GC20-1838-1

IBM Virtual Machine/ System Product General Information Manual

Program Product

IBM

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Program Product

5664-167

This publication contains information about the IBM Virtual Machine/System Product (VM/SP) (Program No. 5664-167). It provides planning information for installation managers, system programmers, and IBM Field Engineering personnel.

The term "VM/SP" applies to the VM/SP program product when used in conjunction with the VM/370 Release 6 system control program.

Second Edition (July 1980)

This is a major revision of and obsoletes GC20-1838-0. This edition applies to IBM Virtual Machine/System Product (VM/SP) until otherwise indicated in new editions or Technical Newsletters.

This publication is intended for planning purposes only. It will be updated from time to time; however, the reader should remember that the authoritative sources of system information are the system library publications for VM/SP. These publications will first reflect any changes. Changes are continually made to the information contained herein; before using this publication in connection with the operation of IBM systems, consult the IBM System/370 and 4300 Processors Bibliography, GC20-0001, for the editions that are applicable and current.

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Information in this publication
is for planning purposes only
until the availability of the product

Preface

This publication introduces and describes the features of the IBM Virtual Machine/System Product (VM/SP) (Program No. 5664-167).

VM/SP is a separately orderable program package that incorporates the functions of VM/370 Basic System Extensions program product Release 2 (Program No. 5748-XX8), and VM/370 System Extensions program product Release 2 (Program No. 5748-XE1), together with functions that are new to VM/SP. The VM/SP package is nonexecutable itself, but is designed as an extension to a prerequisite VM/370 Release 6 base (Program No. 5749-010). When the customer merges VM/SP with VM/370 Release 6, it becomes a functional operating system that includes the function of a Release 6 base, VM/370 Basic System Extensions, VM/370 System Extensions, and additional functions offered only with the VM/SP package.

For users of IBM processors, VM/SP is ordered as an integrated package -- that is, the VM/SP code is integrated with VM/370 Release 6 code. He can also order integrated starter systems for this package. The term VM/SP as used in this publications refers to the merge of the VM/SP program product with the VM/370 Release 6 system control program.

VM/SP has been designed for System/370, 303x, and 4300 processors operating in extended control mode and using dynamic address translation.

VM/SP when applied to a VM/370 base provides virtual machines, virtual storage, the ability to run multiple cperating systems concurrently, and a conversational time-sharing system. Additionally, VM/SP supports many different device options that are available for use in a virtual machine envircnment.

If you are unfamiliar with VM/370 concepts, including virtual machines and their applications, you should read VM/SP Introduction, GC19-6200 thoroughly before using this book and the rest of the VM/SP library.

Unless otherwise noted, the term VSE refers to the combination of the DOS/VSE system control program and the VSE/Advanced Functions program product.

In certain cases, the term DOS is still used as a generic term. For example, disk packs initialized for use with VSE or any predecessor DOS or DOS/VS system may be referred to as DOS disks.

The DOS like simulation environment provided under the CMS component of the VM/System Product, continues to be referred to as CMS/DOS.

This publication contains an introduction and nine sections:

"Introduction" gives you a general overview of the functions of the VM/SP program product.

"Section 1. Functional Highlights" describes the new functions of VM/SP. This section also describes the functions contained in the VM/370 Basic System Extensions Program Product Release 2 (Program No. 5748-XX8) and the VM/370 System Extensions Program Product Release 2 (Program No. 5748-XE1). Each line item highlighted also has a corresponding list of the commands and macro instructions that support that particular line item; the list of VM/SP publications that follow the command and macro summary refer you to books that contain information on that line item.

"Section 2. Storage Requirements and Module Summary" is a section designed to give the system programmer a general idea of the scope of the VM/SP product. It gives him an approximation of storage size needed for VM/SP initialization; the module summary lists the new and changed modules, macro instructions and control blocks for each line item showing the impact each line item has on the VM/SP system.

"Section 3. APAR List" summarizes all the APARs integrated into VM/SP.

"Section 4. System Requirements and Planning Information" defines the software, hardware, and storage requirements of VM/SP in addition to giving the customer a general overview of IBM's installation, updating and service strategies for VM/SP.

"Section 5. Compatibility/Incompatibility" describes the migration compatibilities for users migrating from VM/370 to VM/SP. Any incompatibilities a customer may encounter in his migration to VM/SP from a VM/370 system are also outlined.

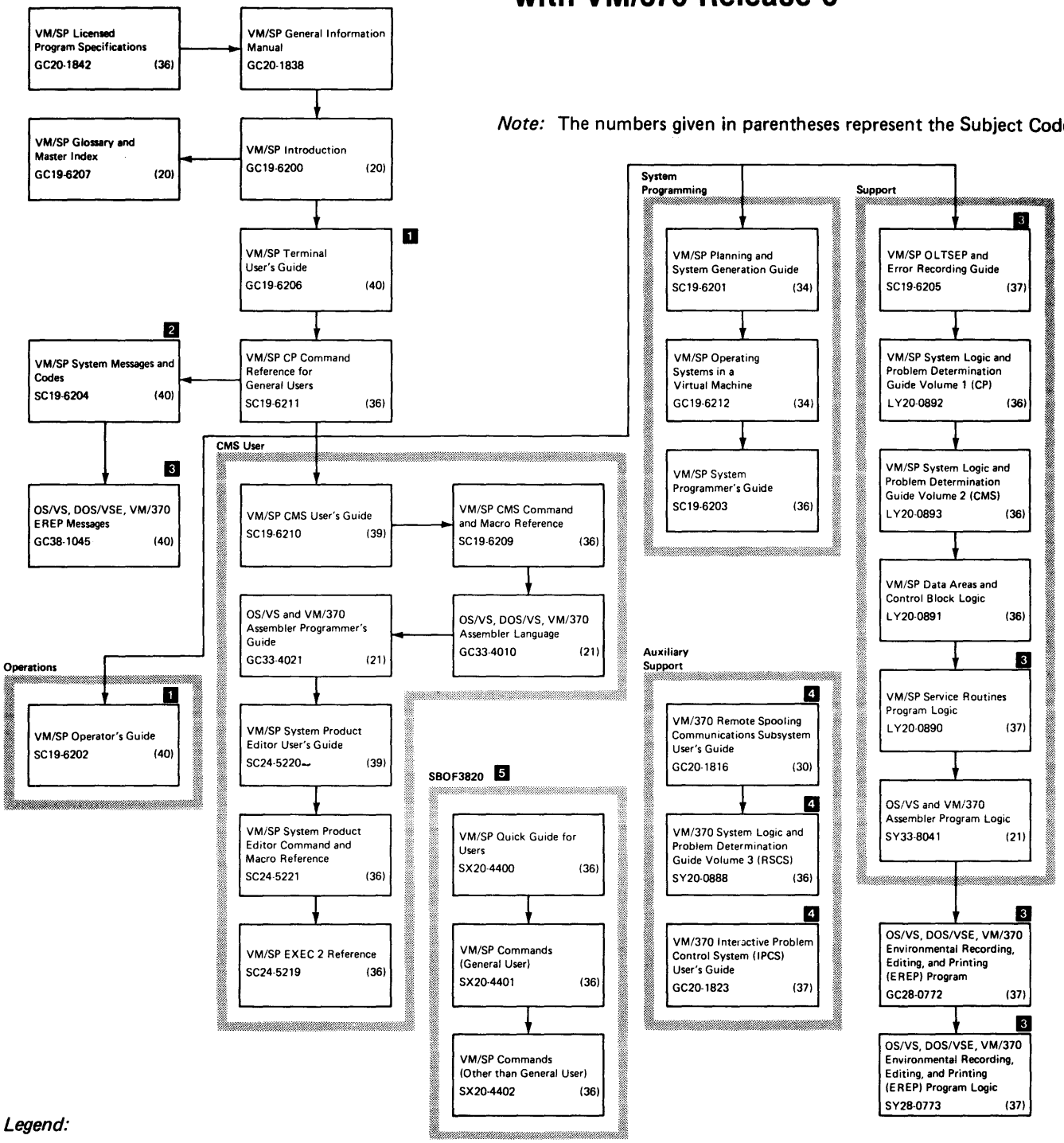
"Section 6. Migration Considerations" describes particular areas that the customer should consider when installing and operating VM/SP.

"Section 7. Publications" briefly describes all the books thst make up the VM/SP library.

"Section 8. Performance" lists any performance considerations the user needs to make in installing VM/SP.

"Section 9. Product Summary" lists information concerning testing period, licensing, services, warranty, and availability of the VM/SP program product.

Publications that support VM/SP as used in conjunction with VM/370 Release 6



Note: The numbers given in parentheses represent the Subject Code.

Legend:

1. For SNA terminal users, the prerequisite publication is: ***VM/VCNA Installation, Operations, and Terminal Use***, Order No. SC27-0502.
2. All users of virtual machines must use the ***VM/SP System Messages and Codes*** publication.
3. Contains information on VM/SP EREP support.
4. VM/370 Release 6 components. However, the IPCS Extension Program Product (5748-SA1) and the RSCS Networking Program Product (5748-XP1) are recommended for use with VM/SP.
5. If you want all three of the Reference Summary publications, use the SBOF number when ordering.

Contents

Introduction

The IBM Virtual Machine/System Product (VM/SP) is a single, separately orderable software package that includes the functions of VM/370 Basic System Extensions Program Product (5748-XX8) and VM/370 System Extensions Program Product (5748-XE1). It combines these functions with features that are new to VM/SP. The VM/SP package alone is not executable.

When you install and use VM/SP in conjunction with the VM/370 Release 6 System Control Program (SCP), it becomes a functional operating system that provides extended features to the control program (CP) and conversational monitor system (CMS) components of VM/370 Release 6. VM/SP adds no additional functions to the remote spooling communications subsystem (RSCS) and the interactive problem control system (IPCS) components of VM/370. However, you can appreciably expand the capabilities of these components in a VM/SP system by installing the Release 2 level of both the RSCS Networking program product (5748-XP1) and the VM/IPCS Extension program product (5748-SA1).

Highlights of the VM/SP program package include:

- Systems Network Architecture (SNA) console support that allows you to use any terminal in a SNA network as the console of a virtual machine
- Extensions to CP functions including real multiprocessor support as well as modifications to attached processor operations
- Extensions to CMS functions including a new System Product Editor and a new EXEC processor (EXEC 2). The System Product Editor provides full screen support and improved text processing; in addition, the System Product Editor provides subcommand language flexibility and expansion by implementing the EXEC 2 processor as its macro language.

Several additional program products are related to VM/SP and complement networking applications:

- VM/VTAM Communication Network Application (VM/VCNA) program product is one requirement if you want SNA support under VM/SP.
- RSCS Networking program product is upgraded to Release 2 to support two VM/SP line items. These items are VM/SP support of remote dedicated 3270 Information Display printers and CP spool enhancements.

In Release 2 of the VM/IPCS Extension program product, support for VM/SP is provided by:

- supporting additional abend codes introduced by features in VM/SP. These features include MP support, inter-user communication vehicle (IUCV), and SNA Console Communication Services (CCS).
- formatting, displaying, and printing the new control blocks added for multiprocessor (MP) support
- supporting the RECBLOK control block modified and extended by VM/SP.

Throughout this publication, the term 'VM/SP' refers to the VM/SP program package when you use it in conjunction with VM/370 Release 6. The terms 'CP' and 'CMS' refer to the VM/370 components enhanced by the functions included in the VM/SP package. Any referral to 'RSCS' and 'IPCS', unless otherwise noted, is to the VM/370 components unchanged by the VM/SP package.

Section 1. Functional Highlights

This section describes the functions contained in the VM/SP program package. This package includes the features contained in VM/370 Basic System Extensions program product Release 2, VM/370 System Extensions program product Release 2 as well as function new and unique to the VM/SP package. The new functions are described first, followed by descriptions of line items in VM/370 Basic System Extensions and VM/370 System Extensions program products.

This section is organized to give you a brief highlight of each line item, a list of commands and macro instructions reflecting support of that line item, and a reference listing of VM/SP publications that contain information on that line item. Please note that the amount of information on a particular line item may vary within each publication.

New VM/SP Functions

The following items are new support functions for VM/SP.

- 3278 model 5 display station support
- 3279 color display station support
- CMS OS loader support
- MP operation
- Modified AP operation
- New CMS EXEC interpreter (EXEC 2) support
- New System Product Editor
- HELP facility enhancements
- Full screen console enhancements
- CP spooling enhancements
- Dedication of remote 3270 display printers to virtual machines
- Systems Network Architecture (SNA) Console Communication Services support
- Inter-user communication vehicle (IUCV)
- Single console image facility
- IPL command enhancement
- New Processor Support
- Support of the 3800 Printing Subsystem as a virtual spooling device
- Support of the 3380 Direct Access Storage and the 3880 Storage Controller Models 2 and 3
- Reliability, Availability and Serviceability Uplevels

- CMS STACK enhancement
- System Security enhancements
- Enhanced DASD Support
- Dynamic Linkage using the CMS SUBCOM function
- CMS/DOS Simulation in VM/SP

3278 Model 5 and 3279 Information Display Station Support

The IBM 3278 Model 5 Information Display Station has the capability of displaying 27 lines per screen with a maximum of 132 characters on a line (3564 character screen).

The IBM 3279 Information Display Station Models 2A, 2B, 3A, and 3B support an extended data stream that contains extended field attributes and character attributes. This extended data stream support allows usage of programmable symbols (symbols whose shapes are program-controlled); extended highlighting which includes reverse video, character underscore and blinking character; and extended color facilities. The user, by issuing a new CP command, can manipulate the extended highlighting and color values for different areas of his display screen: the user input area, the system status area, and the output area consisting of CP output, virtual machine output, and the input redisplay area.

NEW AND CHANGED COMMANDS

SCREEN Command

The new class G SCREEN command allows the user to alter and change the color and/or extended highlighting values for his terminal.

QUERY Command

The class G QUERY command allows the user to query the color and extended highlighting values in effect for his terminal.

NEW AND CHANGED MACRO INSTRUCTIONS

None

NEW AND CHANGED DIRECTORY CONTROL STATEMENTS

SCREEN Directory Control Statement

The SCREEN control statement defined by the installation allows the user the full seven color and extended highlighting capabilities for his terminal. The user can override these system defined settings by issuing the SCREEN command.

VM/SP Publications

The following publications contain information on the 3278 Model 5 and and 3279 Models 2 and 3 Information Display Stations:

LY20-0891 Data Areas and Control Blcck Logic
LY20-0892 System Logic and Problem Determination Guide, Vol. 1 (CP)
SC19-6201 Planning and System Generation Guide
SC19-6203 System Programmer's Guide
SC19-6204 System Messages and Codes
SC19-6210 CMS User's Guide
SC19-6211 CP Command Reference for General Users

CMS OS Loader Support

The CMS OS loader enables OS relocatable load modules to be used under CMS. The user may load a member from a CMS simulated load library (filetype LOADLIB) or from an OS load library on an OS formatted disk. A new CMS command lists, copies, and compresses members of a CMS load library and merges CMS load libraries. This support also allows a user, by issuing the LKED command, to use the OS/VS linkage editor to create a CMS LOADLIB or LOADLIB member.

NEW AND CHANGED COMMANDS

GLOBAL Command

The GLOBAL command has a new parameter, LOADLIB, which allows the user to search specified CMS LOADLIBS or OS module libraries for load modules referenced by the OSRUN command or the LINK, LOAD, ATTACH, or XCTL macros.

LKED Command

Use of the LKED command has been changed to allow a user to link edit a CMS TEXT file or OS object module into a CMS LOADLIB.

LOADLIB Command

This new command allows a user to list, copy, or compress a CMS LOADLIB. CMS LOADLIBs can be merged, and specified members can optionally be selected or excluded during the merge.

OSRUN Command

This new CMS command allows a user to load, relocate, and execute a load module from a CMS LOADLIB or OS module library.

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on the CMS OS Loader support:

GC19-6212 Operating Systems in a Virtual Machine
LY20-0891 Data Areas and Control Block Logic
LY20-0893 System Logic and Problem Determination Guide, Vol 2 (CMS)
SC19-6209 CMS Command and Macro Reference
SC19-6210 CMS User's Guide

MP Operation and Modified AP Operation

Multiprocessor support allows the user a full MP configuration on the 158MP, 168MP, and 3033MP in MP mode with a maximum of 16 channels per processor, and a maximum of 32 channels per MP configuration. VM/SP does not simulate multiprocessing for virtual machines other than under single processor mode. A virtual machine is dispatched by VM/SP on only one of the two processors in a MP configuration unless the single processor mode of the VM/SP is in effect.

Attached Processor (AP) functions have been extensively reworked to improve the VM/SP system locking protocol.

NEW AND CHANGED COMMANDS

DCP Command

The class C and E DCP command allows the user to display the contents of real storage locations in a MP generated system.

ATTACH CHANNEL Command

The class B ATTACH CHANNEL command allows the operator to attach a channel of a particular processor to a user in a multiprocessor configuration.

DMCP Command

The class C and E DMCP command prints the contents of real storage locations in a multiprocessor or attached processor configuration.

INDICATE Command

The response to the class A, E, and G INDICATE command displays the percentage of time each processor in an AP or MP installation is executing along with the processor ID numbers of those processors.

LOCK Command

The class A LOCK command disallows the user from locking shared pages in an AP or MP generated system.

QUERY Command

The class B QUERY raddr command displays the primary path address to a DASD or tape unit. It also displays the status of all paths to a real device by indicating if it is an alternate path device.

The class G QUERY CPUID command displays the processor ID numbers of the IPL and nonIPL processor and displays the mode of operation: it it is MP or AP.

STCP Command

The class C STCP command allows the user to alter the contents of real storage in a multiprocessor configuration.

NEW AND CHANGED MACRO INSTRUCTIONS

RCTLUNIT Macro Instruction

The RCTLUNIT macro instruction allows specification of one alternate channel in a multiprocessor configuration.

SYSCOR Macro Instruction

The SYSCOR macro instruction allows the installation to specify that CP should execute multiprocessor code during system generation.

SYSRES Macro Instruction

The SYSRES macro instruction allows the installation to specify an alternate address for a system residence volume. The alternate address is valid for UP, AP, and MP systems.

NEW AND CHANGED DIRECTORY CONTROL STATEMENTS

DIRECT Directory Control Statement

The DIRECT control statement allows the installation to specify an alternate DASD address for writing the VM/SP directory. This facilitates the writing of the directory in an MP generated system, and may also be used in a UP or AP system.

VM/SP Publications

The following publications contain information on MP/Modified AP support:

GC19-6200 Introduction
GC19-6212 Operating Systems in a Virtual Machine
LY20-0890 Service Routines Program Logic
LY20-0891 Data Areas and Control Block Logic
LY20-0892 System Logic and Problem Determination Guide, Vol. 1 (CP)
SC19-6201 Planning and System Generation Guide
SC19-6202 Operator's Guide
SC19-6203 System Programmer's Guide
SC19-6204 System Messages and Codes
SC19-6205 OLTSEP and Error Recording Guide
SC19-6210 CMS User's Guide
SC19-6211 CP Command Reference for General Users

New CMS EXEC Interpreter (EXEC 2) Support

EXEC 2 coexists with the present EXEC processor to allow easier migration. Several new features are included in the new interpreter:

- Accepts words up to 255 characters each
- Allows commands to be issued either to CMS or to specified subcommand environments, such as the CMS editor or the System Product Editor
- Provides new string manipulation functions
- Provides arithmetic functions for multiplication and division
- Provides debugging facilities
- Supports user-defined functions and subroutines

NEW AND CHANGED COMMANDS

The EXEC command is used in exactly the same way for both EXEC and EXEC 2 files. For EXEC 2, the number of arguments (starting with the special variable &1) is limited only by the maximum number of bytes that can fit in a line (255 bytes if the lines are read from the program stack; 130 bytes if they are read from the console).

NEW AND CHANGED MACRO INSTRUCTIONS

None.

VM/SP Publications

The following publications contain information on the EXEC 2 processor:

GC19-6200 Introduction
SC19-6204 System Messages and Codes
SC19-6209 CMS Command and Macro Reference
SC19-6210 CMS User's Guide
SC24-5219 EXEC 2 Reference
LY20-0893 System Logic and Problem Determination Guide, Vol. 2 (CMS)

New System Product Editor Support

The CMS System Product Editor provides full screen support for 3270 display stations. The new System Product Editor coexists with the current editor and provides language expansion and flexibility through the EXEC 2 processor. In addition, the new editor provides macro instructions to help the user migrate from the Display Editing System IUP (Program No. 5796-PJP) and the current CMS editor. VM/SP also supports typewriter terminals with a subcommand language coherent with the full screen language.

The major highlights of the System Product Editor include:

- Multiple views of the same file or of different files
- Selective column viewing
- Automatic wrapping of lines that are larger than the screen
- Ability to issue selected commands directly from the displayed line
- Ability to define screen format according to individual preferences
- Extended string search facilities to improve text processing
- Functions to handle program develcpment including automatic update generation and packed file handling
- Support of the CMS HELP facility
- Column pointer for intraline editing
- Functions to join and split lines
- Facilities to import and export data
- A macro to assist the EDIT user to migrate to the new editor
- A macro to assist the Display Editing System user to migrate to the new editor

NEW AND CHANGED COMMANDS

XEDIT Command

This is a new CMS command. Use the XEDIT command to invoke the System Product editor to create, modify, and manipulate CMS disk files. Once the System Product editor has been invoked, you may execute XEDIT subcommands and use the EXEC 2 macro facility. You can return control to the CMS environment by issuing the XEDIT subcommands FILE, QUIT, or QQUIT.

EDIT Command

The EDIT command is used to invoke the System Product editor in EDIT compatibility mode to create, modify, and manipulate CMS disk files. In EDIT compatibility mode, you may execute both EDIT and XEDIT subcommands.

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on the System Product Editor:

SC19-6204 System Messages and Codes
SC19-6209 CMS Command and Macro Reference
SC19-6210 CMS User's Guide
SC24-5220 System Product Editor User's Guide
SC24-5221 System Product Editor Command and Macro Reference
LY20-0891 Data Areas and Control Block Logic

HELP Facility Enhancements

These enhancements are additions to the online HELP informational display facility contained in VM/370 Basic System Extensions Release 2. This facility allows the user to display command and subcommand descriptions directly from menus by moving the cursor to the selected command and hitting a program function (pf) key. The user can issue editor, CP and CMS commands and subcommands from a screen that displays a HELP facility menu. The pf keys have more function. The HELP facility interfaces with the System Product Editor providing improved scrolling and locate facilities to retrieve information in each display.

NEW AND CHANGED COMMANDS

HELP Command

The CMS HELP command now reflects new features added to the CMS HELP facility.

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on additions to the CMS HELP facility:

SC19-6204 System Messages and Codes
SC19-6209 CMS Command and Macro Reference
SC19-6210 CMS User's Guide

Full Screen Console Enhancements

Full screen console support enables a virtual machine (for example, OS/VS1 DIDOCS) and CP to share a locally-attached display terminal controlled by CP. The virtual machine can use a display terminal as a graphics device in full screen mode, while CP shares the terminal and uses it as a line device. A Start I/O instruction is the interface for this support. A guest virtual machine can use either the existing DIAGNOSE interface to get full screen support or the SIO interface, but both methods cannot be used simultaneously. This function is not supported for remote terminals or for SNA terminals.

NEW AND CHANGED COMMANDS

TERMINAL Command

The class G TERMINAL command has four new operands that allow the user to use his terminal as a graphic device in full screen mode while CP shares the terminal screen in line mode.

QUERY Command

The class G QUERY TERMINAL command displays the settings of the new operands of the TERMINAL command.

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on full screen console enhancements:

GC19-6206 Terminal User's Guide
GC19-6212 Operating Systems in a Virtual Machine
LY20-0891 Data Areas and Control Block Logic
LY20-0892 System Logic and Problem Determination Guide, Vol. 1 (CP)
SC19-6203 System Programmer's Guide
SC19-6211 CP Command Reference for General Users

CP Spooling Enhancements

CP spocling enhancements allow the general user to manipulate spool files by form name.

An output file has two form names associated with it -- a user form name and an operator form name. Each form name is a one-to-eight byte alphanumeric name. For the user, the form can have a meaningful name such as TAXFORM for a preprinted tax sheet or STOCK80 to indicate a specific form on which the user wants to print a stock inventory for 1980. The user form names TAXFORM and STOCK80 are defined during system generation time by the installation's system programmer and are specified by the user using CP commands.

When the user enters a command specifying a form, CP scans the command line. If it finds a form name, CP scans a table defined by the installation at system generation time. This table maps user form names to operator form names. When CP finds the operator form name corresponding to the user form name, CP assigns the operator form name to the spool file.

The spooling operator, using CP commands, can specify that particular output devices process spool files of a particular operator form name. In this way, CP can direct a spocl file via its form name to a specific output device (either printer or punch) that has been loaded by the operator with a predefined form.

This CP spooling enhancement allows the general user, by issuing CP commands, to close, change, order, purge, spool, and transfer spool files using form names. The spooling operator can now associate output devices with particular form names. This alleviates the need of changing printer paper between jobs requiring different preprinted forms.

