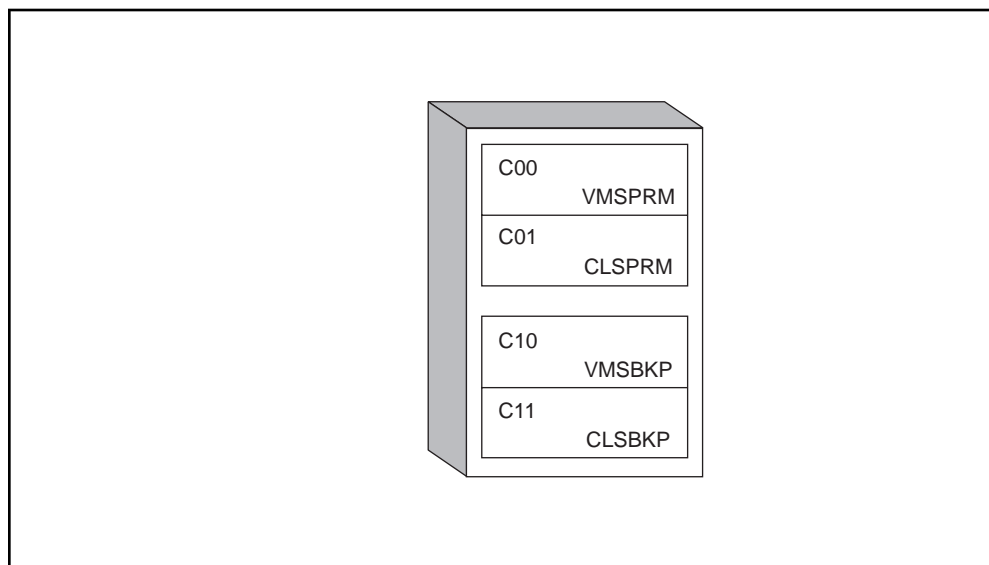
Figure   5-1. Single-Server Configuration

Figure 5-2 shows the dual-server configuration, consisting of **two** 9370 library control processors with **three** 9332 DASD drives each.

Notes:

 1. The dual server uses the same volume names as the single server.

 2. The third drive in each Library Control System contains two new volumes that are unique for each processor.

 3. Both processors can access the two new volumes.
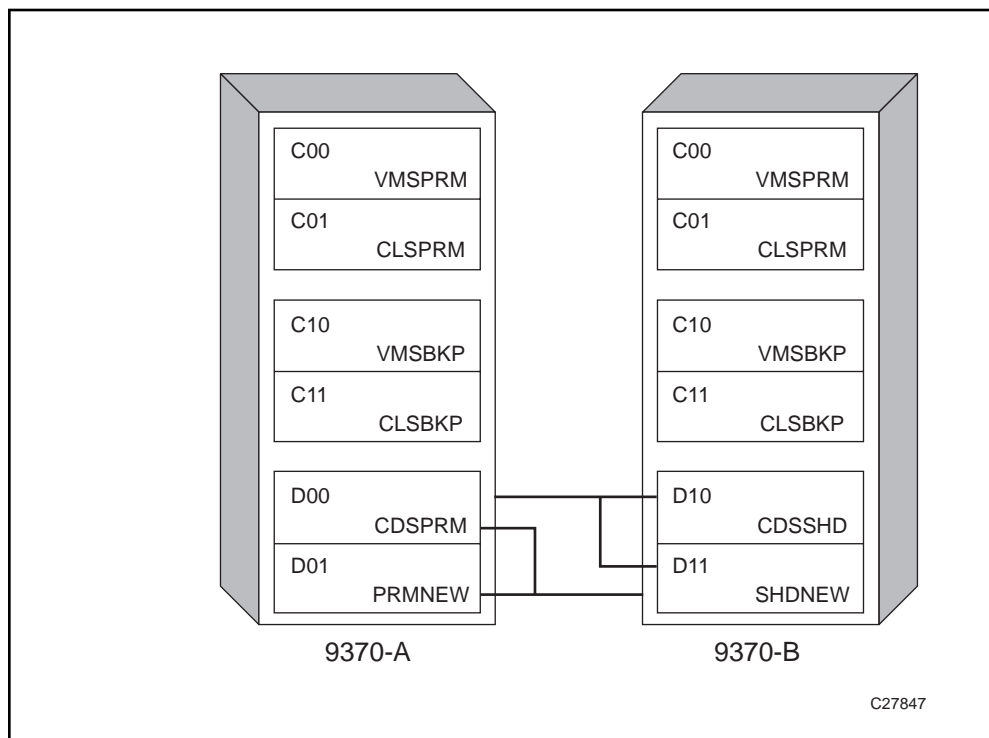
Figure 5-2. Dual-Server Configuration

DASD Contents

The layout of the data on the volumes of the dual server is similar to that on the single server. The difference is that the CDS and CDB databases and CLSM 191 are moved to new volumes, as shown in Table 5-1. Other ancillary databases belonging to CLSM, such as LPPRIM, and SCHDPRIM, reside on the same disk as the CDB.

Table 5-1 (Page 1 of 2). Database Locations			
Database Type	**Minidisk Name**	**Single Server Location**	**Dual Server Location**
Primary CDB	CLSM 500	CLSPRM	CLSPRM
Primary CDS	STKACS 500	CLSPRM	CDSPRM
Shadow CDB	CLSM 501	CLSBKP	CLSBKP
Shadow CDS	STKACS 501	CLSBKP	CDSSHD
Primary VLR	CLSM 500	CLSPRM	CLSPRM
Shadow VLR	CLSM 501	CLSBKP	CLSBKP
Backup CLSM 191	CLSM F91	VMSBKP	VMSBKP
Alternate Primary CDB	CLSM 400	VMSBKP	VMSBKP
Alternate Primary CDS	STKACS 400	VMSBKP	PRMNEW

Table 5-1 (Page 2 of 2). Database Locations			
Database Type	**Minidisk Name**	**Single Server Location**	**Dual Server Location**
Alternate Shadow CDB	CLSM 401	VMSPRM	VMSPRM
Alternate Shadow CDS	STKACS 401	VMSPRM	SHDNEW
Backup CDB	CLSM 506	N/A	PRMNEW
Alternate Backup CDB	CLSM 406	N/A	SHDNEW

BEFORE YOU BEGIN — CONDITIONS AND CAUTIONS

> **Important**
>
> Included with the VM Storage Server is the VMSS2HST utility. This utility converts your CDS from a single-server configuration to a dual-server configuration. You will use this utility in "Task 2 — Reconfigure the VM/HSC CDS for Dual Hosts (New Dual Server Users Only)" on page 5-6.
>
> In order for the VMSS2HST utility to function correctly, the LIBGEN file (on the MAINTSTK userid) must be named **LIBSLSF ASSEMBLE**.
>
> If the LIBGEN file has already been converted to a dual server by adding a second HOSTID, the second HOSTID must be named "STBY." If not, you must ignore Step 3 on page 5-7 and perform the reconfiguration activities manually.

Following are additional points to consider before you begin the tasks in this chapter:

- VMSS2HST saves the original LIBGEN file as LIBSLSF BACKASM. If there are problems, you may want to copy this file back to LIBSLSF ASSEMBLE and make corrections before re-executing VMSS2HST.

- Be sure there are no library volumes selected before shutting down the VM/Host Software Component. Having volumes selected has been known to cause problems during RECONFIG.

  You can check this by running a VOLRPT from the OPERATOR userid. If you find volumes selected, run an UNSELECT, also from the OPERATOR userid. See the *VM/HSC System Programmer's Guide* for details on these utilities.

- Be sure to VARY OFF the station address(es) before starting the RECONFIG job. This is not strictly necessary, but it does prevent a number of confusing messages from being issued as the RECONFIG job starts. The start of RECONFIG is similar in appearance to that of the VM/Host Software Component.

- It is possible to have all the jobs execute successfully and still be unable to successfully start the VM/Host Software Component. The usual reason is that the LMU configurations do not match the LIBGEN, but other possibilities exist. The old control data set (CDS) is saved as a part of the procedure. Submit the RESTORE job if you need to return to the old configuration for any reason. This allows normal single-server operation while you resolve the problems. (For shutdown procedures, see "Shutting Down (9221 and 9370 systems)" on page 7-5.)

TASK 1 — INSTALL SOFTWARE ON SECOND SERVER

To install the software on the second server, repeat the steps in Chapter 4, "Software Installation—9370 Processor" on page 4-1 for the second server.

TASK 2 — RECONFIGURE THE VM/HSC CDS FOR DUAL HOSTS (NEW DUAL SERVER USERS ONLY)

```
┌─ When to Perform This Task ──────────────────────────────────────────┐
│                                                                      │
│  Perform this task only if you are converting from a single-server  │
│  to a dual-server configuration.                                    │
│                                                                      │
│  If you are upgrading an existing dual-server configuration to a     │
│  new software version proceed to "Task 3 — Build the Shared          │
│  Volumes On the Primary Library Control System" on page 5-9.         │
│                                                                      │
└──────────────────────────────────────────────────────────────────────┘
```

This task converts the VM/Host Software Component CDS to a dual-server configuration. The VMSS2HST utility used in this task changes an existing, correct LIBGEN file (LIBSLSF ASSEMBLE on MAINTSTK's Z disk, written for a single host and describing the current running system) into a dual-host LIBGEN in which the second host has the HOSTID of "STBY."

The VMSS2HST utility uses a series of XEDIT macros and EXECs to perform the following functions:

* Modifies the LIBGEN source

* Assembles the LIBGEN

* Reformats the database minidisks

* Starts the SCP and submits BACKUP, SLICREAT, and RECONFIG for execution.

Notes:

1. Perform this task on the **primary server**.

2. Depending on the size of your CDS, this task may take **more than an hour** to complete.

1. On the primary server, log on to the MAINTSTK userid. (VMSS is the default password.)

2. Only the OPERATOR and MAINTSTK machines should be active. Stop all other virtual machines to ensure that nothing else is running when you execute VMSS2HST.

```
System:      Ready;
   You:      SMSG CLSM STOP ALL <Enter>
System:      (messages about the system quiescing)
             Common Library Services Termination complete
   You:      SMSG STKACS STOPSCP <Enter>
System:      (messages about the system quiescing)
              SLKTKW531I ACS system shutdown is complete
```

> **Note:** If shutdown is not successful, see "Shutting Down (9221 and 9370 systems)" on page 7-5 for further instructions.

3. Convert the CDS to a dual-server configuration.

```
System:      Ready;
  You:       VMSS2HST <Enter>
System:       VMSS2HST: This program will modify your LIBGEN source,
              VMSS2HST: reformat minidisks, shut down the HSC, reconfigure the CDS,
              VMSS2HST: and change your active LIBGEN module.

              VMSS2HST: Are you sure this is what you want?
              VMSS2HST: Type YES to continue or hit Enter to quit now.
  You:       YES <Enter>
System:       VMSS2HST: Shutting down the ACS machine.

              DMKMSG045E STKACS not logged on
              SLKACS527E ACS service machine STKACS is not accepting messages.
              VMSS2HST: Backing up LIBSLSF * as  LIBSLSF BACKASM.

              VMSS2HST: Modifying LIBGEN source.

              VMSS2HST: Executing LIBGEN.


              ASSEMBLER (XF) DONE
              NO STATEMENTS FLAGGED IN THIS ASSEMBLY

              VMSS2HST: Copying ACS191 and RUN disks to alternate user.

              VMSSCOPY: ********
              VMSSCOPY: ******** Copying MAINTSTK's 255 (ACS191) to MNT2STK's 255 (ACS191)
              VMSSCOPY: ********
              ENTER:
              ENTER:
              ENTER:
              ENTER:
              COPYING ACS191
              COPYING DATA mm/dd/yy AT hh.mm.ss GMT FROM ACS191 TO ACS191
               INPUT BLOCK EXTENTS        OUTPUT BLOCK EXTENTS
                      START      STOP      START      STOP
                   0000000    0002399   0000000    0002399
              END OF COPY
              ENTER:
              END OF JOB
              VMSSCOPY: ********
              VMSSCOPY: ******** Copying MAINTSTK's 254 (RUN) to MNT2STK's 254 (RUN)
              VMSSCOPY: ********
              ENTER:
              ENTER:
              ENTER:
              ENTER:
              COPYING RUN
              COPYING DATA mm/dd/yy AT hh.mm.ss GMT FROM RUN    TO RUN
               INPUT BLOCK EXTENTS         OUTPUT BLOCK EXTENTS
                      START      STOP      START      STOP
                   0000000    0021999   0000000    0021999
              END OF COPY
              ENTER:
              END OF JOB

              VMSS2HST:  Reformatting RECONFIG minidisks.

              SLKMDI544I Initializing  111
              SLKMDI544I Initializing  112
              VMSS2HST: Re-starting the ACS machine.
              VMSS2HST: and submitting BACKUP, SLICREAT, and RECONFIG

              AUTO LOGON  ***  STKACS   USERS = 008
              PUN FILE nnnn TO STKACS   COPY 001   NOHOLD
              PUN FILE nnnn TO STKACS   COPY 001   NOHOLD
              PUN FILE nnnn TO STKACS   COPY 001   NOHOLD
```

```
VMSS2HST: Shut down the ACS machine when the RECONFIG job completes
VMSS2HST: by typing ACS STOPSCP

Ready;
SLKTKM450I Licensed/Secret/Unpublished Work/Copyright (1986-1992) StorageTek
SLKOST104I Task ID started
SLKOST104I Task LIBRARY started
SLKOST104I Task LIBUT1 started
SLKOST104I Task LIBUT2 started
SLKOST104I Task LIBUT3 started
  .
  .
  .
SLS1505I HSC SERVICE LEVEL BASE INITIALIZATION COMPLETE
SLS0527I RECONFIGURATION FUNCTION IS CURRENTLY RUNNING: PLEASE DO NOT START
SLS0527I OTHER ACS SUBSYSTEMS
SLS0525I RECONFIGURATION FUNCTION WAS SUCCESSFULLY RUN
SLS1506I HSC SERVICE LEVEL BASE NORMAL TERMINATION IN PROGRESS
SLS1513I HSC SERVICE LEVEL BASE TERMINATION COMPLETE
SLKJOB608I Job file nnn from ACS4400/MAINTSTK execution complete - R15=0
SLKJOB609I Job reader LIBRARY waiting for work - CLASS=L,KEY=2
```

4. Shut down the VM/Host Software Component.

System:	Ready;
You:	**SMSG STKACS STOPSCP <Enter>**
System:	(messages about the system quiescing)
	SLKTKW531I ACS system shutdown is complete

    Note: If shutdown is not successful, see "Shutting Down (9221 and 9370 systems)" on page 7-5 for further instructions.

5. Verify that the submitted jobs ran successfully by examining the associated files in your Reader (the Reader files are named SLICREAT SYSPRINT and BACKUP SLSPRINT).

    Also, check the console display to determine if the reconfig job completed; a message (SLS0527I) displays the start time for the job and a second message (SLS0530I) displays the job's completion time. There may also be some intermediate messages between these two. If any job fails to return a completion code of zero (0), or if the EXEC fails to complete, call StorageTek to report the failure.

    See the *Requesting Help From Software Support* guide for information about contacting StorageTek for support in your country or geographical region.

6. The RECONFIG job has built its new copy of the CDS on disk addresses 400 and 401, rather than doing an update in place. Copy the 400 and 401 disks back to 500 and 501 (the effective primary and shadow addresses).

System:	Ready;
You:	**VMSSCOPY STKACS 400 STKACS 500 <Enter>**
System:	(messages)
You:	**VMSSCOPY STKACS 401 STKACS 501 <Enter>**
System:	(messages)

7. Bring up the STKACS machine in production mode.

System:	Ready;
You:	**AUTOLOG STKACS VMSS <Enter>**
System:	HSC service level FULL initialization complete.

    Note: If errors occur during VM/Host Software Component startup, you can restore the saved CDS by executing:

```
ACS SUBMIT RESTORE VMSSJCL <Enter>
```

8. Verify VM/Host Software Component operation by entering a mount command. See the *VM/Host Software Component Operator's Guide* for the syntax of the command. The following is an example:

```
ACS .MOUNT SCRTCH B04 <Enter>
```

9. Dismount the tape and log off MAINTSTK.

TASK 3 — BUILD THE SHARED VOLUMES ON THE PRIMARY LIBRARY CONTROL SYSTEM

This task converts a single server to a dual server. The VMSSBLD utility used in this task copies the CDB and VM/Host Software Component CDS from the existing single server volumes to the shared DASD.

Notes:

1. Perform this task on the **primary server**.

2. The server must be in the single-server state before you perform this task. If it is not, the VMSSBLD utility will terminate with an error message indicating the server's state.

1. On the primary server, log on to the MAINT userid. (VMSS is the default password.)

2. If you have not done so already, stop all other virtual machines to ensure that nothing else is running.

```
System:     Ready;
   You:     SMSG CLSM STOP ALL <Enter>
System:     (messages about the system quiescing)
            Common Library Services Termination complete
   You:     SMSG STKACS STOPSCP <Enter>
System:     (messages about the system quiescing)
             SLKTKW531I ACS system shutdown is complete
```

Note: If shutdown is not successful, see "Shutting Down (9221 and 9370 systems)" on page 7-5 for further instructions.

