File No. S370-34
Order No. GC20-1822-0

Systems

IBM Virtual Machine Facility/370: Release 3 Guide

Release 3 PLC 1

This publication contains information about the scope and content of the current release of the IBM Virtual Machine Facility/370. It provides planning and implementation information for installation managers, system programmers, and IBM system hardware and software support personnel. This publication describes:

- New and changed VM/370 features, components, and requirements
- Changes to VM/370 publications
- Modules added, deleted, modified, or sequenced for the current release
- Ordering and distribution procedures for the current release
- VM/370 restrictions
- A list of Release 2 APAR fixes that have been incorporated in the Release 3 base system

Prerequisite Publications

IBM Virtual Machine Facility/370:
Introduction, Order No. GC20-1800
Planning and System Generation, Order No. GC20-1801

IBM

First Edition (February 1976)

This edition, GC20-1822-0, corresponds to Release 3 PLC 1 (Program Level Change) of the IBM Virtual Machine Facility/370, and to all subsequent modifications unless otherwise indicated in new editions or Technical Newsletters.

Changes are periodically made to the specifications herein; before using this publication in connection with the operation of the IBM systems, consult the latest IBM System/370 Bibliography, Order No. GC20-0001, for the editions that are applicable and current.

Requests for copies of IBM publications should be made to your IBM representative or to the IBM branch office serving your location.

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This publication reflects the content and status of the IBM Virtual Machine Facility/370 (VM/370) Release 3. It provides installation managers, system programmers and IBM hardware and software support personnel with information useful for planning for and implementing Release 3.

This publication has nine sections and two appendixes:

- Section 1 is a summary of the VM/370 system for this release.
- Section 2 is more detailed description of the changes to the VM/370 system for this release.
- Section 3 describes the expanded VM/370 library changes for Release 3. Also shown is a chart showing the location of information in the VM/370 library as it applies to each major change or enhancement to VM/370.
- Section 4 contains charts showing changes to VM/370 commands, macros, EXEC procedures, ABEND codes, and service programs control statements.
- Section 5 contains a module directory and status list of all modules in the system. The module sizes indicated are based on the latest information that was available when this book went to press. Some modules in the distributed system may be larger or smaller than the stated sizes.
- Section 6 contains ordering and distribution procedures for Release 3 program material shipped with the system, and available optional material.
- Section 7 contains a list of VM/370 restrictions.
- Section 8 lists the APARs (Authorized Program Analysis Report) written against the Release 2 base VM/370 System Control Program (SCP) that were corrected and integrated into the Release 3 system.
- Section 9 contains APAR numbers and the related PTFs (Program Temporary Fix) that need to be applied to and used with VM/370 supported System Control Programs (SCPs) and Program Products.
- Appendix A contains comparison information between DOS/VS and the services offered by CMS/DOS.
- Appendix B details the VSAM and Access Method Services support offered by CMS.

PREREQUISITE PUBLICATIONS

IBM Virtual Machine Facility/370:

Introduction, Order No. GC20-1800.

Planning and System Generation Guide, Order No. GC20-1801.

Figure 1-1 is an overview of the VM/370 library, with the publications grouped according to their probable users.

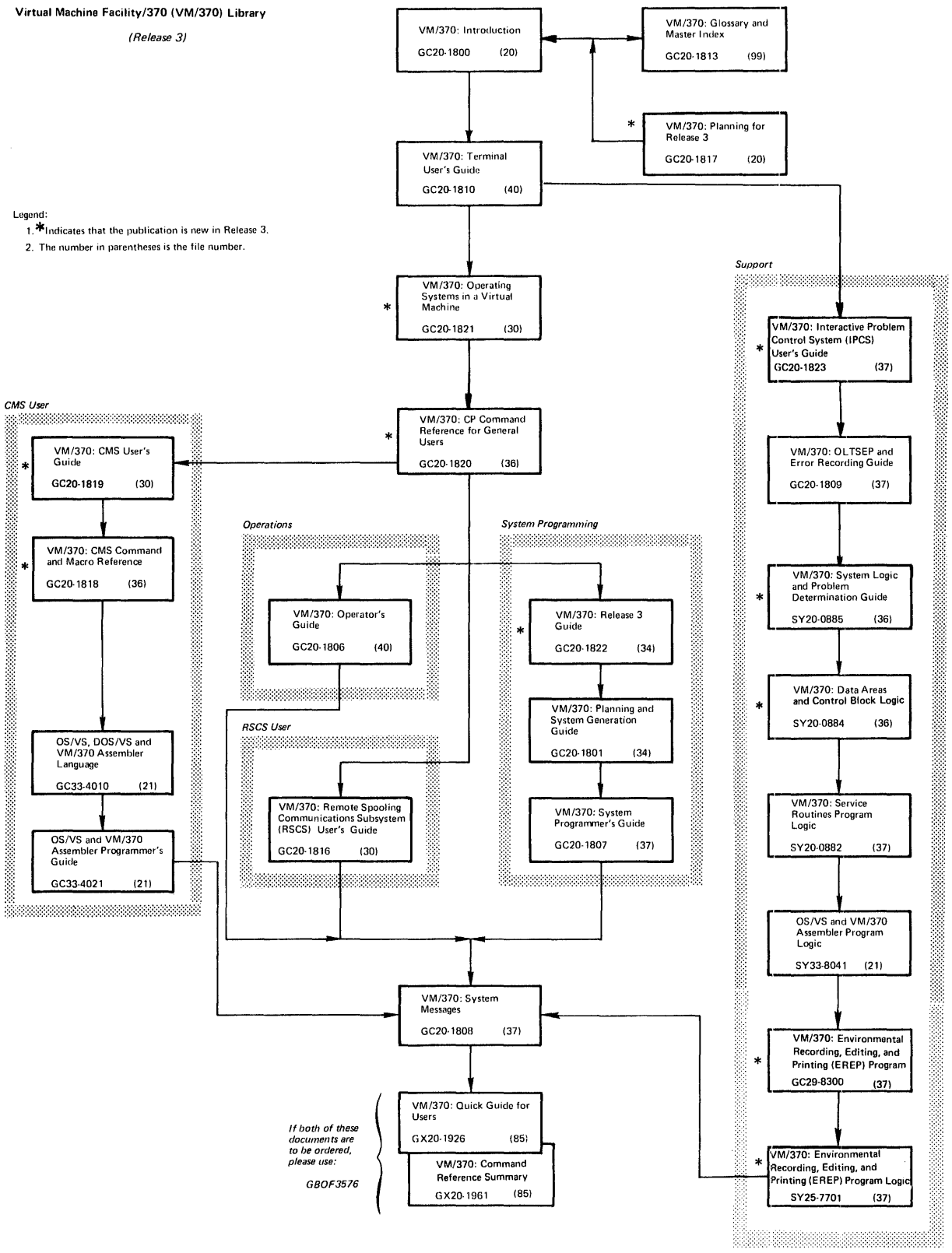

Figure 1-1. Virtual Machine Facility/370 Library

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SECTION 1. SUMMARY OF CHANGES TO THE VM/370 SYSTEM

Section 1 briefly discusses the changes made to the VM/370 system for Release 3. Each of the items in this section is described in greater detail in "Section 2. Description of Changes to the VM/370 System."

RELEASE 3 PLC 1: SUMMARY OF CHANGES TO THE VM/370 SYSTEM

INTERACTIVE PROBLEM CONTROL SYSTEM (IPCS) - A NEW VM/370 COMPONENT

To increase the serviceability of VM/370, a new component has been added to VM/370. This component, IPCS, the Interactive Problem Control System, standarizes the VM/370 program problem reporting process through an online data base. This is done by extending the function of the VMFDUMP command and adding a new function that produces problem reports. A facility is provided to modify the problem reports, find problem reports with similiar search parameters, and perform problem report tracking and online debugging capabilities. For details of this component see "Enhanced Servicability via IPCS's Online Problem Reporting System" in Section 2.

EXTENDED SHARED SEGMENT SUPPORT

Shared segment support has been altered to allow the use of the virtual machine assist feature. This implementation of shared segments removes the previous restriction on the use of CP's STORE, ADSTOP, and TRACE commands and CMS's DEBUG, BREAK, and STORE commands. A detected modification to a shared segment by a user forces the user into nonshared mode and releases the altered copy of the shared segment (named system) to that user. Other users of the shared segment system make references to the original unaltered version as paged in from the paging disk.

Shared segment support via this new approach also allows the use and support of discontiguous saved segments. Discontiguous saved segments are segments of storage that have a unique name assigned to them. These segments, which may be sharable, are loaded beyond the storage address range of the virtual machine. Facilities have been provided to attach or detach discontiguous segments on an as-needed basis.

For more detailed information, refer to "VM/370 Discontiguous Shared Segment Now Compatible with the Virtual Machine Assist Feature" in Section 2.

CMS PROVIDES INTERACTIVE PROGRAM DEVELOPMENT FOR DOS/VS USERS

An additional function has been added to CMS to allow the DOS/VS user program development capabilities in CMS, comparable to those provided to OS users. In CMS, this is done via new commands that provide functions equivalent to that of DOS/VS Job Control Language. To augment this enhancement to CMS, CMS now supports two more compilers: DOS/VS COBOL and DOS PL/I Optimizing compilers.

To provide DOS/VS interactive program development, CMS simulates the control blocks, supervisor and I/O macros, linkage-editor and fetch routines necessary to support the compiling, testing and execution of DOS/VS programs in CMS.

CMS SUPPORTS VSAM AND ACCESS METHOD SERVICES FOR DOS AMD OS USERS

The Virtual Storage Access Method (VSAM) and Access Methods Services as supported by CMS for DOS and OS users, is based on the DOS/VS VSAM and DOS/VS Access Method Services. CMS supports VSAM for the following compilers:

- OS/VS COBOL
- OS PL/I
- VS BASIC
- DOS/VS COBOL
- DOS PL/I Optimizer

Assembler program usage of the VSAM function however, is not supported by this new CMS function. Furthermore, there is no support for the ISAM Interface Program (IIP).

VSAM data sets can be read, written and updated in CMS. Furthermore, VSAM data sets created in CMS can be used on DOS/VS and OS/VS systems because they are on DOS/VS or OS/VS initialized disks and, therefore, do not adhere to CMS disk format.

IMPROVED SPOOL FILE RECOVERY

With Release 3, CP updates checkpoint data on closed spooled files on the system checkpoint cylinders. This system enhancement provides the re-creation of spool allocation records in the event that the original records are destroyed in an abnormal termination or system shutdown.

NEW DASD DEVICE SUPPORT, 3344 AND 3350

VM/370 now supports the following DASD devices:

- IBM 3344 Direct Access Storage, Model B2
- IBM 3350 Direct Access Storage, Models A2 and B2

The extent of this support is as follows:

	CP	CMS	RSCS
• 3344	yes	yes	yes
• 3350 native mode (see Note)	yes	yes	yes
• 3350 in 3330 Model 1 compatability mode	yes	yes	yes
• 3350 in 3330 Model 11 compatability mode (see Note)	yes	yes	yes

Note: The 3350 in native mode and in 3330 Model 11 compatibility mode is supported for use with CMS files. However, if the 3350 is used as a DOS disk, to contain VSAM data sets in CMS or to contain the output of DOS programs, it must be used in 3330 Model 1 compatibility mode.

3270 PRINTERS AND THE COPY FUNCTION ENHANCE LOCAL 3270 SUPPORT

Users of local 3270 display systems now have the same copy capability and support as users of remote 3270 display terminals. The copy function is limited to copying 3270 screen images to any locally attached supported 3270 printer connected to the VM/370 system.

APL CHARACTER SUPPORT FOR THE 3270

The 3270 Data Analysis-APL Feature, which includes the APL characters, is supported for remote and local 3270 display stations and printers.

3704/3705 NCP/VS RELEASE 4 EMULATION PROGRAM SUPPORTED

Release 3 of VM/370 supports the Release 4 Emulator program of the 3704/3705 Network Control Program (NCP/VS). Provided with this support is a faster installation EXEC procedure to facilitate the installation of 3704/3705 control programs under CMS.

MAJOR CHANGES TO VM/370 LIBRARY

Figure 1-1 shows the restructured Release 3 Virtual Machine Library. The new library:

- Consolidates program logic information
- Consolidates CMS and CP functions into separate publications
- Provides more tutorial and general information on CMS and virtual machine operations.

Detailed information on the VM/370 library and new VM/370 publications is described in "Section 3. Changes to VM/370 Publications".

ADDITIONAL ENHANCEMENTS AND CHANGES TO VM/370

AUTOLOG - A New CP Command: This command allows the system operator to automatically log on and initial program load other virtual machines and their operations.

CPEREP Distribution and Installation Change: CPEREP distribution, installation and update procedures relating to Environmental Recording, Editing and Printing (EREP) program, have been modified to achieve independence of VM/370 release activity. However, the VM/370 interface to EREP code via the CPEREP command is the same as Release 2. That is, the initiated operand(s) of CPEREP produce similar reports and tape output as the Release 2 version.

VMFASM EXEC Procedure Changed: The VMFASM EXEC procedure now contains default settings that suppress macro and copyfile expansion and the printing of cross reference lists. Options are available to override these default values.

2780 Spooling Remote (DMKSRP) Support Removed: This program is no longer contained in VM/370. Support of 2780 remote spooling is and has been handled by the Remote Spooling Communications Subsystem (RSCS) of VM/370 as documented in the Release 2 PLC 11 version of VM/370.

Serviceability Improvement - Statistical Data Recording (SDR): A facility is provided in VM/370 to accumulate and record SDR values for CP I/O activity.

SECTION 2. DESCRIPTION OF CHANGES TO THE VM/370 SYSTEM

Section 2 describes, in greater detail, the changes to the VM/370 Release 3 system that are listed in Section 1.

RELEASE 3 PLC 1: DESCRIPTION OF CHANGES TO THE VM/370 SYSTEM

ENHANCED SERVICEABILITY VIA IPCS'S ONLINE PROBLEM REPORTING SYSTEM

VM/370 now provides, via the virtual machine control and the CMS environment, an online VM/370 problem reporting system. This component, the IPCS (Interactive Problem Control System), provides to VM/370 system support personnel, a standardized method of reporting, identifying, tracking and updating program problems that occur in the VM/370 environment. This problem reporting scheme is used in conjunction with EWS (Early Warning System) microfiche.

Generated problem reports are categorized as either CP system-detected or user-detected failures. For CP system-detected failures (ABEND/DUMP conditions), VMFDUMP has been modified so that other pertinent environmental conditions can be included in a generated problem report. For user-detected problems (not triggered by CP ABEND conditions) problem reports are generated or updated by the use of the PROB command employing prompting techniques. Other commands exist for examining and modifying the status in summarized reports of system problems.

In addition, a facility is provided to the user to scan CP dumps (CMS files) for desired information by use of the new DUMPSCAN command. IPCS is designed to be generated for one virtual machine with access to CP's dump files on disk. All information on IPCS, including system generation considerations and messages, are contained in the VM/370: Interactive Problem Control System (IPCS) User's Guide, GC20-1823. Installation information is also detailed in the VM/370: Planning and System Generation Guide.

VM/370 DISCONTIGUOUS SHARED SEGMENT NOW COMPATIBLE WITH VIRTUAL MACHINE ASSIST FEATURE

Release 3 of VM/370 supports the virtual machine assist feature for virtual machines executing shared named systems. Routines that can be shared by multiple users but that are not required at all times can be placed in discontiguous segments. These segments can then be attached to and detached from virtual machines as they are needed.

Finding, loading, and purging the shared segment is done by new Diagnose codes defined by the function names, FINDSYS, LOADSYS and PURGESYS utilized by CMS.

A virtual machine may use storage beyond the defined virtual machine size without redefining the virtual machine size. In particular, CMS can increase its shared segment code without requiring modules or problem programs to be loaded at a higher address. No reloading is necessary, yet CMS supports DOS program execution, VSAM data sets, and Access Method Services in discontiguous saved segments. The CMS Editor, EXEC processor, and OS simulation routines may also be placed in a discontiguous saved segment.

A name can be associated with one or more segments. Named segments are the same as named systems except that named segments do not require a virtual IPL device. The only disk requirement for named segments is that they be stored on a CP-owned volume; thus, the use of named

segments may reduce the amount of DASD space required online at any one time.

Instructions and commands that alter pages belonging to shared systems can be executed. When this is done, you are given your own copy of the saved system, in nonshared mode. The other users of the shared system are not affected by your changes. However, system performance may be adversely affected when shared systems are used in nonshared mode.