Other CP spooling enhancements allow the general user to specify virtual forms control buffer (FCB) images for his spool files. When CP loads the file into a real printer, CP uses the virtual FCB image specified by the user. In addition, CP assists the operator in aligning preprinted forms. The separator pages of printed output now include both the file's sequence number and its distribution code. CP spool enhancements provide trailer pages on output as well.

NEW AND CHANGED COMMANDS

BACKSPAC Command

The response to the class D BACKSPAC command displays the number of unprocessed records left in a printer or punch spool file and the file's distribution and sequence number.

CHANGE Command

The class D and G CHANGE command allows the user to change the form name associated with a spool file.

CLOSE Command

The class G CLOSE command allows the user to close spool files by their form name.

LOADBUF Command

The FCBs the user specifies on the class D LOADBUF command are overridden by the FCBs he specifies on the class G LOADVFCB command unless a real 1403 printer processes the file.

LOADVFCB Command

The class G LOADVFCB command allows the user to specify a virtual FCB image to load in a printer spool file.

ORDER Command

The class D and G ORDER command allows the user to order spool files in a reader, printer or punch queue by their form name.

PURGE Command

The class D and G PURGE command allow the user to purge spool files in a reader, printer or punch queue by their form name.

QUERY Command

The class A, B, C, D, E, F, and G QUERY commands allow the user to query spool files by their form name, and allow the spooling operator to query the status of spool files by form name (whether a device processing spool files of a particular form name is drained or waiting, needs setting up, or whether preprinted forms need aligning.)

REPEAT Command

The response to the class D REPEAT command displays the number of copies of printer or punch files yet to be processed, the sequence number of the file, and file's distribution code.

SPOOL Command

The class G SPOOL command allows the user to spool files to a reader, printer or punch queues by form name.

SPTAPE Command

The class D SPTAPE command allows a spooling operator to load spool files of a particular form name from tape or to dump spool files of a particular form name to tape.

START Command

The class D START command allows the spooling operator to specify that an output device process spool files of a particular form name.

TAG Command

The class G TAG command allows the user to specify a previously closed reader, printer or punch spool file whose TAG information he wants to replace or query.

TRANSFER Command

The class D and G TRANSFER command allows the user to transfer spool files by form number among reader, printer, and punch queues.

NEW AND CHANGED MACRO INSTRUCTIONS

SYSFORM Macro Instruction

This new system generation macro instruction allows the installation to specify a list of user form names with their corresponding operator form names.

SYSID Macro Instruction

This new system generation macro instruction allows the installation to define a system ID number to appear on all output separator pages.

SYSPCLASS Macro Instruction

This new system generation macro instruction allows the installation to classify all printed output with a 1-to-46 character classification title on the separator page, and optionally, at the bottom of each page of output.

VM/SP Publications

The following publications contain information on CP spooling enhancements:

GC19-6212 Operating Systems in a Virtual Machine
LY20-0891 Data Areas and Control Block Logic
LY20-0892 System Logic and Problem Determination Guide, Vol. 1 (CP)
SC19-6201 Planning and System Generation Guide
SC19-6202 Operator's Guide
SC19-6203 System Programmer's Guide
SC19-6204 System Messages and Codes
SC19-6211 CP Command Reference for General Users

Dedicated Remote 3270 Information Display Printers to Virtual Machines

This support provides a generalized interface that allows a remote 3270 Information Display printer to be dedicated to a virtual machine, as well as allowing a virtual machine to access a 3270 Information Display printer via a SIO instruction. For example, this support gives the Release 2 level of the Remote Spooling Communications Subsystem Networking program product the ability to spool and print VM/SP files on remote 3270 Information Display printer.

NEW AND CHANGED COMMANDS

NETWORK Command

The class A and class B NETWORK command allow the operator to attach or detach a remote 3270 Information Display System Printer that is dedicated to a virtual machine.

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on remote dedicated 3270 Information Display System Printer support:

LY20-0891 Data Areas and Control Block Logic
SC19-6201 Planning and System Generation Guide
SC19-6202 Operator's Guide

Systems Network Architecture (SNA) Console Communication Services Support

Systems Network Architecture (SNA) provides full VM/SP console interface capabilities for SNA terminal users. SNA Console Communications Services is the necessary interface between Virtual Machine/VTAM Communications Network Application (VM/VCNA) program product and CP for guest virtual machines. The following VM/SP console interface capabilities are provided:

- Full CP and CMS command processing capabilities
- Full processing capabilities using either the CMS editor or the System Product Editor
- VM/SP full screen support for 3270 display stations via DIAGNOSE interface.

For more information on VM/VCNA program product (Program No. 5735-RC5) refer to VM/VTAM Communication Network Application General Information Manual, GC27-0501.

NEW AND CHANGED COMMANDS

SET Command

The class G SET ccmmand allows the user to specify a logical unit name (luname) on the SET PFnn COPY command line.

ENABLE/DISABLE Commands

The class A and class B ENABLE and DISABLE commands allow the user to enable/disable the SNA logical units for a particular VTAM Service Machine (VSM) or enable/disable all SNA units for all VSMs.

LOCATE Command

The raddr option of the LOCATE command is not valid for CP control blocks associated with SNA terminals connected via the VM/VCNA product.

QUERY NAMES Command

The class Any QUERY NAMES command displays the luname for the userid rather than the real address of the terminal.

QUERY USERS Command

The class Any QUERY USERS command displays the total number of users currently logged on to a VM/SP system as well as a subtotal of users logged on to that VM/SP system via a SNA network.

QUERY userid Command

The class Any QUERY userid command displays the luname for a SNA virtual console rather than its real address.

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on SNA CCS:

LY20-0891 Data Areas and Control Block Logic
LY20-0892 System Logic and Problem Determination Guide, Vol. 1 (CP)
SC19-6201 Planning and System Generation Guide
SC19-6202 Operator's Guide
SC19-6203 System Programmer's Guide
SC19-6204 System Messages and Codes
SC19-6211 CP Command Reference for General Users

Inter-User Communication Vehicle (IUCV)

The Inter-User Communication Vehicle (IUCV) facilitates the transfer of messages either among virtual machines or between CP and a virtual machine. The principal features of this support are:

- All IUCV interfaces are provided to the user at a macro level
- The ability to selectively establish and terminate communication paths
- The ability to establish multiple paths between virtual machines and CP
- A virtual machine can receive messages and reply either synchronously without an interrupt or asynchronously via an external interrupt
- An installation can restrict the number of messages outstanding on each communication path
- A receiver can selectively reject messages
- IUCV coexists with the Virtual Machine Communication Facility (VMCF)

NEW AND CHANGED COMMANDS

None

NEW AND CHANGED MACRO INSTRUCTIONS

None

NEW AND CHANGED DIRECTORY CONTROL STATEMENTS

MAXCONN Directory Option

The MAXCONN keyword on the OPTION control statement specifies the maximum number of IUCV connections that may be outstanding for this virtual machine at any given time.

IUCV Directory Control Statement

The IUCV control statement defines an authorization for establishing a communication path with another virtual machine, or with a CP system service. No Directory authorization is required for a virtual machine to establish a communication path with itself.

VM/SP Publications

The following publications contain information on IUCV:

GC19-6200 Introduction
LY20-0891 Data Areas and Control Block Logic
LY20-0892 System Logic and Problem Determination Guide, Vol. 1 (CP)
SC19-6201 Planning and System Generation Guide
SC19-6203 System Programmer's Guide
SC19-6204 System Messages and Codes

Single Console Image Facility

The single console image facility enables a virtual machine operator to control multiple virtual machines from one physical terminal. This capability is available for use by any virtual machine.

NEW AND CHANGED COMMANDS

QUERY Command

The class G QUERY command displays the userid of the secondary user specified in the CONSOLE directory statement.

SEND Command

The new class G SEND command passes commands and message replies to disconnected virtual machines for execution.

NEW AND CHANGED MACRO INSTRUCTIONS

None

NEW AND CHANGED DIRECTORY CONTROL STATEMENTS

CONSOLE Directory Statement

The CONSOLE Directory statement has a new option, userid, that allows specification of a secondary userid whose console is to be used when the user disconnects.

VM/SP Publications

The following publications contain information on the single console image facility:

GC19-6200 Introduction
GC19-6212 Operating Systems in a Virtual Machine
LY20-0891 Data Areas and Control Block Logic
SC19-6201 Planning and System Generation Guide
SC19-6202 Operator's Guide
SC19-6203 System Programmer's Guide
SC19-6204 System Messages and Codes
SC19-6211 CP Command Reference for General Users

IPL Command Enhancement

The IPL command enhancement allows the user to activate OS/VS1 virtual machines without operator intervention.

NEW AND CHANGED COMMANDS

IPL Command

The class G IPL command has a new operand, ATTN, that generates an attention interrupt to a virtual machine during the IPL procedure. When the user specifies this operand for an OS/VS1 IPL, the resulting ATTN interrupt activates the OS/VS1 FASTNIP feature.

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on the IPL command:

GC19-6212 Operating Systems in a Virtual Machine
SC19-6204 System Messages and Codes
SC19-6210 CMS User's Guide
SC19-6211 CP Command Reference for General Users

Support of the 3800 Printing Subsystem as a Virtual Spooling Device

VM/SP supports the IBM 3800 Printing Subsystem as a virtual spooling device. This support allows a virtual machine user to issue the CP DEFINE command to add a spooling 3800 to his virtual machine configuration. He can then create spool files destined for printing on a real printer (either a 3800 if one is available, or any other real printer VM/SP supports).

The user can issue the new CMS SETPRT command to select the characteristics for a 3800 spool file. These characteristics include forms overlay, forms control buffers (FCBs), the number of copies to print, and the character arrangement tables. The SETPRT command generates 3800 Load channel command words (CCWs) that CP includes in each spool file. In addition, the CP START command allows the operator to accept spool files that have 3800 LOAD CCWs imbedded throughout the file. The user can mix character sets on the same line and/or page using SCRIPT/VS commands or user written application programs.

A virtual operating system (such as MVS) running in a virtual machine can run application programs that create 3800 spool files. The installation must define a 3800 printer. In this way, a real 3800 can be shared among many virtual machines using VM/SP spooling techniques.

NEW AND CHANGED COMMANDS

DEFINE Command

The class G DEFINE command allows the user to define a 3800 printer in his virtual machine configuration.

IMAGEMOD Command

This new CMS command allows an installation to make changes to a 3800 Named System without regenerating a completely new named system.

QUERY Command

The class G and D QUERY PRT command displays the characteristics of a 3800 spool file. The class B QUERY raddr command displays the characteristics of a real 3800 printer.

START Command

The class D START command allows the spooling operator to specify what type of virtual 3800 spool file can print: whether the 3800 accepts spool files with no 3800 LOAD CCWs, spool files interspersed with 3800 LOAD CCWs, or spool files with 3800 LOAD CCWs imbedded at the beginning of the file.

FILEDEF Command

The CMS FILEDEF command allows the OS and DOS user to mix character sets in a 3800 spool file. The user can specify the OPTCD=J parameter that indicates that the first data character of every record in a spool file

is a Table Reference Character (TRC) byte. The TRC byte indicates that CP issues a Select Translate Table CCW to the 3800 for every TRC byte encountered in a spool file.

PRINT Command

The CMS PRINT command has two new options, TRC and NOTRC. When the user specifies TRC, PRINT processing interprets the first character of each record in a file. The TRC byte determines which Select Translate Table CCW is issued to the 3800. NOTRC indicates that TRC bytes are not imbedded in the file to be printed.

SETPRT Command

The CMS SETPRT command allows the user to specify the following characteristics for a 3800 spool file:

- from one to four character arrangement tables
- the number of copies the user wants
- the copy number of the first copy to be printed
- the name of the flash overlay the user wants to overlay on his file and the number of copies flashed
- the FCB for the 3800 to load
- any copy modification data the user must load as part of a file.

NEW AND CHANGED MACRO INSTRUCTIONS

PRINTL Macro Instruction

The PRINTL macro instruction allows the CMS user to use different character sets in a 3800 spool file. This macro accepts the TRC byte that specifies which Translate Table CCW in the 3800 should be used for translating each line in a spool file. The PRINTL macro instruction converts this byte into a Select Translate Table CCW.

VM/SP Publications

The following publications contain information on support of the 3800 printing subsystem as a virtual spooling device:

GC19-6212 Operating Systems in a Virtual Machine
LY20-0891 Data Areas and Control Block Logic
LY20-0892 System Logic and Problem Determination Guide, Vol. 1 (CP)
LY20-0893 System Logic and Problem Determination Guide, Vol. 2 (CMS)
SC19-6201 Planning and System Generation Guide
SC19-6202 Operator's Guide
SC19-6203 System Programmer's Guide
SC19-6204 System Messages and Codes
SC19-6205 OLTSEP and Error Recording Guide
SC19-6209 CMS Command and Macro Reference
SC19-6210 CMS User's Guide
SC19-6211 CP Command Reference for General Users

New Processor Support

4331 MODEL GROUP 2 PROCESSOR SUPPORT

The IBM 4331 Model Group 2 processor combines System/370 compatibility with large scale integration (LSI) technology. The features of this processor include: a maximum of four megabytes of processor storage, a high speed channel, an additional File Tape Adapter (FTA), and greater internal speed.

IBM 3033 ATTACHED PROCESSOR MODEL 2 PROCESSOR SUPPORT

VM/SP supports I/O on both sides of a 3033 attached processor when the complex includes a 3042 Model 2 attached processor.

The 3042 Model 2 offers a standard group of 6 channels, and an optional feature adds another group of six, for a configuration of 18, 22, or 28 channels in a 3033 attached processor complex.

NEW AND CHANGED COMMANDS

None

NEW AND CHANGED MACROS

None

VM/SP Publications

The following publications contain information on new processor support:

SC19-6201 Planning and System Generation Guide
SC19-6202 Operator's Guide
SC19-6205 OLTSEP and Error Recording Guide

Support of the 3380 Direct Access Storage and the 3880 Controller Models 2 and 3

The 3380 Direct Access Storage is a large capacity, count-key-data direct access storage unit. The 3380 supports all the traditional DASD functions; this includes spooling and paging facilities, providing temporary minidisk space, directory space, and system residence space and containing large amounts of user data.

The IBM 3880 Controller Models 2 and 3 provides direct attachment of the 3330, 3340, 3344, 3350, and 3380 to channels that conform to standard System/370 architecture. In addition, the 3380, when attached to a VM/SP system by the 3880 controller Models 2 and 3, uses the high speed channels available on the 303x and 4341 processors. Use of these high speed channels in combination with the machine-implemented instructions within the 3880 controller Models 2 and 3 decreases data access and retrieval time and provides more reliable online data storage.

NEW AND CHANGED COMMANDS

DEFINE Command

The class G DEFINE command allows the user to define temporary disk space on a virtual 3380.

NEW AND CHANGED MACRO INSTRUCTIONS

RCTLUNIT Macro Instruction

The CUTYPE= parameter on the RCTLUNIT macro instruction now accepts the 3880 controller as a valid device type.

RDEVICE Macro Instruction

The RDEVICE macro instruction is modified to accept the 3380 as a valid device type.

SYSRES Macro Instruction

The SYSRES macro instruction now accepts the 3380 as a valid system residence volume.

VM/SP Publications

The following publications contain information on the 3380 Direct Access Storage and the 3880 Controller Models 2 and 3:

GC19-6200	Introduction
GC19-6212	Operating Systems in a Virtual Machine
LY20-0890	Service Routines Program Logic
LY20-0891	Data Areas and Control Block Logic
LY20-0892	System Logic and Problem Determination Guide, Vol. 1 (CP)
LY20-0893	System Logic and Problem Determination Guide, Vol. 2 (CMS)
SC19-6201	Planning and System Generation Guide
SC19-6202	Operator's Guide
SC19-6203	System Programmer's Guide
SC19-6204	System Messages and Codes
SC19-6210	CMS Command and Macro Reference
SC19-6211	CP Command Reference for General Users

Reliability, Availability, and Serviceability Enhancements

VM/SP supports the following RAS enhancements for DASD:

- The option to allow an installation to reserve DASD space for system dumps and allocate the system dump to certain DASD after CP initialization.
- Expansion of the spool file checkpoint limit from 2048 to 9900. CP now checkpoints a maximum of 9900 spool files instead of 2048; it also checks for duplicate spool file ID numbers.
- Utilization of the SIOF instruction in CP. CP now uses the SIOF instruction to initiate all paging operations, spooling, local terminal I/O operations, simulation of I/O from DIAGNOSE execution, and simulation of guest virtual machine SIOF instructions.
- Detection of I/O interrupts that are pending for a device. CP detects these interrupts when the interval timer expires for that I/O request. When CP detects a missing interrupt (that is, the normal execution time for that interrupt has expired), the system operator is notified.

Note: Since a majority of the enhancements to reliability, availability, and serviceability is supported by logic internal to the VM/SP Control Program, the user may not see all of these enhancements reflected in external characteristics such as commands, macro instructions, and system generation options.

VM/SP Publications

The following publications contain information on reliability, availability, and serviceability enhancements:

GC19-6200 Introduction
GC19-6212 Operating Systems in a Virtual Machine
LY20-0890 Data Areas and Control Block Logic
LY20-0892 System Logic and Problem Determination Guide, Vol. 1 (CP)
SC19-6201 Planning and System Generation Guide
SC19-6204 System Messages and Codes

Enhanced DASD Support

VM/SP supports the following enhancements for direct access storage devices:

- Designation, by macro instruction, of preferred paging areas and nonpreferred paging areas on the same DASD volume. Using the same macro instruction, a system programmer can also specify that CP should use the same volume for paging and spooling overflow operations. The system programmer can also change the order in which CP searches DASD for preferred and nonpreferred paging areas.
- Utilization of full track reads for the 3330, 3340, 3344, 3350, and 3380 when the DASD Dump Restore (DDR) Utility is running and the Full Track Read (FTR) feature is installed. The Full Track Read feature decreases by one-half the number of I/O operations CP needs to read the contents of a DASD track.
- Fixed head support for the 3340, 3344, 3350, and 3380 allowing zero access time for preferred paging areas and CP owned volumes. CP schedules ,on the same volume, I/O paging requests for fixed head cylinders before it schedules I/O requests for moveable head cylinders.
- Page migration support for the 3380 allowing installations to control when CP should migrate preferred moveable head pages to nonpreferred paging areas. Migration of pages from moveable head preferred paging areas to nonpreferred paging areas takes place when an installation defined percentage of all moveable head preferred pages is reached.

NEW AND CHANGED COMMANDS

SET Command

The class E SET SRM command has a new option that allows the user to specify when page migration from a moveable head preferred paging area should occur.

QUERY Command

The class A and E QUERY SRM command allows the user to display the current percentage specified on a previous SET SRM command.

NEW AND CHANGED MACRO INSTRUCTIONS

SYSORD Macro Instruction

The SYSORD system generation macro instruction allows an installation to specify the order in which CP searches preferred and nonpreferred paging areas for paging space.

SYSOWN Macro Instruction

The function of the SYSOWN macro instruction is changed. SYSOWN now generates a list of CP and DASD volumes. The SYSOWN macro instruction

is no longer used to specify preferred and nonpreferred paging areas. The TEMP and PAGE options of this macro instruction are no longer valid.

VM/SP Publications

The following publications contain information on enhanced DASD support:

GC19-6200 Introduction
GC19-6212 Operating Systems in a Virtual Machine
LY20-0890 Data Areas and Control Block Logic
LY20-0892 System Logic and Problem Determination Guide, Vol. 1 (CP)
SC19-6201 Planning and System Generation Guide
SC19-6204 System Messages and Codes

System Security Enhancements

These enhancements include:

- Security protection of the system operator's virtual machine following an abend and consequent automatic system restart. If the CP operator is logged off, disconnected or if he is not logged on the primary system console at the time of the abend, an automatic initial program load does not cause an automatic logon of the system operator.
- Data integrity of temporary minidisk space using a system generation option. This option automatically clears any user data residing on temporary disk space.

NEW AND CHANGED COMMANDS

None

NEW AND CHANGED MACRO INSTRUCTIONS

SYSRES Macro Instruction

The SYSRES macro instruction has a new option that allows the installation to specify that CP should clear all temporary disk space whenever a user logs off the system.

VM/SP Publications

The following publications contain information on system security enhancements:

GC19-6200 Introduction
GC19-6212 Operating Systems in a Virtual Machine
LY20-0890 Data Areas and Control Block Logic
LY20-0891 System Logic and Problem Determination Guide, Vol. 1 (CP)
SC19-6201 Planning and System Generation Guide
SC19-6202 Operator's Guide
SC19-6204 System Messages and Codes
SC19-6211 CP Command Reference for General Users

Spool File to Tape Improvement

A spool file to tape improvement allows CP to spool to tape a system dump file residing on a reader queue.

NEW AND CHANGED COMMANDS

SPTAPE Command

The class D SPTAPE command now spools to tape CP dump files in the reader queue.

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publication contains information on the spool file to tape support:

SC19-6202 Operator's Guide

CMS Stack Enhancement

The CMS stack is now split into two stacks:

- a console input buffer (formerly the console input stack)
- a new program stack

CMS places lines the user enters at the terminal into the console input buffer. The user can enter up to 130 characters per line. CMS handles these terminal entries as fixed length records, padding them with hexadecimal zeroes if they are less than the maximum length.

However, CMS now places in the program stack lines transmitted through programs either by the CMS ATTN function or through a CMS EXEC. CMS treats lines it places in the program stack as variable length entries with a maximum of 255 characters per line. This allows program flexibility because programs running under CMS can exchange data streams without limitation to program content. CMS no longer line edits entries placed in the program stack.

NEW AND CHANGED COMMANDS

CONWAIT Command

The CMS CONWAIT command causes a program to wait until all pending terminal I/O is complete. The CONWAIT command synchronizes input and output to the terminal. It ensures that CMS clears the output console stack before the program continues execution. It also ensures that CMS completes a read or write operation before the user modifies an I/O buffer.

DESBUF Command

The CMS DESBUF command clears the console input and output buffers. The user can issue CONWAIT to halt program execution until CMS displays all output lines at the terminal before the DESBUF command clears the input buffer.

DROPBUF Command

The new CMS DROPBUF command eliminates the most recently created program stack buffer.

FINIS Command

The CMS FINIS command lets the user close one or more files that are currently open. The user can issue FINIS when his program does not close a file during its execution.

MAKEBUF Command

The new CMS MAKEBUF command creates a new buffer within the program stack.

SENTRIES Command

The new CMS command SENTRIES obtains the number of lines currently in the program stack(but not the console input buffer) as a return code.

SET Command

The CMS SET command is modified to allow suppression of CMS terminal display within an EXEC and resumption of a CMS terminal display that has been suppressed as a result of a previous SET command.

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on the CMS Stack enhancement:

SC19-6204 System Messages and Codes
SC19-6209 CMS Command and Macro Reference
SC19-6210 CMS User's Guide

Dynamic Linkages Using the New SUBCOM Function

A CMS user can make known to CMS the name of a program that he has already loaded from disk. He does this by issuing the create function of SUBCOM. SVC 202 can then dynamically call this program rather than having to search the CMS function table (FUNCTAB) entries built at system generation time. The SUBCOM function allows the user to dynamically name a program he wants to link to before he issues an SVC 202. SUBCOM also makes it possible for a program that has become dynamically known to CMS (through SUBCOM) to make other programs dynamically known if the former program knows the entry points of those programs.

NEW AND CHANGED COMMANDS

None

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on the SUBCOM function:

SC19-6204 System Messages and Codes
SC19-6209 CMS Command and Macro Reference
SC19-6210 CMS User's Guide

CMS/DOS Simulation in VM/SP

CMS/DOS support is upgraded in VM/SP to support the VSE/VSAM Release 2 program product (5746-AM2) and the VM/Interactive File Sharing program product (5748-XXC). The first program product allows the user to create and develop VSAM files at the Release 2 level of VSE/VSAM. The second program product allows the user to develop programs under CMS using interactive file sharing techniques. DOS/VSE and the VSE/Advanced Functions program product are not required for VSE/VSAM Release 2 and interactive file sharing support.

However, CMS/DOS facilities that access VSE/Advanced Functions libraries (such as high level language compilers) require the installation of both DOS/VSE and the VSE/Advanced Functions Release 2 program product.