3. Run VMSSBLD with the DUAL option.

Notes:

a. If the DUAL option has been run previously on this server, VMSSBLD will fail with an error message indicating that the DUAL option cannot be run again.

b. The NOCOPY option of VMSSBLD changes the directory, but it does not copy databases. This is useful for converting a server from a single to a dual configuration without overwriting existing data.

```
System:     Ready;
   You:     VMSSBLD DUAL <Enter>
System:      VMSSBLD: Started on dd mmm yyyy at hh:mm:ss.
             VMSSBLD: Build type = DUAL.

             VMSSBLD: You are about to build a Dual Server environment. The
             VMSSBLD: CDS volumes will be copied to the shared DASD
```

```
                          VMSSBLD: Type YES to continue,
                          VMSSBLD:  NOCOPY to only change the directory,
                          VMSSBLD: or anything else to quit.
            You:          YES <Enter>
            System:       VMSSBLD: ********
                          VMSSBLD: ******** Putting label CDSPRM on device D00.
                          VMSSBLD: ********

                          VMSSBLD: ********
                          VMSSBLD: ******** Putting label CDSSHD on device D10.
                          VMSSBLD: ********

                          VMSSBLD: ********
                          VMSSBLD: ******** Putting label PRMNEW on device D01.
                          VMSSBLD: ********

                          VMSSBLD: ********
                          VMSSBLD: ******** Putting label SHDNEW on device D11.
                          VMSSBLD: ********

                          VMSSBLD: Moving the primary CDS to CDSPRM...

                          VMSSCOPY: ********
                          VMSSCOPY: ******** Copying STKACS's 500 (CDSPRM) to STKACSDL's 500 (CDSSHD)
                          VMSSCOPY: ********
                          ENTER:
                          ENTER:
                          ENTER:
                          ENTER:
                          COPYING   CDSPRM
                          COPYING DATA  mm/dd/yy AT hh.mm.ss   GMT FROM CDSPRM TO CDSSHD
                           INPUT BLOCK EXTENTS        OUTPUT BLOCK EXTENTS
                                  START      STOP      START      STOP
                             0000000    0024807    0000000    0024807
                          END OF COPY
                          ENTER:
                          END OF JOB

                          VMSSBLD: Moving the secondary CDS to CDSSHD...

                          VMSSCOPY: ********
                          VMSSCOPY: ******** Copying STKACS's 501 (CDSPRM) to STKACSDL's 501 (CDSPRM)
                          VMSSCOPY: ********
                          ENTER:
                          ENTER:
                          ENTER:
                          ENTER:
                          COPYING   CDSPRM
                          COPYING DATA  mm/dd/yy AT hh.mm.ss  GMT FROM CDSPRM TO CDSPRM
                           INPUT BLOCK EXTENTS        OUTPUT BLOCK EXTENTS
                                  START      STOP      START      STOP
                             0000000    0024807    0000000    0024807
                          END OF COPY
                          ENTER:
                          END OF JOB

                          VMSSBLD: Creating backup CDB

                          VMSSCOPY: ********
                          VMSSCOPY: ******** Copying CLSM's 500 (CDBPRM) to CLSMDL's 506 (CDBPRM)
                          VMSSCOPY: ********
                          ENTER:
                          ENTER:
                          ENTER:
                          ENTER:
                          COPYING   CDBPRM
                          COPYING DATA  mm/dd/yy AT hh.mm.ss   GMT FROM CDBPRM TO CDBPRM
                           INPUT BLOCK EXTENTS        OUTPUT BLOCK EXTENTS
                                  START      STOP      START      STOP
                             0000000    0001499    0000000    0001499
                          END OF COPY
                          ENTER:
                          END OF JOB
```

```
                     VMSSCOPY: ********
                     VMSSCOPY: ******** Copying CLSM's 500 (CDBPRM) to CLSMDL's 406 (CDBPRM)
                     VMSSCOPY: ********
                     ENTER:
                     ENTER:
                     ENTER:
                     ENTER:
                     COPYING   CDBPRM
                     COPYING DATA  mm/dd/yy AT hh.mm.ss   GMT FROM CDBPRM TO CDBPRM
                      INPUT BLOCK EXTENTS        OUTPUT BLOCK EXTENTS
                             START      STOP      START      STOP
                        0000000   0001499   0000000   0001499
                     END OF COPY
                     ENTER:
                     END OF JOB

                      VMSSBLD: Rebuilding the directory for a Dual Server system...


                      VMSSDIR: Building alternate system (VMSBKP) directory...

                      VMSSDIR: Updating directory on alternate system (VMSBKP)...
                     EOJ DIRECTORY NOT UPDATED
                     EOJ DIRECTORY UPDATED AND ON LINE

                      VMSSDIR: Updating directory on running system (VMSPRM)...
                     EOJ DIRECTORY NOT UPDATED
                     EOJ DIRECTORY UPDATED AND ON LINE
                      VMSSBLD: The Dual Server environment has been built on this system.
                      VMSSBLD: Refer to the Turnkey Installation Guide for instructions
                      VMSSBLD: on how to install the Standby Server on the other processor.

                      VMSSBLD: Completed on dd mmm yyyy at hh:mm:ss.
                     Ready;
```

TASK 4 — RUN VMSSBLD ON THE STANDBY LIBRARY CONTROL SYSTEM

This task makes the following modifications to the Library Control System software on the standby server:

* Modifies the ACS SYSPROF file by adding the "STBY" HOSTID. This allows the standby server to share the CDS with other hosts.

* Comments out the command in AUTOLOG's PROFILE EXEC file that automatically starts CLS. This disables the autostart function so the standby server does not automatically autolog CLS during startup.

Note: Perform this procedure on the **standby server**.

1. On the standby server, log on to the MAINT userid. (VMSS is the default password.)

2. Run VMSSBLD with the STANDBY option.

```
System:       Ready;
  You:        VMSSBLD STANDBY <Enter>
System:        VMSSBLD: Started on mm/dd/yy at hh:mm:ss.
               VMSSBLD: Build type = STANDBY.

               VMSSBLD: You are about to make changes to this system which will
               VMSSBLD: enable this processor to serve as the Standby processor.

               VMSSBLD: Type YES to continue or anything else to quit.
```

```
You:        YES <Enter>
System:       VMSSBLD: The HSC's hostid (in ACS SYSPROF) has been
              VMSSBLD: changed to STBY.

              VMSSBLD: 'AUTOLOG CLSM' statement in AUTOLOG1's PROFILE EXEC
              VMSSBLD: has been commented out. CLSM will no longer come up
              VMSSBLD: automatically at IPL time on this processor.
            DMSACP723I B (194) R/O
            DMSACP723I E (193) R/O

              VMSSASM: ********
              VMSSASM: ******** Assembling DMKSYS for VMSPRM...
              VMSSASM: ********
            No update files were found
            ASMBLING DMKSYS

            ASSEMBLER (XF) DONE
            NO STATEMENTS FLAGGED IN THIS ASSEMBLY
            DMKSYS TEXT A1 CREATED
              VMSSASM: DMKSYS TEXT renamed to DMKSYS TXTPRM

              VMSSASM: Updating alternate MAINT 191 disk.
            Copy DMKSYS TXTPRM A1 to DMKSYS TXTPRM C1 (old file)
            Copy DMKSYS VMSPRM A1 to DMKSYS VMSPRM C1 (old file)

              VMSSGEN: ********
              VMSSGEN: ******** Creating CP nucleus for VMSPRM...
              VMSSGEN: ********

            Copy DMKSYS TXTPRM A1 to DMKSYS TEXT A1 (new file)
            Copy DMKSNT TXTPRM A1 to DMKSNT TEXT A1 (old file)
            SYSTEM LOAD DECK COMPLETE
            PUN FILE 0085  TO  MAINT     COPY 001   NOHOLD
            NUCLEUS LOADED ON VMSPRM --- STARTING CYL/BLK=000016, LAST CYL/BLK USED=002471
            CP entered; disabled wait PSW '00020000 00000012'
```

Note: The DMKDSP450W message may not appear, depending on how you have
set error message handling (with the "CP SET EMSG" command). In this
case, verify that the PSW contains wait state 12 by typing:

CP D PSW <Enter>

The response should be:

PSW = 00020000 00000012

If the response contains wait state 12, proceed to Step 3. If the response
contains any other wait state, **do not** proceed; call StorageTek Software
Support for assistance.

3. Re-IPL CMS.

```
System:     Ready;
   You:     CP I CMS <Enter>
System:     4400 ACS VM STORAGE SERVER

            D (192) R/O
            M (113) R/O
            N (114) R/O
            R (193) R/O
            System id is: ACS4400  -- VMSS Version is: CLS 2.3.0
```

4. Shutdown and re-IPL the system.

```
System:     Ready;
   You:     SHUTDOWN REIPL <Enter>
```

When the system comes back up, verify that "STBY" is displayed in the lower right corner of your screen.

TASK 5 — DEFINE INTERNET ADDRESSES

The internet address for both servers must be defined as a local socket. To do this, complete the following steps:

1. Execute the CLSCM command from the CLSOC1 or CLSOC2 userid. See the *CLS Reference Manual* for information about the CLSCM command.

2. Select the Logical Port option on the menu.

3. Type **5** (communications) beside the appropriate LP.

4. Define a local and foreign socket for each server. In each case, the local socket is the IP address and the foreign socket is the IP address of the client system.

TASK 6 — SET UP SPLIT-SERVER CONFIGURATION (OPTIONAL)

This task converts a dual-server configuration to a split-server configuration.

The split-server configuration allows CLS to run on two processors simultaneously and independently, while sharing only the VM/Host Software Component's CDS. The advantage of this configuration is that server use can be divided among the client systems to help distribute the load and avoid a single point of failure. In addition, clients can be administered on both processors so that one server can operate as a backup for the other. Each client can use only one server at a time, however, and some operator intervention is required to switch clients from one server to the other.

Like the dual-server configuration, the split-server configuration consists of two ES/9000 or ES/9370 processors, each with an additional 9332-402 disk that either processor can access. With the split-server configuration, however, client systems can run on only one of the two processors; client systems cannot make requests of both servers at the same time.

Both Library Control System processors run standard VM Storage Server software. They both run the VM/Host Software Component, and they can provide CLS services simultaneously. The STKACS database is on shared DASD and accessible to any hosts configured for that database. The shadow database is located on a separate 9332-402 disk in the standby processor.

One server can act as backup for the other server. In the event of a server failure, clients can continue processing on the other server, provided they are administered on that server. The operator must start those logical ports on the active server and make sure the client systems communicate with the proper server.

Step 1 — Update the CP Directory on Both Servers

Note: You must perform this step twice: first on the **primary server**, then on the **standby server**.

1. On the primary server, log on to the MAINT userid. (VMSS is the default password.)

2. Edit the CP directory:

   System: `Ready;`
       You: **`VMSSDIR EDIT <Enter>`**

3. You will be in XEDIT in the CP directory file. Locate the line containing the text `USER CLSM`. Comment out the `MDISK` statements for the 406 and 506 disks by inserting an asterisk (*) in the first column of each line.

   When you are finished, at the XEDIT command line, type **`FILE <Enter>`** to save the changes.

4. Activate the changes.

   ```
   System:     VMSSDIR: You have changed the source directory for the running system.

               VMSSDIR: Type 'DIRECT' to place it online now.
               VMSSDIR: Type 'SAVE' to quit without putting it online.
               VMSSDIR: Type 'RESTORE' to backout the changes you made.
      You:     DIRECT <Enter>
   System:     Ready;
               DMSACP113S C(291) not attached

                VMSSDIR: Unable to access VMSBKP,
                VMSSDIR: Directory on VMSBKP will not be updated.

                VMSSDIR: Updating directory on running system (VMSPRM)...
               EOJ DIRECTORY NOT UPDATED
               EOJ DIRECTORY UPDATED AND ON LINE
               Ready;
   ```

5. Repeat this procedure on the standby server.

Step 2 — Update the AUTOLOG1 Profile

Note: Perform this step on the **standby server only**.

1. Log on to the MAINT userid, if you are not there already. (VMSS is the default password.)

2. Link to the AUTOLOG1 191 disk:

   System: `Ready;`
       You: **`VMSSLINK AUTOLOG1 191 222 MR Z <Enter>`**
   System: `(messages)`

3. Edit the PROFILE EXEC file:

   System: `Ready;`
       You: **`XEDIT PROFILE EXEC Z <Enter>`**

4. In the file, locate the line containing the text VMSSSTRT 'CLSM VMSS'. Remove the beginning and ending comments from this line (beginning comment /*, ending comment */).

   When you are finished, at the XEDIT command line, type **FILE <Enter>** to save the changes and exit XEDIT.

5. Release and detach the disk:

   System: Ready;
      You: **REL Z (DET <Enter>**
   System: DASD 191 DETACHED

TASK 7 — VERIFY THAT BOTH SERVERS ARE WORKING

Make sure both servers are functioning correctly by repeating the verification steps in "Verify the Installation" for each server.

Chapter 6. Installation Verification

This chapter describes how to test the VM Storage Server software. These procedures apply to single-, split-, or dual-server configurations.

Chapter Contents

VERIFY THE INSTALLATION

In installation verification, you are testing the following items:

- VM functionality

- Basic CLS functionality

- VM/Host Software Component interface

- TCP/IP communications

- PVM/3270 communications

Note: Unless you have both kinds of communications protocol, you only need to run the test that applies to your site.

Important

All tasks in this chapter are performed from the OPERATOR userid.

TASK 1 — VERIFY VM FUNCTIONALITY

Use the CP "QUERY ALL" command to verify that VM is working.

Figure 6-1 is sample output from the QUERY ALL command for a preconfigured 9221 single server using TCP/IP for communications.

Note: The processor has slightly less than four megabytes of installed memory, one processor, two Ethernet adapters, and four disk drives installed. The memory does not equal four megabytes exactly because some is being used for processor management.

```
q all
STORAGE = 0014576K
GRAF  0000 LOGON  AS MAINT    0009
GRAF  0002 LOGON  AS CLSOC1   0009
GRAF  0010 ATTACHED TO STKACS   00D8
GRAF  0013 ATTACHED TO STKACS   00DB
GRAF  0016 ATTACHED TO STKACS   00DE
GRAF  0018 ATTACHED TO STKACS   00D0
GRAF  001D LOGON  AS TCPIP     0009
LINE 0100 ATTACHED TO TCPIP    0100
LINE 0101 ATTACHED TO TCPIP    0101
LINE 0102 ATTACHED TO TCPIP    0102
LINE 0103 ATTACHED TO TCPIP    0103
LINE 0400 ATTACHED TO TCPIP    0400
LINE 0401 ATTACHED TO TCPIP    0401
LINE 0402 ATTACHED TO TCPIP    0402
LINE 0403 ATTACHED TO TCPIP    0403
DASD 0C00 CP OWNED  ESARES  56
DASD 0C01 CP OWNED  ESA001  4
DASD 0C02 CP OWNED  ESA002  10
DASD 0C03 CP OWNED  ESA003  3
DASD 0D00 CP SYSTEM CDSPRM  3
DASD 0D01 CP SYSTEM CDSSHD  2
Ready;
```

Figure   6-1. Example of the QUERY ALL Command—9221 Platform

Figure 6-2 on page 6-3 is sample output from the QUERY ALL command for a preconfigured 9370 single server using PVM for communications.

```
q all
08:50:07 STORAGE = 03656K
08:50:07 PROCESSOR 00 ONLINE
08:50:07 LINE B80 ATTACH TO CLSCOMM  080
08:50:07 DASD C00 CP OWNED  VMSPRM   0007
08:50:07 DASD C01 CP OWNED  CLSPRM   0004
08:50:07 DASD C10 CP OWNED  VMSBKP   0002
08:50:07 DASD C11 CP OWNED  CLSBKP   0002
Ready;
```

Figure 6-2. Example of the QUERY ALL Command—9370 Platform

TASK 2 — VERIFY BASIC CLS FUNCTIONALITY

To verify that the CLS software is working, perform the following tasks:

1. Re-start the host CSC if necessary. For instructions, see your Host CSC Operations Guide.

2. Log on to VM userid CLSOC1 (Password is VMSS.)

3. Type **CLSOC <Enter>.**

4. Wait for the message CLS4005 CLSOC initialization is complete.

5. Start a logical port, for example CLSLP1, on either server.

6. Inspect the status line on the top of the CLSOC screen and verify that the Ver and Rel values are the same as the Ver and Rel shown on the labels of the install tapes.

7. Type **Q CLIENTS <Enter>.**

   This displays the status of all client systems defined to CLS during CLS Configuration Management. For new users, verify that the data under the Client and AM headings match the data contained in the information sheet shipped with the preconfigured installation tapes. See Figure 6-3.

   Note: The information displayed for your account will be different from that shown in the example. This example is provided so you can identify the locations of important information and see the type of data to expect in the location.

```
StorageTek Common Library Services Ver 2 Rel 3.0  Thu 22 May 07:20 1997
----------------------------------------------------------------READY

q clients
CLS3606 Client    Ve Description  DateChg AM A L   HB Scratch Pool  Status
CLS3607 CLSLP1    01 UNISYS PATH1 08/01/95 P 0 2   30 0             INAC
CLS3608 1 total client(s): 0 active, 0 suspended.
==>
PF1=Help     PF2=         PF3=Exit     PF4=Rdrlist  PF5=Clear1  PF6=Time
PF7=Backward PF8=Forward PF9=Retrieve PF10=Bkwd1/2 PF11=Fwd1/2 PF12=Cancel
```

Figure 6-3. Example of the QUERY CLIENTS Command

8. Type **Q TRANS** *client-name* **<Enter>.**

9. Verify that the address mapping correctly associates the client device names to the
    Library Control Processor addresses supplied before software preconfiguration. If
    you are a new user, you should compare this screen with the data in the information
    sheet shipped with the preconfigured installation tapes. See Figure 6-4.

    Note: The information displayed for your account will be different from that shown
    in the example. This example is provided so you can identify the locations of
    important information and see the type of data to expect in the location.

```
StorageTek Common Library Services Ver 2 Rel 3.0  Thu 22 May 07:20 1997
------------------------------------------------------------------READY

 q trans clslp1
 CLS3250 CLSOC1:  q trans clslp1
 CLS3603 CSC (CLSLP1) - HSC (STKACS) Transport Translation Mapping
 CLS3604   Client    HSC    Client    HSC   Client    HSC    Client   HSC
 CLS3605     L50 <> 0660     L51 <> 0661     L52 <> 0662     L53 <> 0663
 CLS3605     L54 <> 0664     L55 <> 0665     L56 <> 0666     L57 <> 0667

 ====>
 PF1=Help     PF2=        PF3=Exit     PF4=Rdrlist  PF5=Clear1  PF6=Time
 PF7=Backward PF8=Forward PF9=Retrieve PF10=Bkwd1/2 PF11=Fwd1/2 PF12=Cancel
```

Figure   6-4. Example of the QUERY TRANS Command

10. Repeat the Q TRANS command and verification process for any remaining defined
    client.

11. Type **Q CONSOLES <Enter>.**

    This displays the status of all CLS-authorized operators defined to CLS during CLS
    Configuration Management.

    Verify that the data displayed is as shown in Figure 6-5 (unless you have modified
    the configuration database).

```
StorageTek Common Library Services Ver 2 Rel 3.0  Thu 22 May 07:20 1997
------------------------------------------------------------------READY

q consoles
CLS3250 CLSOC1:  q consoles
CLS3609 Console   Description           DateChg  CmdClass    Status
CLS3610 CLSOC2    Operator Console      02/22/94 AGHOSM      INAC
CLS3610 CLSOC1    Operator Console      11/06/94 AGHOSM      ACTI
CLS3610 OPERATOR  sys console           07/02/94 AGHOSM      INAC
CLS3608 3 total console(s): 1 active, 0 suspended.

====>
PF1=Help     PF2=        PF3=Exit     PF4=Rdrlist  PF5=Clear1  PF6=Time
PF7=Backward PF8=Forward PF9=Retrieve PF10=Bkwd1/2 PF11=Fwd1/2 PF12=Cancel
```

Figure   6-5. Example of the QUERY CONSOLES Command

12. Type **Q HSC <Enter>.**

    This displays:

    • The VM userid of the VM/Host Software Component machine

- The status of the VM/Host Software Component

- The VM/Host Software Component prefix character

13. Verify that the response displayed is as shown in Figure 6-6.

```
StorageTek Common Library Services Ver 2 Rel 3.0  Thu 17 May 07:20 1997
----------------------------------------------------------------READY

 q hsc
 CLS3250 CLSOC1: q hsc
 CLS3612 HSC: UserId STKACS Status AVAILABLE Prefix Char .



====>
PF1=Help     PF2=         PF3=Exit    PF4=Rdrlist  PF5=Clear1  PF6=Time
PF7=Backward PF8=Forward PF9=Retrieve PF10=Bkwd1/2 PF11=Fwd1/2 PF12=Cancel
```

Figure   6-6. Example of the Q HSC Command

TASK 3 — VERIFY VM/HOST SOFTWARE COMPONENT INTERFACE

This step uses the CLSOC console to issue VM/Host Software Component commands. Some of these commands cause tape movement in the library.

1. Select a tape that is not in the library. Use an OCR-labeled tape, if one is available. This tape will be mounted in the drive.

2. Type **MOUNT** *vvvvvv drive-address* **CLSM <Enter>.**

   Where *vvvvvv* is the volume serial number of the tape to be mounted, and *drive-address* is the address of the drive as known to CLSM.