The procedure for creating shared segments is similar to the procedure used for creating saved systems. Refer to "Saved Systems" in VM/370: System Programmer's Guide. The NAMESYS macro has been modified for this enhancement. In addition the new CMS command, SET KEY, is used to set the storage protection key(s) of shared segment(s). SET NONSHARE, another new CMS command, provides the user with his own nonsharable copy of the shared segment. For the user to determine the availability of shared segments, he need only invoke CMS QUERY SYSNAMES. For the implementation and usage of shared segments, refer to VM/370: Planning and System Generation Guide and VM/370: CMS User's Guide.

CMS ENHANCEMENTS TO SUPPORT DOS/VS INTERACTIVE PROGRAM DEVELOPMENT

The extent of DOS/VS Interactive Program Development support as provided by the CMS component of VM/370 is as follows:

- CMS supports DOS PL/I Optimizing Compiler.
- CMS supports DOS/VS COBOL Compiler.
- DOS/VS assembler programs developed under CMS using VM/370 assembler and DOS macros as described in Appendixes A and B.
- A new environment of CMS called CMS/DOS simulates DOS/VS and I/O services.
- DOS/VS linkage editor functions are available under CMS.
- DOS/VS sequential files can be read and DOS/VS VSAM files can be read or written by DOS/VS COBOL and PL/I programs executing in a CMS virtual machine.
- DOS/VS system and private core image library, relocatable and source statement libraries can be read under CMS.
- CMS supports a similated DOS/VS core image library as a CMS file. This file is identified as a CMS phase library (DOSLIB).

This support allows the DOS/VS user to create, compile, test and execute application programs. CMS/DOS provides most of this support, in a single background partition DOS system. CMS/DOS, an environment of CMS, is entered via the SET DOS ON command (an extension of CMS's SET command). Commands available in this environment of CMS are described in Section 4. For more information on these commands, refer to VM/370: CMS Command and Macro Reference and to the VM/370: CMS User's Guide.

PROVISIONS OF SET DOS ON

SET DOS ON provides the following DOS/VS facilities:

- DOS/VS linkage editor
- Fetch support
- DOS/VS supervisor and I/O macro support
- DOS/VS supervisor control block support
- Transient area support
- DOS/VS library services

The extent of DOS support as implemented and integrated into CMS can be determined by the information contained in "Appendix A: CMS/DOS - Provisions and Limitations" and by the summary of CMS/DOS commands described in Section 4. The extent of DOS/VS macros, routines and control blocks supported in CMS/DOS are also described in Appendix A. Much of the function provided by CMS/DOS requires prior generation of a DOS/VS system pack and/or the placement of DOS/VS private libraries (for CMS/DOS availability). In general, these DOS/VS volumes are needed whenever:

- The DOS/VS COBOL Compiler or DOS PL/I Optimizing Compiler is required. The compilers are executed from the system or private core image libraries.

- DOS/VS COBOL or DOS PL/I source programs contain COPY, LIBRARY, %INCLUDE, or CBL statements. These statements copy books from the system or private source statement library.

- One of the librarian programs (DSERV, RSERV, SSERV, PSERV, or ESERV) is invoked.

- DOS programs that use LIOCs modules are executed. CMS/DOS link-edits the LIOCS routines directly from DOS/VS system or private relocatable libraries.

CMS/DOS LIMITATIONS

While CMS/DOS can execute programs that use sequential access methods (SAM) and virtual storage access methods (VSAM) and can access DOS/VS libraries, CMS/DOS cannot execute programs that have execution-time restrictions such as programs that use sort exits, teleprocessing access methods, or multitasking.

Other factors that must be considered in determining the usability of CMS/DOS are as follows:

- CMS/DOS does not support all DOS macros. Not all operands or functions for those DOS macros that are supported, are honored as they are in DOS/VS.

- CMS/DOS does not have the extensive device support that is available to DOS/VS.

- CMS/DOS does not support dedicated unit record devices.

- CMS/DOS does not support multiple disks with identical volume serial numbers online at the same time.

- CMS/DOS does not support tape label processing in the same manner as DOS/VS.

- CMS/DOS does not support a standard label cylinder.

However, programs created in the CMS/DOS environment can use all CMS debug and test facilities, as well as use CP's error recording and recovery procedures.

CMS/DOS STORAGE AND SYSTEM GENERATION CONSIDERATIONS

CMS/DOS Storage Requirements

CMS/DOS requires DASD space to contain its source, text, module, and EXEC files. This DASD requirement is in addition to the space already required for CMS system residence. The DASD space required by CMS/DOS is:

- 21 cylinders on a 2314/2319
- 12 cylinders on a 3330
- 33 cylinders on a 3340/3344
- 6 cylinders on a 3350 (CMS format and usage assumed. DOS does not support the 3350 in native mode).

CMS/DOS also has virtual storage requirements; these requirements are in addition to the basic virtual storage required by Release 3 of CMS.

The size of the CMS nucleus is increased by approximately 1300 decimal bytes. Eight DOSLIB directories and the simulated DOS/VS control blocks account for the increase.

Note: This increase does not affect the starting address of the CMS user area because Release 3 of CMS is repackaged. For Release 3, the CMS Editor, EXEC processor, and OS simulation routines are reenterable so they can be moved to a discontiguous segment.

CMS/DOS also uses the CMS user area. CMS/DOS executes the DOS compilers, linkage editor, and librarian programs in the CMS user area. The virtual storage requirements are:

- 60K plus buffers for the DOS/VS COBOL compiler
- 44K plus buffers for the DOS PL/I Optimizing compiler
- 20K for the CMS/DOS linkage editor
- 3K for the RSERV librarian program
- 2K for the PSERV librarian program
- 2K for the SSERV librarian program

System Generation Consideration for CMS/DOS

CMS/DOS can only function in conjunction with an installed DOS/VS Release 31 or 32 system and applicable libraries. Therefore, the generation of a DOS/VS system is a prerequisite to the installation of VM/370 with CMS/DOS. If the DOS/VS COBOL compiler or DOS PL/I Optimizing compiler are to be used, these too must be obtained and installed on the DOS/VS system. VM/370 can then be generated with CMS/DOS. CMS/DOS is generated as a named shared segment by using a special installation EXEC procedure provided in the VM/370 Release 3 package. For details on CMS/DOS installation, see the VM/370: Planning

and System Generation Guide. System program support personnel requiring more information on CMS/DOS, see Appendix A.

CMS SUPPORTS VSAM (VIRTUAL STORAGE ACCESS METHODS) AND ACCESS METHOD SERVICE

A new function in CMS allows the manipulation and use of VSAM data sets via supported VSAM and Access Method Services. The extent of this support is as follows:

- DOS/VS COBOL and DOS PL/I programs that read and write VSAM data sets can be executed from the CMS/DOS environment.
- VS BASIC, OS/VS COBOL, and OS PL/I programs that read and write VSAM data sets can be executed from CMS.
- Access Method Services programs can be executed for VSAM and SAM data sets on real OS and DOS disks and on minidisks. Also, Access Method Services can be used to read and write files in CMS.
- VSAM data sets that were created under CMS can be read and updated using either OS or DOS.

The support of VSAM data sets, based on DOS/VS VSAM and DOS/VS Access Method Services, is only valid for disk devices supported by DOS/VS. They are:

- IBM 2314 Direct Access Storage Facility
- IBM 2319 Disk Storage
- IBM 3330 Disk Storage, Models 1 and 2
- IBM 3330 Disk Storage Model 11 only as a virtual Model 1 or 2
- IBM 3340 Direct Access Storage Facility
- IBM 3344 Direct Access Storage
- IBM 3350 Direct Access Storage, only in 3330 Model 1 compatibility mode

The support of VSAM in CMS extends to the following compilers:

Compiler	Program No.
OS/VS COBOL Compiler and Library	5740-CB1
OS COBOL Interactive Debug	5734-CB4
VS Basic Processor	5748-XX1
OS PL/I Optimizing Compiler and Libraries	5734-PL3
OS PL/I Checkout Compiler	5746-CB1
DOS PL/I Optimizing Compiler and Library	5736-PL3

To provide CMS VSAM support, CMS now contains the AMSERV, the DLBL and the LISTDS command to control, assign and interrogate VSAM data sets. Brief descriptions of these commands are described in Section 4. The extent of this support is further described in "Appendix B: CMS VSAM and Access Method Services-Provisions and Limitations." Further use and description of these commands are contained in VM/370: CMS User's Guide and the VM/370: CMS Command and Macro Reference.

CMS DOS/VS VSAM AND ACCESS METHOD SERVICES INSTALLATION REQUIREMENTS

Because CMS support of VSAM and Access Method Services is based on DOS/VS VSAM and Access Method Services, a DOS/VS system (Release 31 or 32) must be ordered. The DOS/VS starter system must then be used to install the CMS VSAM support. In addition, CMS/DOS support must be installed before VSAM is installed under CMS. The Release 3 VM/370 starter system, equipped with a new EXEC procedure, VSAMGEN, facilities the installation of the CMS VSAM and Access Method Services support as discontiguous saved systems. VM/370: Planning and System Generation Guide details these installation procedures.

CLOSED SPOOL FILE RECOVERY ENHANCED BY CHECKPOINTING

Prior to Release 3 of VM/370, in abnormal termination situations, the Control Program (CP) in the process of attempting to perform a warm start, copied data concerning closed spool files and devices (as well as other system information) from real storage to warm start cylinders on the VM/370 system residence volume. Then VM/370 attempted a warm start by retrieving the spool file data and other system data from the warm start cylinders. If the warm start was successful, system operation continued. Because the data required for a warm start was copied from real storage, a warm start was not possible if that data in real storage was invalidated because of an internal or external malfunction. The only alternative available to the system operator was to perform a cold start. Closed spool files and system data are not recovered when a cold start was invoked.

With Release 3 of VM/370, closed spool files may be recovered even when a warm start is not possible. The improved spool file recovery procedure checkpoints certain changes in spool file or device status when the changes occur. One or more cylinders on the VM/370 system residence volume are allocated to contain the spool file recovery checkpoint information. The checkpoint information is recorded on these checkpoint cylinders (for a checkpoint start) each time the status of a spool file or spooling device changes; thus the data needed to reconstruct spool file chains is already in auxiliary storage at the time of a system failure and cannot be lost.

With Release 3, system startup time has been extended because of warm start checkpoint activity involved with checkpoint spool file activity. Cold start also takes longer because the spool files are purged from the checkpoint cylinders, as well as from the warm start cylinders. The improved spool file recovery procedure affects system performance because two extra pages are written each time a file is closed or made active. One page contains the map of spool files and the other page contains the SFBLOKs. Thus, each time a CHANGE, CLOSE, DRAIN, FLUSH, FREE, HOLD, PURGE, START, or TRANSFER command is executed, two additional page writes are also executed. This enhancement requires the coding of a new operand, SYSCKP, in the SYSRES macro during system generation, to permanently allocate additional cylinders on the system residence volume for the spool file checkpoint data. For more information on checkpoint cylinder allocation and disk requirements, see VM/370: Planning and System Generation Guide. For operational control of warm start and checkpoint activity, refer to the VM/370: Operator's Guide.

VM/370 SUPPORTS 3344 AND 3350 DIRECT ACCESS STORAGE

- VM/370 supports the IBM 3350 Direct Access Storage, Models A2 and B2, in 3350 native mode, in 3330/3333 Model 1 compatibility mode, and in 3330/3333 Model 11 compatibility mode. VM/370 also supports the IBM 3344 Direct Access Storage, Model B2.

- VM/370 supports the same CP, CMS, and RSCS functions for the 3344 as it does for the 3340 series.

- VM/370 supports the 3350 in native mode as a:

  - CP system residence volume

  - CP paging and spooling disk

  - Dedicated device attached to a virtual machine

  - CMS system disk

  - CMS user disk (For a 3350 in native mode, the maximum size of a CMS minidisk is 115 cylinders.)

- Under CMS, VSAM and Access Method Services support the 3344 and also the 3350 (in 3330 Model 1 compatibility mode). CMS VSAM and Access Method Services do not support the 3350 in native mode, or in 3330 Model 11 compatibility mode.

- Any 3350 used as a DOS disk file or DOS system residence volume under CMS/DOS must be in 3330 Model 1 compatibility mode; the 3350 in native mode or in 3330 Model 11 compatibility mode are not supported. CMS/DOS also supports the 3344.

- VM/370 supports the same CP, CMS, and RSCS functions for the 3350 in 3330/3333 Model 1 and 11 compatibility mode as it does for the 3330 series.

The 3344 is a two-drive unit which attaches to a 3340 Model A2 and may be intermixed with 3340 Model B1 and B2 units. A maximum of three 3344 units can be attached to each 3340 Model A2.

The 3350 Direct Access Storage is configured from two units. The 3350 Model A2 is a two-drive unit with associated controls. Each 3350 string must have an A2 unit. The 3350 Model B2 is a two-drive unit which attaches to the Model A2. Up to three B2 units may be attached to one A2 unit for a maximum of eight drives per 3350 string.

PERFORMANCE OF THE 3344 AND THE 3350

Performance of a VM/370 system using 3344 or 3350 devices is dependent on several factors, such as configuration, placement and activity of data sets, control unit and channel loads, whether RPS (rotational position sensing) is supported by the virtual machines, and the number and complexity of virtual machines. Therefore, no specific statement of general performance can be made except that, whenever possible, VM/370 should use the 3350 in native mode.

Although VM/370 supports the 3350 for CP system residence, CP paging and spooling, CMS system residence, and CMS file system use, you should consider performance characteristics carefully before designating a 3350 as a paging and spooling volume. The large capacity of the 3350 permits

one 3350 volume to contain VM/370 paging and spooling areas and yet have much space left for other uses. Before you assign paging and spooling areas to a 3350, you should ensure that your installation's use of the remaining 3350 space does not introduce significant arm contention.

CHANGES TO VM/370 SYSTEM GENERATION

There is no 3350 starter system for Release 3. However, 3350 system residence volume can be created using the 2314, 3330, or 3340 starter systems. First, restore a starter system tape to a 2314, 3330 or 3340, then create a 3350 system residence volume by responding to starter system messages.

CHANGES TO CP, CMS COMMAND SERVICE PROGRAMS AND THE CMS FILE SYSTEM

Support of the 3344 and the 3350 has had minimal impact on CP and CMS commands and service programs. For those command and service programs affected by this new disk system refer to "Section 4. Command, Macro, EXEC, ABEND Code and Service Program Changes." The CMS file system is updated to support the 3344. The CMS file sytem supports the 3350 in native mode and 3330 compatibility mode.

The Release 3 CMS/DOS support permits reading, but not writing or updating the real DOS files and system residence volumes under CMS. These files are real DOS disks and are not part of the CMS file system; thus DOS limitations apply. Only 3350s that are in 3330 Model 1 compatibility mode and 3344s can be read-only DOS disks under CMS.

Likewise, because the CMS VSAM and Access Method Services support is based on DOS/VS, only 3350s that are in 3330 Model 1 compatibility mode and 3344s can be used for VSAM data sets under CMS. Although VSAM data sets can be read, written, and updated under CMS, they are actually in DOS/OS format, and not part of the CMS file system.

For a complete description of the 3350, see the Introduction to IBM 3350 Direct Access Storage, Order No. GA26-1638.

For a complete description of the 3344, see the Reference Manual for IBM 3340/3344 Disk Storage, Order No. GA26-1619.

VM/370 SUPPORTS THE COPY FUNCTION FOR LOCALLY ATTACHED 3270 PRINTERS

With Release 3, the image of any 3270 locally attached screen can be copied to any locally attached available printer. Printers that can be attached to support this function are:

- IBM 3284, Model 2
- IBM 3286, Model 2
- IBM 3288 Line Printer, Model 2

The function and performance provided is similar to that provided by Release 2 remote 3270 support. That is, the printers are only used for the copy function; they cannot be used for spooled output files. The

copy function is performed by pressing a 3277 display terminal's PF (program function) key (that was previously defined via the SET PFnn COPY command with the desired printer device address). A copy of the user's screen image is then printed on the selected printer. The user is flashed a NOT ACCEPTED status message if the printer is not available to receive the image. The printers, 3284, 3286 and/or 3288, must be coded into the RDEVICE macro to provide this function.

3704/3705 RELEASE 4 270X EMULATOR PROGRAM SUPPORTED

Release 3 of VM/370 supports Release 4 of the NCP/VS for the 3704 Emulation Program (EP). A special support package supplied with the IBM 3704/3705 Network Control Program for OS/VS, (Program No. 5744-BA2) contains a new EXEC procedure that facilitates the installation of the EP program under CMS.

The EXEC procedure, INST 3705, is faster in execution than the previously supplied EXEC (LOADCC used with version 2 and 3 of the 3704/3705 NCP programs) as it builds the CMS macro libraries directly from an IEMOVE unloaded partitioned data set via the CMS TAPEMAC command.