NEW AND CHANGED COMMANDS

None

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on CMS/DOS support:

SC19-6203 System Programmer's Guide
SC19-6204 System Messages and Codes
SC19-6209 CMS Command and Macro Reference
SC19-6210 CMS User's Guide

VM/370 Basic System Extensions Function Contained in VM/SP

The following features, now a part of VM/SP function, were originally offered in VM/370 Basic System Extensions Program Product Release 2 (Program No. 5748-XX8):

- Resource management facilities subset
- Virtual storage preservation support
- Accounting-records-on-disk support
- Spool-files-to-tape support
- CMS tape label processing support
- Full screen support via DIAGNOSE X'58'
- Enhanced 3270 support
- APL/Text support for the 3270
- Display control for the 3270
- Addition to the VM/370 Extended Control Program Support
- Interactive HELP facility under CMS
- CMS file system extensions
- CMS TAPE command improvement
- CMS use of CP page management interfaces
- CP extensions
- Small CP option
- Support of the 3289 Model 4 printer
- Support of the 8809 tape unit
- Support of the 3310 and 3370 direct access devices
- Logical device support facility
- Support of the 3262 Models 1 and 11 printers

Resource Management Facilities Subset

This facility helps to improve system performance by correlating the use of available storage to the changing system environment. By modifying the control program of VM/SP, this facility allows the revised scheduler to more equitably share system resources and improve the ability of the system to respond by distinguishing between trivial and nontrivial interactive transactions. A new priority queue called Q3, handles users running for long periods of time without needing terminal interaction with the operating system.

The SET FAVORED command allows several virtual machines to have a specified percentage of processor time.

The internal monitor of CP has been modified to reduce the time needed to tune the system by dynamically adjusting scheduling decisions. These adjustments optimize throughput and control paging.

NEW AND CHANGED COMMANDS

MIGRATE Command

This class A command allows the VM/370 system operator to force the pages of a specified user to migrate to the secondary paging device. If a user identification is not specified, the normal page and swap table migration is activated.

QUERY SRM Command

This class A and E command displays the current number of pageable pages, the duration of the dispatching time slice, maximum working set, maximum drum page allocation, page migration activity counters, unused segment elapsed time criteria, current PCI flag setting, maximum page bias value, and current interactive shift bias value. VM/SP function enhances this command to display the percentage value of preferred moveable head space that is full.

SET SRM Command

This class E command sets the maximum value of the virtual machine's working set, sets the maximum number of fixed head cylinder pages to be allocated to any one virtual machine, sets the unused segment elapsed time criteria, sets the PCI flag for 2305 page requests, sets the maximum page bias value, and sets the interactive shift bias for Q1 virtual machines that are using less than their allocated share of the processor. VM/SP function modifies this command to allow the user to set a percentage value after which page migration from preferred moveable head area should occur.

QUERY PAGING Command

This class A and E command displays the current SET PAGING value.

SET PAGING Command

This class E command sets the decimal digit to be used in the working set size for the scheduler algorithm.

SET FAVORED Command

This class A command has been enhanced to allow several virtual machines to have a specified percentage of processor time. Designation of the userid as always dispatchable must be done with the SET FAVORED command.

INDICATE LOAD Command

Added to the display of the current class G INDICATE LOAD command are the responses for the expansion factor, paging rate, steal rate, and page contention load.

INDICATE FAVORED Command

This class A and E command displays favored userids and their processor usage.

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following VM/SP publications contain information about Resource Management Facility:

SC19-6204 System Messages and Codes
LY20-0891 Data Areas and Control Block Logic
LY20-0892 System Logic and Problem Determination Guide, Vol 1 (CP)
SC19-6201 Planning and System Generation Guide
SC19-6202 Operator's Guide
SC19-6205 OLTSEP and Error Recording Guide
SC19-6211 CP Command Reference for General Users

Virtual Storage Preservation Support

With this facility, the system programmer can specify, during VM/SP system generation time, that the contents of specific virtual machines be saved automatically if either the virtual machine is terminated by VM/SP or VM/SP itself abnormally terminates. At the time of abend, CP saves the contents of these virtual machines on DASD space previously allocated by the system programmer during system generation. Virtual storage preservation protects security and privacy by clearing the V=R storage area when a complete system failure occurs, or when a different V=R user is loaded into storage; and by preserving the V=R storage area when a warm start is possible.

NEW AND CHANGED COMMANDS

SET VMSAVE Command

This class G command enables and disables the VMSAVE option and may be used to designate which of several previously defined DASD areas should be used to save the contents of the virtual machine.

QUERY VMSAVE Command

This class G command displays the status of all of the VMSAVE areas available to the userid. The information includes:

- Whether or not the option is enabled or disabled.
- Whether or not a userid is loaded (via IPL) from the area.
- The volid of the target DASD pack.
- The date and time that a system was saved in this area.
- The page range of the virtual machine that has been or will be saved in the area.

QUERY SET Command

The responses to this class G command are VMSAVE ON or VMSAVE OFF, whichever is the current status of the VMSAVE option.

NEW AND CHANGED MACRO INSTRUCTIONS

NAMESYS Macro Instruction

This macro instruction is used during system generation. It allows the system programmer to specify DASD areas in which to save virtual machines and to establish a priority on the saving of multiple virtual machines. The new operands specify the virtual machine user who can save into this area, the user authorized to access a system in this area, and the order in which to save multiple virtual machines.

VMSAVE Directory Option

The VMSAVE option has been added to the OPTION control statement to cause VM/370 to automatically enable the VMSAVE option when the virtual machine logs on. It is effective only when this user has exactly one designated VMSAVE area and when no other user has been saved in the same designated area. Note that when two virtual machines are defined for the same VMSAVE area and the system terminates, only the user who first enabled the option is saved.

VM/SP Publications

The following publications contain information about virtual storage preservation:

GC19-6200 Introduction
LY20-0891 Data Areas and Control Block Logic
LY20-0892 System Logic and Problem Determination Guide, Vol. 1 (CP)
SC19-6201 Planning and System Generation Guide
SC19-6202 Operator's Guide
SC19-6204 System Messages and Codes
SC19-6205 OLTSEP and Error Recording Guide
SC19-6211 CP Command Reference for General Users

Accounting-Records-On-Disk Support

This function supports the spooling of accounting records to disk. These records are collected on disk and at a later time, they can be read into a virtual machine for billing and usage analysis report generation. This support allows installations without a real card punch to process their accounting information.

NEW AND CHANGED COMMANDS

ACNT Command

This is an existing CP class A command with a new operand, CLOSE, that allows the VM/370 system operator to close the accounting spool file before the limit of the number of records is reached. The number of records to be accumulated is specified in the SYSACNT macro during system generation.

NEW AND CHANGED MACRO INSTRUCTIONS

SYSACNT Macro

To accumulate accounting records, this new macro must be defined during system generation. It specifies:

- The user identification of the virtual machine to which the accounting spool files are spooled when they are closed.
- The class of the accounting spool files.
- The file type of the accounting spool files.
- The number of records to be accumulated before the spool files are closed and made available to the specified virtual machine.

VM/SP Publications

The following publications contain information on Accounting Records on Disks:

GC19-6200 Introduction
LY20-0891 Data Areas and Control Block Logic
LY20-0892 System Logic and Problem Determination Guide, Vol. 1 (CP)
SC19-6201 Planning and System Generation Guide
SC19-6202 Operator's Guide
SC19-6204 System Messages and Codes

Spool-Files-To-Tape Support

Spool-files-to-tape support frees DASD spooling space by allowing the spooling operator to dump to tape those spool files that cannot be immediately processed by real unit record devices. Later, the spooling operator can also load the spool files back into the same or different VM/SP system for processing to an I/O device.

NEW AND CHANGED COMMANDS

SPTAPE Command

This class D command allows the spooling operator to use spool-files-to-tape support. It specifies that:

- Printer, reader, or punch spool files are to be written on or read from tape.
- The tape should be scanned from its current position until the end of the tape (double tape mark) is encountered.
- The previous spool-to-tape operation should be terminated after completing the current file or immediately.
- The spooling classes to be written or read from tape.
- The spool file with a certain spool identification is to be written or read from tape.
- The reset value of tape density.
- The spool files are to be deleted from the spooling system after being successfully written to tape.
- No tape movement should occur after the tape operation.
- The tape should be rewound or unloaded after the tape operation.
- System-held or user-held files should be included in the tape operation.
- Files that are not held should be included in the tape operation.

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on spool file to tape support:

GC19-6200 Introduction
LY20-0891 Data Areas and Control Block Logic
SC19-6202 Operator's Guide
SC19-6204 System Messages and Codes
SC19-6210 CMS User's Guide
LY20-0892 System Logic and Problem Determination Guide, Vol. 1 (CP)

CMS Tape Label Processing Support

This support is added to CMS to read IBM standard labels on input and to write IBM standard labels on output. A facility is included to specify user exits for processing nonstandard label tapes during execution of CMS macro simulations and some CMS tape operation commands. Another facility specifies user written routines to process standard user labels during DOS and OS macro simulation under CMS. The CMS TAPE command is modified to display the VOL1 label when one exists on a read operation, and to write a new VOL1 label during a write operation. The user can also select to bypass tape label processing or to process tapes without labels.

NEW AND CHANGED COMMANDS

TAPE Command

The CMS TAPE command has two new operands, DVOL1 and WVOL1. WVOL1 writes a new VOL1 label on a tape. DVOL1 displays the contents of an existing VOL1 label on a user's terminal, and it also verifies that a requested tape has actually been mounted.

TAPEMAC and TAPPDS Commands

New options are added to both the TAPEMAC and TAPPDS commands. These options specify tape label information including IBM standard label and nonstandard label processing.

FILEDEF Command

The CMS FILEDEF command has been enhanced to include label processing operands for tape files. The user can specify NL, SL, NSL, SUL, and BLP operands that are similar to the OS/VS data definition (DD) cards. The FILEDEF command with the LABOFF operand allows the user to bypass label processing. The meanings of the operands are:

SL The tape data set has an IBM standard label.

NSL The tape data set has a nonstandard label.

SUL The tape data set has both an IBM standard label and a user label.

BLP Requests the system to bypass label process for the tape data set.

NL Requests the system to reject tapes that have IBM standard labels.

LABELDEF Command

This new CMS command allows a user to specify detailed label description information, such as filename, expiration date, etc. This command describes the contents of the IBM standard HDR1 and EOF1 tape labels for both input and output files in CMS, OS simulation, and CMS/DOS.

TAPESL Macro

This CMS macro allows a user writing in assembler language to link to the standard label processing routines to process standard HDR1 or EOF1 labels without using DOS, or OS OPEN or CLOSE macros. TAPESL is used in conjunction with the RDTAPE, WRTAPE, and TAPECTL macros, and it reads and writes only one tape record.

OS Simulation and CMS/DOS OPEN and CLOSE Macros

VM/370 has been enhanced to include some tape label processing for the CMS/DOS and OS simulation OPEN and CLOSE macros. The user may:

- Specify IBM standard tape labels.
- Bypass tape label processing.
- Specify nonstandard tape labels that will be processed by a user-written routine.

VM/SP Publications

The following publications contain information on CMS tape label processing:

GC19-6200 Introduction
LY20-0891 Data Areas and Control Block Logic
LY20-0893 System Logic and Problem Determination Guide, Vol. 2 (CMS)
SC19-6201 Planning and System Generation Guide
SC19-6202 Operator's Guide
SC19-6204 System Messages and Codes
SC19-6209 CMS Command and Macro Reference
SC19-6210 CMS User's Guide

Full Screen Support Via DIAGNOSE X'58'

The user can have full screen console support by issuing DIAGNOSE X'58'. If the user chooses to gain full screen support by issuing the DIAGNOSE, the virtual machine is responsible for processing all control information to the terminal; control information makes most display station facilities (the program function keys, audible alarm, and display intensity) available to the virtual machine.

NEW AND CHANGED COMMANDS

None

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on full screen support using DIAGNOSE X'58':

LY20-0891 Data Areas and Control Block Logic
SC19-6203 System Programmer's Guide

Enhanced 3270 Support

The support for enhanced 3270 devices is similar to that provided by VM/SP for 3270 displays. The 3274, 3275, and 3276 control units have the same VM/SP support as that of the 3271 and 3272. Also, the 3287 and 3289 printers are handled like the 3284, 3285 and 3288 printers. The 3276 and 3278 display stations are supported as virtual consoles. Features of these display stations include various screen sizes (1920, 2560, and 3440 characters); an optional set of 12 program function (pf) keys for a total of 24; and six new national usage characters.

NEW AND CHANGED COMMANDS

TERMINAL Command

The TERMINAL command has a new operand, TABCHAR, that allows a user to define the tab character to be used by the terminal. The tab character may be none, the system default, or any valid special graphic character.

NEW AND CHANGED MACRO INSTRUCTIONS

CLUSTER Macro Instruction

The CLUSTER macro instruction now accepts the 3274 and 3276 as valid control unit types.

RCTLUNIT Macro Instruction

The RCTLUNIT macro instruction accepts the 3276 as a valid control unit.

RDEVICE Macro Instruction

The RDEVICE Macro instruction accepts the 3278 Models 2, 3, and 4; the 3287 and 3289 as valid device types. Note that the MODEL operand is required for DEVTYPE=3278.

RIOGEN Macro Instruction

The RIOGEN macro instruction accepts the 3278 as a valid console.

TERMINAL Macro Instruction

The TERMINAL macro instruction accepts the 3276 Models 2, 3, and 4; the 3278 Models 2, 3, and 4; the 3287 Models 1 and 2; and the 3289 Models 1 and 2 are valid terminals. Note that the MODEL operand is required for the 3276, 3278, 3287 and 3289. The tab character can be displayed on the 3276 and 3278 terminals.

VM/SP Publications

The following publications contain information on enhanced 3270 Information Display support:

GC19-6206 Terminal User's Guide
LY20-0891 Data Areas and Control Block Logic
SC19-6210 CMS User's Guide
SC19-6211 CP Command Reference for General Users

Addition to VM/370 Extended Control-Program Support (ECPS:VM/370)

ECPS:VM/370 on the 135-3,138, 145-3, and 148 processors has been enhanced to accelerate the processing of the DIAGNOSE instruction used to communicate between a virtual machine and CP. This support is also available on the 4300 processors.

NEW AND CHANGED COMMANDS

None

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on additions to ECPS:VM/370 support:

LY20-0892 System Logic and Problem Determination Guide, Vol. 1 (CP)
SC19-6201 Planning and System Generation Guide
SC19-6202 Operator's Guide
SC19-6204 System Messages and Codes

Interactive HELP Facility Under CMS

The HELP Facility is an online informational display service available at the CMS terminal that guides the user in the general user class of CP and CMS commands. It also helps him in responding to CP and CMS messages. When invoked by the CMS user, the HELP facility displays a description of the CP/CMS command requested and its syntax, parameters and message explanations.

NEW AND CHANGED COMMANDS

HELP Command

The HELP command displays CMS (or other component) command or EXEC descriptions, formats, or parameters by option. Operands of the HELP command cause the following information to be displayed:

- A menu of supported CMS commands that the help facility describes
- A menu of supported commands of another component that the help facility describes
- A description of the HELP command
- Either the syntax, parameters, description, or all three for a CMS command, subcommand, or EXEC
- Either the syntax, parameters, description, or all three for commands, subcommands, or EXECs of a component other than CMS
- An explanation, reason, system action, user action, and return code for the CMS (CMSnnnt) message or the CP (DMKnnnt) message specified

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP publications

The following publications contain information on the CMS HELP facility:

GC19-6200 Introduction
LY20-0891 Data Areas and Control Block Logic
LY20-0893 System Logic and Problem Determination Guide, Vol. 2 (CMS)
SC19-6204 System Messages and Codes
SC19-6209 CMS Command and Macro Reference
SC19-6210 CMS User's Guide

CMS File System Extensions

This feature removes the limitation of a maximum of 65,533 items in a CMS file, increases the number of CMS disks that can be accessed to 26, and supports physical block sizes of 800, 1024, 2048, and 4096 bytes for CMS disks.

NEW AND CHANGED COMMANDS

ACCESS Command

The ACCESS command is modified to accept all 26 alphabetic characters as access modes.

FORMAT Command

The BLKSIZE option sets the physical disk block size of a CMS disk as 800, 1024, 2048, or 4096 bytes. The NOERASE option is valid for FB-512 devices only. The designation FB-512 refers to those DASD devices that subscribe to fixed block mode. Specifically, these are the IBM 3310 and 3370 direct access storage devices. With NOERASE, only those physical FB-512 blocks which comprise the disk structure are written on the disk; all other FB-512 blocks are left unchanged (not cleared to binary zeros).

QUERY Command

One new function for the DISK keyword is added to the QUERY command. QUERY DISK now allows the display of the CMS-Disk blocksize in addition to data currently displayed.

NEW AND CHANGED MACRO INSTRUCTIONS

FSCB, FSSTATE, FSREAD, FSWRITE Macro Instructions

The FORM=E keyword has been added to the FSCB, FSSTATE, FSREAD, and FSWRITE macro instructions. This keyword causes generation and/or use of an extended format FSCB consisting of a current FSCB with new fields appended to the end. This extended format FSCB is required to manipulate CMS files larger than 65,533 items. The new maximum file size using the extended format FSCB is $2^{31}-1$ items. The FSCB macro instruction now maps both standard and extended FSCB storage.

FSPOINT Macro Instruction

The FSPOINT macro instruction is a new macro used to reset the write and/or read pointers for a file.

VM/SP Publications

The following publications contain information on CMS file system extensions:

GC19-6200 Introduction
LY20-0891 Data Areas and Control Block Logic
LY20-0893 System Logic and Problem Determination Guide, Vol. 2 (CMS)
SC19-6202 Operator's Guide
SC19-6203 System Programmer's Guide
SC19-6204 System Messages and Codes
SC19-6209 CMS Command and Macro Reference
SC19-6210 CMS User's Guide

CMS TAPE Command Improvement

This command modification allows the CMS user to choose either a blocksize of 4K (4096 bytes) or 800 bytes. A 4096 blocksize provides greater data transfer efficiency.

NEW AND CHANGED COMMANDS

TAPE Command

The block size may be specified as either 800 or 4096 bytes. If 800 is specified, a tape compatible with previous VM/370 systems is produced.

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on the CMS TAPE command improvement:

LY20-0891 Data Areas and Control Block Logic
LY20-0893 System Logic and Problem Determination Guide, Vol. 2 (CMS)
SC19-6204 System Messages and Codes
SC19-6209 CMS Command and Macro Reference
SC19-6210 CMS User's Guide

CMS Use of CP Page Management Interfaces

Page frames that are released by CMS storage management become available immediately for CP page in activities, avoiding unnecessary CP page out operations.

NEW AND CHANGED COMMANDS

None

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on CMS use of CP page management interfaces:

LY20-0891 Data Areas and Control Block Logic
SC19-6201 Planning and System Generation Guide
SC19-6204 System Messages and Codes
SC19-6209 CMS Command and Macro Reference
SC19-6210 CMS User's Guide

CP Extensions

The CP extensions modify the storage management algorithm to improve the return of free storage allocation, provide a technique to keep a specified user on top of the runlist via dispatching priority, and modify DIAGNOSE X'18' so that CMS disk I/O CCW translation can be processed more efficiently by ECPS:VM/370.

NEW AND CHANGED COMMANDS

None

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on the CP extensions:

LY20-0891 Data Areas and Control Block Logic
LY20-0892 System Logic and Problem Determination Guide, Vol. 1 (CP)
SC19-6201 Planning and System Generation Guide
SC19-6203 System Programmer's Guide
SC19-6204 System Messages and Codes

Small CP Option

The small CP option provides pageable storage to virtual machines. It does this by reducing the size of the resident nucleus. With this option, systems having one megabyte or less of available processor storage may be able to support additional interactive users.

NEW AND CHANGED COMMANDS

None

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on the small CP option:

SC19-6201 Planning and System Generation Guide
SC19-6203 System Programmer's Guide
SC19-6204 System Messages and Codes
LY20-0891 Data Areas and Control Block Logic

APL/Text Support for the 3270

APL/Text support enhances VM/SP support of the functions provided by the 3270 Information Display System. This system has several optional features that enable display stations and printers to display and print APL and Text character sets as well as the EBCDIC character set.

NEW AND CHANGED COMMANDS

TERMINAL Command

The class G TERMINAL command allows the user to turn APL and TEXT character set translation on or off for 3270 Information Display terminals that display APL/TEXT characters.

VM/SP Publications

The following publications contain information on APL/Text Support for 3270 Information Display Stations:

GC19-6206 Terminal User's Guide
LY20-0891 Data Areas and Control Block Logic
LY20-0892 System Logic and Problem Determination Guide, Vol. 1 (CP)
SC19-6201 Planning and System Generation Guide
SC19-6203 System Programmer's Guide
SC19-6204 System Messages and Codes
SC19-6210 CMS User's Guide
SC19-6211 CP Command Reference for General Users

Display Control for the 3270

This support allows an application program to control intensification or suppression of all or part of a line on a 3270 display station. The cursor can be positioned within a line to the desired location.

NEW AND CHANGED COMMANDS

TERMINAL Command

The class G TERMINAL command allows the user to turn highlighting on or off.

QUERY Command

The class G QUERY TERMINAL command allows the user to query the setting of highlighting for his terminal--either ON or OFF.

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on display control for 3270 Information Display Stations:

LY20-0891 Data Areas and Control Block Logic
LY20-0892 System Logic and Problem Determination Guide, Vol 1 (CP)
SC19-6201 Planning and System Generation Guide
SC19-6203 System Programmer's Guide
SC19-6210 CMS User's Guide
SC19-6211 CP Command Reference for General Users

Support of the 3289 Model 4 Printer

This support closely parallels the VM/SP support of the 3203 Model 4 printer except that unique buffer images are required.

NEW AND CHANGED COMMANDS

DEFINE Command

The DEFINE command is changed to allow definition of virtual 3289 Model 4 printer.

CPEREP Command

The DEV= parameter of the CPEREP command is changed to allow specification of the 3289 (Model 4) device type.

NEW AND CHANGED MACRO INSTRUCTION

RDEVICE Macro Instruction

The RDEVICE macro instruction is changed to allow specifications of the 3289 (Model 4) as a valid device type.

VM/SP Publications

The following publications contain information on 3289 Model 4 printer support:

LY20-0890 Service Routines Program Logic
LY20-0891 Data Areas and Control Block Logic
LY20-0892 System Logic and Problem Determination Guide, Vol. 1 (CP)
SC19-6201 Planning and System Generation Guide
SC19-6202 Operator's Guide
SC19-6203 System Programmer's Guide
SC19-6209 CMS Command and Macro Reference
SC19-6211 CP Command Reference for General Users

Support of the 8809 Tape Unit

This support enables the installation to use the 8809 tape unit, which is a two speed tape drive that runs at 12.5 IPS and 100 IPS and uses standard nine-track 1,600 BPI tape. The tape unit is supported at 12.5 IPS by VM/SP and attaches to the 4300 processors in native mode as a channel attached tape drive. The 8809 is supported at 100 IPS by a standalone dump/restore utility to provide high speed system backup capability.

NEW AND CHANGED COMMANDS

None

NEW AND CHANGED MACRO INSTRUCTIONS

RDEVICE Macro Instruction

The RDEVICE macro instruction is changed to accept 8809 as a valid device type.

RCTLUNIT Macro Instruction

The RCTLUNIT macro instruction is changed to accept the 8809 attachment as a valid device type.

VM/SP Publications

The following publications contain information on the 8809 tape unit:

LY20-0890 Service Routines Program Logic
LY20-0891 Data Areas and Control Block Logic
SC19-6201 Planning and System Generation Guide
SC19-6204 System Messages and Codes
SC19-6209 CMS Command and Macro Reference

Support of the 3310 and 3370 Direct Access Devices

These devices (collectively referred to as FB-512 devices) employ fixed block (512 byte block) mode. Support for these devices provides every aspect of traditional DASD usage in CP on the 4300 processors.

NEW AND CHANGED COMMANDS

DEFINE Command

The type parameter of the DEFINE command has been changed to accept 3310 and 3370 valid device types.

IPL Command

The IPL command has been modified to accept FB-512 (fixed block - 512 bytes) block number displacements for a precise IPL start location.

CPEREP Command

The DEV= parameter of the CPEREP command has been changed to accept 3310 and 3370 as valid device types.

DIRECT Command

The DIRECT command does not change. However, it accepts the DIRECTORY and MDISK control statements which are changed to allow FB-512 specification. On the MDISK statement block numbers are also specified.

DDR Command

The DDR command is changed to accept block number designations for dump, copy, or restore of FB-512 volumes.

QUERY Command

The output from the QUERY VIRTUAL DASD command is changed for FB-512 minidisks. Instead of a cylinder size, a block size is printed. Also, the QUERY TDSK output is changed in the same manner.

NEW AND CHANGED MACRO INSTRUCTIONS

RDEVICE Macro Instruction

The DEVTYPE parameter of the RDEVICE macro instruction has been changed to accept specification of 3310 and 3370 as valid device types.

SYSRES Macro Instruction

The SYSTYPE parameter of the SYSRES macro instruction has been changed to accept 3310 and 3370 as valid device types.

NAMESYS, NAMENCP, and NAME3800 Macro Instructions

A new parameter, SYSBLOK=, has been added to the NAMESYS macro instruction. The SYSBLOK= parameter should be used in place of the SYSCYL= parameter for 3310 and 3370 direct access storage devices. The SYSSTRT= parameter can be specified on the NAMESYS, NAMENCP, and NAME3800 macro instructions and allows specification of a page number for FB-512 devices.