   The VM/Host Software Component issues the following message:

   ```
   ## T .SLS0126D Mount of vvvvvv on drive hsc-address is
         not in library. Retry, Perm enter, Temp enter,
         or Ignore (R,P,T,I)
   ```

3. Type **## T <Enter>.**

   Where ## is the reply number in the above message. The VM/Host Software Component issues messages:

   ```
   SLKORE700I From CLSM via CLSM: ## t
   SLS0258I Request allowed CAP selection of CAPid nn.
   *SLS0261I Open CAPid nn for entering when unlocked.
   ```

4. Open the CAP and place the cartridge in the upper left cell.

5. Close the CAP. Both the VM/Host Software Component and CLS issue messages. See Figure 6-7 on page 6-6. The VM/Host Software Component issues messages:

   ```
   *SLS0696A LSM nn CAP door opened.
   SLS0697I LSM nn CAP door closed.
   ```

CLS issues the following message:

`CLS3132 Mount command, completed for vvvvvv.`

Where *vvvvvv* is the volume serial number.

The VM/Host Software Component issues the following message:

`SLS0252I Cartridge vvvvvv entered into LSMid nn.`

Where *vvvvvv* is the volume serial number, and *nn* is the number of the LSM.

The mount is now complete.

```
StorageTek Common Library Services Ver 2 Rel 3.0  Thu 22 May 07:20 1997
-----------------------------------------------------------------READY


Mount 123456 5C1 CLSM
02  .SLS0126D Mount of 123456 on drive 5C1 is not in library.
        Retry, Perm enter, Temp enter, or Ignore (R,P,T,I)
02 T
SLKORE700I From CLSM via CLSM: 02 t
SLS0258I Request allowed CAP selection of CAPid 00.
*SLS0261I Open CAPid 00 for entering when unlocked.
*SLS0696A LSM 00 CAP door opened.
SLS0697I LSM 00 CAP door closed.
CLS3132 Mount command, completed for 123456.
SLS0252I Cartridge 123456 entered into LSMid 00.
====>
PF1=Help     PF2=        PF3=Exit     PF4=Rdrlist  PF5=Clear1  PF6=Time
PF7=Backward PF8=Forward PF9=Retrieve PF10=Bkwd1/2 PF11=Fwd1/2 PF12=Cancel
```

Figure   6-7. Example of Messages in Response to the MOUNT Command

6.   Type **DISPLAY VOL,***vvvvvv***,DETAIL <Enter>**.

Where *vvvvvv* is the volume serial number.

The VM/Host Software Component displays the status of the volume. The status should be:

- •   SCRATCH=NO

- •   SELECTED=YES

7.   Type **Q VOL <Enter>**.

The CLS Query Volume command should show the volume mounted.

8.   Type **Q LOCKS <Enter>**.

The CLS Query Locks command should show the volume and the transport locked, along with an internal lock (LocksOK).

9.   Type **DISMOUNT** *vvvvvv hsc-address* **CLSM <Enter>.**

Where *vvvvvv* is the volume serial number of the tape mounted, and *hsc-address* is the address of the VM/Host Software Component.

The VM/Host Software Component issues messages:

```
SLS0258I Request allowed CAP selection of CAPid nn.
##SLS0934D Eject of vvvvvv, Drive not rewound, Reply
        Dismount, Retry or Ignore (D,R,I)
```

10. Type **## D <Enter>**.

The VM/Host Software Component and CLS issue messages. The VM/Host Software Component issues:

```
SLKORE700I From CLSM via CLSM ## D
```

CLS issues the following message:

```
CLS3132 Dismount command, completed for vvvvvv.
```

The VM/Host Software Component issues messages:

```
*SLS0254I Cartridge vvvvvv ejected to CAP CELL aal:r:c.
SLS0259E CAP processing terminating, empty CAPid nn.
```

11. Remove the cartridge from the CAP. The VM/Host Software Component issues messages:

```
*SLS0696A LSM nn CAP door opened.
SLS0697I LSM nn CAP door closed.
```

12. Type **Q SCRATCH ALL**.

The CLS Query Scratch command should display all scratch volumes in the library. Figure 6-8 is an example.

```
StorageTek Common Library Services Ver 2 Rel 3.0  Thu 22 May 07:20 1997
------------------------------------------------------------------READY


CLS3067 CLS is processing your QUERY SCRATCH request.
CLS3061 CLS Poolid  HSC Poolid  Label Type      Range(s)     Scratch Count
CLS3062 1            001        Unlabelled    ZZZ001-ZZZ001      25
CLS3062 2            002        Standard      U01100-U01190       7
CLS3062 3            004        Unlabelled    UNI800-UNI899      100
CLS3253 Command complete.

====>
PF1=Help     PF2=        PF3=Exit    PF4=Rdrlist  PF5=Clear1  PF6=Time
PF7=Backward PF8=Forward PF9=Retrieve PF10=Bkwd1/2 PF11=Fwd1/2 PF12=Cancel
```

Figure   6-8. Example of the QUERY SCRATCH ALL Command

TASK 4 — VERIFY COMMUNICATIONS

Perform either Step 1 or Step 2, depending on whether you are using PVM or TCP/IP communications.

Step 1 — Verify PVM/3270 Communications

This step verifies that the PVM/3270 communications path from the Library Control Processor Passthru Virtual Machine (PVM) to the client system (such as OS/1100) is installed and working correctly.

Execute the following procedure from a terminal attached to the Library Control Processor.

1. Press **\<Tab\>** to position the cursor next to the word COMMAND on the Logo screen.

2. Type **DIAL CLSCOMM \<Enter\>.**

3. Press \<Tab\> to position the cursor under the CSC system name you are going to test.

    Note: The cursor stops one character to the left of the system name.

4. Press **\<Enter\>.**

    The message USER CONNECTED TO PORT # nn is displayed by PVM. *nn* is the port number.

5. Press **\<Clear\>.**

    The client system's Hello message is displayed.

6. Press the **\<BACKTAB\>** key and then the **\<ERASE EOF\>** key.

7. Type #### **\<Enter\>.**

    The Passthru menu is redisplayed.

8. Repeat these steps for any other client systems attached to the Library Control Processor.

9. Press **\<PA1\>.**

10. Press **\<Enter\>.**

Step 2 — Verify TCP/IP Communications

This test verifies that a Local Area Network (LAN) connection between the library control processor and the client system is fully operational. The LAN hardware and TCP/IP protocol software on both processors is exercised.

1. Enter the following command:

    NETSTAT HOME \<Enter\>

    This verifies that the TCP/IP software is in operation. The command also returns the Internet address(es) of the Library Control Processor. If you specify NETSTAT HOME on the client side, you will get the Internet address of the client. You will use these addresses later. The Internet address is of the form:

    nn.nn.nn.nn

    Figure 6-9 on page 6-9 is an example of how to get the home addresses with the NETSTAT command.

```
   Ready:
   NETSTAT HOME <Enter>
   VM TCP/IP NETSTAT R1.2.1
   Home address list


   Address              Link
   10.0.0.0                     ETH300
   10.0.1.0                     ETH400
   Ready:
```

Figure   6-9. Example of the NETSTAT HOME Command

2.   Enter the following command:

NETSTAT DEVLINKS <Enter>

This command displays the status and proper installation of the 802.3 LAN
adapter(s). The command response shows the address of the LAN adapter. The
address should be 300 or 400. The status should be **Ready**. Figure 6-10 is an
example of the NETSTAT DEVLINKS command.

```
   Ready:
   NETSTAT DEVLINKS <Enter>
   VM TCP/IP NETSTAT R1.2.1

   Device CETI300        Type: ELANS          Status: Ready
   Queue size: 0         Address:  0300
      Link ETH300        Type: ETHER|802.3    Net number: 0

   Device CETI400        Type: ELANS          Status: Ready
   Queue size: 0         Address:  0400
      Link ETH400        Type: ETHER|802.3    Net number: 0
   Ready:
```

Figure   6-10. Example of the NETSTAT DEVLINKS Command

3.   Use the PING command to test TCP/IP by typing:

PING *nn.nn.nn.nn* **<Enter>**

Where *nn.nn.nn.nn* is the address of the client.

With the PING command, you need the Internet address of one side to issue the
PING command from the other side. If you have the Internet address of the client
side, you may issue the PING command from the VM Storage Server side. If you
have the Internet address of the VM Storage Server side, you may issue the PING
command from the client side. Figure 6-11 is an example of the PING command.

```
   PING 10.0.0.2 <Enter>
   PING R1.2.1: PINGING HOST 10.0.0.2. ENTER #CP EXT to interrupt.
   PING:  PING #1 RESPONSE TOOK 0.077 SECONDS. SUCCESSES SO FAR 1.
```

Figure   6-11. Example of the PING Command

The client TCP/IP software must be operational for the PING command to work.
This command verifies the entire connection between the Library Control Processor

and the client processors, including the TCP/IP protocol software **when the Internet address (nn) of the client is known.**

The response shows whether the command was successful or timed out (which means it failed). If the Internet address of the client is not known, enter the PING command from the client, specifying the Library Control Processor's address. Refer to the NETSTAT command on the previous page to get the home address.

Figure 6-12 shows a diagram that may help you visualize the PING process. It also describes typical network addresses used by NETSTAT and PING commands. The diagram shows the default addressing for a dual-path two-client VM Storage Server.
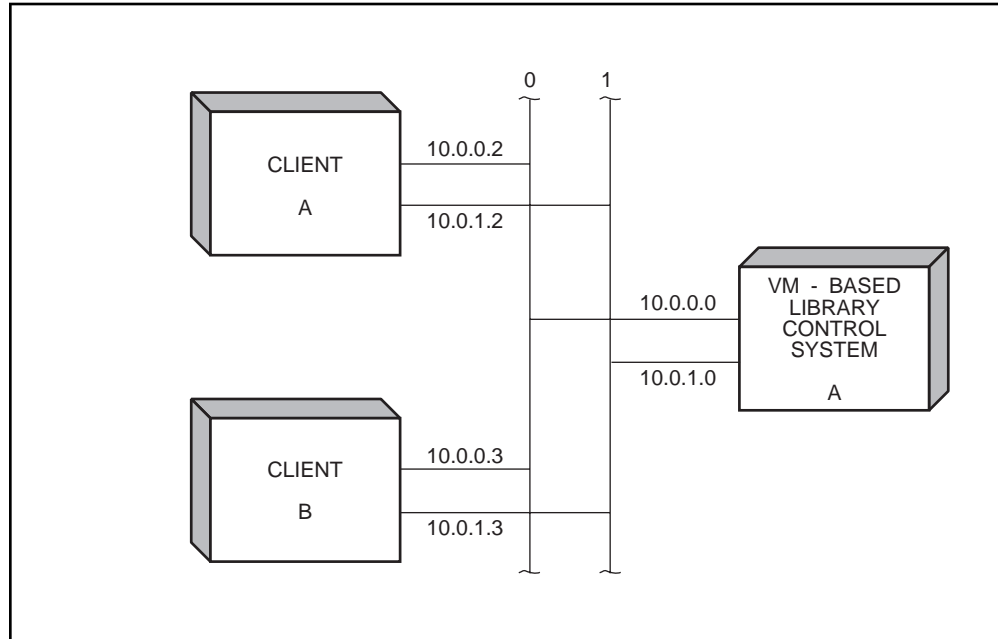
Figure 6-12. Standard Layout for a Dedicated LAN

Chapter 7. Operations

This chapter describes operations that are specific to the operation of a preconfigured VM Storage Server. It should be used as a supplement to the *4400 ACS Common Library Services User's Guide* and the *4400 ACS VM/HSC Operator's Guide*.

Chapter Contents

SYSTEM OPERATIONAL MODES

The VM Storage Server can run in one of three modes, based on which of the disk volumes are operational. The three modes are:

Normal   Both the primary and backup disks are operational.

Backup   The primary disk has failed and the Library Control System was re-IPLed from the backup. The backup disk is now the primary disk.

Degraded   The backup disk has failed. The Library Control System was re-IPLed from the primary without a backup disk.

These modes also apply to the standby Library Control System in a dual server configuration.

VM STORAGE SERVER USERID DESCRIPTIONS

The following is a list of userids supplied with the VM Storage Server. The default password for all userids is VMSS.

Userid	Description
AUTOLOG1	The userid used to AUTOLOG other userids during system startup.
CLSCOMM	The IBM PVM product machine. (If your machine does not use 3270 connections, this userid will exist in the directory; however, its minidisks will be empty because the PVM software will not exist.)
CLSLP1 – 4	The four CLS Logical Port machine userids.
CLSM	The CLS manager userid.
CLSMDL	Special userid used by dual-server configurations only. This is an exact duplicate of the CLSM directory, except the MDISK entry specifies dual server volume serial numbers.
CLSOC1 – 2	The two CLS OPERATOR userids.
DISKACNT	The userid used to collect and discard CP accounting information.
EREP	The userid used to execute IBM's EREP error analysis program.
FTP	File Transfer Protocol, part of the TCP/IP product. (If your hardware does not use IEEE 802.3 connections, this machine will exist in the directory; however, its minidisk will be empty because the TCP/IP software will not exist.)
HSCUTIL	The userid used to submit VM/Host Software Component utilities.
MAINT	The VM maintenance userid.
MAINT2	A NOLOG userid used to map MAINT's minidisks on the alternate disk.
MAINTSTK	StorageTek maintenance userid.
MAINTST2	A NOLOG userid on 9221 systems used to map MAINTSTK's minidisks on the alternate system.
MNT2STK	A NOLOG userid on 9370 systems used to map MAINTSTK's minidisks on the alternate system.
MONITOR	The userid used for the Resource Manager. This is a service machine that runs in the disconnected state.
OPERATOR	The VM system OPERATOR userid.
PERFDATA	Userid for the SLUACTV utility and VM/HSC performance data.
STKACS	The VM/Host Software Component machine userid.

STKACSDL   Special userid used by dual-server configurations only. This is an exact duplicate of the STKACS directory, except the MDISK entry specifies dual server volume serial numbers.

TCPIP   The IBM product machine that runs the TCP/IP program. (If your hardware does not use IEEE 802.3 connections, this machine will exist in the directory; however, its minidisk will be empty because the TCP/IP software will not exist.)

USERAREA   A special NOLOG userid that reserves 20,000 blocks of disk space for unique customer requirements.

COMMONLY USED PROCEDURES

The following procedures are those associated with the everyday operation of your systems.

Shutting Down (9221 and 9370 systems)

1. From the OPERATOR or MAINT userid, shut down the CLSM.

   SMSG CLSM STOP ALL <Enter>

   This also shuts down all LP machines.

2. Shut down the VM/Host Software Component.

   SMSG STKACS STOPSCP <Enter>

   If the VM/Host Software Component does not log off within one minute, one or more tasks are pending. If there are no pending mounts or dismounts, type:

   SMSG STKACS CANCEL ACS <Enter>

   This cancels the VM/Host Software Component. The STKACS machine will log off.

3. Shut down the entire system.

   SHUTDOWN <Enter>

4. Wait for the message `warm start data saved`.

5. If necessary, turn off the power to the library control processor.

Creating Backup Tapes (9221 and 9370 systems)

Use this procedure to create backup tapes of the primary disk volumes (ESARES and ESA001 on 9221 systems; VMSPRM and CLSPRM on 9370 systems). The procedure does not detail any CMS or CP commands that you use. You must be familiar with those.

Note: It is not normally necessary to back up the "backup" volumes (ESA002 and ESA003 on 9921 systems; VMSBKP and CLSBKP on 9370 systems). If the backup volumes are maintained properly they will be duplicates of the primary volumes already.

1. Log on to the MAINT userid. (VMSS is the default password.)

2. Shut down the CLSM and STKACS machines, but do **not** shut down the entire system. See "Shutting Down (9221 and 9370 systems)" on page 7-5 for details.

3. Vary on a tape drive.

   VARY ON *cuu* **<Enter>**

   Where *cuu* is the tape drive address.

4. Mount a scratch tape on *cuu*.

5. Attach the tape drive as 181.

   ATTACH *cuu* **★ 181 <Enter>**

6. Build the backup of the primary system residence volume in the same format as the distribution tapes.

   VMSSTAPE *volid* **<Enter>**

   where *volid* is ESARES on 9221 systems, VMSPRM on 9370 systems.

7. Remove the tape from the drive and label it clearly with an external label.

8. Mount a second scratch tape.

9. Build the backup of the primary CLS and VM/HSC volume in the same format as the distribution tapes.

   VMSSTAPE *volid* **<Enter>**

   where *volid* is ESA001 on 9221 systems, CLSPRM on 9370 systems.

10. Remove the tape from the drive and label it clearly with an external label.

Restoring the System from Backup Tapes (9221 and 9370 systems)

Once you create the backup tapes, you can use them to restore the primary volumes (ESARES and ESA001 on 9221 systems; VMSPRM and CLSPRM on 9370 systems). This procedure will be necessary only when you do not want to use VMSSBLD PRM to restore the system. For example, you would follow this procedure if you are already running in degraded mode and your remaining primary disk volume has also been corrupted.

1. Log on to the MAINT userid. (VMSS is the default password.)

2. Mount the primary system residence volume (ESARES or VMSPRM) tape in an available drive.

3. Perform a normal IPL. Refer to the following documents for instructions.

Table 7-1. Supporting IBM Hardware Documentation	
System	**Document Title**
ES/9000	*Operating Your System, Volume 1*
ES/9370	*Operating Your System*

4. Perform a second normal IPL.

5. Issue the following set of commands:

```
System:    ENTER CARD READER ADDRESS OR CONTROL STATEMENTS
           ENTER:
   You:    SYSPRINT CONS <Enter>
System:    ENTER:
   You:    INPUT cuu drive-type <Enter>
           (where cuu is the tape drive address, and drive-type
           is the type of drive, such as 3480, 3490, etc.)
System:    ENTER:
   You:    OUTPUT cuu FB-512 volid <Enter>
           (where volid is the primary system residence volume,
           ESARES or VMSPRM, and cuu is its real address, normally C00)
System:    ENTER:
   You:    RESTORE ALL <Enter>
System:    RESTORING volid
           DATA DUMPED mm/dd/yy AT hh.mm.ss GMT FROM volid RESTORED TO volid
           INPUT BLOCK EXTENTS          OUTPUT BLOCK EXTENTS
              START       STOP             START          STOP
              00000000    nnnnnnnn         00000000        nnnnnnnn
           END OF RESTORE
           BYTES RESTORED nnnnnnnnnn

           ENTER:
```

6. Wait for the tape to unload, then remove it.

7. Mount the primary CLS and VM/HSC volume (ESA001 or CLSPRM) tape in the drive.

8. Perform a normal IPL.

9. Perform a second normal IPL.

10. Issue the following set of commands:

```
System:   ENTER:
   You:   SYSPRINT CONS <Enter>
System:   ENTER:
   You:   INPUT cuu drive-type <Enter>
          (where cuu is the tape drive address, and drive-type
          is the type of drive, such as 3480, 3490, etc.)
System:   ENTER:
   You:   OUTPUT cuu FB-512 volid <Enter>
          (where volid is the primary CLS and VM/HSC volume,
          ESA001 or CLSPRM, and cuu is its real address, normally C01)
System:   ENTER:
   You:   RESTORE ALL <Enter>
System:   RESTORING volid
          DATA DUMPED mm/dd/yy AT hh.mm.ss GMT FROM volid RESTORED TO volid
          INPUT BLOCK EXTENTS              OUTPUT BLOCK EXTENTS
             START        STOP                START        STOP
             00000000     nnnnnnnn            00000000     nnnnnnnn
          END OF RESTORE
          BYTES RESTORED nnnnnnnnnn

          ENTER:
```

11. Wait for the tape to unload, then remove it.

12. Run VMSSBLD BKP to rebuild backup volumes.

    Note: **Skip** this step if the volumes are not working.