The installation procedure uses ASM3705 for Release 4 of NCP/VS to generate a new 3705 assembler (the ALIGN and TEST options, however, are not supported). This differs from the 3705 assembler (assembler F) that VM/370 generated for versions 2 and 3 of the 3704/3705 control program.

IMPROVED DISTRIBUTION PROCEDURES FOR VM/370 EREP

As of Release 3, VM/370 is distributing text decks for EREP updates. Former updates to EREP in Release 2 were in module form. The Release 3 starter system contains a text library, EREPLIB TXTLIB, that contains all the EREP text files. A second text library, ERPTFLIB TXTLIB, is also being distributed with the starter system. This second text library initially contains only the CPREAD text file. As updates are made to EREP, they will be added to the ERPTFLIB TXTLIB.

The VMFBLD installation EXEC procedure loads EREP text decks onto a staging area preparatory to ERPTFLIB text library update. The procedure for updating EREP is described in the Release 3 VM/370: Planning and System Generation Guide.

For Release 3, the CPEREP command processor is an EXEC procedure instead of a command module. The CPEREP EXEC procedure issues a GLOBAL command to make the ERPTFLIB and EREPLIB text libraries available and then invokes the command module. With Release 3, the distribution of EREP and EREP updates is simpler.

VM/370 STATISTICAL DATA RECORDING SUPPORT

Release 3 of VM/370 accumulates and records statistical data relating to specific devices and their I/O error conditions. The accumulation of error information is accomplished by incrementing count fields, device statistic tables, in an SDRBLOK chained to the RDEVBLCK associated with the I/O device that detected the error. The data contained in the count fields is formatted into an OBR record (outboard recording) and written

out to the I/O error recording cylinder. The transmission to the I/O error recording cylinder occurs whenever any of the count fields in the SDRBLOK reach a maximum counter value (15 or 255 decimal value) and whenever the related device is placed in an offline status via the VARY OFFLINE or NETWORK VARY OFFLINE command. SHUTDOWN invokes the same SDR OBR recording process for all SDR affected devices on the system. NETWORK SHUTDOWN causes SDR OBR recording for 3704/3705 communication controllers and 3270 devices on binary synchronous lines.

Note, accumulated SDR counter values are lost on VM/370 ABEND conditions. SDR counter values maintained in the SDRBLOK are not preserved through VM/370 restart procedures. For details on SDR VM/370 support, refer to the VM/370: OLTSEP and Error Recording Guide, GC20-1809

THE AUTOLOG COMMAND

A new system operator command, AUTOLOG, allows the system operator to specify virtual machines that are to be logged on automatically.

The virtual machine that is logged on in this manner operates in disconnect mode. It can only issue one console read. The same restraints that apply to any disconnected virtual machine apply to virtual machines logged on via AUTOLOG. Also, a virtual machine that is in disconnected mode cannot issue an AUTOLOG command. This command facilitates the initialization and start-up of virtual machines that operate as batch systems.

THE 3270 DATA ANALYSIS-APL FEATURE SUPPORTED BY VM/370

The 3270 Data Analysis-APL Feature makes it possible for a user of a virtual machine equipped with a 3270 display console to interact with the VS APL Program Product under CMS. When installed on the appropriate 3270 devices, the feature allows you to enter, display, or print the full 133-character APL character set. This APL character set includes the standard uppercase and lowercase EBCDIC characters. The standard dual-case 3270 character set is combined with the 54 APL-specific characters, including the 19 compound or overstruck symbols. An underscored uppercase alphabet may also be used.

A special APL keyboard replaces the standard 3270 keyboard. If the APL ON/OFF key is pressed, you can enter the 36 APL symbols. If, in addition, you press and hold down the APL ALT key, you can enter one or more of the 19 compound APL characters. In this manner, you avoid the tedious procedure of keying in three characters (character-backspace-character) for each compound character which is the procedure if you use 2741-type terminals. A 3270 terminal equipped with the 3270 Data Analysis-APL Feature can display all simple and compound APL characters on the screen, regardless of the setting of the APL ON/OFF key. However, you can only key in all the APL characters if the APL ON/OFF key is set on.

CP's 3270 screen management support is used. VS APL displays prompting messages in the user input area and repositions the cursor. VS APL uses the normal Start I/O interface for writing to the 3270 screen output area and uses the CP Diagnose interface to write to the 3270 screen input area. When VS APL uses the Diagnose interface, CP permits VS APL to insert cursor orders only directly into the input area. The insert cursor order has to be positioned at the location where you want it to appear in the input area. APL function definition mode, which is a special APL facility, is an example of the prompting environment. If the TERMINAL APL ON command is issued, CP bypasses editing data from the input area and translates compound and overstrike characters that are displayed on the screen.

As of Release 3, DMKTBL contains translate tables that accept the corporate standard EBCDIC character set, which includes all the APL characters. In addition, with 3270 hard copy support you have the option to print the contents of your display screen that contains APL characters. To make use of APL, log on the VM/370 system, IPL CMS and then invoke the APL program by executing the APL EXEC procedure. Information about invoking and using the VS APL-CMS program is in the VS APL: Terminal User's Guide for CMS, SC20-9067.

APL characters are accepted and translated to their appropriate code whenever they are received from a 3270. EBCDIC or APL characters can always be displayed; the APL ON/OFF key does not change this. An APL EXEC procedure issues the TERMINAL APL ON command and the VS APL program issues DIAGNOSE Code X'54' to reflect external interrupts to VS APL whenever the PA2 key is pressed. When the VS APL Ready message appears on the screen, APL is ready for use.

VM/370 supports APL characters on the 3270:

- VM/370 supports, as an extension of current 3270 local and remote support, VS APL under CMS via the 3270 Data Analysis-APL Feature (#1066) with the following devices:

  - IBM 3271 Control Unit, Model 2, and the IBM 3272 Control Unit, Model 2

  - IBM 3277 Display Station, Model 2, with the 66-character APL keyboard (#4637) or the 78-character APL keyboard (#4638)

  - IBM 3284 Printer, Model 2, or the IBM 3286 Printer, Model 2

- The local and remote 3270 copy function is supported for APL terminals. The 78-character keyboard includes the 12 program function keys; VM/370 recommends this keyboard if you plan to use the local or remote copy function.

  The 3270 copy function is significant for APL users. System printers do not have an APL print chain; thus, to print a copy of your APL program, you must send a copy of your 3270 screen to a printer that has the 3270 Data Analysis-APL Feature installed.

- The 3270 Data Analysis-APL Feature is not supported for the following VM/370-supported 3270 devices:

  - IBM 3275 Display Station, Model 2
  - IBM 3284 Printer, Model 3
  - IBM 3286 Printer, Model 3
  - IBM 3288 Line Printer, Model 2

Consult the VM/370: Planning and System Generation Guide for the requirements and features necessary to adapt 3271, 3277 and companion printer equipment for the 3270 Data Analysis-APL Feature.

SUPPRESSED MACRO EXPANSION FOR VMFASM

For Release 3, the VMFASM EXEC has been changed. The change alters the default values of VMFASM; in addition, options: EXP and XREF have been added to the exec. VMFASM now defaults to the print suppression of macro and copy files in VM/370 source program listings and the print suppression of cross reference lists. When VMFASM is invoked with the EXP option, the full expansion of macro and copy files are printed. If VMFASM is invoked with XREF then full cross referencing material is included in the printed output.

All of the listing files distributed with the starter system contain fully expanded macros and full cross-reference information. Also, the microfiche available with VM/370 contains fully expanded macros and full cross-reference information. However, by not specifying these options, the amount of paper required for program listings is reduced when you assemble VM/370 source modules at your installation. Furthermore, the amount of paper saved by suppressing the printing of control block expansions is significant.

SECTION 3. CHANGES TO VM/370 PUBLICATIONS

Changes to VM/370 publications for Release 3 involve changes to the VM/370 library structure in addition to technical changes and improvements to VM/370. Therefore, changes to the VM/370 library structure and the general contents of each publication are described at the beginning of this section. Changes reflecting the addition, modification and deletion of technical data in Release 3 of VM/370 publications are shown in the chart under "Release 3 PLC 1-Changes to VM/370 Publications by Function."

This chart shows the VM/370 publications affected by major changes to the VM/370 system for Release 3. The publications have information, in varying degrees of detail, about the new functions or modifications.

The "Publications Addenda" contain information that was inadvertently omitted from other VM/370 publications.

RELEASE 3 PLC 1: CHANGES TO THE VM/370 LIBRARY

VM/370 SRL LIBRARY CHANGES

Information formerly contained in 17 major VM/370 publications has been modified and expanded by tutorial and Release 3 changes and enhancements and repackaged into 21 System Reference Library (SRL) and logic manuals.

VM/370 SRL PUBLICATIONS - NO LONGER AVAILABLE

The following publications are no longer published or available as part of the VM/370 Release 3 Library.

IBM Virtual Machine Facility/370:

EDIT Guide, Order No. GC20-1805
EXEC User's Guide, Order No. GC20-1812
Command Language Guide for General Users, Order No. GC20-1804

NEW RELEASE 3 SRL PUBLICATIONS

In addition to the publications, VM/370: Planning for Release 3 and the VM/370: Release 3 Guide, the follcwing publications have been added to the VM/370 SRL Library:

IBM Virtual Machine Facility/370:

CMS Command and Macro Reference, Order No. GC20-1818
CMS User's Guide, Order No. GC20-1819
CP Command Reference for General Users, Order No. GC20-1820
Operating Systems in a Virtual Machine, Order No. GC20-1821
Interactive Problem Control System (IPCS) User's Guide, Order No. GC20-1823
Environmental Recording, Editing, and Printing (EREP) Program, Order No. GC29-8300

DETAILS ON SRL PUBLICATION CHANGES

Information formerly contained in VM/370: EDIT Guide and VM/370: EXEC User's Guide as well as all CMS command and macro information from VM/370: Command Language Guide for General Users that could be categorized as reference data is contained in VM/370: CMS Command and Macro Reference. Tutorial information from these former editions has been expanded upon (and with the addition of Release 3 material) is incorporated in the VM/370: CMS User's Guide.

Similarly, information about CP commands, available to the general user, (G and Any privilege class commands) is also separated into tutorial and reference data. Reference material is in the VM/370: CP Command Reference for General Users. Tutorial information from the VM/370: Command Language Guide For General Users has been expanded upon and is included in the new SRL publication VM/370: Operating Systems in

a Virtual Machine. This new publication also contains operating information about other SCPs (system control programs) operating in a VM/370 virtual machine environment.

In addition to the preceding changes for Release 3, information on CPEREP (the CMS command that interfaces with EREP modules) has been extracted from VM/370: OLTSEP and Error Recording Guide along with samples of ERP printouts and placed in the VM/370: Environmental Recording, Editing, and Printing (EREP) Program. This publication change allows more timely updates to VM/370 EREP documentation resulting from ERP code change.

Detailed user and installation information on the new component of VM/370, the Interactive Problem Control System is contained in the VM/370: Interactive Problem Control System (IPCS) User's Guide. The information about IPCS in other VM/370 publications other than the VM/370: Planning and System Generation Guide are generally referrals to the VM/370: IPCS User's Guide. A companion logic document is not available. Logic information on the IPCS system is contained on the optional listing tape and on microfiche. See "Section 6. Ordering and Distribution Procedures."

To give the reader further insight into the contents of these new publications, the following are amended abstracts of these new SRLs.

VM/370: CP Command Reference for General Users

This publication is intended as a reference manual for the general class of users that are running systems such as OS, DOS, OS/VS, DOS/VS, CMS, and RSCS in a virtual machine under VM/370.

Each CP command available to the general class of user is listed alphabetically and contains general usage information, the command line format, descriptions of all operands and options, allowable values for operand variables, and default values for optional operands. Also included are tables showing the relationship of the general class of CP commands to the entire set of VM/370 commands.

VM/370: Operating Systems in a Virtual Machine

This publication is intended for VM/370 users who plan to use any of the supported System/360 or System/370 operating systems executing under VM/370 control. As such, it is directed to the system programmer, the system operator, as well as to the general user. A section on general operating procedures explains the usage of CP commands, by functional grouping, as they apply to the various aspects of a terminal session. Three other sections provide specific operating information about DOS/VS, OS/VS, and other operating systems.

Users of the Conversational Monitor System (CMS), the Remote Spooling Communications Subsystem (RSCS), or the Interactive Problem Control System are directed to the respective User's Guides.

VM/370: CMS User's Guide

This publication contains general information and examples for using the Conversational Monitor System (CMS) component of IBM Virtual Machine Facility/370 (VM/370).

This publication is written for applications programmers and nontechnical personnel who want to learn 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.

The CMS Editor and EXEC facilities are described, with usage information and examples. Also discussed in this publication is the CMS Batch Facility and information on how to debug a problem program with VM/370.

VM/370: CMS Command and Macro Reference

This publication provides users of the Conversational Monitor System (CMS) component of IBM Virtual Machine Facility/370 (VM/370) with the 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
- CMS assembler language macro instructions

VM/370: Environmental Recording, Editing, and Printing (EREP) Program

This publication shows VM/370 users how to use CPEREP to edit and print the data contained on the error recording cylinders for subsequent use in error analysis. Printout samples are included in the text.

VM/370: Interactive Problem Control System (IPCS) User's Guide

This publication, directed to the system programmer, is intended as a reference publication for users of the Interactive Problem Control System (IPCS) component of VM/370. IPCS standardizes the problem reporting process and provides:

- Online problem management
- Problem diagnosis
- An online debugging facility for disk-resident CP abend dumps
- A problem tracing facility that can be updated by the user or automatically by the system

This manual contains IPCS command formats and instructions for their use. IPCS programs, or subroutines, and files are listed, as well as installation procedures and the system messages associated with IPCS.

Changes to Other SRL Publications

The style and content of remaining SRLs, except for VM/370: System Messages is basically the same as Release 2. In general, new additional information reflects Release 3 PLC 1 function.

However, VM/370: System Messages has been completely revised and has a new format. The most significant change is in the message description section of the text. Messages are now arranged in message number order with the prefixing VM/370 component and module identifier deleted. Thus, the redundancy of identical messages issued by multiple modules is eliminated.

CHANGES TO VM/370 PLM PUBLICATIONS

The following VM/370 Program Logic Manuals (PLMs) have been deleted from the VM/370 library and are no longer obtainable.

IBM Virtual Machine Facility/370:

Control Program (CP) Program Logic, Order No. SY20-0880

Conversational Monitor System (CMS) Program Logic, Order No. SY20-0881

Remote Spooling Communications Subsystem (RSCS) Program Logic, Order No. SY20-0883

Pertinent information formerly contained in these publications has been extracted and modified by the addition of Release 3 PLC 1 changes and included in the following new publications.

IBM Virtual Machine Facility/370:

Environmental Recording, Editing, and Printing (EREP) Program Logic, Order No. SY25-7701

Data Areas and Control Block Logic, Order No. SY20-0884

System Logic and Problem Determination Guide, Order No. SY20-0885

Essentially, the VM/370: Data Areas and Control Block Logic contains the information that was contained in the Control Block and Data Areas sections of the CP, CMS and RSCS PLMs. In addition to a standardized layout, each data area/control block indicates referencing modules.

The VM/370: System Logic and Problem Determination Guide contains, in addition to the introductory material formerly contained in the CP, CMS and the RSCS Program Logic Manuals, (in a compacted form) much of the information formerly contained in Hierarchical Input/Output Diagrams (HIPOs). This comprehensive text has much information on problem isolation and debugging material on:

- Module descriptions
- Entry point directories with descriptions
- ABEND and wait state codes
- Command cross-referencing material
- Extensive cross-referencing material
- Debugging aids

The VM/370: Environmental Recording, Editing, and Printing (EREP) Program Logic is an expansion of information formerly contained in the EREP section of the VM/370: Service Routines Program Logic manual plus modifications caused by Release 3 PLC supported additions.

The VM/370: Services Routine Prcgram Logic manual, reflects the style and content of the Release 2 publication except that the sections on EREP and 2780 Spool Remote Program have been deleted. Modifications to this manual caused by new Release 3 function has not been extensive.