VM/SP Publications

The following publications contain information on the 3310 and 3370 DASD:

GC19-6200 Introduction
LY20-0890 Service Routines Program Logic
LY20-0891 Data Areas and Control Block Logic
LY20-0892 System Logic and Problem Determination Guide, Vol. 1 (CP)
LY20-0893 System Logic and Problem Determination Guide, Vol. 2 (CMS)
SC19-6201 Planning and System Generation Guide
SC19-6202 Operator's Guide
SC19-6203 System Programmer's Guide
SC19-6204 System Messages and Codes
SC19-6205 OLTSEP and Error Recording Guide
SC19-6209 CMS Command and Macro Reference
SC19-6210 CMS User's Guide
SC19-6211 CP Command Reference for General Users

Logical Device Support Facility

The logical device support facility allows an application program running in a virtual machine to create within CP one or more logical 3270 Information Display devices. CP is unaware of the fact that the 3270 terminals have no physical existence and that they are controlled by the application program. CP sees the logical device as a local 3270 display station. The application program communicates with the logical device support facility in CP by means of a new DIAGNOSE X'7C' and a new external interruption code X'2401'.

The VM/Pass-Through Facility program product is one example of an application program that can utilize the logical device support facility. The VM/Pass-Through Facility uses logical device support to allow VM/SP users with display terminals physically connected to their own operating system configuration to gain access to and use the facilities of another VM/SP system.

NEW AND CHANGED COMMANDS

QUERY Command

The class B QUERY command allows the user to query a specific logical device.

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on logical device support:

GC19-6200 Introduction
SC19-6201 Planning and System Generation Guide
SC19-6203 System Programmer's Guide

Support of the 3262 Models 1 and 11 Printers

The 3262 Model 1 is a 650 lines per minute printer; the 3262 Model 11 is a 325 lines per minute printer. These printers are similar to the 3289 Model 4 printer except that the new printer support requires a unique Universal Character Set (UCS) buffer image.

NEW AND CHANGED COMMANDS

DEFINE Command

The class G DEFINE command allows the user to define a virtual 3262 printer in his virtual machine configuration.

CPEREP Command

The class E CPEREP now allows the user to specify the 3262 printers on the DEV= parameter.

LOADBUF Command

The class D LOADBUF command allows the user to specify new UCS buffer images for the 3262 Models 1 and 11 printers.

NEW AND CHANGED MACRO INSTRUCTIONS

RDEVICE Macro

The RDEVICE macro instruction allows the user to specify on the DEVTYPE parameter the 3262 Models 1 and 11 printers as valid device types.

VM/SP Publications

The following publications contain information on 3262 Models 1 and 11 printer support:

LY20-0893 System Logic and Problem Determination Guide, Vol. 2 (CMS)
SC19-6201 Planning and System Generation Guide
SC19-6203 System Programmer's Guide
SC19-6211 CP Command Reference for General Users

VM/370 System Extensions Function Contained in VM/SP

The following line items are also included in the VM/SP package; these items (along with the Basic System Extensions items above) were originally packaged as VM/370 System Extensions Program Product Release 2 (Program No. 5748-XE1).

- Resource management facilities
- Shadow table maintenance facility
- Single processor mode
- Dynamic SCP transition to or from native mode
- MVS/System Extensions support

Resource Management Facilities

In addition to the function contained in the Basic System Extensions Resource Management Subset, other resource management facilities include a page migration facility and a swap table migration facility. The page migration facility allows CP to migrate inactive pages from the primary, high performance, paging devices to secondary paging devices. By keeping the more active pages on high performance devices, page waits are reduced, and better management of the high performance paging devices and preferred paging areas results. The swap table migration facility enables better system use of real storage. Virtual storage segments that remain unused throughout a specific duration have their swap tables copied to secondary storage. The real storage previously occupied by the copied swap tables and their associated page tables is then available to the system.

NEW AND CHANGED COMMANDS

MIGRATE Command

This class A command allows the VM/370 system operator to force the pages of a specified user to migrate to the secondary paging device. If a user identification is not specified, the normal page and swap table migration is activated.

QUERY SRM Command

This class A and E command displays the current number of pageable pages, the duration of the dispatching time slice, maximum working set, maximum drum page allocation, page migration activity counters, unused segment elapsed time criteria, current PCI flag setting, maximum page bias value, and current interactive shift bias value. VM/SP function enhances this command to display the percentage of the preferred moveable head paging space that is full.

SET SRM Command

This class E command sets the maximum value of the virtual machine's working set, sets the maximum number of fixed head cylinder pages to be allocated to any one virtual machine, sets the unused segment elapsed time criteria, sets the PCI flag for 2305 page requests, sets the maximum page bias value, and sets the interactive shift bias for Q1 virtual machines that are using less than their allocated share of the processor. VM/SP function enhances this command to allow the user to set a percentage value after which page migration from the preferred moveable head area should occur.

QUERY PAGING Command

This class A and E command displays the current SET PAGING value.

SET PAGING Command

This class E command sets the decimal digit to be used in the working set size for the scheduler algorithm.

SET FAVORED Command

This class A command has been enhanced to allow several virtual machines to have a specified percentage of processor time. Designation of the userid as always dispatchable must be done with the SET FAVORED command.

INDICATE LOAD Command

Added to the display of the current class G INDICATE LOAD command are the responses for the expansion factor, paging rate, steal rate, and page contention load.

INDICATE FAVORED Command

This class A and E command displays favored userids and their processor usage.

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following VM/SP publications contain information about Resource Management Facility:

GC19-6204 System Messages and Codes
LY20-0891 Data Areas and Control Block Logic
LY20-0892 System Logic and Problem Determination Guide, Vol 1 (CP)
SC19-6201 Planning and System Generation Guide
SC19-6202 Operator's Guide
SC19-6205 OLTSEP and Error Recording Guide
SC19-6211 CP Command Reference for General Users

Shadow Table Maintenance Facility

This enhancement reduces the maintenance overhead associated with maintaining shadow page and segment tables and improves the performance of production virtual storage operating systems running under VM/SP. This facility should be used only for fully tested virtual storage operating systems.

The enhanced facility improves the performance of the virtual operating system run under VM/SP by the following support:

- Multiple shadow table support reduces the number of shadow tables purged when a virtual machine dispatches a new address space.
- Selective invalidation reduces the number of shadow table entries purged when CP steals or releases a page of storage from a virtual machine. CP processing selectively invalidates pages in a shadow table for a virtual machine instead of invalidating the entire shadow table and having to reestablish the pages as a result of a virtual machine request.
- Shadow table bypass for virtual=real users eliminates shadow tables for the virtual=real user by the use of a CP command.
- Shadow table bypass for virtual=virtual users reduces the overhead associated with maintaining shadow tables by the use of a CP command.

NEW AND CHANGED COMMANDS

These commands and macros and their associated operands are only for fully tested production VS running as virtual machines under VM/SP.

SET STBYPASS Command

The class G SET STBYPASS command with the VR and OFF operands is for the V=R user. VR eliminates the shadow tables. OFF reestablishes them.

The class G SET STBYPASS command with the nnn, OFF, and NOVERIFY operands is for the V=V user. These operands reduce the maintenance overhead associated with shadow tables. If virtual machine assist is available, the STFIRST option must be defined in the OPTION control statement for this user.

SET STMULTI Command

The class G SET STMULTI operand allows a user to have VM/SP maintain up to six sets of shadow tables. Previously, each time a VS changed from one virtual storage to another, the VM/SP shadow tables were invalidated. By having multiple shadow tables, the possibility of purging a single set of shadow tables, only to revalidate it shortly thereafter should be significantly reduced.

QUERY SET Command

The class G QUERY SET command has been updated to display the settings of STBYPASS and STMULTI.

STFIRST Directory Option

The use of the SET STBYPASS command for a V=V user running on hardware that has the virtual machine assist feature may have unpredictable results, including CP failure. To reduce this exposure to other VM/370 users, the SET STBYPASS command is executed for the combination V=V and virtual machine assist user only when the STFIRST option has been defined in the OPTION control statement for this user.

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on the shadow table maintenance facility:

GC19-6200 Introduction
GC19-6212 Operating Systems in a Virtual Machine
LY20-0891 System Logic and Problem Determination Guide, Vol. 1 (CP)
LY20-0891 Data Areas and Control Block Logic
SC19-6203 System Programmer's Guide
SC19-6204 System Messages and Codes
SC19-6211 CP Command Reference for General Users

Single Processor Mode

The operator can allow an operating system to have exclusive use of one processor. This option is called single processor mode.

Normally, when an MVS AP or MP system runs in a virtual machine under VM/SP, MVS runs uniprocessor mode. That is, VM/SP restricts MVS to one processor that MVS must share with VM/SP. An MVS AP or MP system running in a virtual machine cannot attain the same level of throughput it can attain running in MP mode.

To improve the throughput of an MVS AP or MP system running in a virtual machine, VM/SP provides single processor mode which provides MVS use of one processor while in the V=R virtual machine running under VM/SP. Therefore, single processor mode improves throughput for MVS by running MVS on two processors. The CP command enables the operator to request exclusive control or relinquish exclusive control of a processor for the V=R virtual machine.

NEW AND CHANGED COMMANDS

SPMODE Command

SPMODE enables a class A user to request exclusive control or relinquish exclusive control of a processor for the V=R machine.

QUERY Command

QUERY enables a class A or G user to determine if VM/SP is running in single processor mode.

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on single processor mode:

GC19-6200 Introduction
GC19-6212 Operating Systems in a Virtual Machine
LY20-0891 Data Areas and Control Block Logic
LY20-0892 System Logic and Problem Determination Guide, Vol. 1 (CP)
SC19-6202 Operator's Guide
SC19-6203 System Programmer's Guide
SC19-6204 System Messages and Codes
SC19-6211 CP Command Reference for General Users

Dynamic SCP Transition to or from Native Mode

Provides a way to switch a system control program (SCP) running in a V=R virtual machine to or from native mode. The operator need only issue the CP class A QVM command to deactivate the VM/SP system. He does not need to stop or reload the SCP again. To return the SCP to the VM/SP environment, the operator stops the processor, stores a byte of data into real storage for VM/SP's use, and then restarts the processor using the restart procedure for his particular processor model. For smooth transitions the operator needs to deactivate certain CP operations of the SCP prior to returning to VM/SP.

NEW AND CHANGED COMMANDS

QVM allows a class A user to switch the SCP in the V=R machine from the VM/370 environment to native mode.

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on dynamic SCP transition to or from native mode:

GC19-6200 Introduction
GC19-6212 Operating Systems in a Virtual Machine
LY20-0891 Data Areas and Control Block Logic
LY20-0892 System Logic and Problem Determination Guide, Vol. 1 (CP)
SC19-6201 Planning and System Generation Guide
SC19-6202 Operator's Guide
SC19-6203 System Programmer's Guide
SC19-6204 System Messages and Codes
SC19-6211 CP Command Reference for General Users

MVS/System Extensions Support

Allows a user who runs an MVS system in a virtual machine to use the MVS/System Extensions program product (Program Number 5740-XE1). The MVS/System Extensions program product uses the System/SP Extended Facility that is part of the 303x processors or the System/370 Extended Feature that is available on the System/370 models 158 and 168. VM/SP support of the MVS/ System Extensions facilitates the use of this hardware facility or feature by an MVS system running in a virtual machine; however, VM/SP does not use this facility for itself or other users. A CP command allows the VM/SP operator to enable and disable all virtual machines to use the MVS/System Extensions program product, provided that the hardware support is present. Additionally, a CP command allows the operator or general user to display whether or not the MVS/System Extensions program product is enabled.

NEW AND CHANGED COMMANDS

SET Command

The SET command has two new operands. The class A command, with the S370E operand, allows the VM/370 system operator to enable and disable all virtual machines to use the MVS/System Extensions program product, provided the hardware support is available. The class G command, with the 370E operand, permits individual virtual machine users to enable the MVS program product for their virtual machines, provided the VM/370 system operator has already enabled it for all users.

QUERY Command

The class A and G QUERY command, with the new operand S370E, displays whether or not the MVS/System Extensions program product is enabled for the users of this VM/370 system.

The class G QUERY SET command now includes a response field that indicates whether or not this virtual machine user has enabled and can use the MVS/System Extensions program product.

NEW AND CHANGED MACRO INSTRUCTIONS

None

VM/SP Publications

The following publications contain information on MVS/System Extensions support under VM/SP:

GC19-6200 Introduction
GC19-6212 Operating Systems in a Virtual Machine
LY20-0891 Data Areas and Control Block Logic
SC19-6201 Planning and System Generation Guide
SC19-6202 Operator's Guide
SC19-6203 System Programmer's Guide
SC19-6204 System Messages and Codes

Section 2. Storage Requirements and Module Summary

Storage Requirements

VM/SP requires a minimum of 384K bytes of available processor storage when you implement the small CP option. Mixed mode environments (that is, CMS running concurrently with another virtual operating system) require a minimum of 512K bytes of available processor storage. The resident nucleus size of VM/SP is approximately 260K which is 56K to 60K larger than the size of the VM/370 Basic System Extensions nucleus; it is 42K to 46K larger than the VM/370 System Extensions nucleus. If an installation chooses to implement the small CP nucleus option, the VM/SP resident nucleus is approximately 184K which is 24K to 28K larger than the resident nucleus size of any installation implementing the same option with VM/370 Basic System Extensions.

Note: The nucleus size approximations for VM/SP are for planning purposes only and may vary by several K bytes depending on your installation's configuration.

Module Summary

These modules are listed for planning purposes only.

Dedicated 3270 Display Printers to Virtual Machines

New and Changed Modules

DMKCFP	DMKLOG	DMKQCN	DMKSCN	DMKVDR
DMKCQG	DMKNEA	DMKRGA	DMKVCN	DMKVDS
DMKDIR	DMKNET	DMKRGB	DMKVDD	

Split Modules

None

New and Changed Macro Instructions/Control Blocks

CONTASK	EQU	NICBLOK	TERMINAL
UDEVBLOK	VCONCTL	VDEVBLOK	

Full Screen Console Enhancements

New and Changed Modules

DMKCFM	DMKCFT	DMKDIR
DMKCFP	DMKCQR	DMKGRF
DMKQCN	DMKVCN	DMKVDS

Split Modules

None

New and Changed Macro Instructions/Control Blocks

CONTASK	DEVTYPES	VCONCTL

CMS OS Loader Support

New and Changed Modules

DMSFLD	DMSLOS	DMSSCL	DMSSLN	DMSSVU
DMSFNC	DMSLLU	DMSSCT	DMSSOP	DMSZAP
DMSGLB	DMKQRY	DMSSEB	DMSSVT	

Split Modules

DMSVT now split into DMSSVU

New and Changed Macro Instructions/Control Blocks

CMSCB	FCBSECT	FCHSECT	NUCON

Inter-user Communication Vehicle (IUCV)

New and Changed Modules

DMKCPI	DMKIUA	DMKIUG	DMKPRV	DMKUSO
DMKDIR	DMKIUC	DMKNEM	DMKUDR	DMMCPA
DMKDSP	DMKIUE	DMKPGS		

Split Modules

DMKUSO split to DMKUSP

New and Changed Macro Instructions/Control Blocks

CCT	IUCV	IUTRACE	PDENT	UIUCBLOK	VMBLK
EQU	IUCVBLOK	IXBLOK	PSA	UMACBLOK	VMBLOK
IPARML	IUSAVE	MSGBLOK	UDIRECT		

SNA Console Communication Services (CCS)

New and Changed Modules

DMKACO	DMKCQG	DMKDIA	DMKQCN	DMKVCT	DMMCPA
DMKELD	DMKCQP	DMKLOG	DMKTRD	DMKVCP	DMKVCV
DMKCPV	DMKCQY	DMKLOH	DMKUSO	DMKVCR	DMKVCX

Split Modules

DMKCQP now split into DMKCQQ
DMKUSO now split into DMKUSP
DMKQCN now split into DMKQCO

New and Changed Macro Instructions/Control Blocks

ACCOUNT	OPTIONS	RDEVBLOK	TRACEVCS	WEBLOK
ACNTBLOK	PSA	SNARBLOK	VSMBLOK	WEIBLOK
EQU	RBLOKS	SYSLOCS		

Single Console Image Facility

New and Changed Modules

DMKCFC	DMKCQR	DMKEMB	DMKMSG	DMKSND
DMKCFM	DMKDIR	DMKLOG	DMKQCN	DMKUSO
DMKCFP	DMKEMA	DMKLOH		

Split Modules

DMKUSO now split into DMKUSP

New and Changed Macro Instructions/Control Blocks

UDBFBLOK UMACBLOK VMBLOK

CP Spooling Enhancements

New and Changed Modules

DMKACO	DMKCQH	DMKCSQ	DMKMIA	DMKSPL	DMKUSO
DMKCKP	DMKCQP	DMKCSU	DMKNLE	DMKSPS	DMKVDS
DMKCKS	DMKCQR	DMKCSV	DMKRSP	DMKSPT	DMKVSP
DMKCPI	DMKCSB	DMKDMP	DMKSBL	DMKTCS	DMKVSQ
DMKCPT	DMKCSO	DMKDRD	DMKSEP	DMKURS	DMKWRM
DMKCQG	DMKCSP				

Split Modules

DMKUSO now split into DMKUSP

New and Changed Macro Instructions/Control Blocks

EQU	RDEVBLOK	SFPBLOK	SYSFORM	SYSPCLAS	VFCBBLOK
FORMBLOK	RSPXBLOK	SPOOL	SYSID	VBLOKS	VSPXBLOK
PBLOKS	SFBLOK	SYSACNT	SYSLOCS		

IPL Command Enhancement

New and Changed Modules

DMKCFG DMKVMI

Split Modules

None

New and Changed Macro Instructions/Control Blocks

None

New CMS Exec Interpreter (EXEC 2) Support

New and Changed Modules

DMSEXC DMSEXE DMSEXI DMSEXT DMSSEG

Split Modules

None

New and Changed Macro Instructions/Control Blocks

None

CMS Stack Enhancements

New and Changed Modules

DMSCAT DMSCRD DMSFNC DMSITS
DMSCIT DMSET DMSINT DMSSET

Split Modules

None

New and Changed Macro Instructions/Control Blocks

NUCON SCBLOK

VM/SP System Product Editor

New and Changed Modules

DMSXBG DMSXDS DMSXHL DMSXMD DMSXSC DMSXST
DMSXCG DMSXED DMSXIN DMSXML DMSXSD DMXSXU
DMSXCM DMSXER DMSXIO DMSXMS DMSXSF DMSXTB
DMSXCN DMSXFC DMSXMA DMSXPT DMSXSG DMSXTF
DMSXCT DMSXFD DMSXMC DMSXPX DMSXSS DMSXUP
DMSXDC DMSXGT

Split Modules

None

New and Changed Macro Instructions/Control Blocks

COMMAND	EDRTN	LSCREEN	SUBC	ZDESTYP	ZPACK
DEFMSG	EDSAVE	PARM	SYNSUB	ZDECS	SAVEREG
EDCALL	ERRMSG	PRSCB	XEDEQU	ZMACS	ZREQDES
EDGOTO	FLTYP	RECSAVE	ZBOCKS	ZFONC	

New Macro Instructions (FILETYPE = XEDIT)

ALTER	HEXTYPE	PARSE	PROFILE	SORT	STATUS
CANCEL	JOIN	POWERINP	SCHANGE	SPLIT	CMSEDIT
CAPPEND	MODIFY	PQUIT			

HELP Facility Enhancements

New and Changed Modules

DMSHLI DMSHLL DMSHLP DMSHLS

Split Modules

None

New and Changed Macro Instructions/Control Blocks

HLPSECT

New Macro Instruction (FILETYPE=XEDIT)

HELPXED

System Security Enhancements

New and Changed Modules

CMKCFO	DMKCKT	DMKCQR	DMKEMC	DMKPGU	DMKVDG
DMKCFP	DMKCPI	DMKDMP	DMKFMT	DMKRSP	DMKWRM
DMKCKS	DMKCPX	DMKDRD	DMKPGT	DMKTDK	DMKZTD

Split Modules

None

New and Changed Macro Instructions/Control Blocks

ALOFBLOK	SHQBLOK
RECBLOK	SYSRES
SFBLOK	TDKBLOK

Enhanced 3270 Display Station Support

New and Changed Modules

DMKBLD	DMKGRF	DMKGRU	DMKGRX	DMKRGA	DMKRGD
DMKDIA	DMKGRH	DMKGRV	DMKQCN	DMKRGB	DMKVCN
DMKGRC	DMKGRT	DMKGRW			

Split Modules

None

New and Changed Macro Instructions/Control Blocks

CALL	GRTBLOK	IOBLOK	TIMER

New Processor Support

New and Changed Modules

DMKCPI

Split Modules

None

New and Changed Macro Instructions/Control Blocks

MCHAREA

3278/3279 Information Display Station Support

New and Changed Modules

DMKACO	DMKCFY	DMKEXT	DMKLOC	DMKQCN	DMKUCC
DMKALG	DMKCKP	DMKFCB	DMKLOG	DMKQCO	DMKUCS
DMKAPI	DMKCPI	DMKGRC	DMKLOH	DMKRGA	DMKUDU
DMKBLD	DMKCPT	DMKGRF	DMKLOK	DMKRGB	DMKVCN
DMKBSC	DMKCPU	DMKGRH	DMKMCT	DMKRGC	DMKVCP
DMKCDM	DMKCQG	DMKGRT	DMKMID	DMKRGD	DMKVCR
DMKCFC	DMKCQR	DMKGRU	DMKMSG	DMKRNH	DMKVCV
DMKCFG	DMKCQS	DMKGRV	DMKNEA	DMKRSP	DMKVCX
DMKCFJ	DMKCSO	DMKGRW	DMKNES	DMKSCN	DMKVDC
DMKCFM	DMKCST	DMKGRX	DMKNET	DMKSND	DMKVDR
DMKCFO	DMKCSU	DMKHVC	DMKNLD	DMKTBL	DMKVDS
DMKCFS	DMKCSV	DMKHVD	DMKPER	DMKTBM	DMKVMC
DMKCFT	DMKDIA	DMKIOS	DMKPIA	DMKTRA	DMKVMD
DMKCFV	DMKDIR	DMKJRL	DMKPSA	DMKUCB	DMKWRM
DMKCFW	DMKERM	DMKLNK			

Split Modules

DMKUSO now split into DMKUSP

New and Changed Macro Instructions/Control Blocks

CLUSTER	IOBLOKS	TERMINAL
CONBUF	NETWORK	UDIRECT
DEVTYPES	PSA	VMBLK
EQU	RBLOKS	VMBLOK
GRTBLOK	RDEVICE	

Reliability, Availability, and Serviceability Enhancements

New and Changed Modules

DMKCFO	DMKCSQ	DMKIOS	DMKVDG
DMKCKP	DMKDID	DMKIOT	DMKVIO
DMKCKS	DMKDMP	DMKPGT	DMKWRM
DMKCKT	DMKDRD	DMKPGU	
DMKCKV	DMKEMC	DMKRSP	
DMKCPI	DMKFMT	DMKTDK	
DMKCQR			

Split Modules

None

New and Changed Macro Instructions/Control Blocks

ALLOC	RDEVBLOK
EQU	SPOOL
PSA	SYSRES
RBLOKS	

Support of 3380 Direct Access Storage and 3880 Storage Control Units Models 2 and 3

New and Changed Modules

DMKACO	DMKCPO	DMKDIB	DMKLNK	DMKRNH	DMKTRK
DMKALG	DMKCPS	DMKDIR	DMKLOG	DMKRSE	DMKTRM
DMKATS	DMKCPT	DMKDMP	DMKLOH	DMKRSP	DMKUNT
DMKELD	DMKCPU	DMKDRD	DMKMCD	DMKSAV	DMKUSO
DMKESC	DMKCPV	DMKDSB	DMKMCH	DMKSCN	DMKVCA
DMKCCH	DMKCQG	DMKDSP	DMKMON	DMKSEV	DMKVCH
DMKCCW	DMKCQP	DMKEIG	DMKMOO	DMKSIX	DMKVCN
DMKCFC	DMKCQQ	DMKENT	DMKMSW	DMKSNC	DMKVDA
DMKCFD	DMKCQR	DMKFMT	DMKNES	DMKSPL	DMKVDC
DMKCFF	DMKCSB	DMKGIO	DMKNET	DMKSPS	DMKVDD
DMKCFG	DMKCSO	DMKGRF	DMKNLD	DMKSPT	DMKVDE
DMKCFH	DMKCSP	DMKGRT	DMKNLE	DMKSRM	DMKVDG
DMKCFJ	DMKCSQ	DMKHVC	DMKNMT	DMKSSP	DMKVDR
DMKCFM	DMKCSV	DMKHVD	DMKOPR	DMKSSS	DMKVDS
DMKCFO	DMKDAD	DMKIOC	DMKPAG	DMKSTK	DMKVER
DMKCFP	DMKDAS	DMKIOE	DMKPGM	DMKSTP	DMKVIO
DMKCFT	DMKDAU	DMKIOF	DMKPGT	DMKSYM	DMKVMA
DMKCKP	DMKDDR	DMKIOG	DMKPGU	DMKTAP	DMKVMI
DMKCKS	DMKDEF	DMKIOH	DMKPRV	DMKTCS	DMKVSC
DMKCKT	DMKDEG	DMKIOJ	DMKPSA	DMKTDK	DMKVSP
DMKCNS	DMKDEI	DMKIOS	DMKQCN	DMKTHI	DMKWRM
DMKCPB	DMKDGD	DMKIOT	DMKRGA	DMKTRC	DMSACM
DMKCPI	DMKDIA	DMKISM	DMKRGB	DMKTRD	DMSASN