    The BKP version of VMSSBLD keeps the data on the volumes synchronized.

13. Re-IPL the system from the system residence volume (ESARES or VMSPRM), performing a COLD start.

    Note: A COLD start of VM is necessary; however, it will result in the loss of all spool files.

Making Changes to the System Directory (9221 and 9370 systems)

It may become necessary to change the CP directory. For example, you may need to change the CP logon passwords or the LP virtual machine names. You must make the changes from the MAINT userid. **Whenever you edit the system directory on either the primary or the backup disk, you must use the VMSSDIR tool.** Doing so ensures that the directories on both disk volumes remain synchronized.

General Changes

To edit a directory, type:

VMSSDIR EDIT <Enter>

This will edit the directory (using XEDIT) of the disk you are currently accessing. After typing **FILE <Enter>** to end the edit session, you have three options:

DIRECT   Builds your changes on the alternate disk and issues CP DIRECT on both systems.

SAVE   Quits the edit without putting your changes online (does not build your changes on the alternate disk or issue the CP DIRECT commands).

RESTORE   Leaves the directory as it was before you made changes.

Note: When you choose the **SAVE** option, you will need to execute VMSSBLD DIRECT at some point to build the changes on the alternate disk and put the changes online.

Figure 7-1 shows the output from executing VMSSDIR EDIT. Figure 7-2 on page 7-10 shows the output from executing VMSSDIR DIRECT.

```
   Ready;
   VMSSDIR EDIT <Enter>

   (... put into XEDIT mode, exit normally by typing "file"
    on the command line when finished ...)

    VMSSDIR: You have changed the source directory for the running system.

    VMSSDIR: Type "DIRECT" to place it online now.
    VMSSDIR: Type "SAVE" to quit without putting it online.
    VMSSDIR: Type "RESTORE" to abandon the changes you made.
   SAVE <Enter>
    VMSSDIR: Be sure to issue VMSSDIR DIRECT to
    VMSSDIR: make the changes you made take affect.
```

Figure 7-1. Example Output for VMSSDIR EDIT

```
    Ready;
    VMSSDIR DIRECT <Enter>

     VMSSDIR: Building alternate system (ESA002/VMSBKP) directory...

     VMSSDIR: Updating directory on alternate system (ESA002/VMSBKP)...

    EOJ DIRECTORY UPDATED AND ON LINE

     VMSSDIR: Updating directory on running system (ESARES/VMSPRM)...

    EOJ DIRECTORY UPDATED AND ON LINE
    Ready;
```

Figure   7-2. Example Output for VMSSDIR DIRECT

Adding an LP (9221 systems only)

To add an LP virtual machine name to the system directory, type:

VMSSDIR ADDLP *lp-name* **<Enter>**

Where *lp-name* is the LP you want to add. This will automatically make all necessary
changes to the system directory.

Processing a CP DUMP (9370 systems only)

To process a CP DUMP, perform the following steps:

1. Log on to the MAINT userid. (VMSS is the default password.)

2. Locate the dump spool file in the OPERATNS reader.

   CP QUERY RDR OPERATNS ALL <Enter>

   The CP abend code and spoolid should be displayed (see the IBM *VM/SP System Messages and Codes* manual).

3. Locate the CPNUC MAP file. Ensure that the date of this file is at least as current as the date the system was last generated. To find this date, type:

   CP QUERY CPLEVEL <Enter>

4. Access the 194 disk as device B.

   ACCESS 194 B <Enter>

5. Type **MAP CP <Enter>**. You will be prompted to enter the filename, type and mode of CPNUC MAP B. Make a note of the filename, type, and mode of the CPIPCS MAP that is created.

6. Transfer the dump to MAINT's reader.

   CP TRANSFER SYSTEM *spoolid* *** <Enter>**

7. Type: **DUMPLOAD <Enter>**

8. Note the assigned problem number (PRB*nnnnn*).

9. Using VMFPLC2, dump the PRB*nnnnn* DUMP0001 file to tape.

Reconfiguring the VM/HSC CDS (9221 and 9370 systems)

When you need to reconfigure the VM/HSC CDS on a VM Storage Server, you should follow this procedure (rather than the one shown in the *4400 ACS VM/Host Software Component System Programmer's Guide*). However, you will still need access to that book since this procedure refers to it.

1. Log on to the MAINTSTK userid. (VMSS is the default password.)

2. Make the appropriate changes to your LIBGEN file, LIBSLSF ASSEMBLE.

    Refer to the *4400 ACS VM/Host Software Component System Programmers Guide* for specifics on how to code LIBGEN macros.

    Note: LIBSLSF is the required filename of the LIBGEN source file. You may want to save your current LIBSLSF ASSEMBLE file to a different name before modifying it.

3. Reassemble your LIBGEN.

    LIBGEN LIBSLSF \<Enter>

4. Shut down the STKACS machine.

    ACS STOPSCP \<Enter>

5. Copy the 500 and 501 disks to the 400 and 401.

    VMSSCOPY STKACS 500 STKACS 400 \<Enter>
    VMSSCOPY STKACS 501 STKACS 401 \<Enter>

6. Relabel the 400 and 401 disks.

    VMSSLINK STKACS 400 400 MR Z \<Enter>
    FORMAT 400 Z (LABEL \<Enter>
    volid **\<Enter>**
    (where *volid* is the spare CDS volume on the primary server:
    PRMNEW on 9221 systems; CDBPRM on 9370 systems)
    REL Z (DET \<Enter>

    VMSSLINK STKACS 401 401 MR Z \<Enter>
    FORMAT 401 Z (LABEL \<Enter>
    volid **\<Enter>**
    (where *volid* is the spare CDS volume on the standby server:
    SHDNEW on 9221 systems; CDBSHD on 9370 systems)
    REL Z (DET \<Enter>

7. Bring the STKACS machine back up.

    AUTOLOG STKACS VMSS (NOJOB \<Enter>

    Note: The NOJOB option is necessary, as it keeps the VM/Host Software Component from coming back up.

8. Back up the current CDS.

    ACS SUBMIT BACKUP VMSSJCL \<Enter>

Note: If an error occurs during the reconfiguration, you can restore the saved CDS by typing:

```
ACS SUBMIT RESTORE VMSSJCL <Enter>
```

9. Initialize the new CDS using the updated LIBSLSF.

```
ACS SUBMIT SLICREAT VMSSJCL <Enter>
```

The new primary CDS is created on the STKACS 400 disk, and the new shadow CDS is created on the STKACS 401 disk.

10. Copy the volume information from the old CDS (on the 500 disk) to the newly created CDS (on the 400 disk).

```
ACS SUBMIT RECONFIG VMSSJCL <Enter>
```

After this job completes successfully, the reconfigured CDS exists on the STKACS 400 disk. (The shadow is on the 401 disk.)

11. Shut down the STKACS machine.

```
ACS STOPSCP <Enter>
```

Note: Wait until the STKACS machine is logged off before starting the next step.

12. Copy the new 400 and 401 disks back to the 500 and 501.

```
VMSSCOPY STKACS 400 STKACS 500 <Enter>
VMSSCOPY STKACS 401 STKACS 501 <Enter>
```

13. Bring the STKACS machine back up and into production.

```
AUTOLOG STKACS VMSS <Enter>
```

14. Copy the LIBGEN changes to the alternate system.

```
VMSSCOPY MAINTSTK 255 MAINTST2 255 <Enter>
VMSSCOPY MAINTSTK 254 MAINTST2 254 <Enter>
```

Changing the I/O Configuration (9370 systems only)

Use this procedure to add devices to the I/O configuration on a 9370 system. Several extra steps for the IOGEN should be performed to ensure that the changes are activated on all the proper volumes.

1. Log on to the MAINT userid. (VMSS is the default password.)

2. Using XEDIT, edit the DMKRIO ASSEMBLE file. Code the proper macros in the file. The macros that can be coded in the DMKRIO ASSEMBLE file are fully described in the IBM manual *VM/SP Planning Guide and Reference*. When you are finished, at the XEDIT command line, type **FILE <Enter>** to save the changes and exit XEDIT.

3. Assemble the DMKRIO CP module.

   VMSSASM DMKRIO <Enter>

4. Create the primary CP nucleus.

   VMSSGEN VMSPRM <Enter>

5. When the system enters wait state 12, re-IPL CMS.

   CP I CMS <Enter>

   Note: If the system enters any other wait state, do **not** re-IPL; call StorageTek Software Support for assistance.

6. Create the backup CP nucleus.

   VMSSGEN VMSBKP <Enter>

7. When the system enters wait state 12, re-IPL CMS.

   CP I CMS <Enter>

   Note: If the system enters any other wait state, do **not** re-IPL; call StorageTek Software Support for assistance.

8. If you have a split-server environment, repeat Steps 1 through 7 on the **standby** server.

9. Shut down CLSM and the VM/Host Software Component. For instructions, see Steps 1 and 2 in "Shutting Down (9221 and 9370 systems)" on page 7-5.

10. To activate the changes you have made, re-IPL the system(s).

    SHUTDOWN REIPL <Enter>

Changing System Real Storage Size (9370 systems only)

The amount of real storage delivered with a VM Storage Server is not always enough as a Library Control System grows to handle more clients. When new storage is added, the system must be rebuilt to allow the new storage to be used. Use the following procedure to change the system nucleus.

1. Log on to the MAINT userid. (VMSS is the default password.)

2. Using XEDIT, edit the DMKSYS VMSPRM file. Change the SYSCOR macro from RMSIZE=xM to RMSIZE=yM, where x is the current number of megabytes and y is the new number. When you are finished, at the XEDIT command line, type **FILE** **<Enter>** to save the changes and exit XEDIT.

3. Build the new nucleus.

   VMSSGEN VMSPRM SYSID=$xxxxxxxx$ <Enter>

   where $xxxxxxxx$ is the current system ID as it appears on the console.

4. Using XEDIT, edit the DMKSYS VMSBKP file. Change the SYSCOR macro from RMSIZE=xM to RMSIZE=yM, where x is the current number of megabytes and y is the new number. When you are finished, at the XEDIT command line, type **FILE** **<Enter>** to save the changes and exit XEDIT.

5. Build the new nucleus.

   VMSSGEN VMSBKP SYSID=$xxxxxxxx$ <Enter>

   where $xxxxxxxx$ is the current system ID as it appears on the console.

6. Shut down CLSM and the VM/Host Software Component. For instructions, see Steps 1 and 2 in "Shutting Down (9221 and 9370 systems)" on page 7-5.

7. From the Operator console, shut down and re-IPL the system:

   SHUTDOWN REIPL <Enter>

This modifies the system nucleus for both the primary and backup servers. Re-IPLing the system makes the changes effective.

Installing Shared Segment LP Code (9370 systems only)

Shared segments are defined as programs that can be shared between virtual machines or re-entrant programs. In VM these programs are generally loaded beyond the memory size of the virtual machine by the Control Program, CP, and cannot overlap in memory with other shared programs in use by the virtual machine. The purpose of a shared segment is to save system memory and thus improve performance.

Why You May Want to Install the Shared LP Code

Each client system requires one LP for communications attachment. The LP is capable of communicating using either TCP/IP connections or bi-synchronous connections. Therefore, if there are, for example, five clients there will be four LPs running to support these clients. Each LP uses about 250,000 bytes of storage for executable code. With five LPs that amounts to 1,250,000 bytes of storage system-wide. If the shared segment is installed you have a savings of 1,000,000 bytes of storage for the system. This memory savings can reduce the system paging rate and improve performance. The gain is most noticeable on systems with many LPs or systems with limited memory.

Installing the Shared Segment LP Code

To install a shared segment, CP has to be made aware of its existence and a memory image of the program has to be written to a special system area. The files DMKSNT VMSPRM and DMKSNT VMSBKP found on the MAINT 191 disk contain the definitions of the LP shared segments. This definition is coded but ignored when the file is assembled through the use of assembly language directives. To use the segment, perform the following tasks:

1. Log on to the MAINT userid. (VMSS is the default password.)

2. Use XEDIT to edit the DMKSNT VMSPRM file and remove the AGO statement. When you are finished, at the XEDIT command line, type **FILE <Enter>** to save the changes and exit XEDIT.

3. Use XEDIT to edit the DMKSNT VMSBKP file and remove the AGO statement. When you are finished, at the XEDIT command line, type **FILE <Enter>** to save the changes and exit XEDIT.

4. Assemble the primary DMKSNT.

   VMSSASM DMKSNT PRM <Enter>.

5. Assemble the backup DMKSNT.

   VMSSASM DMKSNT BKP <Enter>

6. Build the primary nucleus.

   VMSSGEN VMSPRM <Enter>

7. When the system enters wait state 12, IPL CMS.

   CP IPL CMS <Enter>

   Note: If the system enters any other wait state, do **not** re-IPL; call StorageTek Software Support for assistance.

8. Build the backup nucleus.

```
VMSSGEN VMSBKP <Enter>
```

9. When the system enters wait state 12, IPL CMS.

    ```
    CP IPL CMS <Enter>
    ```

    Note: If the system enters any other wait state, do **not** re-IPL; call StorageTek
    Software Support for assistance.

10. Log on to the OPERATOR userid. (VMSS is the default password.)

11. Shut down and re-IPL the system.

    ```
    SHUTDOWN REIPL <Enter>
    ```

12. Log on to the MAINT userid again.

13. Type: **LINK MAINTSTK 354 <Enter>**.

14. Type: **ACCESS MAINTSTK 354 <Enter>**.

15. Load the LP code into memory.

    ```
    LOADMOD CLSSEG <Enter>
    ```

16. Save the memory image to the system disk area.

    ```
    SAVESYS CLSSEG <Enter>
    ```

17. Restart CLSM to activate the LP shared code.

Chapter 8. Managing System Resources

This chapter describes activities you should perform to manage your system's resources. It should be used as a supplement to the *4400 ACS Common Library Services User's Guide* and the *4400 ACS VM/HSC Operator's Guide*.

Chapter Contents

SYSTEM RESOURCES

The VM Storage Server system helps in continuous operation without operator intervention by using a Resource Manager (RM). The RM assures that vital system resources are not consumed; this would bring down the system. The RM prevents interruptions in service.

The RM is implemented as a service machine and is responsible for the following activities:

- Periodic Activities

  — Close the VM/Host Software Component Console Log

  — Purge old Log files (both VM/Host Software Component and CLS)

  — Purge old Trace files

  — Track system spool usage

- Event Driven Activities

  — Issue warning messages

  — Terminate active tracing

  — Purge spool files

  — Process dump files

By setting the variables in the control files provided, you can:

- Activate timer services

- Purge old SPOOL files

- Specify the default age for SPOOL files not under the direct control of the RM

- Purge SPOOL files according to specifications

- Control the overall operation of the RM

Periodic Activities

- Close the VM/Host Software Component Console Log

  The VM/Host Software Component has no built-in facility for closing its console log file. The RM periodically closes this file by sending an SMSG to the VM/Host Software Component service machine. The console log file is deleted either periodically (the normal situation), or when it is necessary to free spool space.

  The closing takes place under the direction of a control file. The default time period is once for each shift. This function is similar to an existing facility built into CLS. The CLS function closes the log based on its size.

- Purge Old Log Files

  Purging of log files is based on the ages of the log files. The older files are deleted after a few days. The retention of old files is also determined by a control file specifying the allowable age of the various spool file groups.

- Purging Old Trace Files

  Trace files too are less useful after time has passed and are deleted. The retention of these is defined in the same control file.

- Track System Spool Usage

  The spool space on a preconfigured system is relatively limited so RM monitors it periodically for depletion. When a set of thresholds is reached, the event-driven activities are triggered to correct the situation. The time intervals and thresholds are described in another control file.

Event-Driven Activities

- Issue Warning Messages

  At the first threshold level, a warning message may be issued. This is most useful during tracing when the terminal doing the tracing is notified of the potential problem. The terminal is then asked to terminate tracing. RM assumes a human being is monitoring the trace.

- Purge Spool Files

  At the second threshold level, a normal purge of the spool files occurs. This activity removes older log and trace files and any others which have passed their retention period.

- Terminate Tracing

  If there is still not enough spool space and CLS or VM/Host Software Component tracing is active, the RM terminates tracing. It does the termination by sending messages to the CLS and VM/Host Software Component service machines and having them close their trace files.

- Process Dump Files

  Since each VM/Host Software Component dump takes up 5MB of spool space, deleting old dumps and processing new ones clears a significant amount of used space. The RM accomplishes this by linking to the target machine's dump disk as the "A" disk and executing IPCSDUMP with default responses. If necessary, old dumps are deleted from the disk before proceeding. The summary records are retained.

Contents of the Control Files

Note: To change your defaults, you must change the control statements in the control files while you are logged on to MONITOR.

The names of the control files are:

- AWAKEN TIMES

- PURGE CONTROL

- MONITOR CONTROL

The control files contain statements that:

- Set the timer services

- Designate which file to purge from the spool

- Monitor the service machine for resources

In addition, RM has a spool space monitor.

Awaken Times

The AWAKEN TIMES control file contains statements that schedule the activation of services. The RM executes only the functions specified in the AWAKEN TIMES file.

The control statement for the timer services has the following format:

ALL { *hh:mm:ss* | *+nn* } *timestamp action*

Where:

ALL	Required.
hh:mm:ss	The hour, minute, and second of the event.
+nn	The interval, in seconds, between events.
timestamp	Reserved for use by the timer services. When you are entering the ALL statement, you do not enter the *timestamp*. Timer services updates this field, so the next time you edit the file, the *timestamp* shows when the action will run again.
action	An executable string; it may be an EXEC with its parameters, a module, or a CP or CMS command.

Figure 8-1 shows an example.

```
ALL +900 9107454851 TESTQ
ALL 00:01:00 9107500060 SMSG STKACS PERFLOG CLOSE
ALL 00:05:00 9107500300 SPLCLN RDR 3
ALL 00:08:00 9107500480 SPLCLN PRT 3
ALL 00:10:00 9107500600 SMSG STKACS CONSLOG CLOSE
```

Figure   8-1. Example of Awaken Times

Purge Control

The PURGE CONTROL file contains the DEFAULT and PURGE statements which control the purging of old SPOOL files. The purge program is invoked by the monitor program.

The control file, PURGE CONTROL, specifies the default age for files not specifically defined, and specifies a pattern and age for other spool files. The pattern includes the filename and filetype of the files; or all filenames; or all filetypes; or empty filenames; or empty filetypes. The age for each pattern is also included.

The Purge program examines spool files of defined names and types and determines their ages.

Note: When the spool is over 75% full, these files should be purged, received to disk, or written to tape with the SPTAPE utility.

Default Statement

The PURGE CONTROL file contains an optional Default statement which specifies the default age. If no Default statement is present, a value of three days is used. This three days is also used if no control file is found. The format is:

DEFAULT *nnn*

where *nnn* is a number between 1 and 365.