RELEASE 3 PLC 1: CHANGES TO VM/370 PUBLICATIONS BY FUNCTION

VM/370:	Extended Shared Segment Support	CMS/DOS Enhance-ment	VSAM and Access Method SVC in CMS	Improved Spool File Recovery	3344/ 3350 Sup-port	Intr-Act Prob Cntrl Sys
Introduction, GC20-1800	X	X	X		X	X
Planning and System Genera-tion Guide, GC20-1801	X	X	X	X	X	X
Operator's Guide, GC20-1804				X	X	X
System Programmer's Guide, GC20-1807	X	X	X	X	X	X
System Messages, GC20-1808	X	X	X	X	X	X
OLTSEP and Error Recording, GC20-1809					X	X
Terminal User's Guide, GC20-1810						
Glossary and Master Index, GC20-1813	X					X
RSCS User's Guide, GC20-1816						
CMS Command and Macro Reference, GC20-1818	X	X	X		X	X
CMS User's Guide, GC20-1819	X	X	X			X
CP Command Reference for General Users, GC20-1820					X	X
Operating Systems in a Virtual Machine, GC20-1821	X					X
Interactive Problem Control System (IPCS) User's Guide, GC20-1823					X	X
Environmental Rec., Edit, and Print Prog, GC29-8300						X
Service Routines Program Logic, SY20-0882					X	X
Data Areas & Control Block Logic, SY20-0884	X	X	X	X	X	X
System Logic and Problem De-termination Guide, SY20-0885	X	X	X	X		X
Env Rec,Edit,Print (EREP) Prog, Logic, SY25-7701						X

VM/370:	Copy Support for LOCAL 3270 Printers	3270 Data Anal. APL Feature Support	Improv. EREP Distribution	CP AUTOLOG Command	VMFASM Macro Suppression
Introduction, GC20-1800	X	X			
Planning and System Generation Guide, GC20-1801	X	X		X	X
Operator's Guide, GC20-1804			X	X	
System Programmer's Guide, GC20-1807				X	
System Messages, GC20-1808		X			
OLTSEP & Error Recording, GC20-1809	X	X	X		
Terminal User's Guide, GC20-1810		X	X		
Glossary and Master Index, GC20-1813					
RSCS User's Guide, GC20-1816					
CMS Command and Macro Reference, GC20-1818					
CMS User's Guide, GC20-1819					
CP Command Reference for General Users, GC20-1820	X	X			
Operating Systems in a Virtual Machine, GC20-1821					
Interactive Prob Cntrl System User's Guide, GC20-1823					
Environment Rec, Edit, and Print Prog, GC20-8300			X		
Services Routine Program Logic, SY20-0882					X
Data Areas & Control Block Logic, SY20-0884	X	X		X	
System Logic and Problem Determination Guide, SY20-0885		X		X	
Env Rec,Edit,Print(EREP)Prog Logic, SY25-7701					

RELEASE 3 PLC 1: PUBLICATION ADDENDA

Changes for the VM/370: Operator's Guide

MONITOR Command

When MONITOR SEEK is invoked, data is collected for all I/O DASD requests. However, no meaningful information is extracted for the virtual=real areas when SET NOTRAN (no CCW translation) is in effect. (This clarification of the MONITOR command is also applicable to the VM/370: System Programmer's Guide.)

Changes for VM/370: Service Routines Program Logic

IBCDASDI

Descriptive text that discusses disk initialization without surface analysis should reflect the following:

- The IBCDASDI can only assign alternate tracks for real 3330/3340 volumes when they are specified by the GETALT statement.
- IBCDASDI cannot assign alternate tracks on 3330/3340/3350 minidisks because no cylinder has been allocated on which to assign alternate tracks.
- Defective tracks are flagged and alternate tracks are assigned on 3330/3340/3350 volumes at the factory.
- An IBCDASDI job that initializes a 3330/3340 performs the Quick DASD function, which reads alternate tracks, decrementing by one the total number of alternates whenever an alternate is found defective or assigned a volume label, VTOC and IPL TEXT (if requested).

Changes for The VM/370: CP Command Reference for General Users

DEFINE Command

Incompatiability exists if shared and nonshared subchannel device types share the same range of virtual channel/control unit device addresses. Therefore, in defining virtual devices, care should be taken to maintain proper address separation between devices that operate on a shared subchannel and devices that operate on a nonshared subchannel. Failure to do so may result in improper I/O execution.

Changes for The VM/370: System Programmer's Guide

NAMESYS Macro

SYSPGCT=pp operand may be omitted from use when assembling Release 3 DMKSNT (system name table) as the macro calculates the number of pages

to be saved. If the user elects to use this operand then pp is the total number of pages specified to be saved, (that is, the total number of pages you indicate via the SYSPGNM operand). This is stated as a decimal number not exceeding five digits.

MONITOR Command

The MONITOR SEEK usage clarification explained previously for the VM/370: Operator's Guide also applies to this publication.

Changes for the VM/370: CMS User's Guide

FCOBOL's Reserved Filetype

Filetype SYMDMP should be added to the list of reserved filetypes mentioned under the caption "Reserved Filetypes for CMS Commands."

Changes for The VM/370: OLTSEP and Error Recording Guide

VM/370 Restriction Clarification

The CP restriction number 18 has been revised and should read as follows:

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

SECTION 4. COMMAND, MACRO, EXEC, ABEND CODE AND SERVICE PROGRAM CHANGES

Section 4 lists the commands, macros, service program control statements, EXEC procedures and ABEND codes that are new or changed in Release 3.

RELEASE 3 PLC 1: CHANGES TO CP COMMANDS

Command	Operand	Comments
TERMINAL	APL	Extended function - APL now includes 3270 Data Analysis - APL Feature as well as 3767 (2741 equivalency) equipped with APL alternate character selection.
AUTOLOG		New command - an A and B privilege class command. AUTOLOG allows system operator to logon (and initiate an automatic IPL) other virtual machines.
DETACH	CHANNEL	Extended function - the use of the CHANNEL operand has been extended to G class users.
NETWORK		Extended function - provides, in addition to 3704/3705 control, control of remote 3270 devices coupled to primary synchronous lines.
UNLOCK	V=R	Substitute operand - contracted form of VIRT=REAL is acceptable and now usable in EXEC control statements.
DEFINE	T3350	New operand - added to support 3350 disk storage.
SET	PFnn COPY	Extended function - allows local 3270 display terminal users to direct display copy to locally attached printers.
IPL	PARM SEG= segmentname	Added function provided by CMS - provides the CMS user with a method of loading an alternate segment (previously coded in the NAMESYS macro).

RELEASE 3 PLC 1: CHANGES TO CMS COMMANDS

Command Name	Operand	Type of Change	Description	Related Support
AMSERV		New command	Provides the Access Method Services to create, alter, list, copy, delete, import, or export VSAM data sets and catalogs under CMS.	CMS VSAM Access Mthd Serv Supp.
ASSGN		New command	Executable only in the CMS/DOS environment. Assigns CMS/DOS system or programmer logical units to a virtual device.	CMS/DOS, VSAM and Access Method Serv
ASM3705	ALOGIC/ NOALOGIC BUFSIZE ESD FLAG LIBMAC/NO- LIBMAC MCALL/ NOMCALL MLOGIC/ NOMLOGIC NOALIGN NESD NORLD NUMBER/ NONUMBER OBJECT/ NOOBJECT RLD STMT/NOSTMT SYSPARM TERMINAL/ NOTERM	New options	Provides processing and output control for the assembling of 3705 macros that are based on the XF assembler used in Version 4 of the 3704/3705 Emulator Program.	3705 NCP Rel 4
DLBL		New Command	Defines a DOS or VSAM ddname and relates the ddname to a disk file.	CMS/DOS, VSAM and Acc Method Services
DOSLIB		New command	Deletes, compacts, or lists information about the phases in a CMS/DOS phase library.	CMS/DOS
DOSLKED		New command	Executable only in the CMS/DOS environment. Link-edits CMS text files, or object modules, from a DOS/VS relocatable library, and places them in executable form in a CMS/DOS phase library.	CMS/DOS
DOSPLI		New command	Executable only in the CMS/DOS environment. Compiles DOS PL/I source programs.	CMS/DOS

Command Name	Operand	Type of Change	Description	Related Support
DSERV		New command	Executable only in the CMS/DOS environment. Displays information about DOS/VS core image, relocatable, source statement, procedure and transient directories.	CMS/DOS
ESERV		New command	Executable only in the CMS/DOS environment. Displays, updates, punches, or prints edited (E sublibrary) DOS/VS source statement books.	CMS/DOS
FCOBOL		New command	Executable only in the CMS/DOS environment. Compiles DOS/VS COBOL source programs.	CMS/DOS
FETCH		New command	Executable only in the CMS/DOS environment. Fetches a CMS/DOS executable phase.	CMS/DOS
GENMOD	{OS / DOS / ALL}	New operands	Specify the type of macro support needed to execute a module - the All operand is intended for CMS internal use.	CMS/DOS
GLOBAL	DOSLIB	New operand	The GLOBAL command can now specify CMS/DOS phase libraries, as well as text and macro libraries.	CMS/DOS
LISTIO		New command	Executable only in the CMS/DOS environment. Displays information about CMS/DOS system and programmer logical units.	CMS/DOS
LISTDS	FREE EXTENT	New operands	The FREE and EXTENT operands cause information about disk extents to be listed.	CMS VSAM Access Mthd Serv Supp.
LOADMOD		New function	LODMOAD checks that a module generated to execute in a specific macro simulation environment (CMS/DOS or CMS) is in the correct environment.	CMS/DOS
OPTION		New command	Executable only in the CMS/DOS environment. Sets compiler options for DOS/VS COBOL.	CMS/DOS
PSERV		New command	Executable only in the CMS/DOS environment. Copies and displays procedures in the DOS/VS procedure libraries and spools the procedures to another virtual machine.	CMS/DOS
QUERY	UPSI	New operand	Executable only in the CMS/DOS environment. Displays current setting of CMS/DOS UPSI byte.	CMS/DOS
	OPTION	New operand	Executable only in the CMS/DOS environment. Displays CMS/DOS compiler options.	CMS/DOS

Command Name	Operand	Type of Change	Description	Related Support
	DLBL	New operand	Provides to the CMS user all the file-name definitions (DOS filenames or VSAM ddnames defined to disk files) currently in effect.	CMS/DOS Support
	DOS	New operand	Displays the current status (active or not active) of CMS/DOS.	CMS/DOS
	DOSLIB	New Operand	Displays the names of all CMS/DOS phase libraries currently being searched for executable phases.	CMS/DOS
	DOSPART	New operand	Provides the current size of the DOS partition (if previously set).	CMS/DOS
	LIBRARY	New function	Displays the names of all CMS/DOS phase libraries to be searched, in addition to the text and macro libraries.	CMS/DOS
	SYSNAMES	New operand	Displays the name of the shared segments currently available for attachment.	CMS/DOS
RSERV		New command	Executable only in the CMS/DOS environment. Copies and displays modules in a DOS/VS relocatable library.	CMS/DOS
SET	DOS {CM[fm] / OFF}	New operand	Makes the CMS/DOS environment active or not active.	CMS/DOS
	DOS ON (VSAM)	New option	Allows the user to use VSAM data sets in the CMS/DOS environment.	CMS VSAM Access Mthd Services
	DOSPART {nnnnn / OFF}	New operand	Sets up DOS partition size for building the partition at execution time.	CMS/DOS
	NONSHARE systemname	New operand	Indicates that saved system is to be loaded in nonshared mode.	CMS/DOS, Extended Shared Segment
	SYSNAME entryname newname	New operand	Indicates that alternate discontiguous segments are to be loaded whenever the CMSSEG, CMSDOS, CMSVSAM, or CMSAMS discontiguous segments are attached to this virtual machine.	CMS/DOS, Extended Shared segement
	UPSI	New operand	Executable only in the CMS/DOS environment. Sets the CMS/DOS UPSI byte.	CMS/DOS
SETKEY		New operand	Assigns a storage protection key to a saved system or saved segments, or to a particular range of addresses within a saved system or saved segments.	Extended Shared Segment
SSERV		New command	Executable only in the CMS/DOS environment. Copies or displays books from the DOS/VS source statement library.	CMS/DOS
TAPEMAC		New command	Provides a means to read and unload partitioned data set (PDS) tape file created by IEHMOVE and create a CMS MACLIB from it.	3705 NCP Rel 4

RELEASE 3 PLC 1: COMMANDS FOR IPCS

CMS Commands	Options	Description
VMFDUMP		New function for IPCS environment - provides, in addition to standard VMFDUMP functions, prompting, and problem report generating capabilities.
PROB		New command - provides a method of generating a problem report for a non-CP ABEND connected event. It also provides the ability to add to previously generated problem reports.
STAT		New command - via keyword operands produces applicable status reports on system problems extracted from the Symptom Summary file.
PRB		New command - provides a means of updating the Status and PTF fields in Symptom Summary Control records.
DUMPSCAN		New command - creates an environment suited to 3270 display usage that permits the interactive inspection of CP dumps (produced by VMFDUMP) that exist as CMS files.

RELEASE 3 PLC 1: SYSTEM GENERATION MACRO CHANGES

Macro Name	Operand	Comments
RDEVICE	DEVTYPE=type	Added function - 3350 (native and and compatibility mode) and the 3344 are acceptable device types for VM/370 operations.
RCHANNEL	FEATURE=64-DEVICE	Added function - FEATURE=64DEVICE may be specified for a 3830 or ISC that controls 3350s.
SYSRES	SUSTYPE=	Added feature - the 3350 can now be specified as the CP system residence device.
NAMESYS	SYSPGCT=pp	Added function - NAMESYS macro now calculates the number of pages to be saved. Therefore, the SYSPGCT=pp (pages to be saved) operand need not be specified.
	VSYSADR=IGNORE	New option - Indicates that the NAMESYS macro is describing a system or segments that do not require a virtual system residence volume.

RELEASE 3 PLC 1: DOS/VS SUPERVISOR MACROS SUPPORTED BY CMS

Macro	SVC Number	Extent of CMS Support
CDLOAD	65	DOS/VS macro for internal use only. Loads a VSAM core image library phase. CMS searches the VSAM saved segments for the phase instead of the DOS/VS SVA area.
FREE	36	No operation is performed by CMS.
FREEVIS	62	CMS invokes its free storage handler to return the storage that is no longer needed.
GETVIS	61	CMS invokes its free storage handling routines to obtain free storage; it follows the DOS/VS register and return code conventions. The SVA operand does not apply to CMS and is not supported. The PAGE and POOL operands are ignored by CMS.
HOLD	35	No operation is performed by CMS.
POST	40	When a POST macro is issued for an ECB, Byte 2 Bit 0 is set on. The SAVE=savarea operand is ignored by CMS.
RELEASE	64	CMS reduces the RURTBL counter for the resource by 1.
SECTVAL	75	CMS uses the data in registers 0 and 1 to calculate the sector number and returns the sector number in register 0.
USE	63	DOS/VS macro for internal use only. CMS supports this macro only to the extent necessary to support VSAM.

RELEASE 3 PLC 1: SERVICE PROGRAMS CONTROL STATEMENT CHANGES FOR 3344/3350 SUPPORT

Program	Control Statement	Operand	Comments
IBCDASDI	DADEF	TODEV=	Extended function - 3350 as a device type code reflects 3350 support in native mode. For a 3350 in 3330 Model 1 compatibility mode, or a 3350 in 3330 Model 11 compatibility mode, existing device type codes are used. The 3344 disk storage device is also supported and an existing device type code is used.
	VTOCD	EXTENT=	A 3350 in native mode has a capacity of 47 VTOC entries per track.
FORMAT	FORMAT/ ALLOCATE	devtype	Extended function - a new device code reflects 3350 support. Existing codes are used for the 3350 in compatibility mode. The 3344 is also supported and an existing device type code is used.
DDR	INPUT OUTPUT	type	Same as "FORMAT/ALLOCATE devtype" description.
Directory	DIRECTORY	devtype	A new device type code, 3350, is supported for a 3350 in native mode.
	MDISK	devtype	A new device type code, 3350, is supported for a 3350 in native mode.

RELEASE 3 PLC 1: VM/370 EXEC CHANGES AND ADDITIONS

The following chart lists the significant changes and additions to VM/370 EXEC procedures to support Release 3.

Exec Name	Options	Comments
ARNGEND		Modified - generates 3705 assembler modules for 3704/3705 NCP Release 4.
CPEREP		New - contains a GLOBAL TXTLIB ERPTFLIB EREPLIB statement which selects updated EREP files from the PLC tape and places them on the CMS disk.
CMSXGEN		New - builds the discontiguous shared segment that contains CMS's OS simulation routines, EXEC procedures, and the CMS Editor.
DOSGEN		New - builds the discontiguous shared segment that contains CMS/DOS.
DOSPLI		New - used to invoke the DOS PL/I compiler.
ESERV		New - prepares the environment for DOS/VS ESERV utility.
FCOBOL		New - used to invoke the DOS/VS COBOL compiler.
INST3705		Modified - generates macro and TXTLIBs needed to generate the 3705 control program Release 4.
VMFASM	EXP	New option - allows the printing of macro and copy files in VM/370 source listings. The default value of VMFASM suppresses the printing of these files.
	XREF	New option - allows the printing of the full cross reference lists. The default value of VMFASM suppresses the printing of these lists.
VSAMGEN		New - builds the discontiguous shared segment for CMS support of VSAM and Access Method Services.
CMSSAMS		New - used in the generation of the discontiguous shared segment containing the CMS Access Method Service support.
CMSVSAM		New - used in the generation of the discontiguous shared segment containing the CMS VSAM support.
GENERATE	RSCS	New option - loads the RSCS files from the RSCS/IPCS tape onto the RSCS disk.
	IPCS	New option - loads the IPCS files from the RSCS/IPCS tape onto the IPCS disk.