DMSDIO	DMSFOR	DMSITI	DMSNUC	DMSROS
DMSFNS	DMSINI	DMSLDS	DMSQRY	

Split Modules

DMKSSS now split into DMKSST
DMKUSO now split into DMKUSP

New and Changed Macro Instructions/Control Blocks

ALLOC	OBRRECN	SYSLOCS
DEVTYPES	RBLOKS	SYSOWN
DIOSECT	RCTLUNIT	SYSORD
IOBLOKS	RDEVICE	SYSRES

Support of 3800 Printing Subsystem as a Virtual Spooling Device

New and Changed Modules

DMKCKP	DMKDEF	DMKRSP	DMKVDS	DMSPIO
DMKCKS	DMKDEG	DMKRSQ	DMKVSP	DMSPRT
DMKCKV	DMKDIR	DMKSEP	DMKVSR	DMSSEB
DMKCQG	DMKEMA	DMKSPL	DMKVSQ	DMSSPR
DMKCQH	DMKEMB	DMKTCS	DMKWRM	
DMKCQP	DMKEMC	DMKURS	DMSFLD	
DMKCSO	DMKRSE	DMKVDR	DMSIMA	

Split Modules

DMKRSP now split into DMKRSQ
DMKVSP now split into DMKVSR

New and Changed Macro Instructions/Control Blocks

CALL
PRINTL
RBLOKS
SPOOL
UDIRECT
VBLOKS

Modified AP Support and MP Support

New and Changed Modules

DMKACC	DMKCPU	DMKENT	DMKMCH	DMKRGB	DMKTRK
DMKACR	DMKCPV	DMKEXT	DMKMCT	DMKRNH	DMKTRM
DMKAPI	DMKCQP	DMKFRE	DMKMIA	DMKRPA	DMKUDR
DMKATS	DMKCQQ	DMKGIO	DMKMON	DMKRSF	DMKUNT
DMKBSC	DMKCQY	DMKGRF	DMKMOO	DMKRSP	DMKURS
DMKCCH	DMKCSB	DMKGRH	DMKMSW	DMKSAV	DMKVAT
DMKCCW	DMKCSO	DMKGRT	DMKNES	DMKSCH	DMKVCA
DMKCDB	DMKCSP	DMKHVC	DMKNET	DMKSCN	DMKVCH
DMKCDM	DMKCSU	DMKHVD	DMKNLD	DMKSEP	DMKVCX
DMKCDS	DMKCSV	DMKIOF	DMKNLE	DMKSPL	DMKVDA
DMKCFO	DMKDAS	DMKIOF	DMKOPR	DMKSPM	DMKVDC
DMKCFP	DMKDAU	DMKIOG	DMKPAG	DMKSPS	DMKVDD
DMKCFS	DMKDEF	DMKIOH	DMKPGM	DMKSRM	DMKVDE
DMKCFT	DMKDEI	DMKIOS	DMKPGS	DMKSTK	DMKVDR
DMKCFV	DMKDGD	DMKIOT	DMKPGT	DMKSTR	DMKVDS
DMKCFY	DMKDIA	DMKIUE	DMKPRG	DMKSVC	DMKVER
DMKCKP	DMKDID	DMKLD00E	DMKPRV	DMKSYM	DMKVIO
DMKCKS	DMKDIR	DMKLNK	DMKPRW	DMKTAP	DMKVMA
DMKCLK	DMKDMP	DMKLOG	DMKPSA	DMKTAP	DMKVSI
DMKCNS	DMKDSB	DMKLOH	DMKPTR	DMKTCS	DMKWRM
DMKCPB	DMKDSP	DMKLOK	DMKQCN	DMKTDK	
DMKCPI	DMKEMA	DMKMCC	DMKQVM	DMKTHI	
DMKCPS	DMKEMB	DMKMCD	DMKRGA	DMKTMR	
DMKCPT	DMKEMC				

Split Modules

DMKCPI now split into DMKSTA
DMKCPU now split into DMKCPO, DMKCPP
DMKMCH now split into DMKMCI
DMKMNI now split into DMKMNJ
DMKUSO now split into DMKUSP

New and Changed Macro Instructions/Control Blocks

CALL	LOCK	RCHANNEL	SIGNAL
CCHREC	MCHAREA	RCTLUNIT	SWITCH
EQU	MONBLOKS	RDEVICE	SYSCOR
ERRELOK	OPTIONS	RIOGEN	SYSRES
IOBLOKS	PSA	SDRBLOK	VBLOKS
IOER	RBLOKS		

Dynamic Linkages in CMS Via the SUBCOM Function

New and Changed Modules

DMSFNC	DMSINT	DMSITS	DMSNUC

Split Modules

None

New and Changed Macro Instructions and Control Blocks

SCBLOCK

CMS/DOS Simulation in VM/SP

New and Changed Modules

DMSAMS	DMSDAS	DMSLAB	DMSSET	DMSVLT
DMSBAB	DMSDOS	DMSLBR	DMSVAN	DMSVSR
DMSBOP	DMSDLB	DMSLCK	DMSVAS	DMSVVN
DMSCLS	DMSETR	DMSNUC	DMSVAX	DMSVVS
DMSCVH	DMSITP	DMSQRY	DMSVBM	DMSXCP

New and Changed Macro Instructions and Control Blocks

BBOX	BGCOM	BGTCB	DIB	DOSAVE	DOSCON
DOSCB	DTFX	DTFSD	IJJHFMTI	IJJHDLST	IJJHCPL
LABREC	LOCKTAB	LPLDCT	NUCON	OCTS	PIB2TAB
PIBTAB	SYSCOM				

New and Changed Macro Instruction (FILETYPE=XEDIT)

VSAMGEN

New and Changed EXECs

CMSAMS	CMSVSAM	DOSGEN	SAMGEN	VSAMGEN

Deleted EXECs

VSAMPP

New and Changed DOSLNK Files

CMSAMSA	CMSAMSB	CMSAMSC	CMSVSAM

New and Changed DOSLIB Files

CMSBAM

Note: The code used to build the CMSBAM Discontiguous Saved Segment (DCSS) is shipped in its entirety within VM/SP code.

Deleted Modules

DMSVPD

Split Modules

DMSDOS DMSETR

Resource Management Facilities Subset

New and Changed Modules

DMKCFC	DMKDIR	DMKPTR	DMKSYM
DMKCFO	DMKDGD	DMKSCH	DMKTHI
DMKCPI	DMKMON	DMKSRM	DMKUSO
DMKCPV	DMKPAG	DMKSTP	DMKVDC
DMKCQR	DMKPSA	DMKSTR	DMMCPA

Split Modules

None

New and Changed Control Blocks

MONBLOKS
VMQBLOK

New and Changed Internal Macros

ACCTOFF

Shadow Table Maintenance Facility

New and Changed Modules

DMKACO	DMKDIR	DMKPGS	DMKTMR
DMKBLD	DMKDSP	DMKPRG	DMKTRA
DMKCFC	DMKEMA	DMKPRV	DMKUSO
DMKCFP	DMKFPS	DMKPTR	DMKVAT
DMKCFS	DMKHVC	DMKSVC	DMKVIO
DMKCFV	DMKHVD	DMDSYM	DMKVSP
DMKCQR	DMKLOG		

Split Modules

None

New and Changed Control Blocks

CORE	SWPTABLE	UMACBLOK
ECBLOK	UDIRECT	VMBLOK
STOBLOK		

New and Changed Internal Macros

CALL
SYSLOCS

Single Processor Mode

New and Changed Modules

DMKCFC	DMKCQY	DMKPRG
DMKCFP	DMKDMP	DMKPRV
DMKCFV	DMKDSP	DMKPSA
DMKCPI	DMKEMC	DMKSPM
DMKCPU	DMKFPS	DMKVAT
DMKCPS		

Split Modules

None

New and Changed Control Blocks

ECBLOK STOBLOK
PSA VMBLOK

New and Changed Internal Macros

PSA

Dynamic SCP Transition to or from Native Mode

New and Changed Modules

DMKCFC DMKEMC DMKQVM
DMKCFS DMKIOS DMKVSI
DMKDSP DMKMID

Split Modules

None

New and Changed Control Blocks

None

New and Changed Internal Macros

None

MVS/System Extensions Support

New and Changed Modules

DMKAPI DMKCQY DMKLOG DMKPSA
DMKCFC DMKDIR DMKMCH DMKSVC
DMKCFO DMKDSP DMKNEM DMKSYM
DMKCFS DMKEMA DMKPRG DMKTMR
DMKCPI DMKEMB DMKPRV DMKVAT
DMKCQR DMKIOS DMKPRW

Split Modules

None

New and Changed Control Blocks

PSA
UDIRECT
UMACBLOK
VMBLOK

New and Changed Internal Macros

EQU
PSA

Virtual Storage Preservation Support

New and Changed Modules

DMKBLD
DMKCFC
DMKCFG
DMKCFH
DMKCFS
DMKCKP
DMKCPI
DMQCPV
DMKCQR
DMKCQY
DMKDDR
DMKDEF
DMKDIR
DMKDMP
DMKEMA
DMKEMC
DMKHVC
DMKHVD
DMKLOG
DMKMCH
DMKPGS
DMKPRV
DMKPSA
DMKRPA
DMKRSP
DMKSAV
DMKUDP
DMKUSO
DMKVMI

Split Modules

None

New and Changed Control Blocks

PSA
SAVTABLE
SYSTBL
UDIRECT
VMBLOK

New and Changed Internal Macros

EQU
NAMESYS
VMBLOK

Accounting-Records-on-Disk Support

New and Changed Modules

DMKACO	DMKCSO	DMKSPL
DMKCKP	DMKFMB	DMKWRM
DMKCPV	DMKRSE	DMMEDM
DMKCQP	DMKRSP	

Split Modules

None

New and Changed Control Blocks

RBLOK
RDEVBLOK
SPTBLOK

New and Changed Internal Macros

PSA
RBLOKS

Spool-Files-to-Tape Support

New and Changed Modules

DMKCFC	DMKFMC	DMKSPS
DMKCKP	DMKRSP	DMKSPT
DMKFMA		

Split Modules

None

New and Changed Control Blocks

RBLOK
RDEVBLOK
SPTBLOK

New and Changed Internal Macros

RBLOKS

CMS Tape Label Processing Support

New and Changed Modules

DMSABN	DMSFNC	DMSSBS	DMSTLB
DMSBOP	DMSINA	DMSSEB	DMSTMA
DMSCLS	DMSINS	DMSSEG	DMSTPD
DMSDOS	DMSLBD	DMSSOP	DMSTPE
DMSFLD	DMSQRY	DMSTLA	

Split Modules

None

New and Changed Control Blocks

CMSCB	NUCON
LABSECT	TLBBLOK

New and Changed Internal Macros

TAPESL

Full Screen Support

New and Changed Modules

DMKGRF	DMKRGB	DMKVCN
DMKQCN	DMSSCR	DMKVDR
DMKRGA		

Split Modules

None

New and Changed Control Blocks

CONTASK
TRQBLOC
VCONCTL

New and Changed Internal Macros

None

Enhanced 3270 Support

New and Changed Modules

DMKACO	DMKCPI	DMKGRU	DMKNLD	DMKUSO
DMKBLD	DMKCPV	DMKGRV	DMKPSA	DMKVCN
DMKCCW	DMKCQR	DMKHVD	DMKQCN	DMKWRM
DMKCFC	DMKCQY	DMKIOC	DMKRGA	DMKVDR
DMKCFS	DMKDIA	DMKLOG	DMKRGB	DMSEDI
DMKCFT	DMKDIB	DMKNES	DMKRNH	DMSEDX
DMKCFP	DMKGRF	DMKNET	DMKTRM	DMSSCR
DMKCNS	DMKGRT			

Split Modules

None

Changed Control Blocks

EDCB	RBLOKS	VCONCTL
GRTBLOK	TIMER	VMBLOK
IOBLOKS	TRQBLOC	

New or Changed Internal Macros

CALL	NETWORK
CLUSTER	RDEVICE
DEVTYPES	TERMINAL

Addition to Extended Control-Program Support (ECPS)

New and Changed Modules

DMKLOGO
DMKPRV

Split Modules

None

New and Changed Control Blocks

None

New and Changed Internal Macros

None

Interactive Help Facility Under CMS

New and Changed Modules

DMSACF DMSHLI
DMSHLB DMSHLP
DMSHLD DMSHLS
DMSHLF

Split Modules

None

New and Changed Control Blocks

HELPSECT
NUCON

New and Changed Internal Macros

CMSGEND
HLPSECT

CMS File System Extensions

New and Changed Modules

DMKDGD	DMSBWR	DMSFNC	DMSLDR	DMSPRT	DMSSOP
DMSABN	DMSCLS	DMSFNS	DMSLDS	DMSPRV	DMSSOS
DMSACC	DMSCMP	DMSFOR	DMSLFS	DMSPUN	DMSSRT
DMSACF	DMSCPY	DMSFST	DMSLGT	DMSQRY	DMSSRV
DMSACM	DMSDIO	DMSGLB	DMSLIB	DMSRDC	DMSSTG
DMSALU	DMSDLB	DMSGND	DMSLIO	DMSRNF	DMSSTT
DMSAMS	DMSDLK	DSMGRN	DMSLKD	DMSRNM	DMSSVT
DMSARE	DMSDSK	DMSIFC	DMSLLU	DMSRRV	DMSSYN
DMSARN	DMSDSL	DMSINA	DMSLST	DMSSBD	DMSTMA
DMSARX	DMSEDI	DMSINI	DMSMOD	DMSSBS	DMSTPD
DMSASM	DMSEDX	DMSINS	DMSMVE	DMSSCR	DMSTRK
DMSASN	DMSERD	DMSINT	DMSNCP	DMSSCT	DMSTYP
DMSAUD	DMSERS	DMSITI	DMSNUC	DMSSEB	DMSUPD
DMSBOP	DMSEXC	DMSLAD	DMSOLD	DMSSEG	DMSVPD
DMSBRD	DMSEXT	DMSLAF	DMSOVR	DMSSET	DMSXCP
DMSBTB	DMSFCH	DMSLBM	DMSPNT	DMSSLN	DMSZAP
DMSBTP	DMSFLD	DMSLBT			

Split Modules

None

New and Changed Control Blocks

ADT	BDCOM	EDCB	KEYSECT
ADTGEN	CMSCB	FSTB	LDRST
ADTSECT	DCH	FSTD	LIB
AFT	DEVTAB	FVS	NUCON
AFTSECT	DOSCB	IO	PDSSECT

New and Changed Macros

FSCB	FSERASE	FSREAD
FSCBD	FSOPEN	FSSTATE
FSCLOSE	FSPOINT	FSWRITE

New and Changed EXECs

CMSGEND

CMS Tape Command Improvement

New and Changed Modules

DMSTPE
DMSTPF
DMSTPG

Split Modules

TAPE

New and Changed Control Blocks

NUCON

New and Changed Internal Macros

CMSGEND
DMSTAPE

CMS Use of CP Page Management Interfaces

New and Changed Modules

DMSDOS DMSSTG
DMSFRE DMSSVT
DMSSMN

Split Modules

None

New and Changed Control Blocks

None

New and Changed Internal Macros

PGRLSE
RELPAG

CP Extensions

New and Changed Modules

DMKCFO	DMKSCH
DMKCPI	DMKTHI
DMKDGD	DMKTMR
DMKFRE	DMKUSO

Split Modules

None

New and Changed Control Blocks

None

New and Changed Internal Macros

None

APL/Text Support of the 3270

New and Changed Modules

DMKCCW	DMKCKP	DMKHVD
DMKGRF	DMKCPI	DMKNET
DMKRGA	DMKCPV	DMKSSP
DMKRGB	DMKDIA	DMKVDS
DMKTBM	DMKDIB	DMKBLD
DMKVNC	DMKDIR	DMKNES
DMKCFT		

Split Modules

None

New and Changed Control Blocks

None

New and Changed Internal Macros

DEVTYPES
TERMINAL
NETWORK

Display Control for the 3270

New and Changed Modules

DMKGRF	DMKVNC	DMKMSG
DMKQCN	DMKCFS	DMKSEP
DMKRGQ	DMKCQR	DMSSCR
DMKRGB		

Split Modules

None

New and Changed Control Blocks

CONTASK
EQU
VDEVBLOK

New and Changed Internal Macros

None

Support of the 3262 Models 1 and 11 Printers

New and Changed Modules

DMKCSB	DMKIOE	DMKVSP
DMKDDR	DMKIOF	DMSASN
DMKDEF	DMKPIB	DMSDLK
DMKDIR	DMKRSE	DMSDSV
DMKFCB	DMKSSP	DMSPIO
DMKIOC	DMKVDR	DMSPRT

Split Modules

None

New and Changed Control Blocks

None

New and Changed Internal Macros

DEVTYPES
RDEVICE

Support of the 3289 Model 4 Printer

New and Changed Modules

DMKCSB	DMKIOF	DMMEDM
DMKDDR	DMKPIA	DMSASN
DMKDEF	DMKRSE	DMSDLK
DMKDIR	DMKSSP	DMSDSV
DMKFCB	DMKVDR	DMSPIO
DMKIOE	DMKVSP	DMSPRT

Split Modules

None

New and Changed Control Blocks

None

New and Changed internal Macros

DEVTYPES
RDEVICE

Support of the 8809 Tape Unit

New and Changed Modules

DMKCFP	DMKDSB	DMKTAP
DMKCKP	DMKIOC	DMKVDD
DMKCPI	DMKIOE	DMKVMI
DMKCPS	DMKMCC	DMSASN
DMKDDR	DMKMSW	DMSTIO
DMKDMP	DMKSSP	

Split Modules

None

New and Changed Control Blocks

None

New and Changed Internal Macros

DEVTYPES
RDEVICE

Support of the 3310 and 3370 Direct Access Devices

New and Changed Modules

DMKACO	DMKCQP	DMKGIO	DMKNLE	DMKTDK	DMKVMI
DMKCCW	DMKCQQ	DMKHVD	DMKPAG	DMKTRD	DMKVSI
DMKCFF	DMKCQR	DMKIOC	DMKPGS	DMKUDR	DMKVSP
DMKCFG	DMKDAU	DMKIOE	DMKPGT	DMKUNT	DMKWRM
DMKCFH	DMKDDR	DMKIOF	DMKPRV	DMKUSO	DMMEDM
DMKCFP	DMKDEF	DMKIOG	DMKPTR	DMKVCH	DMSACC
DMKCFS	DMKDEG	DMKIOS	DMKRSP	DMKVDA	DMSACM
DMKCKP	DMKDIR	DMKLNK	DMKSAV	DMKVDC	DMSDIO
DMKCKS	DMKDMP	DMKMCC	DMKSCN	DMKVDD	DMSFOR
DMKCKT	DMKDRD	DMKMNI	DMKSCN	DMKVDE	DMSINI
DMKCPI	DMKDSB	DMKMON	DMKSPL	DMKVDR	DMSNUC
DMKCPS	DMKEMA	DMKMOO	DMKSSP	DMKVDS	DMSQRY
DMKCPT	DMKEMC	DMKMSW	DMKSYM	DMKVMA	DMSTRK
DMKCQG	DMKFMT	DMKNLD			

Split Modules

DMKCFG
DMKCKS
DMKCPS
DMKCQP
DMKDEG
DMKMON

New and Changed Control Blocks

ACCOUNT	NAMENCP	RCHANNEL
ACCTOFF	NAMESYS	RDEVICE
ALLOC	NCPTBL	SYSRES
DEVTYPES	NUCON	SYSTBL
DIOSECT	PSA	UDIRECT
EQUATES	RBLOKS	VBLOKS

New and Changed Internal Macro

None

Logical Device Support Facility

New and Changed Modules

DMKCFP	DMKCQP	DMKDSP	DMKHVC
DMKCPI	DMKCQY	DMKFMB	DMKHVD
DMKCQG	DMKDIA	DMKGRF	DMKLOH

DMKPSA DMKRGB DMKVCN DMKVSI
DMKRGA DMKSCN DMKVIO

Split Modules

DMKLOG now split into DMKLOG and DMKLOH

New and Changed Macro

RBLCKS
TIMER
VMBLK
VMBLOK
VMPSCOM

Small CP Option

New and Changed Modules

DMKCPI

Split Modules

None

New and Changed Control Blocks

None

New and Changed Internal Macros

None

New and Changed EXEC

GENERATE

Section 3. APAR List

This section lists all those APARs that have been incorporated into VM/SP code. The list reflects APAR fixes to VM/370 Release 6, VM/370 Basic System Extensions, and VM/370 System Extensions.

Release 6 CP Fixes

VM08195	VM09029	VM09244	VM09404	VM09656	VM09952
VM08341	VM09031	VM09251	VM09408	VM09657	VM09957
VM08386	VM09034	VM09256	VM09409	VM09669	VM09958
VM08501	VM09038	VM09257	VM09413	VM09681	VM09965
VM08518	VM09044	VM09263	VM09415	VM09682	VM09968
VM08550	VM09046	VM09264	VM09420	VM09683	VM09980
VM08560	VM09047	VM09265	VM09426	VM09684	VM09985
VM08621	VM09053	VM09266	VM09427	VM09685	VM09992
VM08629	VM09054	VM09268	VM09438	VM09714	VM09994
VM08652	VM09057	VM09273	VM09441	VM09721	VM10003
VM08664	VM09058	VM09274	VM09444	VM09727	VM10009
VM08669	VM09059	VM09275	VM09446	VM09728	VM10010
VM08741	VM09061	VM09276	VM09450	VM09731	VM10011
VM08776	VM09064	VM09279	VM09458	VM09737	VM10012
VM08786	VM09066	VM09280	VM09459	VM09738	VM10021
VM08794	VM09068	VM09281	VM09461	VM09747	VM10024
VM08803	VM09069	VM09282	VM09463	VM09755	VM10042
VM08823	VM09084	VM09284	VM09464	VM09758	VM10053
VM08826	VM09087	VM09294	VM09470	VM09763	VM10057
VM08827	VM09106	VM09296	VM09471	VM09765	VM10061
VM08834	VM09119	VM09298	VM09477	VM09774	VM10073
VM08844	VM09123	VM09299	VM09479	VM09775	VM10074
VM08845	VM09129	VM09300	VM09486	VM09776	VM10075
VM08850	VM09134	VM09301	VM09490	VM09782	VM10076
VM08854	VM09137	VM09302	VM09494	VM09783	VM10078
VM08860	VM09138	VM09303	VM09496	VM09802	VM10081
VM08861	VM09139	VM09304	VM09498	VM09805	VM10088
VM08870	VM09149	VM09305	VM09500	VM09815	VM10103
VM08873	VM09151	VM09306	VM09504	VM09843	VM10128
VM08882	VM09156	VM09312	VM09516	VM09845	VM10136
VM08883	VM09160	VM09313	VM09528	VM09846	VM10137
VM08888	VM09163	VM09314	VM09560	VM09849	VM10147
VM08898	VM09164	VM09316	VM09563	VM09859	VM10197
VM08913	VM09168	VM09319	VM09566	VM09860	VM10201
VM08925	VM09171	VM09323	VM09586	VM09862	VM10202
VM08928	VM09172	VM09324	VM09587	VM09871	VM10204
VM08940	VM09175	VM09331	VM09588	VM09882	VM10205
VM08952	VM09176	VM09336	VM09589	VM09885	VM10206
VM08954	VM09179	VM09337	VM09590	VM09888	VM10215
VM08976	VM09181	VM09339	VM09593	VM09891	VM10216
VM08979	VM09182	VM09343	VM09594	VM09892	VM10217
VM08981	VM09186	VM09347	VM09607	VM09896	VM10245
VM08988	VM09192	VM09352	VM09614	VM09909	VM10261
VM08989	VM09196	VM09371	VM09623	VM09912	VM10263
VM08990	VM09201	VM09375	VM09628	VM09916	VM10286
VM08995	VM09204	VM09376	VM09638	VM09919	VM10292
VM09005	VM09214	VM09384	VM09639	VM09926	VM10302
VM09017	VM09218	VM09386	VM09640	VM09930	VM10311
VM09019	VM09228	VM09394	VM09647	VM09934	VM10312
VM09024	VM09229	VM09395	VM09651	VM09941	VM10332
VM09027	VM09242	VM09396	VM09655	VM09948	VM10343