Purge Statement

The Purge statement allows you to select individual files or patterns of files to purge from the spool. The format is:

PURGE {*ownerid* | * }{*fname* | * | . }{*ftype* | * | . }{*sclass* | * } **nn**

Where:

PURGE   Required — specifies the Purge statement; a keyword that is matched on

ownerid   The owner of the file

fname   A spool filename

ftype   A spool filetype

*   Matches any string

.   Matches an empty string

sclass   The spoolfile class

nn   A number between 1 and 365 specifying the number of days you keep the file before you purge it.

The Purge statements must have the most restrictive conditions first. For example, a specification of PURGE * * * * 7 overrides any statements that follow and causes expiration in 7 days.

Figure 8-2 shows an example.

```
purge * * log L 4
purge * . .   A 2
purge * . .   * 4
```

Figure   8-2. Example of Purge Control

Monitor Control

The Monitor Control file contains the threshold information and destination information.

Threshold Statement

The Threshold statement establishes parameters for managing the spool file. The amount of space available for the spool file is checked regularly at intervals set by the Threshold statement, and action is taken when the specified percentage of allocated disk space has been used.

For the VM Storage Server spool file, two thresholds are maintained:

- When the first threshold is exceeded, a warning message is issued and the frequency for checking the spool space is increased to the interval specified for the second threshold.

- When the second threshold is exceeded, corrective action is taken immediately to free up space. This action includes the termination of tracing and closing of trace files, the purging of old files, and the processing of any dump files that are suitable for IPCS processing.

The format for the Threshold statement is :

THRESH *n pp mm*

Where:

THRESH	Required — specifies the Threshold statement; a keyword that is matched
n	The threshold number 1 or 2 (nothing else is acceptable)
pp	The threshold value in percent from 0 to 99. The default for the first threshold (1) is 75 percent; the default for the second threshold (2) is 85 percent.
mm	The interval value in minutes. The default for the first threshold (1) is 15 minutes; the default for the second threshold (2) is 5 minutes.

Threshold 2 must be larger than threshold 1. If no control file is found, or if Threshold statement values are invalid, the defaults are assumed.

Important

Since threshold 2 initiates corrective action, an inappropriate value that is either too high or too low could have unwanted consequences. For example, CLS tracing is stopped and traces are closed when threshold 2 is exceeded or if the file is allowed to become full. Do not change the default threshold values without considering the possible ramifications of your actions.

Destination Statement

The Monitor Control file also contains the names of the VM/Host Software Component and CLS virtual machines for command direction. This information is in the following format:

{HSC | CLS } *vmname*

Where:

HSC │ CLS   The user must select one of these as the destination for the command.

vmname   The name of a virtual machine.

Figure 8-3 shows an example.

```
    THRESH 1 75 15
    THRESH 2 85 5
    HSC STKACS
    CLS CLSM
```

Figure   8-3. Example of Monitor Control

Chapter 9. Recovery Procedures

This chapter describes Library Control System procedures for the single-, split-, and dual-server environments. It should be used as a supplement to the *4400 ACS Common Library Services User's Guide* and the *4400 ACS VM/Host Software Component Operator's Guide*.

Chapter Contents

SINGLE SERVER RECOVERY PROCEDURES AND STRATEGY

The types of problems that can potentially occur on the VM Storage Server are:

* Disk failures

* Database failures

* Processor failures

Recovery procedures for each of these failure types are discussed in this chapter.

Disk Failure

It is possible to recover from disk failures with minimal interruption in service because of the way the VM Storage Server is designed. All of the data necessary to run the system is packaged on a single disk volume, while a "shadow" copy is kept on a second volume. Only one of the two disk volumes is required for Library Control System operation, so it is possible to lose an entire volume without rendering the Library Control System inoperable.

If a fatal disk error occurs, the recovery procedure is to simply re-IPL from the remaining good disk. (The system console messages that indicate a faulty disk should also identify which disk is defective.) Typically, it only takes five or 10 minutes to fully initialize Library Control System operation after IPL, so the length of the service interruption depends primarily on how quickly the disk failure is discovered by the operator.

Recovery Procedure

Perform the following steps to recover from a disk failure:

1. Power down the inoperative disk, if possible.

    Note: If you cannot power down the disk, log on to MAINT and type:

    CLIP *cuu label* **<Enter>**

    Where *cuu* is the real address of the volume, and *label* is a descriptive label you want to assign, such as BADRES or BAD001.

2. Perform a normal IPL from the operative disk. See the appropriate documentation listed below.

Table 9-1. Supporting IBM Hardware Documentation	
System	**Document Title**
ES/9000	*Operating Your System, Volume 1*
ES/9370	*Operating Your System*

    Note: If you are unable to do a shutdown, IPL with the proper address and wait for the automatic IPL to complete. It may take several minutes for the IPL to complete.

Disk Restore Procedure (9370 systems)

Perform the following steps to restore a failed disk:

After the faulty disk is repaired or replaced, the following steps restore the dual-disk configuration and return to normal mode.

1. Shut down the VM/Host Software Component and stop the CLS according to the procedures in "Shutting Down (9221 and 9370 systems)" on page 7-5, but *do not* shut down VM.

2. Log on to MAINT (VMSS is the default password).

3. After receiving the Ready; prompt, execute VMSSBLD.

   - If you are restoring the system after a primary disk has failed, type:

     VMSSBLD PRM <Enter>

   - If you are restoring the system after a backup disk has failed, type:

     VMSSBLD BKP <Enter>

   This step takes approximately 20 minutes.

4. Perform a normal IPL and a COLD start from C00. See the appropriate documentation listed below.

Table 9-2. Supporting IBM Hardware Documentation	
System	**Document Title**
ES/9000	*Operating Your System, Volume 1*
ES/9370	*Operating Your System*

> **Note:** A COLD start of VM is necessary and will result in the loss of all spool files.

Disk Restore Procedure (9221 systems)

Perform the following steps to restore a failed disk:

After the faulty disk is repaired or replaced, the following steps restore the dual-disk configuration and return to normal mode.

1. Shut down the VM/Host Software Component and stop the CLS according to the procedures in "Shutting Down (9221 and 9370 systems)" on page 7-5, but *do not* shut down VM.

2. Log on to MAINT (VMSS is the default password).

3. Start the format program for VM/ESA:

   ICKDSF <Enter>

4. Format the repaired disk.

   - If you are repairing the C00 volume, follow the steps in "Step 3 — Format the System Volume" on page 3-16

- If you are repairing the C01, C02, or C03 volumes, follow the steps in "Step 4 — Label the Remaining Volumes" on page 3-17.

5. If you are repairing the C01, C02, or C03 volume, format and allocate the volume (follow the steps in "Step 6 — Format and Allocate the TMPxxx Volumes as ESAxxx" on page 3-22).

6. Use the CLIP EXEC to put temporary labels on the paired disks (C00 is paired with C01, and C02 is paired with C03). For example, if C01 is the repaired disk, then type:

   ```
   CLIP C00 VOLC00 <Enter>
   CLIP C01 VOLC01 <Enter>
   ```

   Note: First, you may have to type the following:

   ```
   ATTACH C00 * C00 <Enter>
   ATTACH C01 * C01 <Enter>
   ```

7. Shut down the system (follow the steps in "Step 4 — Shut Down the System" on page 3-15).

8. IPL from the C02 disk (follow the steps in "Step 3 — IPL VM" on page 3-20).

   Note: Enter **C02** in the Load address field.

9. Restart VM (follow the steps in "Step 4 — Start VM" on page 3-20).

10. Save CMS (follow the steps in "Step 5 — Create the CMS Saved System" on page 3-22).

11. Label the volumes:

    ```
    ATT C00 * C00 <Enter>
    ATT C01 * C01 <Enter>
    CLIP C00 ESARES <Enter>
    CLIP C01 ESA001 <Enter>
    DETACH C00 <Enter>
    DETACH C01 <Enter>
    ```

12. If you are running in dual-server mode, return to single-server mode (follow the steps in "Step 1 — Return to a Single-Server Configuration" on page 3-8, being sure to use the NOCOPY option).

13. Build new primary volumes:

    ```
    VMSSBLD PRM <Enter>
    ```

14. If applicable, return to dual-server mode (follow the steps in "Task 8 — Convert to a Dual Configuration" on page 3-33, being sure to use the NOCOPY option).

15. Shut down the system (follow the steps in "Step 4 — Shut Down the System" on page 3-15).

16. IPL from the C00 disk (follow the steps in "Step 3 — IPL VM" on page 3-20).

17. Restart VM (follow the steps in "Step 4 — Start VM" on page 3-20).

18. Save CMS again (follow the steps in "Step 5 — Create the CMS Saved System" on page 3-22).

19. Re-IPL the system (follow the steps in "Step 6 — Restart the System" on page 3-32).

Database Failure

Recovery from a database failure is possible because of the shadow copies of the CDS and CDB that are kept by the VM Storage Server. When both disk volumes are operational, the shadow copies are kept on separate volumes. However, when operating with only one disk volume (meaning one has experienced failure), the system creates and maintains shadow copies on the remaining disk volume until the system is brought back up with two volumes.

Perform the following procedures to recover from database failures:

- To recover from a missing or corrupted shadow database, run VMSSCOPY to copy the error-free copy to the corrupted copy.

- To recover from a lost CDB, follow the "Configuration Database Recovery" procedures found in the *4400 ACS Common Library Services User's Guide*.

- To recover from a lost CDS, follow the "Control Data Set Recovery" procedures found in the *4400 ACS VM/Host Software Component System Programmer's Guide*.

It is also possible to perform file restores for lost or corrupt files, since minidisks on the primary disk volume are duplicated on the backup volume. The directories on both systems map all minidisks, making it possible to link to the alternate minidisk and restore a particular file. Keeping both volumes identical provides an online backup.

It is also possible to make changes to the directory and to some of the minidisk files. However, when a change is made to a file on one volume, **it is the user's responsibility** to ensure that the change is duplicated on the alternate system.

Tools are available to help you manage this responsibility:

- Use VMSSDIR to make changes to a directory on either disk.

- Use VMSSCOPY to duplicate file changes on the alternate disk.

(See "VMSSCOPY" on page 10-9 and "VMSSDIR" on page 10-12 for further descriptions of these two tools.)

Processor Failure

It is not possible to recover from a processor failure in a single-server configuration. The term "processor failure" is used here to mean any type of Library Control Processor hardware failure that renders the system inoperable. The Library is inaccessible (except for manual mode) until the processor has been repaired.

DUAL SERVER RECOVERY PROCEDURES AND STRATEGY

The dual-server configuration provides an extra level of disaster protection since there are two Library Control Processors mirroring each other, in addition to the shadowing that occurs within the disk volumes of each processor. Both Library Control Processors run the standard VM Storage Server software and VM/Host Software Component. Only the "active" or "primary" Library Control System is actually processing requests, however. The active system executes CLS and the appropriate Logical Ports.

The other Library Control Processor in the dual-server configuration is called the "standby" Library Control System. Since the Logical Ports and CLS are not active on the standby Library Control System, the only VM/Host Software Component activity on that machine is its normal heartbeat. The VM/Host Software Component for the standby Library Control System is on the STKACS userid. Client communication software for the standby Library Control System is on the TCPIP userid if TCP/IP is used, or on the CLSCOMM userid if PVM is used. If both TCP/IP and PVM are used, the machine is initialized for both TCP/IP and CLSCOMM.

The role of active or standby Library Control System can be played by either Library Control Processor. Should any part of the primary Library Control System fail, the Logical Ports and CLS machines can be started quickly on the standby Library Control System using operator commands.

> **Important**
>
> The CLSM machine can be active on only one Library Control System at a time, unless you are using ae split-server configuration.

Dual Server Disk or Database Failure

Recovery from a disk or database failure in the dual-server environment is the same as in a single-server configuration (described in "Single Server Recovery Procedures and Strategy" on page 9-2).

Dual Server Processor Failure

Before describing the recovery process for a processor failure in a dual-server environment, it is important to understand the various software components that are involved and what state they are in on both the active and standby Library Control Systems.

- The VM/Host Software Component

  In a dual-server environment the VM/Host Software Component is active on both Library Control Processors. Each VM/Host Software Component has a unique host ID and they both share the same Configuration Data Set (CDS). Using multi-host support and serialized database control, the VM/Host Software Component is resident on both Library Control Processors simultaneously without compromising the database integrity.

- The Common Library Services Manager (CLSM) and Logical Ports (LPs)

  The CLSM and LPs can only be active on one Library Control System at any given time. This is because the CLSM cannot serialize database updates. If two CLSMs were up at the same time, both accessing the same database, the integrity of the data would be lost. Similarly, the LPs cannot be up unless CLSM is up on the same

machine. This means that the LP machines can only be active on one of the two Library Control Processors at a time.

- Communication Access Method Code

  The TCP/IP service machine can be active on both the active and standby Library Control Systems. Each TCP/IP path has a unique Internet address. The two Library Control Systems can be attached to the same LAN or they can be on separate LAN's.

The procedure for recovering from a failure on the active Library Control System is to bring up the CLSM and LPs on the standby Library Control System. The amount of down time experienced depends on how quickly the failure is discovered and how long it takes to re-establish communication with the client system(s). Typically, initialization of the CLSM takes one to two minutes. The communication handshake and potential recovery processing that takes place between the client system(s) and the Library Control System may take several minutes, depending on what was happening at the time of the failure (such as the number of mounts that were in process).

Dual Server Processor Status

The following troubleshooting steps will help you determine the status of the various pieces in a dual-server configuration:

1. If there is a response when you send a QUERY CLIENT command to the active Library Control System, CLSM is up on the active Library Control System.

2. If there is a response when you send a DISPLAY VOLUME command to the active Library Control System, VM/Host Software Component is up on the active Library Control System.

3. If there is a missing heartbeat message (SLS0737D) on the standby Library Control System, VM/Host Software Component is down on the active Library Control System and up on the standby Library Control System.

   Warning

   You must make sure that the Host Software Component is really down before you issue a RECOVER HOST command. See "Shutting Down (9221 and 9370 systems)" on page 7-5.

   ---

4. In certain circumstances, the failed server may still have a reserve on the CDS database, locking out other hosts. A symptom of this is that the remaining active server or servers fail to respond to any VM/Host Software Component commands. In this situation, the remaining active servers must be shut down and restarted to cancel the reserve.

   If there is no missing heartbeat message on the standby Library Control System and no response to a DISPLAY VOLUME command on the active Library Control System, then a reserve lockout condition may exist. The missing heartbeat is a good indication that the other host is no longer accessing the CDS database.

   Important

   Another reason for this could be that one server is running so slowly that the display has not been refreshed yet. You should ensure that the Host Software Component is really down on the failed server. See "Shutting Down (9221 and 9370 systems)" on page 7-5.

If there is a reserve lockout, you need to power off the active Library Control System to free up the reserve lockout. When you power the machine back up, VM/Host Software Component will start automatically but CLS will have to be restarted. You will also need to re-IPL the standby server.

Dual Server Recovery Procedure

> **Important**
>
> StorageTek recommends that you run the following recovery procedure from the OPERATOR logon, but you can run it from another logon with similar permissions that also has access to MAINTSTK's 254 RUN disk.

Notes:

1. While switching from the primary to the backup processor, the VM/Host Software Component on the primary server may have a reserve on the CDS. The VM/Host Software Component issues the reserve on the CDS to gain exclusive access to the CDS. Until this reserve is released by the VM/Host Software Component that issued it, no other host can access the CDS. This procedure may not be possible if one of the servers is down. The only way for the backup server to have access to the CDS in this situation is to re-IPL the active server or servers.

2. If the VM/Host Software Component is running on both servers, there is a small possibility that one of them will abend whenever the other server is shut down or crashes. In this situation, the operator must stop and restart the VM/Host Software Component on the operational server.

3. If the primary server was processing requests when you switched from primary to backup, information kept by the server may be lost or corrupted. Since the servers do not share CLSMs lock information, the standby server cannot always recover mount and lock information. As a consequence, the client systems may have to attempt some form of recovery and re-issue some of its commands. Also, the operator may have to intervene on the behalf of a client to recover from problems caused by the switch, such as dismounting a tape that has no lock or mount information, or recovering a corrupted database.

   Exact recover procedures will vary depending on operating environment and client systems. Please consult the *HSC Operator's Guide* and the *CLS User's Guide* for more information on these commands.

4. If any ENTER jobs were running on the failed server, you may have to physically inspect the CAPs for any remaining cartridges. In the LSM recovery process, the robot inspects the first slot in the CAP of the LSM. If a cartridge is absent from that slot, it assumes the CAP is empty. However, since the ENTER operation starts with the first slot, tapes could be left in the CAP if the operation did not complete. The LSM recovery operation would assume the CAP was empty, and tapes would be lost.

   If an EJECT operation was interrupted, some tapes may have already been deleted from the CDS even though they are still in the CAP. You should remove those tapes before resuming normal operations.

5. If the communications software is not working properly, you may have to quiesce the client machines and restart them. If TCP/IP is used, you may also have to redirect the client machines to new TCP/IP addresses.

Step 1: Shut Down the Primary Server

Perform the following steps on the primary server:

1. Enter the following CP Query command to determine if the CLSM is running:

   Q CLSM <Enter>

   If the CLSM is not operating, you will receive the following message:

   HCPCQU4SE CLSM not logged on

   In this case, skip to step 4.

   If the CLSM is operating, you will receive the following message:

   CLSM - DSC

2. If the CLSM is operational, terminate it with the following:

   SMSG CLSM STOP ALL <Enter>

3. Repeat the CP query command to see if you successfully stopped the CLSM.

   If the CLSM is still running, issue the following command:

   FORCE CLSM <Enter>

4. Determine if there are any outstanding VM/Host Software Component messages by entering the following command:

   ACS Q R <Enter>

   Reply to any outstanding messages you find.

   If there are no outstanding messages, the following will appear on the screen:

   SLKOQU094I Reply outstanding messages:
   SLKOQU094I None
   SLKTKC749I Command complete

5. Shut down the VM/Host Software Component by issuing:

   ACS STOPSCP <Enter>

6. If the VM/Host Software Component does not shut down after about two minutes, issue the following command:

   ACS CANCEL ACS <Enter>

7. If the VM/Host Software Component still does not shut down after about two minutes, issue the following command:

   FORCE STKACS <Enter>

Step 2: Switch to the Standby Server

Note: If you are using a split-server configuration, proceed to Step 3.

Perform the following steps on the standby server:

1. Start the utility.

    VMSSRUN COLD <Enter>

    This command exec will start up both CLSM and VM/Host Software Component.
    While these are being started, the VMSSINIT EXEC will verify that there are both
    primary and shadow CDS and CDB databases. If the primary server is down due to
    a power loss, only one of these databases will be available. As a consequence, the
    VMSSINIT EXEC will make a copy of each of these databases onto a local DASD
    so that shadowing can still be done.

2. Press **<Enter>** one more time when prompted, as shown in Figure 9-1.

```
 Ready;
 vmssrun
  VMSSRUN: You are about to resume Storage Server operation on
  VMSSRUN: this processor. Be sure that the CLSM machine is not
  VMSSRUN: active (logged on) on the other processor.
  VMSSRUN: Hit ENTER to continue or type any character to quit.

 <Enter>

 AUTO LOGON   ***   CLSM      USERS = 011
 Ready;
```

Figure   9-1. VMSSRUN in the Dual-Server Configuration

3. If you switched servers while the primary server was processing mounts, you must
    enter the following command:

    ACS .RECOVER *hostid* **FORCE <Enter>**

    This command is described in the *VM/Host Software Component Operator's Guide*.
    It will enable full automated operation.