RELEASE 3 PLC 1: CMS MACRO LIBRARY

The following is a list and brief description of the CMS macros applicable to Release 3.

Note: The asterisk (*) indicates that the macro is reserved for IBM use.

CMS Macro	Function
*ADT	Generates a CSECT or DSECT for an active disk table.
*ADTGEN	Generates an active disk table (ADT) for a disk, used by ADTSECT.
*ADTSECT	Generates all the ADTs for CMS in the nucleus.
*AFT	Generates a DSECT for an active file table.
*AFTSECT	Generates all the AFTs for CMS in the nucleus.
*BATLIMIT	Table of CPU, punch and printer limits for user jobs running under CMS batch.
*CMSAVE	Equivalent to SVCSAVE macro.
*CMSCB	Generates a list of simulated OS control blocks.
*CMSCVT	Generates the communication vector table as supported by CMS.
COMPSWT	Sets the compiler switch ON/OFF. Refer to VM/370: CMS Command and Macro Reference.
*CORG	Sets the origin for CSECT.
*DBGSECT	Generates a CSECT or DSECT for DEBUG environment variables.
*DEVGEN	Generates a device table for a given device, used by the DEVTAB macro.
*DEVSECT	DSECT for a device table.
*DEVTAB	Generates the device tables for the CMS nucleus.
*DIAG	Issues a specified CP Diagnose instruction.
*DIOSECT	Generates a CSECT or DSECT for all I/O information.
DISPW	Generates the calling sequence for the display terminal interface. Refer to VM/370: System Programmer's Guide.
DMSABN	ABEND the virtual machine. Refer to VM/370: System Programmer's Guide.
*DMSCCB	DSECT describes field of DOS command control block (CCB). Refer to VM/370: Data Areas and Control Block Logic.
*DMSABW	Allocates a work area for DMSABN.
*DMSDM	Reserved for IBM use.
*DMSERR	Sets up parameter list to type out a CMS error message, Refer to the LINEDIT macro.
*DMSERT	DMSERR work area DSECT.
DMSEXS	Execute an instruction without nucleus protection. Refer to VM/370: System Logic and Problem Determination Guide.
DMSFREE	Gets free storage. Refer to VM/370: System Programmer's Guide.
*DMSFRES	Calls system free storage service routines.
DMSFRET	Releases free storage. Refer to VM/370: System Programmer's Guide.
*DMSFREX	Calls system free storage service routines.
*DMSFRT	Generates a DSECT for free storage management work area.
*DMSFRX	Submacro called by DMSFRET.
DMSFST	Sets up a file status table for a given file. Refer to VM/370: System Programmer's Guide.
DMSKEY	Set nucleus protection on/off. Refer to VM/370: System Logic and Problem Determination Guide.
*DMSLN	Called by DMSERR, LINEDIT macros.
*DMSLNC	Called by DMSERR, LINEDIT macros.
*DMSLND	Called by DMSERR, LINEDIT macros.
*DMSLNP	Called by DMSERR, LINEDIT macros.
*DMSLNU	Called by DMSERR, LINEDIT macros.
*DMSLNY	Called by DMSERR, LINEDIT macros.
*DMSLNZ	Called by DMSERR, LINEDIT macros.

CMS Macro	Function
*DMSPID	Passes a fileid in quotes into separate filename, filetype, filemode, used by FSCB, and FSPOINT.
*DMSTMS	Used by RDTAPE, WRTAPE, and TAPECTL.
*EDCB	Frees storage control blocks initialized by DMSEDX for CMS edit modules.
*EQUATES	Generates CMS equates for symbolic names.
*EXCP	Issues an SVC 0.
*EXTSECT	Defines storage for the timer interrupt.
*FCB	Generates a file control block (FCB) DSECT.
FSCB	Sets up a file system control block. Refer to VM/370: CMS Command and Macro Reference.
*FSCBD	DSECT that describes fields in CMS PLIST for related commands.
FSCLOSE	Closes a file. Refer to VM/370: CMS Command and Macro Reference.
*FSENTR	Used by CMS file system routines at entry.
FSERASE	Erases a file. Refer to VM/370: CMS Command and Macro Reference.
FSOPEN	Opens a file. Refer to VM/370: CMS Command and Macro Reference.
*FSPOINT	Executes the CMS POINT function.
FSREAD	Reads a record from a file. Refer to VM/370: CMS Command and Macro Reference.
FSSTATE	Checks for an existing file. Refer to VM/370: CMS Command and Macro Reference.
*FSTB	Generates a file status table (file directory) block.
*FSTD	Entry to the file status table (file directory) block.
FSWRITE	Writes a record into a file on disk. Refer to VM/370: CMS Command and Macro Reference.
*FVS	Defines storage for file system variables.
*GETADT	Gets a specified active disk table.
*GETFST	Gets a specified file status table.
HNDEXT	Handles external and timer interrupts. Refer to VM/370: CMS Command and Macro Reference.
HNDINT	Handles interrupt on devices. Refer to VM/370: CMS Command and Macro Reference.
HNDSVC	Handles SVCs. Refer to VM/370: CMS Command and Macro Reference.
*IO	Contains PLISTs needed to access CMS I/O routines.
*IOSECT	Defines miscellaneous I/O variables.
*KEYSECT	Contains variables necessary for storage key handling.
*KXCHK	Checks to see if HX has been entered by the user.
*LDM	Loads double multiple (for floating point registers).
*LDRST	CMS Loader work area.
LINEDIT	Types a line to the terminal. Refer to VM/370: CMS Command and Macro Reference.
*NUCON	Generates a DSECT CMS nucleus constant area.
*OSFST	Defines an OS file status table for OS ACCESS.
*OVSECT	DMSOVS work area.
*PDSSECT	DSECT used for processing MACLIB files.
*PGMSECT	Defines work area for DMSITP.
PRINTL	Prints a line on the printer. Refer to VM/370: CMS Command and Macro Reference.

CMS Macro	Function
PUNCHC	Punches a card. Refer to VM/370: CMS Command and Macro Reference.
RDCARD	Reads a card from the reader. Refer to VM/370: CMS Command and Macro Reference.
RDTAPE	Reads a record from tape. Refer to VM/370: CMS Command and Macro Reference.
RDTERM	Reads a record from the terminal. Refer to VM/370: CMS Command and Macro Reference.
REGEQU	Generates symbolic register equates. Refer to VM/370: CMS Command and Macro Reference.
*RELPAGES	Sets the release pages flag.
*STDM	Storage for multiple floating-point registers.
STRINIT	Initializes storage. Refer to VM/370: CMS Command and Macro Reference.
*SUBSECT	CSECT or DSECT for CMS SUBSET use.
*SVCENT	Issues a DMSKEY macro before calling an instruction.
*SVCSAVE	System save area.
*SVCSECT	Defines work area for DMSITS.
*SYSLOAD	Puts in a specified register the address of a specified routine in NUCON.
*SYSNAMES	Saves system names table loaded via CMS routines.
TAPECTL	Positions a tape. Refer to VM/370: CMS Command and Macro Reference.
*TSOBLKS	Contains CPPL, UPT, PSCB, and the ECT for TSO service routines.
*TSOGET	Gets the address of the TSO command processor parameter list (CPPL).
*USE	Generates assembler USING and DROP instructions, as needed.
*USERSECT	Creates user work area.
WAITD	Waits until the next interrupt occurs for the specified device. Refer to VM/370: CMS Command and Macro Reference.
WAITT	Waits until all pending I/O to the terminal has completed. Refer to VM/370: CMS Command and Macro Reference.
WRTAPE	Writes a record to tape. Refer to VM/370: CMS Command and Macro Reference.
WRTERM	Writes a record to the terminal. Refer to VM/370: CMS Command and Macro Reference.

RELEASE 3 PLC 1: CMS/DOS MACRO LIBRARY

CMS Release 3 PLC 1 contains a DOS macro library with the following significant entries. A more complete list may be obtained by invoking the DOSMACRO EXEC; this EXEC produces a list of all the macros in the DOS library.

Macro	Function
CCB	Generates the DOS/VS command control block.
COMRG	Returns address of background partitions communication region; expands to SVC 33.
EOJ	Normal processing termination; expands to SVC 0.
OPENR	Activates a data file; simulated by DMSOR1, DMSOR2, DMSOR3.
STXIT	Provides/terminates supervisor linkage to user's program check routines; simulated by DMSDOS.
IKQACB	DSECT for VSAM ACB (access method control block).
IKQEXLST	DSECT for VSAM EXLST control block (contains addresses of user exit routines.
IKQRPL	DSECT for VSAM RPL (request parameter list control block).

Macro	Function
SYSCOM	DSECT of system communication region.
ABTAB	DSECT of abnormal termination option table.
BBOX	DSECT of Boundary Box; contains begin and end addresses of background partitions communication region.
BGCOM	DSECT of Background Communication Region.
FICL	DSECT, CMS/DOS first in class table.
NICL	DSECT, CMS/DOS number in class table.
PCTAB	DSECT, program check option table.
PIB2TAB	DSECT, program information block extension.
PIBTAB	DSECT, program information block.
PUBOWNER	DSECT, physical unit block ownership table.
ANCHTAB	DSECT, DOS/VS anchor table.
DOSAVE	DSECT, describes fields in the logical transient area (LTA).
FCHTAB	DOS/VS fetch table containing fetch/load parameter list.
MAPPUB	DSECT defines fields of CMS/DOS physical unit block (PUB).
PUBTAB	DSECT same usage as MAPPUB.
DOSCB	DOS simulation control block used for the simulation of the CMS file control block (FCB).
EXCPW	DSECT, work area for DMSXCP routine.
DOSCON	Creates CMS/DOS control blocks for DMSNUC.
LUBTAB	DSECT for CMS/DOS logical unit block.

RELEASE 3 PLC 1: CHANGES TO VM/370 CP ABEND CODES

The following CP ABEND codes that have been added or changed to Release 3 PLC 1.

BLD002
CFG010
CKS001
CKS002
CKS003
CKS004
HVD001 (Replaces HVC001)
PGS001
PTR005
PTR013
RGA002
SCN001
VMA001
VMA002
VMA003
VMA004

SECTION 5. CP, CMS, IPCS, AND RSCS MODULE SUMMARY

Section 5 contains charts of all CP, CMS, IPCS, and RSCS modules in the VM/370 system, including information about their size and attributes. Other pertinent information on VM/370 modules is also included in this section.

MODULE RESEQUENCING FOR RELEASE 3

CP - ALL modules have been resequenced by 1000
CMS - DMSEDX, DMSEXT, DMSFOR, DMSLBM, DMSLDS, DMSSET, and DMSLKD have been resequenced by 1000. All other CMS modules that were in existance in Release 2 of VM/370 remain unchanged. All new CMS modules are sequenced by 1000.
RSCS - No modules resequenced.
IPCS - ALL modules are sequenced by 1000.

VM/370 RELEASE 3 MODULE SPLITS

The following modules have been split because the code exceeded the page boundary:

DMKRGF function is now contained in DMKRGA and DMKRGB.
DMKCPV function is split between DMKCPV and DMKCPS.
DMKHVC function is split between DMKHVC and DMKHVD.
DMKTBL function is split between DMKTBL and DMKTBM.
DMKCFM function is split between DMKCFM and DMKCFC.
DMKIOF function is split between DMKIOF and DMKIOC.

MODULE ATTRIBUTES AND SIZE

The following abbreviations are used in the Attributes section of each of the charts:

Ex - Executable
Ne - Nonexecutable
Re - Reentrant
SR - Serially Reusable
Pr - Primary Interrupt Handler
In - Initialization Module
Sh - Shutdown Module
Pa - Pageable
NR - Nucleus Resident
UR - Disk Resident, executes in the User Program Area
TR - Disk Resident, executes in the Transient Area
FS - Disk Resident, executes in Free Storage
TS - Disk Resident, executes in RSCS Task Storage
DS - Discontiguous shared segment resident

Note: To augment Release 3 function of CMS supported as shared segments many CMS modules have been made reentrant.

RELEASE 3 PLC 1: CP MODULES

The following chart contains status information about each of the modules in the Control Program (CP) component of VM/370.

Module Name	New	Module Size (Hex)	Module Size Change	Attributes
DMKACO		0768	8	Ex,Re,Pa
DMKBLD		0710	1B0	Ex,Re,Pa
DMKBOX		0318		Ne,Pa
DMKBSC		03C8	30	Ex,SR,NR
DMKBTS		0728		Ne,Pa
DMKCCH		06C0	-10	Ex,SR,NR
DMKCCW		17C8	368	Ex,Re,NR
DMKCDB		0F48	E0	Ex,Re,Pa
DMKCDS		0848	A8	Ex,Re,Pa
DMKCFC	X	0A40		Ex,Pa,Re
DMKCFD		03B8	10	Ex,Re,Pa
DMKCFG		0F88	AF0	Ex,Re,Pa
DMKCFM		0440	-9A8	Ex,Re,NR
DMKCFP		0798	-6E8	Ex,Re,Pa
DMKCFS		0FC8	88	Ex,Re,Pa
DMKCFT		0440	38	Ex,Re,Pa
DMKCKP		0F80	70	Ex,NonSR, Pa,Sh
DMKCKS	X	0DF0		Ex,SR,Pa
DMKCNS		1708	148	Ex,Re,NR
DMKCPB		05B0	48	Ex,Re,Pa
DMKCPE		0030		Ne,NR
DMKCPI		23B0	148	Ex,NonSR, Pa,In
DMKCPS	X	0888		Ex,Re,Pa
DMKCPV		0838	-670	Ex,Re,Pa
DMKCQG		0C28	-18	Ex,Re,Pa
DMKCQP		0C28		Ex,Re,Pa
DMKCQR		0E98	10	Ex,Pa,Re
DMKCSO		0FF8	18	Ex,Re,Pa
DMKCSP		0E88	70	Ex,Re,Pa
DMKCST		06F8	10	Ex,Re,Pa
DMKCSU		0E08	98	Ex,Re,Pa
DMKCVT		02B0	18	Ex,SR,NR
DMKDAS		0F10	60	Ex,Re,NR
DMKDDR		B6B0	1060	Ex,SR
DMKDEF		09F8	108	Ex,Re,Pa
DMKDGD		0790	1F8	Ex,Re,NR
DMKDIA		0F00	40	Ex,Re,Pa
DMKDIR		6400		Ex,NonSR
DMKDMP		12E0	198	Ex,NonSR,NR
DMKDRD		0828	28	Ex,Re,Pa
DMKDSP		0FC0	148	Ex,Re,NR
DMKEDM		7000		Ex,SR
DMKEIG		0270		Ex,SR,NR
DMKEMA		0CD0	-18	Ne,Pa
DMKEMB		06F8	378	Ne,Pa
DMKERM		0280	18	Ex,Re,Pa
DMKFCB		0060		Ne,Pa
DMKFMT		3718	3A8	Ex,SR

Figure 5-1. Release 3 PLC 1: CP Modules, Status Information (Part 1 of 3)