VM10349	VM10449	VM10546	VM10666	VM10847	VM11209
VM10350	VM10453	VM10547	VM10709	VM10849	VM11229
VM10357	VM10462	VM10548	VM10719	VM10854	VM11236
VM10358	VM10477	VM10556	VM10736	VM10860	VM11248
VM10365	VM10481	VM10557	VM10748	VM10868	VM11292
VM10370	VM10487	VM10567	VM10788	VM10878	VM11299
VM10373	VM10488	VM10572	VM10800	VM10879	VM11345
VM10376	VM10500	VM10576	VM10802	VM10884	VM11347
VM10383	VM10508	VM10616	VM10804	VM10995	VM11361
VM10394	VM10513	VM10621	VM10805	VM11115	VM11369
VM10398	VM10521	VM10624	VM10824	VM11128	VM11370
VM10408	VM10527	VM10631	VM10844	VM11173	VM11437
VM10443	VM10542	VM10640			

Release 6 CMS Fixes

VM03924	VM09013	VM09237	VM09503	VM09881	VM10372
VM08256	VM09015	VM09238	VM09543	VM09884	VM10393
VM08489	VM09042	VM09241	VM09567	VM09901	VM10414
VM08638	VM09043	VM09243	VM09572	VM09940	VM10475
VM08674	VM09051	VM09246	VM09591	VM09951	VM10560
VM08678	VM09080	VM09250	VM09624	VM09973	VM10561
VM08846	VM09093	VM09291	VM09629	VM09976	VM10582
VM08866	VM09103	VM09295	VM09636	VM10035	VM10594
VM08891	VM09105	VM09296	VM09654	VM10044	VM10595
VM08930	VM09107	VM09317	VM09674	VM10071	VM10604
VM08931	VM09115	VM09340	VM09696	VM10086	VM10615
VM08935	VM09121	VM09381	VM09700	VM10090	VM10619
VM08977	VM09122	VM09383	VM09702	VM10101	VM10651
VM08978	VM09133	VM09399	VM09710	VM10193	VM10652
VM08982	VM09142	VM09417	VM09732	VM10242	VM10657
VM08985	VM09155	VM09421	VM09734	VM10248	VM10660
VM08993	VM09159	VM09429	VM09741	VM10276	VM10680
VM08997	VM09193	VM09465	VM09764	VM10305	VM10705
VM09007	VM09200	VM09484	VM09790	VM10314	VM10758
VM09008	VM09217	VM09485	VM09791	VM10327	VM10779
VM09009	VM09227	VM09491	VM09821	VM10333	VM10855
VM09010	VM09234	VM09492	VM09857	VM10334	VM11148
VM09011	VM09236	VM09493	VM09879	VM10359	VM11245

Release 6 RSCS Fixes

VM09014	VM09561	VM10186
VM09075	VM09761	VM10237
VM09230	VM09842	VM10283
VM09277	VM10178	VM10416
VM09476		

Release 6 IPCS Fixes

VM08802	VM09878	VM10450
VM08980	VM09957	VM10490
VM09089	VM10442	VM11255
VM09785		

CP Fixes for VM/370 Basic System Extensions Release 2

VM08370	VM09156	VM09454	VM09897	VM10151	VM10610
VM08484	VM09171	VM09495	VM09905	VM10155	VM10622
VM08495	VM09172	VM09497	VM09906	VM10159	VM10632
VM08722	VM09179	VM09500	VM09908	VM10174	VM10667
VM08738	VM09183	VM09502	VM09917	VM10187	VM10687
VM08794	VM09198	VM09508	VM09936	VM10205	VM10708
VM08824	VM09215	VM09509	VM09944	VM10206	VM10725
VM08826	VM09233	VM09512	VM09957	VM10215	VM10763
VM08827	VM09249	VM09514	VM09975	VM10262	VM10781
VM08836	VM09265	VM09520	VM09984	VM10264	VM10796
VM08845	VM09296	VM09526	VM10000	VM10266	VM10808
VM08878	VM09311	VM09568	VM10010	VM10289	VM10839
VM08902	VM09319	VM09569	VM10046	VM10295	VM10852
VM08922	VM09324	VM09570	VM10053	VM10377	VM10879
VM08943	VM09353	VM09584	VM10056	VM10382	VM10992
VM08972	VM09356	VM09586	VM10057	VM10384	VM10993
VM08995	VM09357	VM09593	VM10060	VM10426	VM11020
VM08999	VM09373	VM09594	VM10074	VM10462	VM11125
VM09020	VM09389	VM09606	VM10076	VM10481	VM11127
VM09031	VM09392	VM09610	VM10078	VM10500	VM11161
VM09038	VM09397	VM09618	VM10083	VM10518	VM11180
VM09040	VM09398	VM09625	VM10088	VM10527	VM11182
VM09056	VM09400	VM09682	VM10108	VM10539	VM11215
VM09081	VM09411	VM09684	VM10109	VM10548	VM11235
VM09087	VM09412	VM09758	VM10121	VM10567	VM11250
VM09109	VM09424	VM09802	VM10122	VM10574	VM11267
VM09111	VM09437	VM09818	VM10133	VM10576	VM11292
VM09136	VM09439	VM09885	VM10139	VM10587	

CMS Fixes for VM/370 Basic System Extensions Release 2

VM03924	VM09417	VM09743	VM10267	VM10496	VM10767
VM08256	VM09432	VM09748	VM10274	VM10519	VM10779
VM08931	VM09433	VM09749	VM10276	VM10525	VM10786
VM08956	VM09483	VM09777	VM10280	VM10537	VM10792
VM08957	VM09484	VM09780	VM10290	VM10551	VM10801
VM08977	VM09491	VM09873	VM10293	VM10554	VM10806
VM08978	VM09499	VM09879	VM10298	VM10560	VM10812
VM08982	VM09506	VM09884	VM10300	VM10561	VM10855
VM08993	VM09510	VM09893	VM10309	VM10564	VM10974
VM09007	VM09513	VM09894	VM10310	VM10582	VM11146
VM09042	VM09521	VM09924	VM10319	VM10584	VM11158
VM09115	VM09539	VM09947	VM10320	VM10594	VM11167
VM09155	VM09548	VM09970	VM10327	VM10595	VM11184
VM09217	VM09598	VM09988	VM10335	VM10604	VM11201
VM09238	VM09599	VM09997	VM10342	VM10611	VM11203
VM09241	VM09622	VM10001	VM10351	VM10614	VM11221
VM09243	VM09635	VM10070	VM10367	VM10615	VM11246
VM09246	VM09646	VM10071	VM10387	VM10623	VM11260
VM09296	VM09648	VM10086	VM10404	VM10652	VM11266
VM09345	VM09652	VM10089	VM10414	VM10656	VM11289
VM09354	VM09653	VM10099	VM10417	VM10657	VM11298
VM09360	VM09654	VM10157	VM10446	VM10680	VM11303
VM09364	VM09673	VM10188	VM10461	VM10697	VM11306
VM09365	VM09708	VM10212	VM10467	VM10700	VM11316
VM09366	VM09709	VM10236	VM10470	VM10731	VM11327
VM09368	VM09724	VM10246	VM10475	VM10743	VM11360
VM09391	VM09726	VM10249	VM10484	VM10754	VM11362
VM09401	VM09734	VM10253	VM10486	VM10755	VM11363
VM09407	VM09739	VM10257	VM10492	VM10758	

CP Fixes for VM/370 System Extensions Release 2

VM08370	VM09137	VM09758	VM10061	VM10315	VM10667
VM08484	VM09149	VM09772	VM10074	VM10332	VM10687
VM08495	VM09156	VM09802	VM10076	VM10377	VM10708
VM08629	VM09171	VM09818	VM10078	VM10379	VM10725
VM08720	VM09172	VM09855	VM10083	VM10382	VM10752
VM08722	VM09179	VM09861	VM10087	VM10384	VM10763
VM08738	VM09183	VM09866	VM10088	VM10391	VM10781
VM08794	VM09198	VM09871	VM10109	VM10408	VM10796
VM08824	VM09215	VM09874	VM10114	VM10426	VM10808
VM08827	VM09233	VM09885	VM10122	VM10447	VM10839
VM08836	VM09249	VM09905	VM10129	VM10453	VM10852
VM08878	VM09311	VM09906	VM10133	VM10462	VM10865
VM08902	VM09373	VM09908	VM10135	VM10481	VM10866
VM08922	VM09447	VM09944	VM10139	VM10493	VM10879
VM08923	VM09449	VM09953	VM10151	VM10500	VM10902
VM08926	VM09454	VM09957	VM10155	VM10518	VM10992
VM08943	VM09500	VM09975	VM10159	VM10527	VM10993
VM08972	VM09566	VM09984	VM10170	VM10539	VM11020
VM08995	VM09594	VM10000	VM10174	VM10542	VM11125
VM08999	VM09606	VM10004	VM10187	VM10548	VM11127
VM09020	VM09610	VM10010	VM10205	VM10549	VM11161
VM09038	VM09618	VM10022	VM10206	VM10567	VM11180
VM09040	VM09625	VM10046	VM10215	VM10574	VM11182
VM09056	VM09664	VM10051	VM10262	VM10576	VM11215
VM09081	VM09669	VM10053	VM10264	VM10587	VM11235
VM09083	VM09682	VM10056	VM10266	VM10610	VM11250
VM09109	VM09684	VM10057	VM10289	VM10622	VM11292
VM09111	VM09713	VM10060	VM10295	VM10632	VM11451
VM09136					

CMS Fixes for VM/370 System Extensions Release 2

VM09155	VM09884	VM10267	VM10461	VM10614	VM10855
VM09238	VM09893	VM10274	VM10467	VM10615	VM10974
VM09417	VM09894	VM10276	VM10470	VM10623	VM11146
VM09483	VM09924	VM10280	VM10475	VM10652	VM11158
VM09484	VM09947	VM10290	VM10484	VM10656	VM11167
VM09491	VM09970	VM10293	VM10486	VM10657	VM11184
VM09622	VM09988	VM10298	VM10492	VM10680	VM11201
VM09635	VM09997	VM10300	VM10496	VM10697	VM11203
VM09646	VM10001	VM10309	VM10519	VM10700	VM11221
VM09648	VM10070	VM10310	VM10525	VM10731	VM11246
VM09652	VM10071	VM10319	VM10537	VM10743	VM11260
VM09653	VM10086	VM10320	VM10551	VM10754	VM11266
VM09654	VM10089	VM10327	VM10554	VM10755	VM11289
VM09673	VM10099	VM10335	VM10560	VM10758	VM11298
VM09708	VM10157	VM10342	VM10561	VM10767	VM11303
VM09709	VM10188	VM10351	VM10564	VM10779	VM11306
VM09724	VM10212	VM10367	VM10582	VM10786	VM11316
VM09726	VM10236	VM10387	VM10584	VM10792	VM11327
VM09734	VM10246	VM10404	VM10594	VM10801	VM11360
VM09748	VM10249	VM10414	VM10595	VM10806	VM11362
VM09749	VM10253	VM10417	VM10604	VM10812	VM11363
VM09879	VM10257	VM10446	VM10611		

IPCS Fixes for VM/370 System Extensions Release 2

VM09713
VM09957

Section 4. System Requirements and Planning Information

This section discusses VM/SP:

- Software prerequisites
- Software and hardware requirements
- Storage requirements
- Distribution and installation procedures

Software Prerequisites

Installations that use OS/VS2 SVS must install PTF UY77566 after installing VM/SP.

Software Requirements

VM/SP is designed to operate with VM/370 Release 6 as a base.

Support under CMS/DOS of VSE/VSAM or interactive file sharing requires the VSE/VSAM Release 2 program product (5746-AM2) or the VM/Interactive File Sharing program product (5748-XXC) respectively. VSE/VSAM support and interactive file sharing support in VM/SP do not require the installation of DOS/VSE or the VSE/Advanced Functions program product.

The CMS/DOS environment does not support the following new functions provided by the VSE/VSAM Release 2 program product:

- DASD Sharing
- VSE/VSAM Space Management for the Sequential Access Method (SAM) Feature
- Backup/Restore Feature

CMS/DOS facilities (such as high level language compilers) that access VSE/Advanced Functions libraries require the installation of DOS/VSE and VSE/Advanced Functions Release 2 program product.

Hardware Requirements

VM/SP has the following hardware requirements:

- MVS/System Extensions support require the IBM System/370 Extended Feature on a System/370 Model 158, 168, 158AP, 158MP, 168AP or 168MP; or the System/370 Extended Facility on the Model 3031, 3031AP, 3032, 3033, 3033AP, 3033AP-2, 3033MP or the 3033 Model Group N processors.
- Single processor mode requires the multiprocessor feature on one of the following System/370 processors: 158AP, 158MP, 168AP, 168MP, 3031AP, 3033AP, and 3033MP.
- Extended Control-Program Support (ECPS:VM/370) requires the following

engineering change (EC) levels:

MODEL	EC LEVEL
135-3	149136 and later
138	149136 and later
145-3	356901 and later
148	147710 and later
3031	276270 and later
3031AP	276270 and later

ECPS:VM/370 support for the 4331, 4331 Model Group 2 and 4341 is included in the initial shipment of these processors.

The EC Level for shadow table bypass (a feature of the Shadow Table Maintenance Facility) on the 3031 and 3031AP processors is 276271 and later.

The remaining VM/SP functions operate on any hardware configuration VM/SP supports.

Supported Hardware

Processors

VM/SP supports the following processors:

- System/370 Model 135
- System/370 Model 135-3
- System/370 Model 138
- System/370 Model 145
- System/370 Model 145-3
- System/370 Model 148
- System/370 Model 155-II
- System/370 Model 158
- System/370 Model 158-3
- System/370 Model 158AP
- System/370 Model 158MP
- System/370 Model 165-II
- System/370 Model 168
- System/370 Model 168-3
- System/370 Model 168AP
- System/370 Model 168MP
- IBM 3031 Processor
- IBM 3031AP
- IBM 3032 Processor
- IBM 3033 Processor
- IBM 3033AP
- IBM 3033 Model Group N Processor
- IBM 3033MP
- IBM 3033AP-2
- IBM 4331 Processor
- IBM 4331 Model Group 2 Processor
- IBM 4341 Processor

Direct Access Storage Devices

VM/SP supports the following direct access storage devices: 2305 Models 1 and 2, 2314, 2319, 3310, 3330, 3333, 3340, 3344, 3350, 3370 and 3380. The 2305 Model 1 can only be used with the 168 and 165-II processors. The 3310 and 3370 employ fixed block mode. The 3310 applies only to the 4331 processor; the 3310 and 3370 apply to the 4300 processors. The 3850 Mass Storage System 3330V volumes are supported as 3330 devices.

VM/SP supports all of these direct access devices as VM/SP system residence, spooling, and paging devices (except 3850 MSS 3330V volumes) and as virtual devices for use by virtual machines. VM/SP supports all of these devices as dedicated devices. CMS supports all of them except the 2305.

Magnetic Tapes

VM/SP supports the following magnetic tape devices: 2401, 2402, 2403, 2415 Models 1,2,3,4, and 5; 2420 Models 5 and 7; 3410/3411 Models 1,2, and 3; 3420 Models 3,4,5,6,7, and 8; and the 8809. The 8809 magnetic tape device is applicable to the 4331 processor only.

Unit Record Devices (Readers, Punches, and Printers)

VM/SP supports the following printers: 1403 Models 2,3,7, and N1; 1443 Model N1; 3203 Models 4 and 5; 3211; 3213; 3262 Models 1 and 11; 3289 Model 4, and the 3800 Printing Subsystem. VM/SP supports the following card readers: 2501 Models B1 and B2; 2540 Model 1; 3505 Models B1 and B2. VM/SP supports the following card punches: 2520 Models B2 and B3; 3525 Models P1,P2, and P3.

Terminals

VM/SP supports the following system consoles/terminals: 2150; 3066 Models 1 and 2; 3210 Models 1 and 2; 7412; 3036 (for 303x processors); 3278 Model 2A (for the 4300 processors); 2741; 1050; 3275 Model 2; 3276 Models 2,3, and 4; 3277 Model 2; 3278 Models 2,3,4, and 5; 3279 Models 2A, 2B, 3A and 3B; 3767 Models 1 and 2; 3215; 3101; and the TTY 33/35. Note that the VM/VCNA program product required for SNA support in VM/SP supports 3790 controller attached 3270's or 8100 controller attached 3270's and 8775's in 3270 data stream compatibility mode only.

Transmission Control Units

VM/SP supports the following transmission control units: 2701, 2702, 2703, a Communications Adapter (CA #1601) on the 4331 processor, and the 3704, 3705-I and 3705-II.

VM/SP Minimum Configuration

- One of the processors listed previously with at least 384K bytes of available processor storage[1]
- One system console device
- One printer
- One card reader[2]
- One card punch[2]
- Two disk drive units
- One 9-track magnetic tape unit
- One transmission control unit (Communications Adapter on the System/370 Models 135, 135-3, 138, and 4331 processors.) The 3272 or 3274 control units are required only when a local 3277 or 3278 display station is used as a terminal.
- One multiplexer channel
- One selector or block multiplexer channel
- One communication terminal

The requirement for at least one transmission control unit, line, and remote terminal can be eliminated if the customer runs only two virtual machines using the primary and alternate system consoles. The requirement is also eliminated if the only terminals used are the 3277 or 3278 attached to a 3272 or 3274 control unit respectively. The requirement for one selector or block multiplexer channel can be eliminated when the file tape adapter is used with the 8809 tape unit.

Configuration Supported by CMS

- The minimum virtual storage size for CMS is 320K bytes. Virtual storage can be as large as 16 megabytes added in multiples of 4K bytes.
- Any terminal supported by VM/SP as a virtual operator's console can be used by CMS
- CMS can use as a spooling device, any virtual (nondedicated) card reader, card punch (except the 2520), and printer that VM/SP supports.
- CMS supports up to 26 virtual 2314, 2319, 3310, 3330, 3333, 3340, 3344, 3350, 3370 and 3380 direct access storage devices, as well as

---

[1]VM/SP requires a minimum available processor storage of 384K bytes when you implement the small CP option. The minimum available processor storage requirement to support a VM/SP mixed mode environment (that is, CMS running concurrently with another virtual operating system) is 512K.

[2]This device is not needed for a cardless system. To generate a cardless system, refer to VM/SP Planning and System Generation Guide.

3850 Mass Storage System 3330V volumes, as 3330 devices. The minimum size of each virtual disk is one cylinder or 12 FB-512 blocks. The CMS system disk is required and reduces the number of user disks that can be accessed at any given time to 25.

- CMS supports up to four 2400, 2415, or 3420 (7 or 9 track), or 8809 and 3410 (9 track only) magnetic tape units.

Distribution

VM/SP is a separately orderable, nonexecutable program package that requires the installation of the VM/370 Release 6 SCP. VM/SP, when used in conjunction with VM/370 Release 6 SCP, is a functional operating system that includes the function of a Release 6 base, VM/370 Basic System Extensions Release 2, VM/370 System Extensions Release 2, and additional features offered only in the VM/SP package.

PRODUCT TAPES

Customers order the VM/SP package by feature number number; the correct order number depends on:

- what tape density the customer needs -- either 1600 bpi or 6250 bpi tapes.
- whether the customer ordering the VM/SP package is a user of an IBM processor.

The following matrix shows which feature number of VM/SP to order:

	Users of IBM Processors		Users of Non-IBM Processors	
b.p.i.	1600	6250	1600	6250
Feature No.	5020	5021	5022	5023

Depending on the type of processor your installation has and the tape density you need, you receive VM/SP on one or more product tapes. If you use an IBM processor and you order VM/SP, you receive the following product tape(s):

- Text Tape
- CP Source Tape
- CMS Source Tape
- RSCS/IPCS SCP Tape (optional)

If you require a tape density of 1600 b.p.i., you receive three product tapes; you receive one product tape if you require a tape density of 6250 b.p.i.

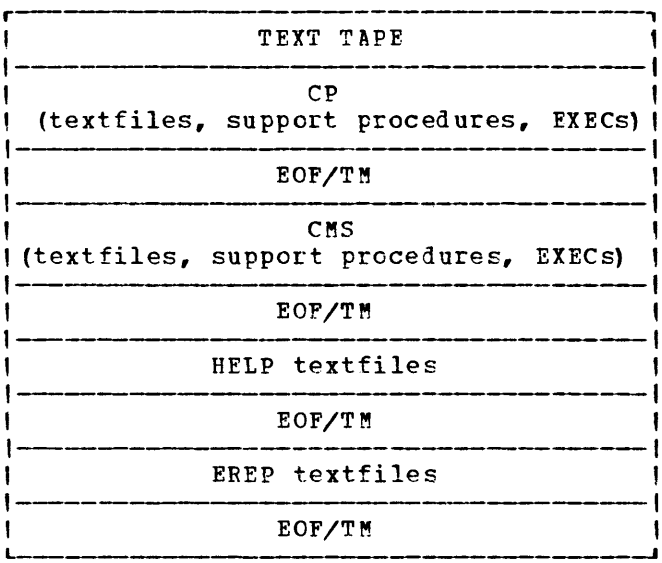
The text tape and the source tapes for users of IBM processors contain all the VM/SP functions merged with VM/370 Release 6 SCP functions. The product tape for RSCS and IPCS is an option available only to users of IBM processors.

If you run a non-IBM processor, you receive only VM/SP text, CP source, and CMS source. The number of tapes you receive depends on the

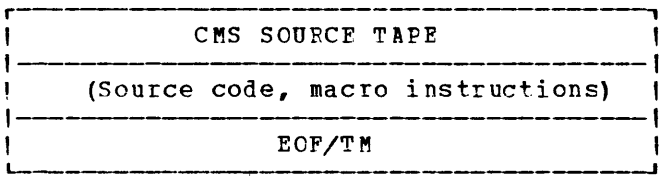
tape density you need. However, the tape(s) include only those modules and macro instructions modified by the code contained in the VM/SP program package: new VM/SP functions as well as the features previously offered in the VM/370 Basic System Extensions and VM/370 System Extensions program products. This package itself is not executable unless you merge it with VM/370 Release 6 code.

In either case, the following diagrams show the format of the product tapes.

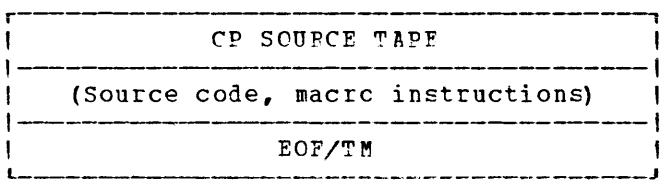
The TEXT TAPE contains four files: one for CP, one for CMS, another for HELP files and a fourth for EREP files:



The CMS source tape contains source code and macro instructions:



The CP source tape contains source code and macro instructions:



The RSCS and IPCS tape, (available as an option to users of IBM processors) contains text files, support procedures, EXECs, and source code for these two VM/370 components unmodified by VM/SP code:

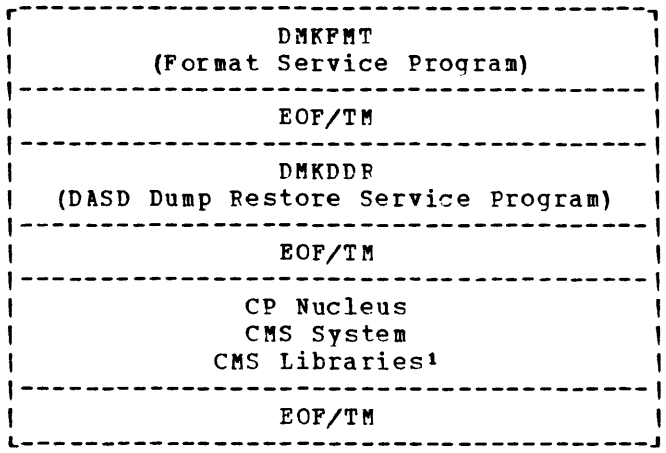
RSCS/IPCS TAPE
RSCS Text
EOF/TM
IPCS Text
EOF/TM
RSCS Source
EOF/TM
IPCS Source
EOF/TM

STARTER SYSTEMS

In addition, users of IBM processors order integrated starter systems for the VM/SP product tapes. If your installation runs with the Release 2 level of either Basic System Extensions or System Extensions, you do not require a starter system to generate a VM/SP system. For details on generating VM/SP, refer to VM/SP Planning and System Generation Guide. The following matrix shows the different starter systems with their corresponding feature numbers:

	STARTER SYSTEMS				
	3330	3340	3350	FB-512	3380
1600 bpi	5002	5004	5006	5008	5010
6250 bpi	5003	5005	5007	5009	5011

The format of the VM/SP starter system tape is:



1The CMS libraries do not include HELP files, EREP files, or IPCS and RSCS text files; these are shipped as part of the VM/SP product tapes.

Maintenance of Your VM/SP System

In most cases, VM/SP maintenance is done by the application of service from a Program Update Tape (PUT) distributed periodically by IBM. The PUT is customized to a user's order profile. It contains cumulative service for the system control program as well as service for all associated program products for which the user has a license. The cover letter that accompanies the PUT identifies how to print the machine readable PUT document. This document describes what the PUT contains and how to apply service to the system.