    > ┌─── **Warning** ───
    >
    > You must make sure that the Host Software Component is really down before
    > you issue a RECOVER HOST command. See "Shutting Down (9221 and 9370
    > systems)" on page 7-5.

    The RECOVER command will allow the VM/Host Software Component on the
    standby server to access all volumes that were locked by the primary server. The
    HOSTID is VM01 and the "FORCE" parameter lets the backup VM/Host Software
    Component execute the recovery operation before it determines that the other
    VM/Host Software Component is inactive.

    If this command is not entered, the standby server can no longer process commands
    concerning these volumes. Also, the Host Software Component (VM01) must be
    re-cycled before it can use the CDS again after this command has been processed.

4. If the VM/Host Software Component on the failed server actually had volumes selected, the following message will appear:

    *xx*SLS0738 Confirm RECOVER for host *CCCCCC*, reply "YES" or "NO."

    where *xx* is the message number.

    Enter the following command the recovery can execute:

    ACS REPLY *xx* YES <Enter>

    If the primary VM/Host Software Component did not have any resources locked, the following message is displayed, and no operator intervention is required:

    SLS08511 Cross Host Recovery not needed for host *CCCCC*

5. If any volumes mounted by the down VM/Host Software Component are in the transport in the read/write position, the standby server's VM/Host Software Component will display the following:

    *xx*SLS0869D errant recovery of *VVVVVV* - *DDDDDD* is loaded.
    Reply Retry or Ignore (R/I).

    where *xx* is the message number.

    The client system must attempt to dismount the tape.

    If the client remained active during the switch over and has successfully connected to the standby server, ignore the message and let the client job run to completion.

    Otherwise, if the client cannot dismount the tape automatically, attempt to issue an unload from the client system and enter the following:

    ACS REPLY *xx* R <Enter>

6. After switching to the standby server, the VM/Host Software Component will probably detect a loss of heartbeat from the primary server and issue the following message:

    *xx*Heartbeat monitor has detected missing host *CCCCCC*,
    reply "WAIT", "DELAY" or "RECOVER".

    where *xx* is the message number.

    Issue the following command:

    ACS REPLY *xx* RECOVER <Enter>

7. At this point, the standby Library Control System becomes the active Library Control System. The state of the CDB and the CDS databases will be as they were at the point of the failure.

    If the standby Library Control System does not yet function as the primary Library Control System after VMSSRUN has run, the communications software is not working properly. In this case, you may have to quiesce the client machines and then restart them. If TCP/IP is used, you may also have to redirect the client machines to new TCP/IP addresses.

Starting CLSM LPs on the Standby Server

To start the CLSM LPs, perform the following steps:

1. To determine if the CLSM is up, watch for the following message:

   `CLS3008 Common Library Services Initialization`

   This message is displayed once CLSM has completed its startup sequence.

2. Check to see if the LPs have been autologged by entering the following command:

   SMSG CLSM Q LP <Enter>

3. If the desired LPs are not active, start them from the OPERATOR ID (or login with similar permissions and has access to MAINTSTK's 254 RUN disk) by entering the following command:

   SMSG CLSM START *lp-name* **<Enter>**

   Where *lp-name* is the name of the LP to be started.

Switching from Standby Server to Primary Server

To switch from the standby server back to the primary server, perform the following procedure:

1. Make sure that both servers are idle.

2. Prior to returning the servers to normal operations, you must restore the database(s) to the most recent level.

   a. Determine if the primary, shadow, or possibly both, went down. If both went down, the only working databases are on the backup minidisk on local DASD.

   If VMSSRUN detected the downed database during startup, it probably copied the remaining good database onto the backup on local DASD. Although this function maintains shadowing capability, the backup disk is not a part of the normal operating environment and the original disks should be restored as soon as possible. You can simply restore the normal operating environment by restoring the downed database with the remaining good one.

   b. **CDB Recovery Without Backup**

   If a single database was lost during normal operations, simply use the VMSSCOPY utility command to copy the good database over the corrupted version.

   To restore the shadow from primary, type:

   VMSSCOPY CLSM 500 CLSM 501 <Enter>

   To restore the primary from shadow, type:

   VMSSCOPY CLSM 501 CLSM 500 <Enter>

   c. **CDB Recovery With Backup**

A more serious but non-fatal condition can occur when the one available shared database fails while operating in either backup or degraded mode. If the other original database fails while operating in this mode, the backup on local DASD will be the only current copy.

Use the VMSSCOPY command to copy the latest copy from the backup disk onto both the primary and shadow databases.

To restore the shadow CLSM databases from backup, type:

```
VMSSCOPY CLSM 401 CLSM 501 <Enter>
```

To restore the primary CLSM databases from backup, type:

```
VMSSCOPY CLSM 400 CLSM 500 <Enter>
```

Perform Step b to make sure that the shadow and primary disks have a current copy of the database before resuming operations.

d. **CDS Recovery Without Backup**

If the database outage occurs during normal operations, either the primary or shadow disk will have a good copy of the database. Refer to the VM/Host Software Component documentation for recovery procedures.

If you are sure which database is current, you can use the VMSSCOPY command to restore the shadowing environment from the current copy.

To restore the shadow from the primary, type:

```
VMSSCOPY STKACS 500 STKACS 501 <Enter>
```

To restore the primary from the shadow, type:

```
VMSSCOPY STKACS 501 STKACS 500 <Enter>
```

e. **CDS Recovery with Backup**

If the only current copy of the CDS resides on backup DASD (such as when VMSSINIT created the backup, and the original database failed during normal operations) use the VMSSCOPY command to get the current CDS back to shared DASD.

To restore the shadow from backup, type:

```
VMSSCOPY STKACS 401 STKACS 501 <Enter>
```

To restore the primary from backup, type:

```
VMSSCOPY STKACS 400 STKACS 500 <Enter>
```

Then perform the previous step to restore the remaining database.

If the VMSSCOPY command was used to restore the databases, the VMSSRUN command will execute VMSSINIT which will rename the copied database(s) to the proper shadow or primary names.

3. Enter the following command to start up the VM/Host Software Component and CLSM; the primary databases will be restored automatically:

```
VMSSRUN COLD <Enter>
```

4. If the VM/Host Software Component on the standby server was processing commands when switching back to the primary server, the CDS will have to be recovered from the primary server. This can be accomplished by entering the following command:

ACS .RECOVER *stby* **FORCE <Enter>**

where *stby* is the HOSTID of the original standby server.

Chapter 10. Library Control System Tools

This chapter describes REXX execs provided to support a preconfigured VM Storage Server.

Note: These execs are available on both the 9221 and 9370 platforms unless specified otherwise.

Chapter Contents

TOOLS FOR THE SYSTEM

The VM Storage Server disk architecture provides data redundancy, making it more likely you will be able to recover all your data in the event of a disk failure. For instance, all minidisks that reside on the primary volumes (ESARES and ESA001 on 9221 systems; VMSPRM and CLSPRM on 9370 systems) are duplicated exactly in the same physical block addresses on the backup volumes (ESA002 and ESA003 on 9221 systems; VMSBKP and CLSBKP on 9370 systems). When files remain identical on both disks, they can serve as an online backup.

The tools described in this chapter perform all functions necessary to ensure that the disks remain synchronized. Therefore, whenever you perform disk maintenance activities, it is important that you use these tools. For example, when you build a new LIBGEN, you modify files on the MAINTSTK 255 and the MAINTSTK 254 disks. After doing so, you must use VMSSCOPY, as shown in Figure 10-1, to reflect these changes to the alternate minidisk. (See "VMSSCOPY" on page 10-9 for more details on VMSSCOPY.)

```
Ready;
VMSSCOPY MAINTSTK 255 MAINTST2 255 <Enter>

Ready;
VMSSCOPY MAINTSTK 254 MAINTST2 254 <Enter>
```

Figure 10-1. VMSSCOPY Examples

CDS and CDB Shadowing Design

CDS and CDB shadowing is always turned on in the VM Storage Server. CDS shadowing is described in the *4400 ACS VM/HSC System Programmer's Guide*. CDB shadowing is described in the *4400 ACS Common Library Services User's Guide*.

Using the Tools

All the VMSS tools are REXX execs that reside on the MAINT 192 minidisk. When you log on as MAINT, the MAINT 192 disk is accessed as the "D" disk. When you log on as CLSM, STKACS, or MAINTSTK, the MAINT 192 disk is accessed as the "V" disk.

To get a descriptive help message for a tool, type:

toolname **HELP <Enter>**

or

toolname **? <Enter>**

RESTTAPE

RESTTAPE restores a VM Storage Server system from tape. The default option of this command formats all disks and overwrites them with data from the tapes.

Note: This utility must be executed from the MAINT userid.

The syntax is as follows:

RESTTAPE <REFRESH>

Where:

REFRESH Restores an existing VM Storage Server system by applying only the PRODUCT tape. It does not format the disks, and it only restores tape files if they are more recent than the corresponding files on disk. It does not overwrite your existing customized data.

```
   Ready;
   RESTTAPE <Enter>

   Processing 3 components named:
     CLS      MAINTSTK HSC
   Installing all components: all disks will be formatted,
   all modified files overwritten and it is expected that a
   matching system has been installed.

   Ensure that all service machines are shut down and logged off.
   Then press ENTER to continue, anything else to quit
   <Enter>

   Processing 1 tape file for component CLS
     Component described as: Common Library Services 2.3.0
     Files to be restored to target id: MAINTSTK
     Formatting MAINTSTK 354 linked as 3EE mode B
     Disk label is CLSRUN and block size is 1024
     Restoring MAINTSTK 354
     Expecting 42 files
     Restore complete to: MAINTSTK 354

   Processing 1 tape file for component MAINTSTK
     Component described as: MAINTSTK 191 Disk
     Files to be restored to target id: MAINTSTK
     Formatting MAINTSTK 191 linked as 3EE mode B
     Disk label is MNTSTK and block size is 1024
     Restoring MAINTSTK 191
     Expecting 14 files
     Restore complete to: MAINTSTK 191
```

Figure 10-2 (Part 1 of 3). RESTTAPE Example

```
       Processing 8 tape files for component HSC
         Component described as: HSC Version 2.0.1 PUT 9602
         Files to be restored to target id: MAINTSTK
         Restoring MAINTSTK 250 with DDR
         MAINTSTK 250 restore complete
         Restoring MAINTSTK 251 with DDR
         MAINTSTK 251 restore complete
         Restoring MAINTSTK 252 with DDR
         MAINTSTK 252 restore complete
         Formatting MAINTSTK 253 linked as 3EE mode B
         Disk label is ZAP and block size is 1024
         Restoring MAINTSTK 253
         Expecting 5 files
         Restore complete to: MAINTSTK 253
         Restoring MAINTSTK 254 with DDR
         MAINTSTK 254 restore complete
         Formatting MAINTSTK 255 linked as 3EE mode B
         Disk label is ACS191 and block size is 1024
         Restoring MAINTSTK 255
         Expecting 11 files
         Restore complete to: MAINTSTK 255
         Formatting MAINTSTK 256 linked as 3EE mode B
         Disk label is IPCS and block size is 1024
         Restoring MAINTSTK 256
         Expecting 1 files
         Restore complete to: MAINTSTK 256
         Formatting MAINTSTK 257 linked as 3EE mode B
         Disk label is STKGCS and block size is 1024
         Restoring MAINTSTK 257
         Expecting 1 files
         Restore complete to: MAINTSTK 257

       Tape contained 11 files
       Completed dd mmm yyyy at hh:mm:ss
       DMSACP113S C(194) not attached or invalid device address

       Tape restore complete. Mount communications tape and press ENTER
       to install tape or type anything else to complete install.
       <Enter>

       Processing 1 component named:
         TCPIP
       Installing all components: all disks will be formatted,
       all modified files overwritten and it is expected that a
       matching system has been installed.

       Ensure that all service machines are shut down and logged off.
       Then press ENTER to continue, anything else to quit
       <Enter>
```

Figure 10-2 (Part 2 of 3). RESTTAPE Example

```
      Processing 2 tape files for component TCPIP
        Component described as: TCP/IP Version 2.2
        Files to be restored to target id: TCPIP
        Formatting TCPIP 191 linked as 3EE mode B
        Disk label is TCP191 and block size is 1024
        Restoring TCPIP 191
        Expecting 7 files
        Restore complete to: TCPIP 191
        Formatting TCPIP 192 linked as 3EE mode B
        Disk label is TCPSYS and block size is 2048
        Restoring TCPIP 192
        Expecting 45 files
        Restore complete to: TCPIP 192

      Tape contained 16 files
      Completed dd mmm yyyy at hh:mm:ss
      DMSACP113S C(194) not attached or invalid device address

      Tape restore complete. Mount communications tape and press ENTER
      to install tape or type anything else to complete install.
      N <Enter>

      Restore ending at hh:mm:ss dd mmm yyyy
      DMSACP113S C(194) not attached or invalid device address

      Process completed successfully
      Tape unloading
```

Figure 10-2 (Part 3 of 3). RESTTAPE Example

VMSSASM (9370 SYSTEMS ONLY)

VMSSASM is a front end to VMFASM for assembling CP modules, especially DMKSYS and DMKSNT.

Note: This utility must be executed from the MAINT userid.

The syntax is as follows:

VMSSASM *fn* **<***systyp***> (NOSetup**

Where:

fn	The name of the file to be assembled.
NOSetup	If this option is specified, SPGEN SETUP will not be done.
systyp	If *fn* is DMKSYS or DMKSNT, *systyp* is required and must be either PRM or BKP. The resultant text decks are named "*fn* TXTPRM" or "*fn* TXTBKP" accordingly.

Note: The control file used by VMFASM is DMKCLS.

VMSSBLD

VMSSBLD does VM Storage Server installation tasks. VMSSBLD uses the file VMSSBLD CONFIG to determine the real addresses to be used for each of the volumes. VMSSBLD CONFIG may need to be tailored to match the real hardware disk addresses of the system.

VMSSBLD is used to convert a single server to a dual server, or to build backup volumes. When building a dual server the "NOCOPY" option is prompted for. This option changes where the files are allocated to the system but does not copy the data. This is useful when converting a backup server from single to dual operations without overwriting the existing data.

To tailor the VMSSBLD CONFIG file, you will find the file on the "D" disk. Change the real address of the volumes as appropriate. Use XEDIT to make your changes.

Note: This utility must be executed from the MAINT userid.

The syntax is as follows:

VMSSBLD <PRM | BKP | DUAL | SINGLE | STANDBY> *(ft*

Where:

PRM   Builds new primary volumes (ESARES and ESA001 on 9221 systems; VMSPRM and CLSPRM on 9370 systems) using the backup volumes (ESA002 and ESA003 on 9221 systems; VMSBKP and CLSBKP on 9370 systems) as a base.

BKP   Builds new backup volumes (ESA002 and ESA003 on 9221 systems; VMSBKP and CLSBKP on 9370 systems) using the primary volumes (ESARES and ESA001 on 9221 systems; VMSPRM and CLSPRM on 9370 systems) as a base.

DUAL   Moves the CDB and VM/HSC CDS from local to shared volumes. This is for dual server systems only and requires shared DASD. If the DUAL option has already been run on a server, the utility will terminate with an error.

SINGLE   Returns a dual-server environment to single-server. In effect, it moves the VM/HSC CDS from shared volumes to local volumes.

STANDBY   Makes system changes necessary for STANDBY operation.

(ft   The optional file type of the configuration file which contains real addresses of the VM Storage Server volumes. File name is always VMSSBLD. The default file type if *ft* is omitted is **CONFIG**.

```
    Ready;
    VMSSBLD PRM <Enter>
    (builds new primary volumes)

    Ready;
    VMSSBLD BKP <Enter>
    (builds new backup volumes)
```

Figure 10-3. VMSSBLD Examples

VMSSCDS (9221 SYSTEMS ONLY)

VMSSCDS initializes the appropriate VM/HSC CDS minidisks for a single-, split-, or dual-server environment. This tool uses the VM/HSC SLIMDISK utility; see the *VM/HSC Installation Guide* for details.

Note: This utility must be executed from the STKACS userid.

The syntax is as follows:

`VMSSCDS PRIMARY | SINGLE | STANDBY`

Where:

PRIMARY   Initializes the minidisks needed for the primary server in a dual-server configuration.

SINGLE   Initializes the minidisks needed for a single-server configuration.

STANDBY   Initializes the minidisks needed for the standby server in a dual-server configuration.

VMSSCOPY

VMSSCOPY does a disk-to-disk DASD Dump Restore (DDR) copy. It can be used to copy individual or multiple minidisks.

Note: This utility must be executed from the MAINT userid.

The syntax is as follows:

```
VMSSCOPY │ vm1 vin vm2 vout │ [(Quiet]
         │ fn <ft> <fm>     │
```

Where:

vm1	The VM name of the owner of *vin*.
vin	Virtual address of the input disk.
vm2	VM name of the owner of *vout*.
vout	Virtual address of the output disk.
fn ft fm	Name of a control file listing multiple minidisks to be copied (default ft fm is "VMSSCOPY A").
(Quiet	Suppresses DDR output messages.
	Note: You can use an asterisk (*) to mean **this userid**. Using an equal sign (=) for *vm2* or *vout* means **same as *vm1* and *vin*.

To copy multiple minidisks at one time, you must create a control file specifying the minidisks to be copied. The control file should have one line per minidisk, and that line should be in the following format:

vm1 vin vm2 vout

vm1 and *vm2* cannot be an asterisk (*) in a control file. Blank lines and lines starting with an asterisk are ignored. See Figure 10-4.

```
    Ready;
    VMSSCOPY * 111 * 222 <Enter>

    Ready;
    VMSSCOPY MAINT 191 MAINT2 191 <Enter>

    Ready;
    VMSSCOPY CLS VMSSCOPY A <Enter>
```

Figure 10-4. VMSSCOPY Examples

VMSSDBK

VMSSDBK backs up CDS files to a tape or to another file. It also restores CDS files from a tape or from another file.

Before running this utility you must perform the following actions:

- Use the STOPSCP command to halt VM/HSC.

- Use the following command to access the 500 disk as device "Q."

    ACC 500 Q <Enter>

Note: This utility must be executed from the STKACS userid.

The syntax is as follows:

VMSSDBK <BACKUP | RESTORE> *CDS_fileid* **<TAP1 |** *fileid2>*

Where:

BACKUP	Copies CDS to either TAP1 or fileid2.
RESTORE	Copies either TAP1 or fileid2 to the CDS.
CDS_fileid	Specifies the full CDS fileid (filename filetype filemode) of the CDS.
TAP1	Specifies a tape drive attached to the user as virtual address 181.

> **Note:** If **TAP1** is specified, a real tape drive must be attached as virtual address 181 before invoking this exec. This is done with the CP ATTACH command as follows:
>
> **ATTACH** *ccu* *** 181 <Enter>**
>
> where *ccu* is the physical address of an available drive.

fileid2	Specifies the full CDS fileid (filename filetype filemode) of the file to receive, or contains the data of the backed-up CDS.

The CDS must reside on a CMS minidisk that was formatted using 4K blocks and reserved (using the CMS RESERVE command).