Module Name	New	Module Size (Hex)	Module Size Change	Attributes
DMKFRE		0B30		Ex,SR,NR
DMKGIO		0240		Ex,Pa,Re
DMKGRF		1E00	6D8	Ex,NR,Re
DMKHVC		0770	-560	Ex,Re,NR
DMKHVD	X	08C8		Ex,Re,NR
DMKIOC	X	029C		Ex,SR,Pa
DMKIOE		07F0	50	Ex,SR,NR
DMKIOF		0DE0	-210	Ex,SR,Pa
DMKIOG		0778	-D0	Ex,SR,Pa
DMKIOS		0F40	A8	Ex,Re,NR,Pr
DMKISM		0208	28	Ex,Re,Pa
DMKLD00E		25D0		(Loader)
DMKLNK		0BAC	C	Ex,Re,Pa
DMKLOC		0118		Ex,Re,Pa
DMKLCG		0E78	3D0	Ex,Re,Pa
DMKMCC		08A0	-10	Ex,SR,Pa
DMKMCH		0BD0	-10	Ex,NR,Pr
DMKMID		02E0	-18	Ex,Re,Pa
DMKMON		0EC0	78	Ex,SR,Pa
DMKMSG		0408		Ex,Re,Pa
DMKMSW		05E0	10	Ex,Re,NR
DMKNEM		0610		Ex,Re,Pa
DMKNES		0A18	20	Ex,Re,Pa
DMKNET		0BF0	18	Ex,Pa,Re
DMKNLD		0F78	-78	Ex,Pa,Re
DMKOPR		0380		Ex,NR,Re
DMKPAG		0828	A8	Ex,SR,NR
DMKPER		0018		Ex,Re,Pa
DMKPGS		0808	4F0	Ex,Re,NR
DMKPGT		0A30	98	Ex,SR,NR
DMKPRG		0590	-110	Ex,SR,NR,Pr
DMKPRV		0C28	18	Ex,Re,NR
DMKPSA		0F28	48	Ex,SR,NR,Pr
DMKPTR		0C10	48	Ex,SR,NR
DMKQCN		08C0	40	Ex,SR,NR
DMKRGA	X	1BD0	1BD0	Ex,SR,NR
DMKRGB	X	1BD0	C38	Ex,SR,NR
DMKRIO		varies		Ne,NR
DMKRND		2000		Ex,UR,SR
DMKRNH		1840	8	Ex,NR,SR
DMKRPA		0218	20	Ex,Re,NR
DMKRSE		09B0	48	Ex,Re,Pa
DMKRSP		1530	40	Ex,Re,NR
DMKSAV		0910	108	Ex,NonSR, Pa,In
DMKSCH		0EC8	138	Ex,SR,NR
DMKSCN		0448	10	Ex,Re,NR
DMKSEP		0CE0	20	Ex,Re,Pa
DMKSEV		03B8		Ex,SR,NR
DMKSIX		03E0		Ex,SR,NR
DMKSNC		0288	18	Ex,Pa,Re
DMKSNT		varies		Ne,Pa
DMKSPL		0B10	E8	Ex,Re,Pa
DMKSSP		1208	90	Ex,NonSR,Pa
DMKSTK		0048		Ex,Re,NR
DMKSYM		0F60	-90	Ne,Pa
DMKSYS		varies		Ne,NR

Figure 5-1. Release 3 PLC 1: CP Modules, Status Information (Part 2 of 3)

Module Name	New	Module Size (Hex)	Module Size Change	Attributes
DMKTAP		0968	28	Ex,Re,Pa
DMKTBL		08C0	-400	Ne,NR
DMKTBM	X	0600		Ne,Pa
DMKTDK		0338	B0	Ex,Re,Pa
DMKTHI		08E8		Ex,SR,Pa
DMKTMR		0558	48	Ex,Re,NR
DMKTRA		0450	-30	Ex,Re,Pa
DMKTRC		0FB0	70	Ex,Re,Pa
DMKTRM		0188	10	Ex,Re,Pa
DMKUCB		0B38		Ex,Re,Pa
DMKUCS		0CA0		Ex,Re,Pa
DMKUDR		0598	A0	Ex,Re,Pa
DMKUNT		0518	70	Ex,Re,NR
DMKUSO		0960	B8	Ex,Re,Pa
DMKVAT		0858		Ex,Re,NR
DMKVCA		0E58	20	Ex,Re,Pa
DMKVCH		0380		Ex,Re,Pa
DMKVCN		0C30	D0	Ex,Re,NR
DMKVDB		0ED0	40	Ex,Re,Pa
DMKVDR		0338	28	Ex,Re,Pa
DMKVDS		0590	8	Ex,Re,Pa
DMKVER		05C8	40	Ex,Re,Pa
DMKVIO		0F38	278	Ex,Re,NR
DMKVMA	X	05F8		Ex,Re,NR
DMKVMI		0838	-10	Ex,SR
DMKVSP		1F18	118	Ex,Re,NR
DMKWRM		08B8	E8	Ex,NonSR, Pa,In

Figure 5-1. Release 3 PLC 3: CP Modules, Status Information (Part 3 of 3)

RELEASE 3 PLC 1: CMS MODULES

The following charts contain status information about each of the modules in the Conversational Monitor System (CMS) component of VM/370.

Module Name	New	Module Size (Hex)	Module Size Change	Attributes
DMSABN		0860	60	Ex,Re,NR
DMSACC		0BC0	50	Ex,SR,TR
DMSACF		0350	60	Ex,Re,TR
DMSACM		0598	90	Ex,Re,TR
DMSALU		0A90	8B8	Ex,SR,TR
DMSAMS	X	10B0		Ex,UR
DMSARD	X	0268		Ne,UR
DMSARE		03A8	108	Ex,SR,TR
DMSARN		1000		Ex,UR
DMSARX	X	1D70		Ex,UR
DMSASD		0290		Ne,UR
DMSASM		1D70		Ex,UR
DMSASN	X	1120		Ex,SR,TR
DMSAUD		0288	-10	Ex,Re,NR
DMSBAB	X	0200		Ex,Re,DS
DMSBOP	X	2000		Ex,Re,DS
DMSBRD		0660		Ex,Re,NR
DMSBTB		01F0	-18	Ex,FS
DMSBTP		0F68	58	Ex,FS
DMSBWR		0C88	E8	Ex,Re,NR
DMSCAT		00F0		Ex,Re,NR
DMSCIO		02A8	10	Ex,Re,NR
DMSCIT		05A0	8	Ex,Re,NR
DMSCLS	X	1000		Ex,Re,DS
DMSCMP		08E0	F0	Ex,UR
DMSCPF		0118		Ex,SR,NR
DMSCPY		2FC8	148	Ex,Re,UR
DMSCRD		0590		Ex,Re,NR
DMSCWR		0210	-20	Ex,Re,NR
DMSCWT		0040		Ex,Re,NR
DMSDBD		0480	28	Ex,Re,NR
DMSDBG		0CD8	78	Ex,Re,NR
DMSDIO		0570	50	Ex,Re,NR
DMSDLB	X	17B0		Ex,TR
DMSDLK	X	4400		Ex,UR
DMSDMP	X	300		Ex,Re,DS
DMSDOS	X	1400		Ex,Re,DS
DMSDSK		0958	-18	Ex,SR,TR
DMSDSL	X	0EB0		Ex,UR
DMSDSV	X	2AA0		Ex,UR
DMSEDC		0140	-118	Ex,Re,UR
DMSEDF		0200	20	Ne,UR
DMSEDI		2BC0	-440	Ex,Re,UR
DMSEDX		0EF0	C8	Ex,SR,TR
DMSERR		07D0		Ex,Re,NR
DMSERS		0810		Ex,Re,NR

Figure 5-2. Release 3 PLC 1: CMS Modules, Status Information (Part 1 of 3)

Module Name	New	Module Size (Hex)	Module Size Change	Attributes
DMSEXC		01B0	C8	Ex,Re,NR
DMSEXT		2320	4A8	Ex,Re,FS
DMSFCH	X	0C00		Ex,Re,DS
DMSFET	X	0528		Ex,Re,NR
DMSFLD		1800	50	Ex,SR,TR
DMSFNC		0308	-A0	Ne,NR
DMSFNS		06A8	68	Ex,Re,NR
DMSFOR		16D0	1C8	Ex,UR
DMSFRE		13E0		Ex,Re,NR
DMSGIO		0080	-58	Ex,Re,UR
DMSGLB		0318	20	Ex,UR
DMSGND		01E8	8	Ex,SR,TR
DMSGRN		12D8	20	Ex,SR,UR
DMSHDI		0300	-8	Ex,Re,TR
DMSHDS		0300	18	Ex,SR,TR
DMSINA		0230	28	Ex,SR,NR
DMSINI		11D8	E0	Ex,NR
DMSINM		0100		Ex,Re,NR
DMSINS		0B58	4A8	Ex,NR
DMSINT		0740	B0	Ex,Re,NR
DMSIOW		0108		Ex,Re,NR
DMSITE		0288	58	Ex,Re,NR
DMSITI		0178		Ex,Re,NR
DMSITP		0668	F8	Ex,Re,NR
DMSITS		0F20	68	Ex,Re,NR
DMSLAD		03F0		Ex,Re,NR
DMSLAF		01E0	20	Ex,Re,NR
DMSLBM		1498	58	Ex,UR
DMSLBT		7BE8	C0	Ex,UR
DMSLDR		1358	B0	Ex,Re,NR
DMSLDS		1510	9D0	Ex,SR,UR
DMSLFS		0530	30	Ex,Re,NR
DMSLGT		0208		Ex,Re,NR
DMSLIB		02C0	-10	Ex,Re,NR
DMSLIO		08A0	70	Ex,Re,NR
DMSLKD	X	0A08		Ex,SR,UR
DMSLLU	X	06C0		Ex,SR,UR
DMSLOA		0128		Ex,Re,NR
DMSLSB		05A0	68	Ex,Re,NR
DMSLST		0960	8	Ex,SR,TR
DMSLSY		0028		Ex,Re,NR
DMSDMP		01E8	10	Ex,SR,TR
DMSMOD		0AA0	198	Ex,Re,NR
DMSMVE		0CB0	A0	Ex,Re,NR
DMSNCP		1000		Ex,UR
DMSNUC		3000		Ne,NR
DMSOLD	X	0F28		Ex,Re,DS
DMSOPL	X	0800		Ex,Re,DS
DMSOPT	X	0228		Ex,Re,TR
DMSOR1	X	0400		Ex,Re,DS
DMSOR2	X	0300		Ex,Re,DS
DMSOR3	X	0400		Ex,Re,DS
DMSOVR		0328		Ex,SR,TR
DMSOVS		0960		Ex,SR,FS
DMSPIO		0490	20	Ex,Re,NR

Figure 5-2. Release 3 PLC 1: CMS Modules, Status Information (Part 2 of 3)

Module Name	New	Module Size (Hex)	Module Size Change	Attributes
DMSPNT		0098		Ex,Re,NR
DMSPRT		1FB0		Ex,SR,TR
DMSPRV	X	06E0		Ex,US
DMSPUN		1FB0		Ex,SR,TR
DMSQRY		1460	388	Ex,SR,TR
DMSRDC		0CB0	-8	Ex,SR,TR
DMSRNE		0AC0		TR,SR
DMSRNM		0730	50	Ex,SR,TR
DMSROS		10C0	78	Ex,Re,FS
DMSRRV	X	0C98		Ex,US
DMSSAB		0378	48	Ex,Re,NR
DMSSBD		04C0	8	Ex,Re,NR
DMSSBS		0378	50	Ex,Re,NR
DMSSCN		00F0		Ex,SR,NR
DMSSCR		0420	-68	Ex,Re,UR
DMSSCT		02C0		Ex,Re,NR
DMSSEB		06B0	18	Ex,Re,NR
DMSSEG	X	0060		Ne,DS
DMSSET		1470	910	Ex,SR,TR
DMSSLN		0808	328	Ex,Re,NR
DMSSMN		0398	130	Ex,Re,NR
DMSSOP		0E78	168	Ex,Re,NR
DMSSQS		0668	30	Ex,Re,NR
DMSSRT		0A10	18	Ex,UR
DMSSRV	X	08F0		Ex,UR
DMSSSK	X	0338		Ex,TR
DMSSTG	X	0410		Ex,Re,NR
DMSSTT		04B8	10	Ex,Re,NR
DMSSVN		0208	78	Ex,Re,NR
DMSSVT		18A8	210	Ex,Re,TR
DMSSYN		0C58	258	Ex,SR,TR
DMSTIO		0260		Ex,SR,NR
DMSTMA	X	09E0		Ex,SR,UR
DMSTPD		0B00	30	Ex,UR
DMSTPE		1988	5F8	Ex,SR,TR
DMSTQQ		01B0		Ex,Re,NR
DMSTRK		01A8	8	Ex,Re,NR
DMSTYP		19B8	20	Ex,SR,TR
DMSUPD		2AB8	128	Ex,SR,UR
DMSVAN	X	00E8		Ne,DS
DMSVAS	X	02B0		Ne,DS
DMSVIB	X	0210		Ex,NR,Re
DMSVIP	X	0E30		Ex,Re,DS
DMSVPD	X	06E0		Ex,UR
DMSVSR	X	01E0		Ex,NR,Re
DMSVVN	X	00E8		Ne,DS
DMSVVS	X	0110		Ne,DS
DMSXCP	X	1800		Ex,Re,DS
DMSZAP		2858	C8	Ex,UR,SR
DMSZAT		2000		Ne,TR
DMSZIT		0000		Ne,NR
DMSZNR		0008		Ne,NR
DMSZUR		0000		Ne,UR

Figure 5-2. Release 3 PLC 1: CMS Modules, Status Information (Part 3 of 3)

RELEASE 3 PLC 1: RSCS MODULES

Figure 5-3 contains status information about each of the modules in the Remote Spooling Communications Subsystem (RSCS) component of VM/370.

Module Name	New	Module Size (Hex)	Module Size Change	Attributes
DMTAKE		138		Ex,SR,NR
DMTASK		1E8		Ex,SR,NR
DMTASY		0208	38	Ex,SR,NR
DMTAXS		2190	8	Ex,SR,TS
DMTCMX		1DB8	A0	Ex,SR,TS
DMTCOM		04B0	10	Ex,Re,TS
DMTCRE		D80		Ex,SR,TS
DMTDSP		98		Ex,SR,NR
DMTEXT		00F0	58	Ex,SR,NR
DMTGIV		88		Ex,SR,NR
DMTINI		1090	118	Ex,SR,NR,In
DMTICM		348		Ex,SR,NR
DMTLAX		01C0	18	Ex,SR,TS
DMTMAP		280		Ne,SR,NR
DMTMGX		0448	10	Ex,SR,TS
DMTMSG		13B0	-C0	Ne,SR
DMTNPT		41C8	1038	Ex,SR,TS
DMTPST		28		Ex,Re,NR
DMTQRQ		38		Ex,SR,NR
DMTREX		0B22	5A	Ex,SR,TS,Sh
DMTSIG		48		Ex,SR,NR
DMTSML		3A50	1D8	Ex,SR,TS
DMTSTO		58		Ex,SR,NR
DMTSVC		58		Ex,SR,NR
DMTSYS		varies		Ne,SR,NR
DMTVEC		90		Ne,SR,NR
DMTWAT		80		Ex,SR,NR

Figure 5-3. Release 3 PLC 1: RSCS Modules, Status Information

RELEASE 3 PLC 1: IPCS MODULES

Figure 5-4 contains status information about each of the modules in the Interactive Problem Control Program (IPCS) component of VM/370.

Module Name	New	Module Size (Hex)	Module Size Change	Attributes
DMMCPA	X	1280		Ex,UR
DMMDIR	X	0B08		Ex,SR,UR
DMMDSC	X	1AC0		Ex,UR
DMMEDM	X	7000		Ex,UR
DMMFED	X	0898		Ex,SR,UR
DMMFEX	X	0328		Ex,SR,UR
DMMGET	X	23E0		SR,UR
DMMGRC	X	02D8		Ex,SR,UR
DMMHEX	X	02C8		Ex,SR,UR
DMMIDM	X	3398		Ex,UR
DMMINI	X	3C30		Ex,UR
DMMINT	X	0248		Ex,SR,UR
DMMIOB	X	0AE8		Ex,SR,UR
DMMLOC	X	28B8		Ex,SR,UR
DMMMAP	X	0950		Ex,US
DMMMOD	X	3950		Ex,SR,UR
DMMPRG	X	03B0		Ex,UR
DMMPRM	X	0A68		Ex,UR
DMMPRO	X	3100		Ex,UR
DMMREG	X	0A48		Ex,SR,UR
DMMRMV	X	0190		Ex,SR,UR
DMMSCR	X	02E8		Ex,SR,UR
DMMSEA	X	0830		Ex,UR
DMMSTA	X	0C10		Ex,UR
DMMSUM	X	0838		Ex,UR
DMMTRC	X	0340		Ex,SR,UR
DMMTRN	X	01E8		Ex,SR,NR
DMMVMB	X	03D8		Ex,SR,UR
DMMWRT	X	13D0		Ex,UR

Figure 5-4. Release 3 PLC 1: IPCS Modules, Status Information

SECTION 6. ORDERING AND DISTRIBUTION PROCEDURES

Section 6 describes the procedures for ordering the VM/370 System Control Program and contains information on the material distributed. To order Release 3 of VM/370, contact your IBM salesman or your local IBM branch office. An initial order may include the base program and any features available.

BASIC PROGRAM MATERIAL

The VM/370 program number is 5749-010. The basic program material provided consists of:

- A starter system
- CP source and object files (CP-2)
- CMS source and object files (CMS-2)
- RSCS and IPCS source and object files[1]
- The current Release 3 PLC tape (Note: The Memo to Users is the second file on the PLC tape.)

Machine Readable Material

The feature numbers which should be specified when ordering the basic program machine readable material are given in Figure 6-1.

	800 bpi		1600 bpi		6250 bpi	
Restore Unit	Feature Number	Tapes	Feature Number	Tapes	Feature Number	Tapes
2314	#9227	7	#9229	5	#9231	5
3330	#9127	7	#9129	5	#9131	5
3340	#9327	7	#9329	5	#9331	5

Figure 6-1. Machine Readable Material for VM/370

[1]Two TXTLIBs are found at the end of the RSCS/IPCS tape. These are EREPLIB TXTLIB and ERPTFLIB TXTLIB. Space constraints prevented the placement of these files in their normal location on the CMS-2 tapes.