There are instances, however, when your installation may need to apply an update to an individual module or apply a fix that is not included in the PUT. In addition, you may wish to modify your system to suit your own specifications. VM/SP Planning and System Generation Guide provides procedures you can follow to manually update your system using VM/SP service routines.

Section 5. Compatibility/Incompatibility

VM/SP is compatible with VM/370 Release 6 and its extensions, VM/370 Basic System Extensions program product (Program Number 5748-XX8) and VM/370 System Extensions program product (Program Number 5748-XE1).

Migration Compatibilities

For easier migration several existing items are maintained and supported by VM/SP.

- 800 byte blocksize for CMS files
- Coexistence of the CMS Editor and the VM/SP System Product Editor

  For ease of migration, the existing CMS editor is supported by VM/SP. However, CMS Editor commands are executed under the control of the System Product editor using compatibility macros, in CMS Editor compatibility mode. In this mode, the user can issue existing CMS Editor subcommands as well as any new System Product Editor subcommands. If the user desires, he can invoke the CMS Editor instead of the System Product Editor in EDIT compatibility mode by specifying OLD as an option on the EDIT command.

  The System Product Editor also provides a Display Editing System (DES) compatibility mode for those installations having the Display Editing System IUP (5796-PJP). The user can issue most DES subcommands as well as System Product Editor subcommands in DES mode. The display format of the screen is similar to the DES display screen format. If the user desires he can also invoke DES instead of the System Product Editor in DES compatibility mode by specifying OLD as an option on the EDGAR command. To invoke DES rather than the System Product Editor, the EDGAR modules must reside on an accessed disk.

- Coexistence of the EXEC and EXEC 2 language processors

  For ease of migration, VM/SP supports the current EXEC processor. Existing EXEC programs execute unchanged under the old EXEC processor. The user may have to rewrite and rename existing CMS EXECs to execute properly under the new EXEC 2 processor.

- Application programs that currently execute under the VM/370 Basic System Extensions program product or the VM/370 System Extensions program product and are not dependent on internal CP or CMS structure and/or control blocks should also run on the VM/System Product.

- An application program that executed successfully in the CMS/DOS environment of previous releases of VM/370 Basic System Extensions and VM/370 System Extensions program products, also executes successfully in a VM/SP CMS/DOS environment if the application program:

- Interfaces with the CMS/DOS environment through VM/SP provided macro instructions or through high level language statements of compilers supported by VM/SP

- Does not alter its DASD Sequential Access Method (SAM) DTF blocks

Incompatibilities

IPCS INCOMPATIBILITIES WITH VM/SP

The installation should not use the IPCS component of VM/370 in a VM/SP environment for:

- Analysis, formatting, and printing of CP dumps taken when the system runs in MP mode
- Analysis of CP dumps with an abend code added since VM/370 Release 6

In addition, the user should be aware that control blocks are formatted by the IPCS component in the Release 6 format. If a block is extended for VM/SP, IPCS does not format the control block extensions. Since the pointer path to RECBLOK has changed for VM/SP, the information that the IPCS component formats to represent the RECBLOK is unpredictable.

The following control blocks are formatted by the IPCS component of VM/370. Those marked with an asterisk indicate that they are extended to accommodate VM/SP code. The extensions to these control blocks are not formatted by the IPCS component:

```
 CONTASK                *SFBLOK
*ECBLOK                 *VCHBLOK
*IOBLOK                 *VCONCTL
 IOERBLOK                VCUBLOK
 RCHBLOK                *VDEVBLOK
*RCUBLOK                *VMBLOK
*RDEVBLOK                VSPLCTL
*RECBLOK (not formatted)
*RSPLCTL
```

To implement the full capabilities of the VM/SP product, installations should consider a migration to the Release 2 level of the VM/Interactive Problem Control System (VM/IPCS) Extension program product (Program Number 5748-SA1).

RSCS INCOMPATIBILITIES WITH VM/SP

The RSCS component of VM/370 has not been modified to support the new function contained in VM/SP that has been added since VM/370 Release 6. The unmodified RSCS component shipped as part of VM/SP does not:

- Handle virtual 3800 spool files
- use a system disk formatted in 1K, 2K, or 4K blocksizes
- use a system disk residing on a 3380 or FB-512 (3310/3370) device
- support remote 3270 Information Display printers, dedicated to virtual machines.

Installations wishing to implement the full capabilities of VM/SP should consider a migration to the Release 2 level of the RSCS Networking program product (5748-XP1) that supports new VM/SP function.

OTHER INCOMPATIBILITIES

Multiprocessor Support

VM/SP does not support virtual MP (multiprocessor) mode. That is, you cannot run MVS in multiprocessor mode as a guest operating system running under VM/SP. However, you can utilize the facilities of single processor mode to emulate an MVS multiprocessor configuration.

CMS File System Extensions

Introduction of an extended disk format causes incompatibilities between the physical disk formats of the current CMS file system and the enhanced disk formats of CMS disks. Conversion of CMS disks from current file system disk format to the extended disk format is not required but the installation can do it easily. Normally, the fastest means of conversion for the entire CMS disk file system is to use the CMS COPYFILE command. This command reads from the current format disks and writes to extended format disks. With the CMS FORMAT command, you can create an appropriately sized minidisk to receive the converted data. Then, using the generic option of COPYFILE (COPYFILE * * a, for instance), you can copy an entire CMS disk to the extended format disk. Finally, you can use the CMS DDR command to place the new format CMS disk back on the original disk, if you prefer.

The extended file system maintains compatibility with user programs written at a macro instruction level (that is, the parameter list level). The design of the extended file system requires changes to several major CMS internal control blocks including NUCON, ADT, AFT, FVS, and FST. Consequently, user programs that modify internal control blocks may require compilation and/or recoding.

The extended CMS file system can produce and read tapes in current blocksize. Slight format differences of TAPE and DISK DUMP records produced by the extended CMS file system cannot be distinguished by the VM/SP system and are processed normally.

Support of the 3262 Models 1 and 11 Printers

System programmers must be sensitive to any system macro instruction changes resulting from 3262 Models 1 and 11 support. Operators must be certain that the correct UCS buffer image is loaded for the 3262 printer.

Support of the 3289 Model 4 Printer

System programmers must be sensitive to any system macro instruction changes resulting from 3289 Model 4 printer support. Operators must be certain that the correct UCS buffer image is loaded for the 3289 printer.

Support of the 3310 and 3370 Direct Access Storage Devices

Conversion to the 3310 and 3370 devices requires significant changes at system generation time. The RDEVICE macro instructions must be provided for the new devices, as must the SYSRES macro if the SYSRES pack is to reside on a 3310 or 3370. Saved systems and discontiguous shared segments to be kept on a 3310/3370 require NAMESYS macro instruction changes, and 3704/3705 control programs require NAMENCP macro instructions that reflect 3310/3370 device characteristics (such as fixed block formatting). User programs written to perform their own DASD I/O (providing their own CCW string) do not function properly unless they perform that I/O to a non-3310/3370 device. User programs that use the CMS file management routines continue to function properly despite the conversion to 3310 and 3370 devices.

MVS/System Extensions Support

The MVS/System Extensions program product support does not include support for an MVS operating system running under a VM/SP system that is itself running under VM/SP.

On the Model 158 and the I/O processor of the 158AP, Virtual Machine Assist Feature and the System/370 Extended Feature are mutually exclusive. Both may be installed together on the non-I/O processor of the 158AP; however, the user of the feature that is not installed on the I/O attached processor must establish affinity to the non-I/O attached processor. RPQ #MK3272 allows coresidence of Virtual Machine Assist and System/370 Extended on the 158-3.

Single Processor Mode

Use of single processor mode requires no changes to existing application programs.

A VM/SP system running in a V=R virtual machine cannot use single processor mode. If VM/SP is loaded into the V=R area with single processor mode active, VM/SP runs in uniprocessor mode.

CMS Tape Label Processing Support

There are some minor incompatibilities between CMS standard label processing for DOS and OS macro instruction simulation and the actual processing when OS or DOS is running in a real or virtual machine. For example, there is no end of volume support. Refer to VM/SP CMS User's Guide for a complete list of incompatibilities.

The following line items do not have migration and integration incompatibilities:

- Resource management facilities subset
- Virtual Storage Preservation Support
- Full screen support via DIAGNOSE'58'
- Enhanced 3270 Information Display station support
- Addition to ECPS:VM/370
- Interactive HELP facility under CMS
- CMS TAPE command improvement
- CMS use of CP page management interfaces
- CP extensions
- APL/Text support for 3270 Information Display Stations
- Display Control for 3270 Information Display Stations
- Support of the 8809 tape unit
- Resource management facilities
- Shadow table maintenance facility
- Dynamic SCP to or from native mode

Section 6. Migration Considerations

As with VM/370, VM/SP when used in conjunction with VM/370 Release 6, is an operating system capable of running an IBM System/370 operating system as long as certain restrictions are not violated.

These restrictions are the same restrictions that apply to VM/370 and hence should not be construed strictly as VM/SP system incompatibilities.

Dynamically Modified Channel Programs

In general, virtual machines may not execute channel programs that are dynamically modified (that is, channel programs that are changed between the time the START I/O (SIO) is issued and the time the input/output ends, either by the channel program itself or by the processor).

Exceptions (that is, dynamically modified channel programs given special consideration by CP) are:

- Those generated by the Indexed Sequential Access Method (ISAM) running under OS/PCP, OS/MFT, and OS/MVT
- Those generated by ISAM running in an OS/VS virtual=real partition
- Those generated by the OS/VS Telecommunications Access Method (TCAM) Level 5, with the VM/SP option
- Those containing polling sequences

The self-modifying channel programs that ISAM generates for some of its operations receive special handling if the virtual machine using ISAM has that option specified in its directory entry. There is no such restriction for DOS ISAM, or for ISAM if it is running in an OS/VS virtual=virtual partition. If ISAM is to run in an OS/VS virtual=real partition, you must specify the ISAM option in the directory entry for the OS/VS virtual machine.

Virtual machines using OS/VS TCAM (Level 5, generated or invoked with the VM/SP option) issue a DIAGNOSE instruction when the channel program is modified. This instruction causes CP to reflect the change in the virtual CCW string to the real CCW string being executed by the channel. CP is then able to execute the dynamically modified channel program properly.

When a virtual machine starts a channel program containing a polling sequence, the CCW translation sets a PCI bit in the real CCW string. Each time the real CCW string is executed, the resulting PCI interruption causes CP to examine the corresponding virtual CCW string for changes. Any changes to the virtual CCW string are also made to the real CCW string while it is executing.

The restriction against dynamically modified channel programs does not apply if the virtual machine has the virtual=real performance option of the SET command with the NOTRANS option set ON.

Minidisk Restrictions

The following restrictions exist for minidisks:

1. In the case of read home address with the skip bit off, CP modifies the home address data in user storage at the completion of the channel program because the addresses must be converted for minidisks; therefore, the data buffer area may not be dynamically modified during the input/output operation.

2. In the case of read device characteristics to an FB-512 device with the skip bit off, CP modifies the data in user storage at completion of the channel program so the data reflects the true minidisk size and characteristics. Therefore, the data buffer area cannot be dynamically modified during the input/output operation.

   Note: The user should not attempt to use this data during the I/O operation.

3. On a minidisk, if a CCW string uses multitrack search on input/output operations, subsequent operations to that disk must have preceding seeks or continue to use multitrack operations. There is no restriction for dedicated disks.

4. OS/PCP, MFT, and MVT ISAM or OS/VS ISAM running virtual=real may be used with a minidisk only if the minidisk is located at the beginning of the physical disk (that is, at cylinder 0). There is no such restriction for DOS ISAM or OS/VS ISAM running virtual=virtual.

   Note: Because the VS1 system does no paging, any ISAM programs run under VS1 are treated by CP as though they are running in an ADDRSPC=REAL partition.

5. CP does not return an end-of-cylinder condition to a virtual machine that has a virtual 2311 mapped to the top half (that is, tracks 0 through 9) of 2314 or 2319 cylinders.

6. If the user's channel program for a count-key-data minidisk does not perform a seek operation, then to prevent accidental accessing, CP inserts a positioning seek operation into the user's channel program. Thus, certain channel programs may generate a condition code (CC) of 0 on a SIO instead of an expected CC of 1, which is reflected to the virtual machine. The final status is reflected to the virtual machine as an interrupt.

7. A DASD channel program directed to a 3330, 3340, or 3350 device may give results on dedicated drives that differ from results on minidisks having non-zero relocation factors. This occurs if the channel program includes multiple-track operations and depends on a SEARCH ID HIGH or a SEARCH ID EQUAL or HIGH to terminate the program. This is because the record 0 count fields on the 3330, 3340, and 3350 must contain the real cylinder number of the track on which they reside. Therefore, a SEARCH ID HIGH, for example, based on a low virtual cylinder number may terminate prematurely if a real record 0 is encountered.

   Notes:

   1. Minidisks with non-zero relocation factors on 3330, 3340, and 3350 devices are not usable under OS and OS/VS systems. This is because the locate catalog management function employs a search ID equal or high CCW to find the end of the VTOC.

2. This restriction also applies to minidisks with a VTOC of more than one track.

8. The IBCDASDI program cannot assign alternate tracks for a 3330, 3340, or 3350 or FB-512 minidisk.

9. If the DASD channel programs directed to 3330/3340/3350 devices include a write record R(0), results differ depending on whether the 3330/3340/3350 is dedicated (this includes a minidisk defined as the entire device) or nondedicated. For a dedicated 3330/3340/3350, a write R(0) is allowed, but the user must be aware that the track descriptor record may not be valid from one 3330/3340/3350 to another. For a nondedicated 3330/3340/3350, a write record R(0) is replaced by a read record R(0) and the skip flag is set on. This could result in a command reject condition due to an invalid command sequence.

10. When performing DASD I/O the real search ID uses the relocated search argument instead of the argument that was read dynamically. To avoid this problem, the record field of a search ID argument should not be set to binary zero if the search argument is to be dynamically read or if a search ID on record 0 is not intended.

11. On FB-512 devices, the use of the CE area is different for dedicated devices and minidisks. Any user with a dedicated device can use the CE area. However, only class F users can use the CE area for minidisks.

12. FB-512 diagnostic commands are also handled differently for dedicated devices and minidisks. Any user with a dedicated device can issue diagnostic CCWs. For minidisks, however, only users with a minidisk equal to the size of the entire pack can issue a diagnostic control command. Because diagnostic sense commands must be chained from a diagnostic control command, this restriction indirectly applies to those commands also.

13. Refer to Device Support Facilities, GC35-0033, for procedures to format 3380 direct access storage for use in an OS/VS operating system running in a virtual machine.

Timing Dependencies

Timing dependent applications in input/output devices or programming do not function consistently under VM/SP:

1. The following telecommunication access methods (or the designated option) violate the restriction on timing dependency by using program-controlled interrupt techniques and/or the restriction on dynamically modified channel programs:

   - OS Basic Telecommunications Access Method (BTAM) with the dynamic buffering option.
   - OS Queued Telecommunications Access Method (QTAM).
   - DOS Queued Telecommunications Access Method (QTAM).
   - OS Telecommunications Access Method (TCAM).
   - OS/VS Telecommunications Access Method (TCAM) Level 4 or earlier, and Level 5 if TCAM is not generated or invoked with the VM/SP option.

These access methods may run in a virtual=real machine with CCW translation suppressed by the SET NOTRANS ON command. Even if SET NOTRANS ON is issued, CCW translation will take place if one of the following conditions is in effect:

- The channel program is directed at a nondedicated device (such as a spooled unit record device, a virtual CTCA, a minidisk, or a console).
- The channel program starts with a SENSE operation code.
- The channel program is for a dialed terminal invoked by the DIAL command.
- START I/O tracing is in effect.
- The CAW is in page zero or beyond the end of the virtual=real area.

(OS BTAM can be generated without dynamic buffering, in which case no virtual machine execution violations occur. However, the BTAM reset poll macro will not execute under VM/SP if issued from third level storage. For example, a reset poll macro has a no-op effect if executed from a virtual=virtual storage under VS1 which is running under VM/SP.)

2. Programming that makes use of the PCI channel interrupt for channel program or processor signalling must be written to allow the follow:
   - So that processing can continue normally if the PCI is not recognized until I/O completion, or
   - if the modifications performed are not executed by the channel.
3. Devices that expect a response to an interrupt within a fixed period of time may not function correctly because of execution delays caused by normal VM/SP system processing. An example of such a device is the IBM 1419 Magnetic Character Reader.
4. The operation of a virtual block multiplexer channel is timing dependent. For this reason, the channel appears available to the virtual machine operating system, and channel interrupts are not observed. However, operations on virtual block-multiplexing devices should use the available features like Rotational Position Sensing to enhance utilization of the real channels.
5. Devices that experience extreme performance penalties if not reinstructed within a fixed interval may experience this penalty during every I/O operation. An example is the 8809 tape drive. Setting the mode to "streaming" may actually result in a slower data rate than running in nonstreaming mode. Execution delays, caused by normal VM/SP processing, prevent a timely reinstruct and the 8809 tape drive may sustain a 1.2 second delay on every I/O operation. The result is that the effective data rate may be less than running at 20 inches per second (IPS). The user must decide (based mainly on the size of the I/O buffers) between running at 100 IPS with continuous delays and running at 20 IPS.

Processor Model-Dependent Functions

On the System/370 Model 158 and the I/O processor of the 158AP, Virtual Machine Assist feature and the System/370 Extended Feature are mutually exclusive.

Programs written for processor model-dependent functions may not execute properly in the virtual machine under VM/SP. The following points should be noted:

1. Programs written to examine the machine logout area do not have meaningful data since CP does not reflect the machine logout data to a virtual machine.

2. Programs written to obtain processor identification (via the Store CPUID instruction, STIDP) receive the real machine value. When the STIDP instruction is issued by a virtual machine, the version code contains the value 255 in hexadecimal ("FF") to represent a virtual machine.

3. No simulation of other processor models is attempted by VM/SP.

4. Since an operating system's channel error recovery procedures may be processor model- and channel model-dependent, operating systems that will run in a virtual machine may have to be generated for the same model of processor that VM/SP will be running on.

Channel Model-Dependent Functions

Channel checks (channel data check, channel control check, and interface control check) are reflected to the virtual machine as are other I/O errors. This provides the operating system or other programs in the virtual machine with the opportunity to attempt recovery or close out its operation in an orderly manner. To take full advantage of this the virtual machine should comply with the following requirement:

> Each virtual channel should map to real channels of a single type. In other words, the virtual devices on a virtual channel should all map to real devices on real channels of a single type and model. These real channels should all be the same as each other, but not necessarily the same as the virtual channel.

If the I/O configuration of a virtual machine does not meet the above requirement, no warning message is issued and the virtual machine will run successfully until a channel check occurs. In this case, when a channel check occurs, there is a possibility that the channel extended logout data may be inconsistent with the data provided by the store channel id (STIDC) instruction.

Note: Virtual machines running CMS need not comply with these requirements. Here, only unit record spooling and diagnose I/O are performed. For unit record spooling, there are no channel checks and for diagnose I/O, CP attempts to perform the error recovery itself.

When the store channel id instruction (STIDC) is executed in a virtual machine, it returns information from an arbitrary channel. The type, model, and logout length data returned by the STIDC are the same as the real channel except that when a real channel is a block multiplexer and the virtual channel is a selector, the type field returned by STIDC indicates a selector channel.

Since the STIDC returns identifying data from the real channel, channel type-dependent error recovery procedures can use STIDC to identify the channel.

Channel extended logouts are reflected to the virtual machine in a manner that is processor model- and channel model-dependent and consistent with the data returned by STIDC (provided that the virtual-to-real channel mapping the requirement stated previously is met).

A deviation in handling channel extended logouts occurs if the virtual machine uses the control bit in register 14 to mask out channel extended logouts. Channel extended logouts will not be lost when they are kept pending along with their associated I/O interrupts. Regardless of whether or not the setting causes the virtual machine to lose the channel extended logout, CP will still successfully record the logout in its own error recording areas.

Virtual Machine Characteristics

Other characteristics that exist for a virtual machine under VM/SP are as follows:

1. Virtual machine size can be from 8K to 16 megabytes. The size is defined in the user directory and may be temporarily altered by the user with the CP DEFINE command. The minimum virtual storage size for CMS is 320K bytes.

2. If the virtual=real option is selected for a virtual machine, input/output operations specifying data transfer into or out of the virtual machine's page zero, or into or out of storage locations whose addresses are greater than the storage allocated by the virtual=real option, must not occur. The storage-protect-key mechanism of the IBM System/SP processor and channels operates in these situations but is unable to provide predictable protection to other virtual machines. In addition, violation of this restriction may compromise the integrity of the system. The results are unpredictable.

3. The DIAGNOSE instruction cannot be issued by the virtual machine for normal function. CP uses this instruction to allow the virtual machine to communicate system services requests. The Diagnose interface requires the operand storage addresses passed from the virtual machine issuing the DIAGNOSE instruction to be real. For more information about the DIAGNOSE instruction in a virtual machine, see the VM/SP System Programmer's Guide.

4. A two-channel switch can be used between the IBM System/SP running a virtual machine under VM/SP and another processor.

5. A control unit normally never appears busy to a virtual machine. An exception exists when a forward space file or backward space file command is executed for a tape drive. Subsequent I/O operations to the same virtual control unit result in a control unit busy condition until the forward space file or backward space file command completes. If the real tape control unit is shared by more than one virtual machine, a control unit busy condition is reflected only to the virtual machine executing the forward space file or backward space file command. When a virtual machine attempts an I/O operation to a device for which its real control unit is busy, the virtual machine is placed in I/O wait (nondispatchable) until the real control unit is available. If the

virtual machine executed a SIOF instruction (rather than SIO) and was enabled for block-multiplexing, it is not placed in I/O wait for the above condition.

6. The CP IPL command cannot simulate self-modifying IPL sequences from dedicated unit record devices or certain self-modifying IPL sequences from tape devices.

7. The VM/SP spooling facilities do not support punch-feed-read, stacker selection, or column binary operations. Detection of carriage control channels is supported for a virtual 3211 only.

8. VM/SP does not support count control on the virtual 1052 operator's console.

9. Programs that use the integrated emulators function only if the real computing system has the appropriate compatibility feature. VM/SP does not attempt simulation. The DOS emulator running under OS or OS/VS is not supported under VM/SP.

10. The READ DIRECT and WRITE DIRECT instructions are not supported for a virtual machine.

11. The SET CLOCK instruction cannot be simulated and, hence, is ignored if issued by a virtual machine. The STORE CLOCK instruction is a nonprivileged instruction and cannot be trapped by VM/SP; it provides the true TOD clock value from the real processor.

12. The 1050/1052 Model 2 Data Communication System is supported only as a keyboard operator's console. Card reading, paper tape I/O, and other modes of operation are not recognized as unique, and hence may not work properly. This restriction applies only when the 1050 system is used as a virtual machine operator's console. It does not apply when the 1050 system is attached to a virtual machine via a virtual 2701, 2702, or 2703 line.

13. The pseudo-timer (usually device address 0FF, device type TIMER) does not return an interrupt from a Start I/O; therefore, do not use EXCP to read this device.

14. A virtual machine device IPL with the NOCLEAR option overlays one page of virtual machine storage. The IPL simulator uses one page of the virtual machine to initiate the IPL function. The starting address of the overlaid page is either the result of the following formula:

$$\frac{\text{virtual machine size}}{2} = \text{starting address of the overlayed page}$$

or the hexadecimal value 20000, whichever is smaller.

15. To maintain system integrity, data transfer sequences to and from a virtual system console are limited to a maximum of 2032 bytes. Channel programs containing data transfer sequences that violate this restriction are terminated with an interrupt whose CSW status indicates incorrect length and a channel program check.

Notes:

1. A data transfer sequence is defined as one or more connected read or write CCWs. The introduction of command chaining defines the start of a new data transfer sequence.

2. Data chained seek CCWs with counts of less than four are inconsistent with VM/SP data security and therefore will give an error when attempting to use.

16. When an I/O error occurs on a device, the System/SP hardware maintains a contingent connection for that device until a SENSE channel command is executed and sense data is recorded. That is, no other I/O activity can occur on the device during this time. Under VM/SP, the contingent connection is maintained until the SENSE command is executed, but I/O activity from other virtual machines can begin on the device while the sense data is being reflected to the virtual machine. Therefore, the user should be aware that on a shared disk, the access mechanism may have moved during this time.

17. The mode setting for 7-track tape devices is maintained by the control unit. Therefore, when a virtual machine issues the SET MODE channel command to a 7-track tape device, it changes the mode setting of all 7-track tape devices attached to that control unit.

    This has no effect on virtual machines (such as OS or DOS) that issue SET MODE each time a CCW string is to be executed. However, it can cause a problem if a virtual machine fails to issue a SET MODE with each CCW string executed. Another virtual machine may change the mode setting for another device on the same control unit, thereby changing the mode setting of all 7-track tape devices attached to that control unit.