Figure 10-5 on page 10-11 shows how to use VMSSDBK to back up and restore CDS files.

```
    Ready;
    VMSSDBK BACKUP CDS PRIM Q TAP1 <Enter>

    Ready;
    VMSSDBK BACKUP CDS PRIM Q CDS BACK R <Enter>

    Ready;
    VMSSDBK RESTORE CDS PRIM Q TAP1 <Enter>

    Ready;
    VMSSDBK RESTORE CDS PRIM Q CDS BACK R <Enter>
```

Figure 10-5. VMSSDBK Examples

VMSSDIR

VMSSDIR performs all manner of CP directory maintenance. This tool edits the CP directory (using XEDIT), duplicates the changes on the alternate disk volume, and places the changes online. In so doing, the tools ensures that the disks remain synchronized.

Note: This utility must be executed from the MAINT userid.

The syntax is as follows:

VMSSDIR <EDIT | DIRECT | ADDLP *lp-name***>**

Where:

EDIT
Edits the directory residing on the system from which you execute VMSSDIR. After completing your edits you can:

- With the **DIRECT** option, place the changes online immediately

- With the **SAVE** option, save the changes but do not put them online immediately

- With the **RESTORE** option, restore the directory to the way it was before the edit

For example, if the current system residence volume (on 9221 systems) is ESARES, VMSSDIR EDIT will edit ESARES DIRECT A. If the current system residence volume (on 9370 systems) is VMSPRM, VMSSDIR EDIT will edit VMSPRM DIRECT A.

DIRECT
Builds the changes on the alternate disk volume and then issues the CP DIRECT command on both disk volumes. If you exit a VMSSDIR EDIT session with the **SAVE** option, you must execute VMSSDIR DIRECT to put those changes online.

For example, if the current system residence volume (on 9221 systems) is ESARES, VMSSDIR DIRECT will create ESA002 DIRECT (using ESARES DIRECT as a template) and then issue CP DIRECT for both.

ADDLP *lp-name*
Makes all necessary changes to add the specified logical port to the system directory.

```
    Ready;
    VMSSDIR EDIT <Enter>

    (... put into XEDIT mode, exit normally by typing "file"
     on the command line when finished ...)

     VMSSDIR: You have changed the source directory for the running system.

     VMSSDIR: Type "DIRECT" to place it online now.
     VMSSDIR: Type "SAVE" to quit without putting it online.
     VMSSDIR: Type "RESTORE" to abandon the changes you made.
    SAVE <Enter>
     VMSSDIR: Be sure to issue VMSSDIR DIRECT to
     VMSSDIR: make the changes you made take affect.
```

Figure 10-6. VMSSDIR EDIT Example

```
    Ready;
    VMSSDIR DIRECT <Enter>

     VMSSDIR: Building alternate system (ESA002/VMSBKP) directory...

     VMSSDIR: Updating directory on alternate system (ESA002/VMSBKP)...

    EOJ DIRECTORY UPDATED AND ON LINE

     VMSSDIR: Updating directory on running system (ESARES/VMSPRM)...

    EOJ DIRECTORY UPDATED AND ON LINE
    Ready;
```

Figure 10-7. VMSSDIR DIRECT Example

VMSSGEN (9370 SYSTEMS ONLY)

VMSSGEN is a front-end to SPGEN for creating CP nucleus on VMSPRM and VMSBKP. This procedure is used to change the SYSID, change the IOGEN (DMKRIO), and to change the memory size.

Note: This utility must be executed from the MAINT userid.

The syntax is as follows:

VMSSGEN *sysres* **<SYSID=***sysid***>**

Where:

sysres   Either VMSPRM or VMSBKP.

sysid   System ID — must be 1 to 8 alphanumeric characters. The characters are translated to uppercase.

Before doing an SPGEN NUC CP, the appropriate DMKSYS TXT*ccc* and DMKSNT TXT*ccc* are copied by VMSSGEN to DMKSYS TEXT and DMKSNT TEXT, respectively. TXT*ccc* is either TXTPRM or TXTBKP.

If the optional SYSID= keyword is specified, the SYSID macro in the appropriate DMKSYS source file is changed to *sysid* and the file is reassembled before doing the SPGEN NUC CP.

Figure 10-8 shows an example.

```
    Ready;
    VMSSGEN VMSPRM <Enter>

     VMSSGEN: ********
     VMSSGEN: ******** Creating CP nucleus for VMSPRM...
     VMSSGEN: ********

    DMSCPY721I Copy DMKSYS TXTPRM A1 to DMKSYS TEXT A1 (old file)
    DMSCPY721I Copy DMKSNT TXTPRM A1 to DMKSNT TEXT A1 (old file)
    DMSACP723I F (295) R/O
    DMSACP723I G (294) R/O
    DMSACP723I H (194) R/O
    DMSACP723I J (193) R/O
    SYSTEM LOAD DECK COMPLETE
    PUN FILE nnnn  TO MAINT    COPY 001    NOHOLD
    NUCLEUS LOADED ON VMSPRM --- STARTING CYL/BLK=000016,
                                 LAST CYL/BLK USED=nnnnnn
    DMKDSP450W CP entered; disabled wait PSW '00020000 00000012'
```

Figure 10-8. VMSSGEN Example

Note: The DMKDSP450W message may not appear, depending on how you have set error message handling (with the "CP SET EMSG" command). In this case, verify that the PSW contains wait state 12 by typing:

CP D PSW <Enter>

The response should be:

PSW = 00020000 00000012

If the response contains wait state 12, then IPL CMS. If the response contains any other wait state, **<u>do not</u>** proceed; call StorageTek Software Support for assistance.

VMSSMON

VMSSMON monitors the system and collects CP performance data that can be analyzed with the IBM VMAP utility. Normally, VMSSMON is run under the direction of StorageTek personnel while diagnosing a problem.

The syntax is as follows:

VMSSMON <*address*> <*interval*>

Where:

address   Specifies the real tape address of the dedicated drive that will receive the collected data. A real tape drive must be used and the device must be online but not attached to any user.

interval   Specifies the amount of time (in minutes) to collect sample data.

Figure 10-9 shows an example of how to use VMSSMON to collect CP performance data.

```
Ready;
VMSSMON 580 60 <Enter>
```

Figure 10-9. VMSSMON Example

VMSSREST

VMSSREST restores a minidisk that was previously saved to tape using DDR. It is primarily intended for restoring CDB and CDS databases.

Note: This utility should be executed from the MAINT userid.

The syntax is as follows:

VMSSREST <*vaddr*** | CDB | CDS>**

Where:

vaddr   The virtual address of the minidisk that is to receive the data from tape.

CDB or **CDS**   Special keywords. If used, the virtual address used will be 500. In addition to restoring the data from tape, the disk will be relabeled and the database file name(s) will be renamed to conform to the VM Storage Server naming conventions.

The naming conventions are as follows:

```
        Type   Disk Label   CMS File Name(s)
        ----   ----------   ----------------
        CDS    CDSPRM       CDS PRIM
        CDB    CDBPRM       CDB BTDATA and CDB BTNDX0
```

Figure 10-10. Example of Naming Conventions

Note: A real tape drive must be attached as virtual address 181 before invoking this exec. This is done with the CP ATTACH command as follows:

ATTACH *ccu* *** 181 <Enter>**

where *ccu* is the physical address of an available drive.

Figure 10-11 on page 10-18 shows how to restore the CDS.

```
    Ready;
    VMSSREST CDS <Enter>

     VMSSREST: Invoking DDR to restore the CDSPRM (501) disk.

    ENTER:
    RESTORING CDSPRM
    DATA DUMPED   mm/dd/yy AT hh.mm.ss GMT FROM CDSPRM RESTORED TO CDSPRM
     INPUT BLOCK EXTENTS        OUTPUT BLOCK EXTENTS
          START     STOP       START     STOP
        000000    001499     000000    001499
    END OF RESTORE
    ENTER:
    DMKDDR701E INVALID OPERAND - YES
    ENTER:
    END OF JOB
     VMSSREST: Restore of the 501 disk complete at hh:mm:ss mm/dd/yy.
    Ready;
```

Figure 10-11. VMSSREST Example

VMSSRUN

VMSSRUN starts the VM Storage Server system.

Note: This utility should be executed from the MAINT userid.

The syntax is as follows:

VMSSRUN <COLD>

Where:

COLD   Performs a cold start on the CLSM.

```
    Ready;
    VMSSRUN <Enter>
     VMSSRUN: You are about to resume Storage Server operation on
     VMSSRUN: this processor. Be sure that the CLSM machine is not
     VMSSRUN: active (logged on) on the other processor.
     VMSSRUN: Hit ENTER to continue or type any character to quit.

    AUTO LOGON  ***        TCPIP    USERS = 5
    AUTO LOGON  ***        CLSM     USERS = 6
    Ready;
```

Figure 10-12. VMSSRUN Example

```
    Ready;
    VMSSRUN COLD <Enter>

     VMSSRUN: You are about to resume Storage Server operation on
     VMSSRUN: this processor. Be sure that the CLSM machine is not
     VMSSRUN: active (logged on) on the other processor.
     VMSSRUN: Hit ENTER to continue or type any character to quit.

     VMSSRUN: The COLD  option has been selected.  This process
     VMSSRUN: may result in loss of mount, HUTIL, or transmit file
     VMSSRUN: information.  Hit ENTER to continue or type any
     VMSSRUN: character to quit.

    AUTO LOGON  ***        TCPIP    USERS = 5
    AUTO LOGON  ***        CLSM     USERS = 6
    Ready;
```

Figure 10-13. VMSSRUN COLD Example

VMSSTAPE

VMSSTAPE dumps the disk volumes to tape.

VMSSTAPE dumps the disk volumes in the following format:

file 1   Format/Allocate program (fixed 80-byte records).

file 2   DDR program (fixed 80-byte records) followed by volume data in DDR format.

Note: This utility must be executed from the MAINT userid.

The syntax is as follows:

VMSSTAPE *volser* **<**start_blk end_blk**>**

Where:

volser   On 9221 systems, either ESARES, ESA001, ESA002, or ESA003. On 9370 systems, either VMSPRM, CLSPRM, VMSBKP, or CLSBKP.

start_blk   The starting block number (default is 0).

end_blk   The ending block number (default is 360035).

```
    Ready;
    VMSSTAPE ESARES <Enter>

    Ready;
    VMSSTAPE CLSPRM <Enter>
```

Figure 10-14. VMSSTAPE Examples

Note: A real tape drive must be attached as virtual address 181 before invoking this tool. Do this by typing:

ATTACH *cuu* *** 181 <Enter>**

Where *cuu* is the physical address of an available drive.

VMSSTCP (9221 SYSTEMS ONLY)

VMSSTCP modifies TCP/IP information for the VM Storage Server. The VMSSTCP command with no options prompts you for IP addresses and CPU channel addresses and updates the TCPIP PROFILE file. Optionally, you can modify a different file and/or modify TCP/IP pool sizes.

The syntax is as follows:

VMSSTCP <_fn ft fm_ **(EDIT>**

Where:

_fn ft fm_   Allows you to specify the file to update.

(EDIT   Allows you to XEDIT the file to make changes to TCP/IP pool sizes.

```
    Ready;
    VMSSTCP <Enter>
    CPU Channel address defined: x00
    CPU Channel address defined: x00
    IP address defined: ddd.ddd.ddd.ddd
    IP address defined: ddd.ddd.ddd.ddd

    Is this information correct?
    Enter 'Y', 'N' or 'Quit' to exit.
    Y <Enter>
    Ready;
```

Figure 10-15. Example of VMSSTCP

VMSS2HST

VMSS2HST partially automates the transformation of a VM/Host Software Component from one with a single host defined to one with two hosts defined. It performs the following functions:

- Modifies the LIBSLSF ASSEMBLE LIBGEN file.

- Assembles LIBSLSF.

- Performs VMSSCOPY on several files: the ACS191 and RUN disks are copied to the alternate MAINTSTK, which is MAINTST2 (on 9221 systems) or MNT2STK (on 9370 systems).

- Reformats the CDS minidisks.

- Starts the SCP.

- Submits SLKJCL files for BACKUP, SLICREAT, and RECONFIG.

Note: This utility must be executed from the MAINTSTK userid.

The syntax is as follows:

VMSS2HST (NOEdit

Where:

NOEdit   Performs a reconfiguration only. Does **not** modify the LIBGEN.

Figure 10-16 shows an example.

```
   Ready;
  VMSS2HST <Enter>
   VMSS2HST: This program will modify your LIBGEN source,
   VMSS2HST: reformat minidisks, shut down the HSC, reconfigure the CDS,
   VMSS2HST: and change your active LIBGEN module.

   VMSS2HST: Are you sure this is what you want?
   VMSS2HST: Type YES to continue or hit Enter to quit now.
  YES <Enter>
   VMSS2HST: Shutting down the ACS machine.

 DMKMSG045E STKACS not logged on
 SLKACS527E ACS service machine STKACS is not accepting messages.
   VMSS2HST: Backing up LIBSLSF * as  LIBSLSF BACKASM.

   VMSS2HST: Modifying LIBGEN source.

   VMSS2HST: Executing LIBGEN.
```

Figure 10-16 (Part 1 of 2). Example of VMSS2HST

```
      ASSEMBLER (XF) DONE
      NO STATEMENTS FLAGGED IN THIS ASSEMBLY

       VMSS2HST: Copying ACS191 and RUN disks to alternate user.

       VMSS2HST:  Reformatting RECONFIG minidisks.

      SLKMDI544I Initializing  111
      SLKMDI544I Initializing  112
       VMSS2HST: Re-starting the ACS machine.
       VMSS2HST: and submitting BACKUP, SLICREAT, and RECONFIG

      AUTO LOGON   ***   STKACS   USERS = 008
      PUN FILE 0255  TO  STKACS   COPY 001   NOHOLD
      PUN FILE 0257  TO  STKACS   COPY 001   NOHOLD
      PUN FILE 0259  TO  STKACS   COPY 001   NOHOLD

       VMSS2HST: Shut down the ACS machine when the RECONFIG job completes
       VMSS2HST: by typing ACS STOPSCP
      Ready;
```

Figure 10-16 (Part 2 of 2). Example of VMSS2HST

Appendix A. Gathering Diagnostic Materials

Overview

During problem resolution, Software Support may request that you provide them with specific diagnostic material. While printed format may be accepted, it is most desirable that you provide machine-readable data (on magnetic tape). For small amounts of data, Software Support may request that you FAX the data, instead of mailing it. Sending small amounts of data by FAX may significantly reduce the time taken to resolve problems.

VM Diagnostic Materials

Diagnostic material may be requested by Software Support and, as appropriate to the problem, may include one or more of:

- Details of circumstances
- Console logs
- Processed VMDUMP files
- CP dump data
- Copies of log and trace files

Tape Format

If Software Support requests a tape of your diagnostic materials, follow this procedure:

1. Copy the requested files to tape using standard utility programs.

   Note: Make sure that the user ID has enough space to store the files.

2. Include with the tape a description of the contents of the tape, including any information necessary for Software Support to retrieve the files from the tape (the volume serial number of the tape and the label attributes, the number of files on the tape, the file names and attributes, and so on).

See the *Requesting Help From Software Support* guide for more information.

Appendix B. VMSS Messages Issued by VMSSINIT

VMSS001I   *vmname* **startup at** *date time***.**

> **Explanation:** The VM Storage Server virtual machine *vmname* has started. *date* and *time* are replaced in the message with the actual time the component was started.

> **System Action:** *vm name* startup continues.

> **Operator Response:** None.

VMSS002W   *vmname* **will attempt to initialize degraded, DASD maintenance required.**

> **Explanation:** During startup one of the database volumes was unavailable; the virtual machine will attempt to initialize on a single copy.

> *vmname*   the name of the virtual machine

> **System Action:** Initialization continues; however, maintenance on the disk should be performed as soon as possible.

> **Operator Response:** Monitor the virtual machine's initialization messages to ensure that initialization completes normally. Schedule a service call for the DASD failure.

VMSS003W   *vmname***; Error** *arc* **trying to access the** *disk* **disk.**

> **Explanation:** During *vmname* startup, the CMS ACCESS command failed with return code *arc*.

> *vmname*   the name of the virtual machine.

> *arc*   a return code

disk	replaced with either 500 (the primary disk) or 501 (the shadow disk).
volser	the volume serial number of the volume that contains *vmname disk*.

System Action: Processing continues; however, the machine that is in startup will probably fail due to the database disk being unreachable.

Operator Response: Check to be sure that the disk in question has been properly formatted and initialized. See the appropriate installation documentation for the component involved.

VMSS004W   *vmname* **database file "***name***" not found on the** *type* **(***disk***) disk.**

Explanation: During *vmname* startup a required database file was not found.

vmname	the name of the virtual machine.
name	the CMS file name that is expected for preconfigured systems.
type	primary or shadow
disk	replaced with either 500 (the primary disk) or 501 (the shadow disk).

System Action: Processing continues; however, the machine that is in startup will probably fail because the database it expects to find will not be there.

Operator Response: Check to be sure the database in question has not been renamed from the original names supplied on the preconfigured system.

VMSS005W   *vmname'*s *type* **disk (***disk***) is not available.**

Explanation: During *vmname's* startup the *disk* minidisk was not found. *disk* is either 500 for the primary database or 501 for the shadow database. The 500 and 501 disks are defined to be the primary and shadow database disks for preconfigured systems and must exist.

vmname	the name of the virtual machine.
type	primary or shadow
disk	replaced with either 500 (the primary disk) or 501 (the shadow disk).

System Action: Processing continues; however, the machine that is in startup will probably fail because a required database will be unreachable.

Operator Response: If the standard preconfigured configuration has not been modified, contact StorageTek.

See the *Requesting Help From Software Support* guide for information about contacting StorageTek for support in your country or geographical region.

VMSS006I   *vmname*'s *type* **database is on** *raddr*.

          Explanation: This is an informational message displayed during *vmname* startup which shows where *type* database exists. *type* is either primary or shadow, and *raddr* is the real address of the volume where the *type* database lives.

vmname	the name of the virtual machine.
type	primary or shadow
raddr	real address of the volume where the *type* database lives

          System Action: None; normal processing continues.

          Operator Response: None.

VMSS007I   *vmname*'s *type1* (*disk*) **disk on** *raddr* **contains a** *type1* **database. It has been renamed to become the** *type2*.

          Explanation: During *vmname* startup, a *type1* database was found on the *disk* disk and has been renamed to be a *type2*.

vmname	the name of the virtual machine.
volser	the volume serial number of the volume that contains the *vmname disk*.
disk	either 500 for the primary disk or 501 for the shadow.
type1	either primary or shadow
type2	the opposite of *type1*.

          System Action: None; normal processing continues.

          Operator Response: None.

VMSS008I   *vmname*; **Creating a new** *type1* **database by making a copy of the** *type2*.

          Explanation: During *vmname* startup, it was necessary to build a new *type1* database. *vmname* is the name of the virtual machine. *type1* is either the primary or the shadow. *type2* is the opposite of *type1*. *type1* database is unavailable.

vmname	the name of the virtual machine.
type1	either primary or shadow
type2	the opposite of *type1*.

          System Action: The copy proceeds and may take two to five minutes; then normal processing continues.

          Operator Response: None.

VMSS009W   *vmname*; *type* **database build failed.**

> **Explanation:** During *vmname* startup, a copy of the database to a new disk has failed. *vmname* is the name of the virtual machine. *type* is either the primary or the shadow.
>
> *vmname*   the name of the virtual machine.
>
> *type*   either primary or shadow
>
> **System Action:** Processing will continue; however, machine startup will probably fail due to the shadow database being unreachable.
>
> **Operator Response:** Contact StorageTek.
>
> See the *Requesting Help From Software Support* guide for information about contacting StorageTek for support in your country or geographical region.