Documentation

The VM/370 publications distributed with the basic program material are:

Title	Order No.
IBM Virtual Machine Facility/370:	
Release 3 Guide	GC20-1822
Planning and System Generation Guide	GC20-1801
Terminal User's Guide	GC20-1810
Operator's Guide	GC20-1806
System Messages	GC20-1808
System Programmer's Guide	GC20-1807
Remote Spooling Communications Subsystem (RSCS) User's Guide	GC20-1816
CMS User's Guide	GC20-1819
CMS Command and Macro Reference	GC20-1818
CP Command Reference for General Users	GC20-1820
Interactive Problem Control System (IPCS) User's Guide	GC20-1823

OPTIONAL PROGRAM MATERIAL

The optional program material associated with VM/370 consists of machine readable material and documentation.

Machine Readable

The feature numbers which should be specified when ordering the optional machine readable material are given in Figure 6-2.

	800 bpi		1600 bpi		6250 bpi	
Option	Feature Number	Tapes	Feature Number	Tapes	Feature Number	Tapes
CP Assembly Listings	#7027	4	#7029	2	#7031	2
CMS Assembly Listings	#7127	3	#7129	2	#7131	2
Assembler Source and Text	#7227	1	#7229	1	#7231	1
RSCS Assembly Listings	#7327	1	#7329	1	#7331	1
IPCS Assembly Listings	#7427	1	#7429	1	#7431	1

Figure 6-2. Optional Machine Readable Material for VM/370

Documentation

No documentation is provided with the optional program material. For other related documentation, see "Additional Publications."

Additional Publications

The following VM/370 manuals can be obtained through your IBM representative or your local IBM branch office.

Title	Order No.
IBM Virtual Machine Facility/370:	
Introduction	GC20-1800
OLTSEP and Error Recording Guide	GC20-1809
Data Areas and Control Block Logic	SY20-0884
Operating System in a Virtual Machine	GC20-1821
Service Routines Program Logic	SY20-0882
Command Reference Summary	GX20-1961
Quick Guide for Users	GX20-1926
Glossary and Master Index	GC20-1813
Environmental Recording, Editing, and Printing (EREP) Program	GC29-8300
System Logic and Problem Determination Guide	SY20-0885
Environmental Recording, Editing and Printing (EREP) Program Logic	SY25-7701
OS/VS, DOS/VS, and VM/370 Assembler Language Manual	GC33-4010
OS/VS, DOS/VS, and VM/370 CMS Assembler Programmer's Guide	GC33-4021
OS/VS and VM/370 CMS Assembler Logic Manual	SY33-8041

Note: A program logic manual is not available for the IPCS component of VM/370; refer to optional tape listings or to microfiche.

Microfiche

VM/370 program listings are also available on microfiche. The listings are the equivalent of output listings produced by assembling each of the source programs.

Title	Order No.
CP Listings and CP Label Cross-References Microfiche	SYB0-0900
CMS Listings and CMS Label Cross-Reference Microfiche	SYB0-0901
RSCS Listing and RSCS Label Cross-Reference Microfiche	SYC0-9000
IPCS Listing and IPCS Label Cross-Reference Microfiche	SYC0-9001

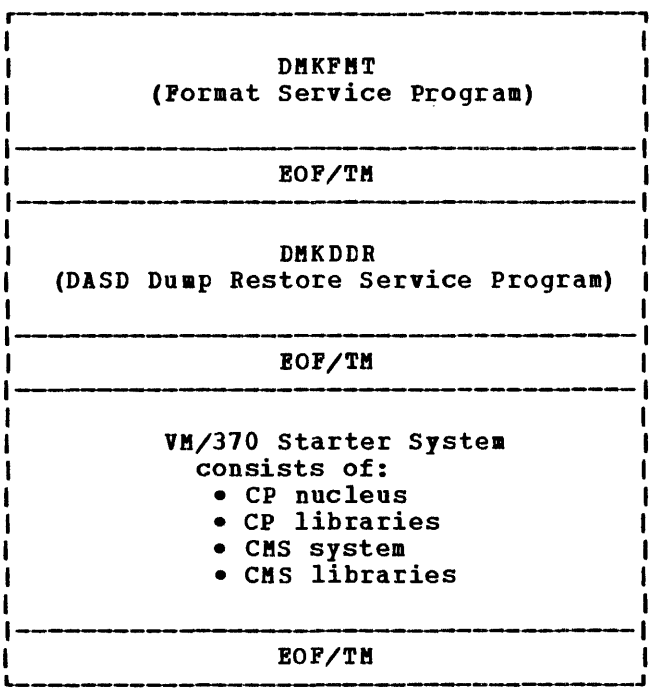
Note: Microfiche for linkage-editor and EREP support under Release 3 will not be provided under the VM/370 Microfiche order number, but can be ordered using the following number:

Linkage-Editor Component ID 5741-SC1-04
Microfiche Order #SJD2-2068
VS/2 EREP Listings Component ID 5752-SC1CD
Microfiche Order #SJD2-4350

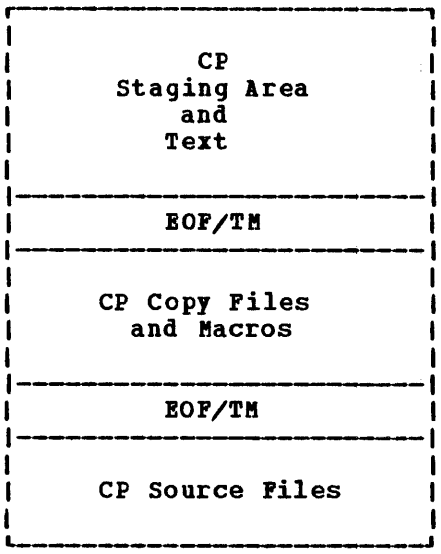
PROGRAM MATERIALS LIST

Basic System Tapes

VM/370 CP STARTER SYSTEM TAPE: The VM/370 CP starter system is distributed either on one 6250 bpi or one 1600 bpi tape or on two 800 bpi tapes, and consists of three files. The starter system tape format is:



VM/370 CP-2 TAPE: The CP-2 material is distributed on either one 1600 bpi or one 6250 bpi tape or two 800 bpi tapes. CP-2 tape(s) consists of CP source files, text files, support procedures, macros, and the macro library of CP. It contains three files; its format follows:



Files contained in the first tape file are:

DMKR30	CNTRL	A1	DMKCFT	TEXT	A1
NCPR30	CNTRL	A1	DMKCKP	TEXT	A1
LDT	DMKSAVNC	A1	DMKCKS	TEXT	A1
CPLOAD	EXEC	A1	DMKCNS	TEXT	A1
DMKMAC	EXEC	A1	DMKCPB	TEXT	A1
VRLOAD	EXEC	A1	DMKCPE	TEXT	A1
DMKLD00E	LOADER	A1	DMKCPI	TEXT	A1
DMKMAC	MACLIB	A1	DMKCPV	TEXT	A1
DMKACO	TEXT	A1	DMKCQG	TEXT	A1
DMKBLD	TEXT	A1	DMKCQP	TEXT	A1
DMKBOX	TEXT	A1	DMKCQR	TEXT	A1
DMKBSC	TEXT	A1	DMKCSO	TEXT	A1
DMKBTS	TEXT	A1[1]	DMKCSP	TEXT	A1
DMKCCH	TEXT	A1	DMKCST	TEXT	A1
DMKCCW	TEXT	A1	DMKCSU	TEXT	A1
DMKCDB	TEXT	A1	DMKCVT	TEXT	A1
DMKCDS	TEXT	A1	DMKDAS	TEXT	A1
DMKCFC	TEXT	A1	DMKDDR	TEXT	A1
DMKCFD	TEXT	A1	DMKDEF	TEXT	A1
DMKCFG	TEXT	A1	DMKDGD	TEXT	A1
DMKCFM	TEXT	A1	DMKDIA	TEXT	A1
DMKCFP	TEXT	A1	DMKDIR	TEXT	A1
DMKCFS	TEXT	A1	DMKDMP	TEXT	A1

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[1] DMKBTS is a group of text files associated with 3704/3705 support. There is no ASSEMBLE file distributed (or available) for the DMKBTS text file.

DMKDRD	TEXT	A1	DMKRGB	TEXT	A1
DMKDSP	TEXT	A1	DMKRND	TEXT	A1
DMKEDM	TEXT	A1	DMKRNH	TEXT	A1
DMKEIG	TEXT	A1	DMKRPA	TEXT	A1
DMKEMA	TEXT	A1	DMKRSE	TEXT	A1
DMKEMB	TEXT	A1	DMKRSP	TEXT	A1
DMKERM	TEXT	A1	DMKSAV	TEXT	A1
DMKFCB	TEXT	A1	DMKSCH	TEXT	A1
DMKFMT	TEXT	A1	DMKSCN	TEXT	A1
DMKFRE	TEXT	A1	DMKSEP	TEXT	A1
DMKGIO	TEXT	A1	DMKSEV	TEXT	A1
DMKGRF	TEXT	A1	DMKSIX	TEXT	A1
DMKHVC	TEXT	A1	DMKSNC	TEXT	A1
DMKHVD	TEXT	A1	DMKSNT	TEXT	A1
DMKIOC	TEXT	A1	DMKSPL	TEXT	A1
DMKIOE	TEXT	A1	DMKSSP	TEXT	A1
DMKIOF	TEXT	A1	DMKSTK	TEXT	A1
DMKIOG	TEXT	A1	DMKSYM	TEXT	A1
DMKIOS	TEXT	A1	DMKTAP	TEXT	A1
DMKISM	TEXT	A1	DMKTBL	TEXT	A1
DMKLD00E	TEXT	A1	DMKTBM	TEXT	A1
DMKLNK	TEXT	A1	DMKTHI	TEXT	A1
DMKLOC	TEXT	A1	DMKTDK	TEXT	A1
DMKLOG	TEXT	A1	DMKTMR	TEXT	A1
DMKMCC	TEXT	A1	DMKTRA	TEXT	A1
DMKMCH	TEXT	A1	DMKTRC	TEXT	A1
DMKMID	TEXT	A1	DMKTRM	TEXT	A1
DMKMON	TEXT	A1	DMKUCB	TEXT	A1
DMKMSG	TEXT	A1	DMKUCS	TEXT	A1
DMKMSW	TEXT	A1	DMKUDR	TEXT	A1
DMKNEM	TEXT	A1	DMKUNT	TEXT	A1
DMKNES	TEXT	A1	DMKUSO	TEXT	A1
DMKNET	TEXT	A1	DMKVAT	TEXT	A1
DMKNLD	TEXT	A1	DMKVCA	TEXT	A1
DMKOPR	TEXT	A1	DMKVCH	TEXT	A1
DMKPAG	TEXT	A1	DMKVCN	TEXT	A1
DMKPER	TEXT	A1	DMKVDB	TEXT	A1
DMKPGS	TEXT	A1	DMKVDR	TEXT	A1
DMKPGT	TEXT	A1	DMKVDS	TEXT	A1
DMKPRG	TEXT	A1	DMKVER	TEXT	A1
DMKPRV	TEXT	A1	DMKVIO	TEXT	A1
DMKPSA	TEXT	A1	DMKVMA	TEXT	A1
DMKPTR	TEXT	A1	DMKVMI	TEXT	A1
DMKQCN	TEXT	A1	DMKVSP	TEXT	A1
DMKRGA	TEXT	A1	DMKWRM	TEXT	A1

Files contained in the seccnd tape file are:

ABEND	MACRO	A1	DECHEX	MACRO	A1
ACCOUNT	COPY	A1	DEVTYPES	COPY	A1
ACCTOFF	COPY	A1	DMPBLOKS	COPY	A1
ACCTON	COPY	A1	ENTER	MACRO	A1
ALLOC	COPY	A1	EQU	COPY	A1
BSCBLOKS	COPY	A1	ERRBLOK	COPY	A1
BTUCMD	COPY	A1	EXIT	MACRO	A1
CALL	MACRO	A1	GOTO	MACRC	A1
CCHREC	COPY	A1	HEXDEC	MACRO	A1
CCPARM	COPY	A1	IOBLOKS	COPY	A1
CLRIO	MACRO	A1	IOER	COPY	A1
CLUSTER	MACRO	A1	LOCAL	COPY	A1
CONBUF	COPY	A1	MAXDV	MACRO	A1
CORE	COPY	A1	MCHAREA	COPY	A1
CPF	COPY	A1	MCRECORD	COPY	A1
DDRREC	COPY	A1	MDRREC	COPY	A1

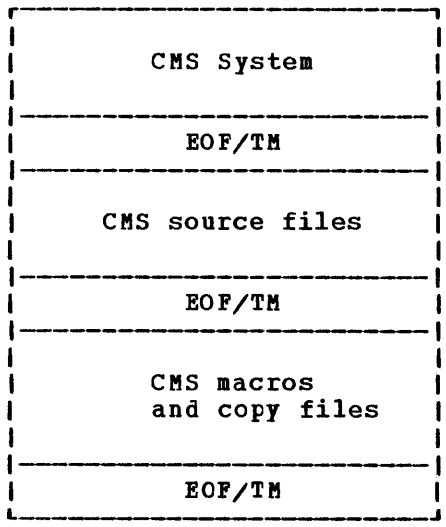
```
MICBLOK  COPY      A1
MIHREC   COPY      A1
MONBLOKS COPY      A1
MONCOM   COPY      A1
MSG      MACRO     A1
NAMENCP  MACRO     A1
NAMESYS  MACRO     A1
NCPTBL   COPY      A1
NETWORK  COPY      A1
OBRRECN  COPY      A1
OPTIONS  COPY      A1
PGTBL    MACRO     A1
PGBLOK   COPY      A1
PSA      MACRO     A1
RBLOKS   COPY      A1
RCHANNEL MACRO     A1
RCTLUNIT MACRO     A1
RDEVICE  MACRO     A1
RDVTBL   MACRO     A1
RECPAG   COPY      A1
RELOC    MACRO     A1
RIOGEN   MACRO     A1
SAVE     COPY      A1
SAVTABLE COPY      A1
SDRBLOK  COPY      A1
SHRTABLE COPY      A1
SPOOL    COPY      A1
SYM      MACRO     A1
SYSCOR   MACRO     A1
SYSLOCS  MACRO     A1
SYSOPR   MACRO     A1
SYSOWN   MACRO     A1
SYSRES   MACRO     A1
SYSTBL   COPY      A1
SYSTEM   MACRO     A1
SYSTIME  MACRO     A1
TIMER    COPY      A1
TERMINAL MACRO     A1
TNSREC   COPY      A1
TRANS    MACRO     A1
TREXT    COPY      A1
UDIRECT  COPY      A1
VBLOKS   COPY      A1
VCTCA    COPY      A1
VMBLK    MACRO     A1
VMBLOK   COPY      A1
XINTBLOK COPY      A1
End of Tape 1 800 bpi
```