18. OS/VS2 is supported in uniprocessor mode only.

19. A shared system or one that uses discontiguous saved segments cannot be loaded (via IPL) into a virtual machine running in the virtual=real area.

20. The DUMMY feature for VSAM data sets is not supported and should not be used at program execution time. Specifying this option on the DLBL command will cause an execution-time OPEN error.

21. The 3066 is supported as a 3215. It is not supported as a graphics terminal; therefore, it is recommended that the NODISP option of the EDIT command be used when editing in a 3066.

22. The Program Controlled Interruption (PCI) FETCH option for load module retrieval is not supported for OS/MFT or VS1.

MSS Restrictions

1. There are two OS/VS system data sets associated with Mass Storage System: The mass storage volume inventory and the mass storage volume control journal. There is one copy of each data set per Mass Storage System, not necessarily one per operating system. If more than one OS/VS system (running either in native mode or in a virtual machine) is connected to a common Mass Storage System, then the OS/VS systems must share a common inventory and journal.

2. When a real 3330V device is dedicated to a virtual machine as a virtual 3330V, the programming support in the virtual machine must recognize and access the virtual device as a 3330V.

3. The following must be compatible; the definition of 3330V addresses in the MCS tables; the DMKRIO module; and the IOGEN for any OS/VS system running in a virtual machine with a dedicated MSC port.

4. Each active volume in the MSS must have a unique volume number. If you wish to have two or more user volumes having the same volume serial (such as different versions of an OS/VS2 system residence volume both having a volume serial of VS2037), then create two MSS volumes having different volume serials and allocate the user volumes as minidisks.

5. Mass Storage System volumes may not be used for VM/SP residence, paging, spooling, or temporary disk space.

6. You must not change the volume serial of a real 3330V volume (the volume serial as known by the MSC) except by using the OS/VS access method services utilities. If, for example, cylinder 0 of a 3330V is dedicated to a virtual machine and that virtual machine alters the volume serial using DDR, then the volume cannot be mounted.

CMS Restrictions

The following restrictions apply to CMS, the conversational monitor subsystem of VM/SP:

1. CMS executes only on a virtual IBM System/SP provided by VM/SP.

2. CMS employs the spooling facilities of VM/SP to perform unit record I/O. However, a program running under CMS can issue its own SIOs to attached dedicated unit record devices.

3. Only CMS simulated OS and VSE program facilities can be executed under CMS.

4. Many types of object programs produced by CMS (and OS) languages can be executed under CMS using CMS's simulation of OS supervisory functions. Although supported in OS and VSE virtual machines under VM/SP, the writing and updating of non-VSAM OS data sets and VSE files are not supported under CMS.

5. CMS can read sequential and partitioned OS data sets and sequential VSE files.

   The following restrictions apply when CMS reads OS data sets that reside on OS disks:

   - Except for VSAM, read-password-protected data sets are not read.
   - BDAM and ISAM data sets are not read.
   - Multivolume data sets are read as single-volume data sets. End-of-volume is treated as end-of-file and there is no end-of-volume switching.
   - Except for VSAM, keys are ignored and only the data is read.
   - User labels in user-labeled data sets are bypassed. The following restrictions apply when CMS reads VSE files that reside on DOS disks:
   - Only VSE sequential files can be read. CMS options and operands that do not apply to OS sequential data sets (such as the MEMBER and CONCAT options of FILEDEF and the PDS option of MOVEFILE) also do not apply to VSE sequential files.

- The following types of DOS files cannot be read:
  - VSE DAM and ISAM files.
  - Files with the input security indicator on.
  - VSE files that contain more than 16 extents. (Note: User labels occupy the first extent; therefore, the file can hold only 15 additional data extents.)
- Multivolume files are read as single-volume files. End-of-volume is treated as end-of-file. There is no end-of-volume switching.
- User labels in user-labeled files are bypassed.
- Since VSE files do not contain BLKSIZE, RECFM, or LRECL parameters, these parameters must be specified via FILEDEF or DCB parameters; otherwise, defaults of BLOCKSIZE=32760 and RECFM=U are assigned. LRECL is not used for RECFM=U files.
- CMS does not support the use of OS/VS DUMMY VSAM data sets at program execution time. Specifying the DUMMY option with the DLBL command causes an error.

6. Assembler program usage of VSAM and the ISAM Interface Program (IIP) is not supported.

7. System logical units (SYSIN, SYSRDR, SYSIPT, SYSLST, and SYSPCH), are not supported for DOS formatted FB-512 devices because the SYSFIL function (SVC 103) of VSE is not supported under CMS/DOS.

Miscellaneous Restrictions

1. The number of pages used for input/output must not exceed the total number of user pages available in real storage. Violation of this restriction causes the real computing system to be put into an enabled wait state.

2. If you intend to define more than 64 virtual devices for a single virtual machine, be aware that any single request for free storage in excess of 512 doublewords (a full page) can cause an error message to be issued if storage cannot be obtained. Tables for virtual devices for a virtual machine must reside in contiguous storage. Therefore, two contiguous pages of free storage must be available in order to logon a virtual machine with more than 64 virtual devices, (three contiguous pages for a virtual machine with more than 128 virtual devices, etc.). Contiguous pages of free storage are sure to be available only immediately after IPL, before other virtual machines have logged on. Therefore, a virtual machine with more than 64 devices should be the first to logon after IPL. The larger the real machine size, the less the possibility of this occurring.

3. If an I/O device (such as a disk or tape drive) drops ready status while it is processing virtual I/O activity, any virtual machine users performing I/O on that device are unable to continue processing or to log off. Also, the LOGOFF and FORCE commands are not effective because they do not complete until all outstanding I/O is finished. The system operator should determine which I/O device is involved and make that device ready once more.

4. Any modifications to local OPTIONS COPYFILE, unless otherwise specified in existing documentation, are not supported.

5. If an installation is using an IBM 3031, 3032, or 3033 processor, it must dedicate the service record file (SRF) device to VM/SP. Thus, the channel on which the SRF is located cannot be dedicated to any virtual machine.

6. When using the SPOOL, DEDICATE, and SPECIAL directory control statements to define virtual devices, specify virtual addresses that do not conflict or contend with the virtual control unit interface. This conflict or contention occurs because devices can require special I/O interface protocol from control units such as shared and nonshared subchannel operations. Putting devices that require different real control units on the same virtual control unit can result in a hung or busy condition. To avoid this problem, users must define (and separate) devices within their own control unit range. For example, if the directory entry specifies:

   ```
   SPOOL 102 3211
   SPECIAL 103 3270
   ```

   The control unit 0 on channel 1 controls both a nonshared device (the 3211 printer) and a shared device (the 3270 display unit). Processing of channel programs involving these two devices can result in a hung or busy condition.

Section 7. Publications

In addition to the VM/SP General Information Manual, GC20-1838, the following list identifies the major publications in the VM/SP library and gives a brief description of the contents of each book.

Note: The VM/SP library addresses the VM/370 extended operating system as a VM/SP system; that is, the user has already merged the Release 6 SCP with the VM/SP program package. As such, the library does not delineate Release 6 SCP function from VM/SP function. The reader who wishes to know what function is offered in a Release 6 base operating system should refer to the appropriate publication in the VM/370 library.

Introduction, GC19-6200

This manual contains introductory information about the facilities VM/SP provides. It defines the minimum configuration necessary for virtual machine execution. VM/SP restrictions are also included. Prior knowledge of virtual storage concepts as implemented in System/370 is assumed.

Planning and System Generation Guide, SC19-6201

This publication is intended for those responsible for the planning and installation of a VM/SP system. It includes information about virtual machine concepts, operating systems in a virtual machine, and planning considerations for a VM/SP system. It includes the information necessary to generate a VM/SP system.

Terminal User's Guide, GC19-6206

This publication tells the user how to access VM/SP through terminal devices. Topics discussed include terminal initialization, gaining access to VM/SP, procedures for logging on, command environments, and contacting VM/SP through common carrier facilities.

CP Command Reference for General Users, SC19-6211

This publication describes the CP command language syntax that is used to control the functions associated with the execution of the general user's virtual machine.

Operating Systems in a Virtual Machine, GC19-6212

This publication tells the system programmer how to use operating systems under the control program of VM/SP. This publication describes

the aspects of running operating systems under VM/SP that are common to all systems, and describes how to use VM/SP functions more efficiently when running operating systems under VM/SP.

CMS User's Guide, SC19-6210

This publication contains general information and examples for using the Conversational Monitor System (CMS) component of VM/SP. The guide explains how to use CMS to create and modify data files (including VSAM data sets) and programs, and to compile, test, and debug OS or DOS programs under CMS.

CMS Command and Macro Reference, SC19-6209

This publication provides CMS users with detailed reference information concerning command syntax and usage notes for CMS commands, EDIT subcommands, DEBUG subcommands, EXEC control statements, special variables, and built-in functions, and CMS assembler language macro instructions.

System Messages and Codes, SC19-6204

This publication contains the VM/SP messages including explanations, system action, and the appropriate user response. In addition, system abend codes and wait states are also listed. Messages produced by associated language translators are explained in the SRL publication pertaining to that language translator.

OLTSEP and Error Recording Guide, SC19-6205

This publication aids the IBM customer engineer (CE) in performing hardware I/O maintenance from a virtual machine. It includes VM/SP concepts and data on error handling and recording, and describes how to run the Online Test Sections (OLTS) under OLTSEP. Also included in the publication are additional CE aids such as the VMFDUMP command.

System Programmer's Guide, SC19-6203

This publication contains detailed descriptions of procedures, commands, and utility programs useful in debugging as well as guidelines for reading dumps. It also describes the VM/SP Control Program (CP) and how it works; it also gives details on how to modify or better utilize CP. Finally, some of the special features of this VM/SP component are described.

Operator' Guide, SC19-6202

This publication aids those responsible for the operation and administration of a VM/SP system. It includes descriptions of those commands that affect the I/O resources and operating characteristics of VM/SP, the associated virtual machines, and the real hardware configuration. Also included is information on spooling, resource allocation, system startup and shutdown procedures, and VM/SP service programs.

System Logic and Problem Determination Guide Vol. 1 (CP), LY20-0892

This publication is intended for IBM system hardware and software support personnel. It provides information on the internal logic of the VM/SP Control Program (CP) component including module descriptions, cross-references, and wait states.

System Logic and Problem Determination Guide Vol. 2 (CMS), LY20-0893

This publication is intended for IBM system hardware and software support personnel. It provides information on the internal logic of the CMS component of VM/SP including module descriptions, and cross-references.

Data Areas and Control Block Logic, LY20-0891

This publication, together with VM/SP System Logic and Problem Determination Guide (Volumes 1 and 2) is intended for system programmers responsible for updating the VM/SP system. This publication contains descriptions of the major data areas and control blocks used by the CP and CMS components of VM/SP.

Glossary and Master Index, GC19-6207

This publication contains a glossary of VM/SP terms and brings together the indexes of all publications in the VM/SP library. It also provides an overview of the VM/SP library.

Service Routines Program Logic, LY20-0890

This publication describes the program logic for the VM/SP service routines. Each service routine (or group of routines) is described in its own chapter. Each chapter contains an introduction, a method of operation section, a program organization section, a directory, a data areas section, and a diagnostic aids section.

Quick Guide For General Users, SX20-4400

This guide describes some of the essential VM/SP operations to the new user. It also provides a brief description of all VM/SP commands for the experienced user.

VM/SP Commands (General Users) Reference Summary, SX20-4401

This card summarizes all CP, CMS and RSCS commands available to the general user. Also listed are Service Aids.

VM/SP Commands (Other than General Users) Reference Summary, SX20-4402

This card summarizes CP and CMS commands other than for general users. Also listed are Service Aids.

EXEC 2 Guide and Reference, SC24-5219

This publication is intended as a primer for new users of the EXEC 2 interpreter. It contains complete reference information for EXEC 2 language statements, and contains a comparison between the EXEC and EXEC 2 languages.

VM/SP System Product Editor Command and Macro Reference, SC24-5221

This publication provides information on the System Product Editor with detailed reference information about the System Product Editor command language, the XEDIT command and its subcommands, and EXEC 2 control statements.

VM/SP System Product Editor User's Guide, SC24-5220

This publication contains general information and examples for using the System Product Editor.

RELATED PUBLICATIONS

The first three publications contain information on the RSCS and IPCS components of VM/370. These components remain unmodified by VM/SP code. The user should refer to the last two publications if he installs the RSCS Networking Program Product (5748-XP1) and the VM/IPCS Extension Program Product (5748-SA1).

VM/370 System Logic and Problem Determination Guide Vol. 3 (RSCS), SY20-0888

This publication is intended for the IBM system hardware and software personnel and provides a description of the RSCS program logic and RSCS module descriptions and cross-reference.

VM/370 Interactive Problem Control System (IPCS) User's Guide, GC20-1823

This publication is a reference manual for users of the IPCS component of VM/370. It is specifically directed to the system programmer or the IBM program support representative (PSR). This publication describes the functions of the IPCS component of VM/370 as well as gives an explanation of how to use the IPCS VMFDUMP command.

Remote Spooling Communications Subsystem (RSCS) User's Guide, GC20-1816

This publication provides users of the RSCS component of VM/370 with the information and commands necessary to operate remote terminals and stations.

VM/370 RSCS Networking Program Reference and Operations Guide, SH24-5005

This publication describes the capabilities of remote networks enhanced with the RSCS Networking program product describing commands and protocols for operating remote terminals and stations.

VM/IPCS Extension User's Guide, SC34-2020

This publication describes the interactive problem control commands and procedures provided by the VM/IPCS Extension program product.

CHANGES IN PUBLICATION CONTENT

The program logic manuals no longer contain the lists of abend codes and DIAGNOSE codes. VM/SP System Messages and Codes now contains the abend codes while the VM/SP System Programmer's Guide lists the DIAGNOSE codes.

Section 8. Performance

Virtual Machine/System Product performance in unconstrained storage environments should not differ significantly from the performance of VM/370 Basic System Extensions and VM/370 System Extensions running in the same type of environment. However, VM/SP does require more storage as a result of CP nucleus growth, and increased CMS working set size due to the EXEC 2 processor and the System Product Editor. Therefore, existing VM/370 environments that are constrained by either storage or paging activities should assess the performance implications before installing VM/SP.

Use of the small CP nucleus option in building the VM/SP system is a way to reduce its resident nucleus size since it eliminates certain CP functions. Installations whose real storage configurations are one megabyte or less might consider implementing the small CP nucleus option if the installation does not require the full function of VM/SP.

Any system control program (SCP) running in an IBM System/370, 303X, and 4300 processor in native mode, generally offers better performance than that same SCP under VM/SP. This is true because two control programs (the guest SCP and VM/SP are in contention for the resources of one system. In native mode, however, there is a one to one correspondence between the system resources and the SCP.

Some systems employ a handshaking facility that provides a communications interface between VM/SP and the guest SCP making each system control program aware of the capabilities and requirements of the other. The handshaking facility eliminates guest SCP and VM/SP duplication of function. When the handshaking facility is used in the VM/SP environment, throughput performance may approach native operation levels.

Performance of any virtual machine operation is based on its contention with other virtual machines and VM/SP itself for system resources. Performance of any virtual machine is also relative to the power of the installation's processor, its main storage size, the speed of its I/O devices, and the number of defined channel paths to those devices.

Line Item Performance Considerations

The following line items should not significantly affect overall system performance:

- Interactive HELP Facility
- APL/TEXT Support for 3270 Information Display Stations
- Display Control for 3270 Information Display Stations
- Support of the 3262 Models 1 and 11 Printers
- Support of the 3289 Model 4 Printer
- Support of the 3310 and 3370 Direct Access Storage Devices
- Logical Device Support
- Support of the 3278 Model 5 and 3279 Information Display Stations

- HELP Facility Enhancements
- Full Screen Console Enhancements
- CP Spooling Enhancements
- Remote Dedicated 3270 Information Display Printers to Virtual Machines
- Single Console Image Facility
- IPL Command Enhancements

NEW CMS EXEC INTERPRETER (EXEC 2) SUPPORT

EXEC 2 should require less processor time for interpretation than the EXEC interpreter. EXEC 2, however, requires more storage. The impact to general system performance should not be significant.

SYSTEM PRODUCT EDITOR SUPPORT

The System Product Editor requires more processor time and storage than the CMS editor but these factors should not have a significant impact to overall system performance. However, performance may be affected if you invoke the System Product Editor in CMS EDIT compatibility mode.

SNA CONSOLE COMMUNICATION SERVICES SUPPORT

Installations choosing to implement SNA support in VM/SP should expect some performance degradation.

INTER-USER COMMUNICATIONS VEHICLE (IUCV) SUPPORT

Installations using the IUCV interface in conjunction with SNA CCS support and the VM/VCNA program product should expect some performance degradation. However, the use of the IUCV interface itself has no impact on system performance.

3270 DISPLAY STATION ENHANCEMENTS

Improvement in performance may occur since a full screen of data is displayed by one WRITE CCW rather than by multiple WRITE CCWs for each line of the screen

SUPPORT OF 3380 DIRECT ACCESS STORAGE AND 3880 STORAGE CONTROLLER MODELS 2 AND 3

Improved performance may result for users having DASD with the full track read feature and/or fixed head feature.

SUPPORT OF THE 3800 PRINTING SUBSYSTEM AS A VIRTUAL SPOOLING DEVICE

There are no performance implications when this support is not utilized.

SECURITY AND INTEGRITY ENHANCEMENTS TO VM/SP

There are no performance implications for system dump space allocation after CP initialization.

There is no performance implication for expansion of the spool file checkpoint limit from 2048 to 9900 files.

There are no performance implications for disallowing operator automatic logon during an automatic system restart.

If the SYSCLR=YES option is specified in the system generation SYSRES macro instruction, the automatic clearing of temporary disk space by CP may have a negative impact on performance.

MP/MODIFIED AP SUPPORT

Improved locking logic may lessen the contention on the global system lock. Availability of symmetric I/O paths from both processors in an MP configuration may reduce I/O wait time.

RESOURCE MANAGEMENT FACILITIES SUBSET

Virtual machines should receive a more uniform level of service and the trivial interactive user should be less affected by heavy system load situations.

VIRTUAL STORAGE PRESERVATION SUPPORT

Performance of a real IPL should be improved if a V=R area is generated. IPL is changed to read only the VM/SP nucleus and not the entire V=R area.

Virtual machine abend, restart, and termination are degraded. Normal logoff is unchanged. The amount of degradation depends on the number of virtual machines to be saved and the number of pages specified at system generation to be saved.

ACCCUNTING RECORDS ON DISK SUPPORT

Performance should be equal to or better than the accounting performance in a VM/370 Release 6 system because spooling I/O is substituted for real I/O punch.

SPOOL FILES TO TAPE SUPPORT

There should be no degradation tc normal CP routines due to the inclusicn of this code if the spool files to tape support is not implemented.

CMS TAPE LABEL PROCESSING SUPPORT

There should be no measurable performance impact on CMS for IBM supplied standard label processing routines. When labels are processed, however, CP takes a longer time to read and write tape files than when the tapes are unlabeled. The performance impact in this case is negligible.

FULL SCREEN SUPPORT VIA DIAGNOSE X'58'

There should be no significant impact to performance over current implementation. There is no impact to the CMS component of VM/SP or the RSCS component of VM/370. Although full screen support allows a virtual machine to read and write a full screen of data in one I/O operation rather than separate I/O operations for each line, any performance gain depends on the implementation of the program running in the virtual machine.

ENHANCED 3270 INFORMATION DISPLAY SUPPORT

There may be some added degradation for enhanced 3270 Information Display support because of the extra time needed to process the larger buffers; however, because the terminal user has more data available to him. The time he needs to evaluate the larger amount of information should increase, resulting in a lcwer interaction rate.

ADDITION TO ECPS:VM/370

Extended Control Program Support (ECPS) for VM/370 on the IBM System/370 Models 135-3, 138, 145-3, 148 and the IBM 4300 processors has been enhanced to accelerate the processing of the DIAGNOSE instruction used to communicate between a virtual machine and CP.

CMS FILE SYSTEM EXTENSIONS

The file system extensions are:

- Larger DASD blocksize capability allows the CMS user to optimize the usage of blocksize while taking into consideration such factors as the type of DASD, the processor and the storage his installation has.
- Selective directory updating requires fewer I/O operations to upgrade CMS file directory blocks. This should especially benefit users writing to CMS disks that contain a large number of files.
- Random access of variable format CMS files is improved because CP no longer performs a sequential search to locate a particular item. This provides a potential performance gain for programs written in COBOL and PL/1, whose compilers randomly access their variable format work files. A performance gain may also be realized by files accessed from CMSBAM DOSLIB.
- The ability to open a file in read/write status permits CP to issue a read or write without an intermediate close.

CMS TAPE COMMAND IMPROVEMENT

The larger available tape blocksize (4K) for the TAPE DUMP command yields a performance improvement for most TAPE command users. In most environments, the TAPE DUMP, TAPE LOAD, TAPE SCAN, and TAPE SKIP commands have better performance with 4K tape blocksizes.

CMS INCREASED USER OF CP PAGE MANAGEMENT INTERFACES

Systems with high available processor storage utilization may benefit from the increased use by CMS of CP page management interfaces. CMS storage management services detect when a page of CMS virtual storage is no longer used and releases that page frame to free storage. The page frame is then immediately available for a CP page in operation, thereby saving a page out operation. CMS storage management can issue page release by a CMS FREEMAIN, CMS/DOS FREEVIS or RELPAG, or a CMS/OS FREEMAIN or PGRLSE.

CP EXTENSIONS

The CP extensions improve the performance of CMS users as well as the performance of guest operating systems in a mixed mode environment.

- The storage management algorithm changes for returning free storage to the dynamic paging area may benefit systems having free storage area extensions.
- The userid indicated on the SET FAVORED userid 100 command is given a higher dispatching priority than specified in his directory entry. Therefore, a guest operating system in a mixed mode environment may experience better performance (that is, a batch job may take less time to run) with SET FAVORED 100.

- If ECPS:VM/370 is used for CCW translation of CMS disk I/O (that is, DIAGNOSE X'18'), performance may be improved for most CMS environments on processors equipped with ECPS (for example, the 138, 148 and the 4300 processors).

SMALL CP OPTION

This item may increase overall system performance in systems with small (one megabyte or less) available processor storage.

SUPPORT OF THE 8809 TAPE UNIT

100 IPS is maintained only in the standalone DDR (DASD Dump Restore) utility. All other tape I/O performs at 12.5 IPS. Therefore, with the 8809 support, there is no adverse effect on system performance.

RESOURCE MANAGEMENT FACILITIES

- The revised scheduler provides a more efficient, more equitable way for virtual machines to share system resources. In an environment where there is a mix of interactive jobs as well as noninteractive jobs, the revised scheduler improves system performance. sk
- The internal monitor dynamically tunes the VM/SP scheduler to obtain the most efficient resource utilization. These adjustments, based on previous use of system resources, improves VM/SP throughput.

- Migrating inactive pages from available processor storage to slower secondary DASD storage may reduce the amount of time virtual machines must wait for pages to be paged in from that secondary storage. If less time is used in the paging activity, VM/SP performance may improve.

- Migrating inactive swap tables from available processor storage to auxiliary storage frees the available processor storage occupied by the swap tables. With more free storage available to VM/SP, system performance may improve.

SHADOW TABLE MAINTENANCE FACILITY

Multiple shadow table support reduces purge and revalidation time for virtual storage operating systems.

Shadow table selective invalidation effects only those users who do not have the Virtual Machine Assist feature active. For these users, selective invalidation is an improvement over letting software handle purges and revalidation operations.

Shadow table bypass for the V=R user eliminates shadow tables and associated purging and revalidation.

Because of the new algorithms for shadow table maintenance may be used instead of some ECPS:VM/370 algorithms, users running on a 135-3, 138, 145-3, 148 or 4300 processors with ECPS:VM/370 may not realize the full performance benefits of ECPS.

The total system performance depends on the job stream and the system being measured, and on the performance items being used at any given time.

SINGLE PROCESSOR MODE

The throughput of a virtual machine running in single processor mode is higher than the throughput of the same virtual machine running the identical job stream without single processor mode active.

DYNAMIC SCP TRANSITION TO OR FROM NATIVE MODE

Compared to other methods of switching a system control program (SCP) to or from native mode, dynamic SCP transition to or from native mode improves availability and guest virtual machine performance. The system operator no longer needs to quiesce or IPL the SCP when switching that SCP to native mode. Likewise, he does not need to quiesce or IPL VM/SP or another SCP when switching back to VM/SP.

MVS/SYSTEM EXTENSIONS SUPPORT

The MVS/System Extensions support allows the user to run MVS with the MVS/System Extensions program product (5740-XE1) in a virtual machine. The impact of VM/SP support of the MVS/System Extensions program product in a guest MVS operating system should have minimal impact on system performance.

Section 9. Product Summary

Testing Period

The testing period is two months.

Licensing Provisions

A separate license is required for each designated machine on which the licensed program materials will be used except as otherwise specified by IBM.

Program Services

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