VMSS010E   *vmname* **is an unsupported virtual machine.**

> **Explanation:** VMSSINIT has been invoked from a virtual machine that is not defined in VMSSINIT. This message would show that the standard preconfigured environment has been modified.
>
> **System Action:** None; the processing normally performed in VMSSINIT is bypassed.
>
> **Operator Response:** Contact StorageTek.
>
> See the *Requesting Help From Software Support* guide for information about contacting StorageTek for support in your country or geographical region.

Appendix C. STKBKP and STKREST Utilities

This appendix provides technical background information about the STKBKP and STKREST utilities.

> **Note**
>
> Information in this appendix is not required to install or operate the VM Storage Server.

This information may be useful for StorageTek CCEs, SSRs, and others who install the VM Storage Server software, especially at customer sites where unusual system configurations and customizations have occurred.

Starting with VM Storage Server 2.4.0, the STKBKP and STKREST utilities are being used by StorageTek to create product distribution tapes and as a vehicle for electronic delivery of upgrades or maintenance. Additionally, these utilities are being used during the software installation process to automatically back up and restore customized data at existing customer sites. (Previously, existing customers had to back up and restore configuration files individually as a part of the process of migrating to a new software release level.)

The STKBKP utility and a control file named BACKUP BACKCTL are supplied on the BACKUP UTILITIES cartridge. The control file contains instructions for backing up CDS, CDB, LIBGEN, CMS, and HSCUTIL files. A significant aspect of this process is that the control file can be modified by the customer to include additional operations.

> **Note**
>
> If you have added new VM users to the CP directory or have some special files on one of the disks, this information can be added to the control file or a new control file can be created, saving additional manual steps during the installation.

Information that is backed up using STKBKP BACKUP is restored with the STKREST utility, specifically a driver utility called STKINST that invokes STKREST.

Backup Tape Layout

A backup tape has the following layout:

FILE 1	VMFPLC FORMAT.
	Contains two CMS files:
	1. STKBKP ++HDR++
	Contains the time and date stamps of when the tape was created, the list of components that where backed up on the tape and the version of STKREST that is supplied on the tape.
	2. STKINST EXEC
	The "shell" EXEC, used to drive the RESTORE process.
FILE 2	VMFPLC FORMAT.
	Contains one file, STKREST EXEC
FILE 3	VMFPLC FORMAT.
	Contains one file, *component* ++RCTL++ -
	This file contains restore control statements for the next *n* tape files.
NEXT *n* tape files	Tape format and number of tape files dependant on previous control information.
	The control file/data sequence can be repeated as needed.
STKBKP ++EOT++	VMFPLC FORMAT.
	An END-OF-TAPE marker.

STKBKP ++HDR++ file format

The header file contains the following information (the records are in a **tag.value** format):

- :LVLID. *STKREST version level.*

- :DATETIME. *Date and time tape was was created.*

- :ID. *component identification*

There is one :ID. record for each component available on the backup.

STKBKP Syntax

```
                       ┌──── BACKUP ─────────────────────────┐
                       │      ┌─BACKUP─┐                      │
►►──STKBKP──┤      ┌───────────────────┐  │────────────────────►◄
                   └▼─filename of control file─┘
                                              ┌─RUN──┐
                                         └─(──┼─REW──┼─┘
                                              └─LEAVE─┘
```
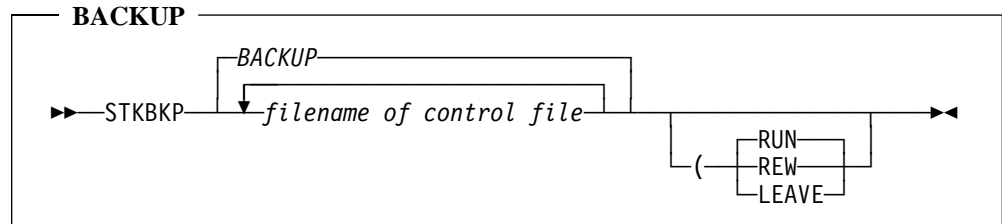
STKBKP accepts a list of control files. The filetype of the backup control file is
BACKCTL . If a list of control files is not specified the default file of *BACKUP
BACKCTL* * is used.

Operation

- Write the header file to the tape. The header file contains the backup/restore version
  ID and the current date and time.

- Write a copy of the STKINST utility to tape.

- Write a copy of the STKREST utility to tape.

- Process a backup control file:

  — Read the entire file.

  — Create a RESTORE control file:

    - Collect TAPEDUMP statements until a TAPEMARK statement is found.
      This creates a single TAPELOAD statement.

    - Translate DDRDUMP statements into DDRLOAD statements.

    - Copy all other statements directly to the RESTORE control file.

- Write the RESTORE control file to tape.

- Execute the BACKUP control statements.

- Get next backup control file and repeat.

- Write the END-OF-TAPE marker after the last backup control file has been
  processed.

STKBKP Control Statements

The following statements are recognized and processed by STKBKP. When STKBKP processes these statements, it creates a restore control file. Not all statements are executed by STKBKP: they are written to the restore control file to be executed when STKREST is invoked.

```
┌─ Comments ─────────────────────────────────────────────────┐
│                                                             │
│  ►►──*─────────────────────────────────────────────────►◄   │
│        └─commentary─┘                                        │
│                                                             │
└─────────────────────────────────────────────────────────────┘
```
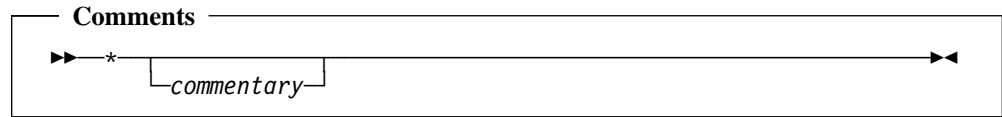
Any line starting with an asterisk is ignored.

Any comments are carried over to the restore control file.

```
┌─ ID ───────────────────────────────────────────────────────┐
│                      ┌─BACKUP─────────────────┐             │
│  ►►──ID──────────────┴─component identification─┴───────►◄  │
│                                                             │
└─────────────────────────────────────────────────────────────┘
```
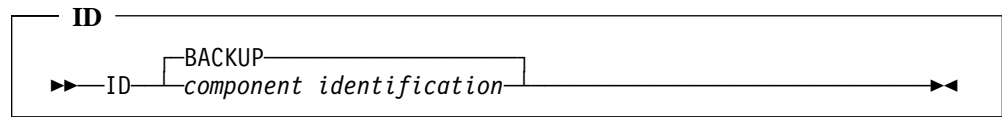
The ID statement identifies the component being processed by this control file. The component identification can be specified on the STKREST command line to perform selective restores.

```
┌─ TAPE DUMP ────────────────────────────────────────────────┐
│                                      ┌─*──*──────────┐      │
│  ►►──TAPEDUMP──userid──vaddr─────────┴─filename─filetype─┴──►│
│                                                             │
│  ►────────────────────────────────────────────────────►◄   │
│      └─(───────────────────────────────┐                    │
│         └─RESTORETO──userid──vaddr─┘                         │
│                                                             │
└─────────────────────────────────────────────────────────────┘
```
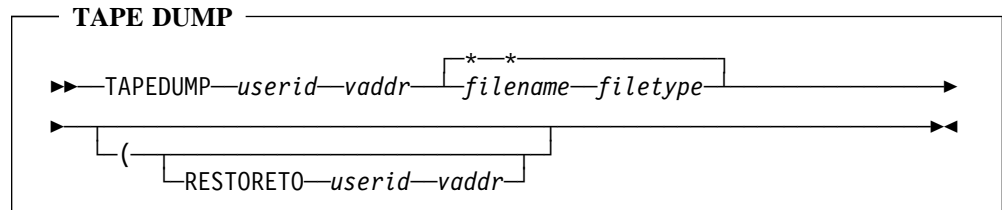
The TAPEDUMP statement is translated by STKBKP into the appropriate TAPELOAD statement. By default, the TAPELOAD statement restores the data back to the same userid that was dumped. The RESTORETO option restores the file(s) to the specified userid virtual address.

Note: The way that STKBKP creates the restore control file can cause some problems if TAPEMARKs are not inserted prior to other statements. In particular if a *CMS, CP* or *SAY* statement occurs between a TAPEDUMP and a TAPEMARK statements, the *CMS, CP* or *SAY* statements are executed after the TAPEMARK statement.

```
┌─ DDR DUMP ─────────────────────────────────────────────────┐
│                                                             │
│  ►►──DDRDUMP──userid──vaddr──────────────────────────────►◄ │
│                             └─(──────────────────────┐      │
│                                └─RESTORETO──userid──vaddr─┘  │
│                                                             │
└─────────────────────────────────────────────────────────────┘
```
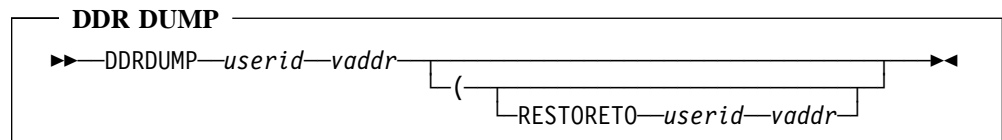
The DDRDUMP statement is translated by STKBKP into the appropriate DDRLOAD statement. By default, the DDRLOAD statement restores the data back to the same userid/address that was dumped. The RESTORETO option will restore to the specified userid/address.

```
┌─ Clean disk ──────────────────────────────────────────────────┐
│                                        *──*                    │
│  ▶▶──CLEANDISK──userid──vaddr──┬────────────┬──────────────▶   │
│                                └─filename──filetype─┘          │
│                                                               │
│  ▶──┬──────────────────────────────────────────────┬──▶◀     │
│     └─(──┬──BLKSIZE──blksize──────────┬─            │         │
│          ├──LABEL──vol label──────────┤             │         │
│          └──RESERVE──filename──filetype─┘           │         │
└───────────────────────────────────────────────────────────────┘
```
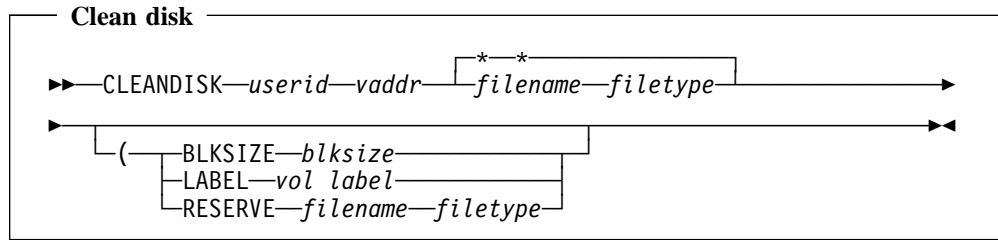
The CLEANDISK statement clears the specified user's minidisk. By default CLEANDISK removes all files from the minidisk. By specifying a filename/filetype (wildcard characters are permitted) following the vaddr parameter, a subset of the files can be removed. CLEANDISK formats the minidisk under the following conditions.

- The disk is initially unformatted

- All files are being removed from the disk and the block size specified does not match the current block size of the disk

- The RESERVE option was specified

The disk is not reformatted if there is any chance that data remains on the disk. An example is specifing the removal of a specified file and the disk is not blocked the same as what was specified on the CLEANDISK BLKSIZE option.

This statement is not executed by STKBKP. It is put into the control file that STKREST uses and is executed during the restore process.

```
┌─ TAPE MARK ───────────────────────────────────────────────┐
│                           ┌─1───┐                          │
│  ▶▶──TAPEMARK──┬─────┬────────────────────────────────▶◀  │
│                └count┘                                     │
└───────────────────────────────────────────────────────────┘
```
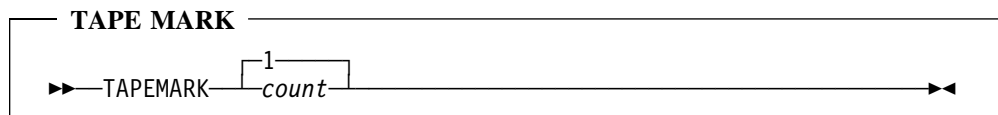
Writes the specified number of tape marks on the tape.

This statement is not directly translated into the restore control file. It is more of an indicator that the current TAPELOAD operation is complete. If the target user/address of a series of TAPEDUMPs changes before a TAPEMARK statement, STKBKP inserts a TAPEMARK into the stream.

If multiple TAPEMARKs are requested, a TAPEFSF statement is generated to skip the empty tape files.

```
┌─ CP commands ─────────────────────────────────────────────┐
│  ▶▶──CP──cp command string────────────────────────────▶◀  │
└───────────────────────────────────────────────────────────┘
```
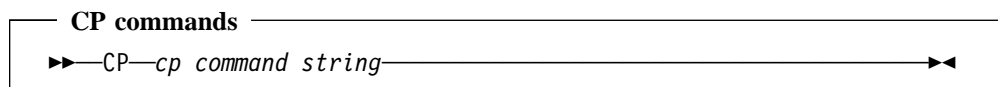
Executes the CP command string.

This statement is not executed by STKBKP. It is put into the control file that STKREST uses and is executed during the restore process.

```
┌─ CMS commands ──────────────────────────────────────────────┐
│                                                              │
│  ►►──┬─EXEC──exec name─┬──CMS command parameters───────────►◄ │
│      └─CMS command─────┘                                      │
│                                                              │
└──────────────────────────────────────────────────────────────┘
```

Executes the specified CMS command. To execute a CMS exec the keyword *EXEC* must be specified before the name of the EXEC.

This statement is not executed by STKBKP. It is put into the control file that STKREST uses and is executed during the restore process.

```
┌─ SAY ───────────────────────────────────────────────────────┐
│                                                              │
│  ►►──SAY──line to echo to terminal──────────────────────────►◄ │
│                                                              │
└──────────────────────────────────────────────────────────────┘
```

The SAY statement echoes the line to the terminal.

This statement is not executed by STKBKP. It is put into the control file that STKREST uses and is executed during the restore process.

RESTORE Syntax

```
      ┌──── Install ─────────────────────────────────────────────┐
      │                                                           │
  ►►──┤ STKINST ─┬─────────────────────────────────┬──────────►  │
      │          │   ┌─ALL──────────────────────┐  │             │
      │          └───┤ ◄──────────────────────┐ ├──┘             │
      │              └─▼─component identification┘                │
      │                                                           │
  ►───┬────────────────────────┬──────────────────────────►◄      │
      │    ┌─RUN─┐              │                                 │
      └──( ─┼─REW─┼─────────────┘                                 │
           └─LEAVE┘                                               │
```
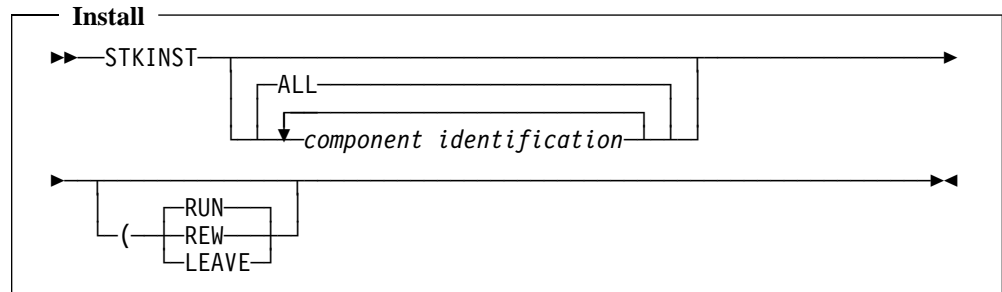
STKINST is a shell for the actual restore function that determines the level of STKREST available and the level available on the tape. If the tape contains a newer version, that version will be loaded and invoked. All parameters that are passed to STKINST are handed directly to STKREST.

Operation

- Rewind tape to load point.

- Read header file to determine backup/restore level on tape.

- Determine if level of STKREST on the tape is higher then the current level and restore the STKREST utility if required.

- Invoke STKREST.

```
      ┌──── RESTORE ─────────────────────────────────────────────┐
      │                                                           │
  ►►──┤ STKREST ─┬─────────────────────────────────┬──────────►  │
      │          │   ┌─ALL──────────────────────┐  │             │
      │          └───┤ ◄──────────────────────┐ ├──┘             │
      │              └─▼─component identification┘                │
      │                                                           │
  ►───┬────────────────────────┬──────────────────────────►◄      │
      │    ┌─RUN─┐              │                                 │
      └──( ─┼─REW─┼─────────────┘                                 │
           └─LEAVE┘                                               │
```
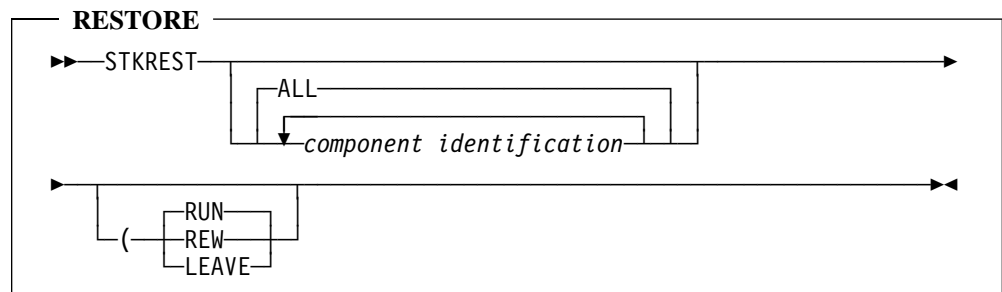
By default, STKREST restores all components on the tape. Otherwise, a list of components can be supplied on the command line.

Operation

- Read the header file and determine what components are available on the tape.

- Display the date and time when the backup tape was created.

- Process the list of components that where specified on the command line. Ensure that each component is available on the tape. Allow the user to change the list of components that will be restored.

- Locate and load the next restore control file on tape.

- Execute each control file statement.

- Repeat until the end-of-tape marker is located or until there are no components to restore.

RESTORE Control Statements

The following statements are processed by STKREST. They cannot be specified in the backup control file. All the statements are created by STKBKP.

```
┌─ TAPE Forward Space File ──────────────────────────────────────┐
│                         ┌─1───┐                                │
│  ►►──TAPEFSF───┴─count─┴──────────────────────────────►◄       │
└────────────────────────────────────────────────────────────────┘
```
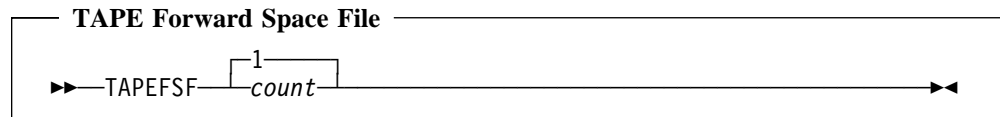
Skips (forward space file) the specified number of TAPE files.

```
┌─ TAPE LOAD ────────────────────────────────────────────────────┐
│  ►►──TAPELOAD─userid─vaddr──────────────────────────────►◄      │
└────────────────────────────────────────────────────────────────┘
```

Restores the file(s) to the specified user.

```
┌─ DDR LOAD ─────────────────────────────────────────────────────┐
│  ►►──DDRLOAD─userid─vaddr───────────────────────────────►◄      │
└────────────────────────────────────────────────────────────────┘
```

Restores the file(s) to the specified user.

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