Files contained in the third tape file are:

```
CPEREP   ASSEMBLE  A1
DMKACO   ASSEMBLE  A1
DMKBLD   ASSEMBLE  A1
DMKBOX   ASSEMBLE  A1
DMKBSC   ASSEMBLE  A1
DMKCCH   ASSEMBLE  A1
DMKCCW   ASSEMBLE  A1
DMKCDB   ASSEMBLE  A1
DMKCDS   ASSEMBLE  A1
DMKCFC   ASSEMBLE  A1
DMKCFD   ASSEMBLE  A1
DMKCFG   ASSEMBLE  A1
DMKCFM   ASSEMBLE  A1
DMKCFP   ASSEMBLE  A1
DMKCFS   ASSEMBLE  A1
DMKCFT   ASSEMBLE  A1
DMKCKP   ASSEMBLE  A1
DMKCKS   ASSEMBLE  A1
DMKCNS   ASSEMBLE  A1
DMKCPB   ASSEMBLE  A1
DMKCPE   ASSEMBLE  A1
DMKCPI   ASSEMBLE  A1
DMKCPV   ASSEMBLE  A1
DMKCQG   ASSEMBLE  A1
DMKCQP   ASSEMBLE  A1
DMKCQR   ASSEMBLE  A1
DMKCSO   ASSEMBLE  A1
DMKCSP   ASSEMBLE  A1
DMKCST   ASSEMBLE  A1
DMKCSU   ASSEMBLE  A1
DMKCVT   ASSEMBLE  A1
DMKDAS   ASSEMBLE  A1
DMKDDR   ASSEMBLE  A1
DMKDEF   ASSEMBLE  A1
DMKDGD   ASSEMBLE  A1
DMKDIA   ASSEMBLE  A1
DMKDIR   ASSEMBLE  A1
DMKDMP   ASSEMBLE  A1
DMKDRD   ASSEMBLE  A1
DMKDSP   ASSEMBLE  A1
DMKEDM   ASSEMBLE  A1
DMKEIG   ASSEMBLE  A1
DMKEMA   ASSEMBLE  A1
DMKEMB   ASSEMBLE  A1
DMKERM   ASSEMBLE  A1
DMKFCB   ASSEMBLE  A1
DMKFMT   ASSEMBLE  A1
DMKFRE   ASSEMBLE  A1
DMKGIO   ASSEMBLE  A1
DMKGRF   ASSEMBLE  A1
DMKHVC   ASSEMBLE  A1
DMKHVD   ASSEMBLE  A1
DMKIOC   ASSEMBLE  A1
DMKIOE   ASSEMBLE  A1
DMKIOF   ASSEMBLE  A1
DMKIOG   ASSEMBLE  A1
DMKIOS   ASSEMBLE  A1
DMKISM   ASSEMBLE  A1
DMKLD00E ASSEMBLE  A1
DMKLNK   ASSEMBLE  A1
DMKLOC   ASSEMBLE  A1
DMKLOG   ASSEMBLE  A1
DMKMCC   ASSEMBLE  A1
DMKMCH   ASSEMBLE  A1
DMKMID   ASSEMBLE  A1
DMKMON   ASSEMBLE  A1
DMKMSG   ASSEMBLE  A1
DMKMSW   ASSEMBLE  A1
DMKNEM   ASSEMBLE  A1
DMKNES   ASSEMBLE  A1
DMKNET   ASSEMBLE  A1
DMKNLD   ASSEMBLE  A1
```

```
DMKOPR   ASSEMBLE  A1
DMKPAG   ASSEMBLE  A1
DMKPER   ASSEMBLE  A1
DMKPGS   ASSEMBLE  A1
DMKPGT   ASSEMBLE  A1
DMKPRG   ASSEMBLE  A1
DMKPRV   ASSEMBLE  A1
DMKPSA   ASSEMBLE  A1
DMKPTR   ASSEMBLE  A1
DMKQCN   ASSEMBLE  A1
DMKRGA   ASSEMBLE  A1
DMKRGB   ASSEMBLE  A1
DMKRND   ASSEMBLE  A1
DMKRNH   ASSEMBLE  A1
DMKRPA   ASSEMBLE  A1
DMKRSE   ASSEMBLE  A1
DMKRSP   ASSEMBLE  A1
DMKSAV   ASSEMBLE  A1
DMKSCH   ASSEMBLE  A1
DMKSCN   ASSEMBLE  A1
DMKSEP   ASSEMBLE  A1
DMKSEV   ASSEMBLE  A1
DMKSIX   ASSEMBLE  A1
DMKSNC   ASSEMBLE  A1
DMKSNT   ASSEMBLE  A1
DMKSPL   ASSEMBLE  A1
DMKSSP   ASSEMBLE  A1
DMKSTK   ASSEMBLE  A1
DMKSYM   ASSEMBLE  A1
DMKSYS   ASSEMBLE  A1
DMKTAP   ASSEMBLE  A1
DMKTBL   ASSEMBLE  A1
DMKTBM   ASSEMBLE  A1
DMKTDK   ASSEMBLE  A1
DMKTHI   ASSEMBLE  A1
DMKTMR   ASSEMBLE  A1
DMKTRA   ASSEMBLE  A1
DMKTRC   ASSEMBLE  A1
DMKTRM   ASSEMBLE  A1
DMKUCB   ASSEMBLE  A1
DMKUCS   ASSEMBLE  A1
DMKUDR   ASSEMBLE  A1
DMKUNT   ASSEMBLE  A1
DMKUSO   ASSEMBLE  A1
DMKVAT   ASSEMBLE  A1
DMKVCA   ASSEMBLE  A1
DMKVCH   ASSEMBLE  A1
DMKVCN   ASSEMBLE  A1
DMKVDB   ASSEMBLE  A1
DMKVDR   ASSEMBLE  A1
DMKVDS   ASSEMBLE  A1
DMKVER   ASSEMBLE  A1
DMKVIO   ASSEMBLE  A1
DMKVMA   ASSEMBLE  A1
DMKVMI   ASSEMBLE  A1
DMKVSP   ASSEMBLE  A1
DMKWRM   ASSEMBLE  A1
IBCDASDI ASSEMBLE  A1
End of Tape 1 @ 1600 bpi
End of Tape 2 @  800 bpi
```

VM/370 CMS-2 TAPE: The CMS-2 tape (one tape at 1600 or 6250 bpi or two tapes at 800 bpi) consists of CMS source files, support procedures, macros, and all files that reside on the CMS system disk. It contains three files; its format is:



CMS files included in the first tape file are:

DMSM30	CNTRL	A1	DOSMACRO	MACLIB	A2
DMSR30	CNTRL	A1	OSMACRO	MACLIB	A2
IPL	DDR	A2	OSMACRO1	MACLIB	A2
IPL	DIR	A2	TSOMAC	MACLIB	A2
CMSAMS	DOSLNK	A2	ACCESS	MODULE	A2
CMSVSAM	DOSLNK	A2	AMSERV	MODULE	A2
$DUP	EXEC	A2	ASSEMBLE	MODULE	A2
$MOVE	EXEC	A2	ASSGN	MODULE	A2
ASMGEND	EXEC	A1	CMSBATCH	MODULE	A2
CMSSAMS	EXEC	A2	COMPARE	MODULE	A2
CMSGEND	EXEC	A2	COPYFILE	MODULE	A2
CMSLIB	EXEC	A1	CPEREP	MODULE	A2
CMSLOAD	EXEC	A1	DDR	MODULE	A2
CMSVSAM	EXEC	A2	DIRECT	MODULE	A2
CMSXGEN	EXEC	A2	DISK	MODULE	A2
CPEREP	EXEC	A2	DLBL	MODULE	A2
DOSGEN	EXEC	A2	DMSEXT	MODULE	A2
DOSMACRO	EXEC	A1	DMSOVS	MODULE	A2
DOSPLI	EXEC	A2	DMSVPD	MODULE	A2
ESERV	EXEC	A2	DOSLIB	MODULE	A2
FCOBOL	EXEC	A2	DOSLKED	MODULE	A2
GENERATE	EXEC	A2	DSERV	MODULE	A2
IVP	EXEC	A2	EDIT	MODULE	A2
RUN	EXEC	A2	EDINIT	MODULE	A2
VMFASM	EXEC	A2	FILEDEF	MODULE	A2
VMFMAC	EXEC	A2	FORMAT	MODULE	A2
VSAMGEN	EXEC	A2	GENDIRT	MODULE	A2
IPL	FMT	A2	GEN3705	MODULE	A2
IPL	IBCDASDI	A2	GLOBAL	MODULE	A2
DMKLD00E	LOADER	A1	HNDINT	MODULE	A2
3CARD	LOADER	A2	HNDSVC	MODULE	A2
SLC	L00E000	A1	IFLDUMP	MODULE	A2
SLC	L010000	A1	IFOX00	MODULE	A1
SLC	L020000	A1	IFOX01	MODULE	A1
SLC	L021000	A1	IFOX02	MODULE	A1
CMSLIB	MACLIB	A2	IFOX03	MODULE	A1

IFOX04	MODULE	A1
IFOX05	MODULE	A1
IFOX06	MODULE	A1
IFOX07	MODULE	A1
IFOX11	MODULE	A1
IFOX21	MODULE	A1
IFOX31	MODULE	A1
IFOX41	MODULE	A1
IFOX42	MODULE	A1
IFOX51	MODULE	A1
IFOX61	MODULE	A1
IFOX62	MODULE	A1
LISTDS	MODULE	A2
LISTFILE	MODULE	A2
LKED	MODULE	A2
MACLIB	MODULE	A2
MODMAP	MODULE	A2
MOVEFILE	MODULE	A2
NCPDUMP	MODULE	A2
PRINT	MODULE	A2
PSERV	MODULE	A2
PUNCH	MODULE	A2
QUERY	MODULE	A2
READCARD	MODULE	A2
RELEASE	MODULE	A2
RENAME	MODULE	A2
RENUM	MODULE	A2
RSERV	MODULE	A2
SAVENCP	MODULE	A2
SET	MODULE	A2
SETKEY	MODULE	A2
SORT	MODULE	A2
SSERV	MODULE	A2
SVCTRACE	MODULE	A2
SYNONYM	MODULE	A2
TAPE	MODULE	A2
TAPEMAC	MODULE	A2
TAPPDS	MODULE	A2
TXTLIB	MODULE	A2
TYPE	MODULE	A2
UPDATE	MODULE	A2
VMFDATE	MODULE	A2
VMFDUMP	MODULE	A2
VMFLOAD	MODULE	A2
VRSIZE	MODULE	A2
ZAP	MODULE	A2
CMSNUC	NUCLEUS	A1
LDT	STARTADR	A1
$$BENDQB	TEXT	A2
$$BOMSG1	TEXT	A2
$$BOMSG2	TEXT	A2
$$BOMSG7	TEXT	A2
CPEREP	TEXT	A1
DMKDDR	TEXT	A1
DMKDIR	TEXT	A1
DMKEDM	TEXT	A1
DMKFMT	TEXT	A1
DMKRND	TEXT	A1
DMSABN	TEXT	A1
DMSACC	TEXT	A1
DMSACF	TEXT	A1
DMSACM	TEXT	A1
DMSALU	TEXT	A1
DMSAMS	TEXT	A1
DMSARD	TEXT	A2
DMSARE	TEXT	A1
DMSARN	TEXT	A2
DMSARX	TEXT	A2
DMSASD	TEXT	A1
DMSASM	TEXT	A1
DMSASN	TEXT	A1
DMSAUD	TEXT	A1
DMSBAB	TEXT	A2
DMSBOP	TEXT	A2
DMSBRD	TEXT	A1
DMSBTB	TEXT	A1
DMSBTP	TEXT	A2
DMSBWR	TEXT	A1
DMSCAT	TEXT	A1
DMSCIO	TEXT	A1
DMSCIT	TEXT	A1
DMSCLS	TEXT	A2
DMSCMP	TEXT	A1
DMSCPF	TEXT	A1
DMSCPY	TEXT	A1
DMSCRD	TEXT	A1
DMSCWR	TEXT	A1
DMSCWT	TEXT	A1
DMSDBD	TEXT	A1
DMSDBG	TEXT	A1
DMSDIO	TEXT	A1
DMSDLB	TEXT	A1
DMSDLK	TEXT	A1
DMSDMP	TEXT	A2
DMSDOS	TEXT	A2
DMSDSK	TEXT	A1
DMSDSL	TEXT	A1
DMSDSV	TEXT	A1
DMSEDC	TEXT	A2
DMSEDF	TEXT	A1
DMSEDI	TEXT	A2
DMSEDX	TEXT	A1
DMSERR	TEXT	A2
DMSERS	TEXT	A2
DMSEXC	TEXT	A1
DMSEXT	TEXT	A2
DMSFCH	TEXT	A2
DMSFET	TEXT	A1
DMSFLD	TEXT	A1
DMSFNC	TEXT	A1
DMSFNS	TEXT	A1
DMSFOR	TEXT	A1
DMSFRE	TEXT	A1
DMSGIO	TEXT	A2
DMSGLB	TEXT	A1
DMSGND	TEXT	A1
DMSGRN	TEXT	A1
DMSHDI	TEXT	A1
DMSHDS	TEXT	A1
DMSINA	TEXT	A1
DMSINI	TEXT	A1
DMSINM	TEXT	A1
DMSINS	TEXT	A1
DMSINT	TEXT	A1
DMSIOW	TEXT	A1
DMSITE	TEXT	A1
DMSITI	TEXT	A1
DMSITP	TEXT	A1
DMSITS	TEXT	A1
DMSLAD	TEXT	A1

```
DMSLAF   TEXT     A1
DMSLBM   TEXT     A1
DMSLBT   TEXT     A1
DMSLDR   TEXT     A2
DMSLDS   TEXT     A1
DMSLFS   TEXT     A1
DMSLGT   TEXT     A2
DMSLIB   TEXT     A2
DMSLIO   TEXT     A2
DMSLKD   TEXT     A1
DMSLLU   TEXT     A1
DMSLOA   TEXT     A1
DMSLSB   TEXT     A1
DMSLST   TEXT     A1
DMSLSY   TEXT     A1
DMSMDP   TEXT     A1
DMSMOD   TEXT     A1
DMSMVE   TEXT     A1
DMSNCP   TEXT     A1
DMSNUC   TEXT     A1
DMSOLD   TEXT     A2
DMSOPL   TEXT     A2
DMSOPT   TEXT     A1
DMSOR1   TEXT     A2
DMSOR2   TEXT     A2
DMSOR3   TEXT     A2
DMSOVR   TEXT     A1
DMSOVS   TEXT     A1
DMSPIO   TEXT     A1
DMSPNT   TEXT     A1
DMSPRT   TEXT     A1
DMSPRV   TEXT     A1
DMSPUN   TEXT     A1
DMSQRY   TEXT     A1
DMSRDC   TEXT     A1
DMSRNE   TEXT     A1
DMSRNM   TEXT     A1
DMSROS   TEXT     A2
DMSRRV   TEXT     A1
DMSSAB   TEXT     A1
DMSSBD   TEXT     A1
DMSSBS   TEXT     A1
DMSSCN   TEXT     A1
DMSSCR   TEXT     A1
DMSSCT   TEXT     A1
DMSSEB   TEXT     A1
DMSSEG   TEXT     A2
DMSSET   TEXT     A1
DMSSLN   TEXT     A2
DMSSMN   TEXT     A2
DMSSOP   TEXT     A2
DMSSQS   TEXT     A2
DMSSRT   TEXT     A1
DMSSRV   TEXT     A1
DMSSSK   TEXT     A1
DMSSTG   TEXT     A1
DMSSTT   TEXT     A1
DMSSVN   TEXT     A2
DMSSVT   TEXT     A2
DMSSYN   TEXT     A1
DMSTIO   TEXT     A1
DMSTMA   TEXT     A1
DMSTPD   TEXT     A1
DMSTPE   TEXT     A1
DMSTQQ   TEXT     A1
DMSTRK   TEXT     A1
DMSTYP   TEXT     A1
DMSUPD   TEXT     A1
DMSVAN   TEXT     A2
DMSVAS   TEXT     A2
DMSVIB   TEXT     A1
DMSVIP   TEXT     A2
DMSVPD   TEXT     A1
DMSVSR   TEXT     A1
DMSVVN   TEXT     A2
DMSVVS   TEXT     A2
DMSXCP   TEXT     A2
DMSZAP   TEXT     A1
DMSZAT   TEXT     A1
DMSZIT   TEXT     A1
DMSZNR   TEXT     A1
DMSZUS   TEXT     A1
ICDQRNMS TEXT     A1
IFLD2COM TEXT     A1
IFLD2CTL TEXT     A1
IFLD2FMB TEXT     A1
IFLD2FMO TEXT     A1
IFLD2FOP TEXT     A1
IFLD2INT TEXT     A1
IFLD2MES TEXT     A1
IFLD2PRT TEXT     A1
IFLD2VAL TEXT     A1
IFNX1A   TEXT     A1
IFNX1J   TEXT     A1
IFNX1K   TEXT     A1
IFNX1S   TEXT     A1
IFNX2A   TEXT     A1
IFNX3A   TEXT     A1
IFNX3B   TEXT     A1
IFNX3K   TEXT     A1
IFNX3N   TEXT     A1
IFNX4D   TEXT     A1
IFNX4E   TEXT     A1
IFNX4M   TEXT     A1
IFNX4N   TEXT     A1
IFNX4S   TEXT     A1
IFNX4T   TEXT     A1
IFNX4V   TEXT     A1
IFNX5A   TEXT     A1
IFNX5C   TEXT     A1
IFNX5D   TEXT     A1
IFNX5F   TEXT     A1
IFNX5L   TEXT     A1
IFNX5M   TEXT     A1
IFNX5P   TEXT     A1
IFNX5V   TEXT     A1
IFNX6A   TEXT     A1
IFNX6B   TEXT     A1
IFNX6C   TEXT     A1
IFOX0A   TEXT     A1
IFOX0B   TEXT     A1
IFOX0C   TEXT     A1
IFOX0D   TEXT     A1
IFOX0E   TEXT     A1
IFOX0F   TEXT     A1
IFOX0G   TEXT     A1
IFOX0H   TEXT     A1
IFOX0I   TEXT     A1
IFOX0J   TEXT     A1
VMFDATE  TEXT     A1
```

```
VMFLOAD  TEXT      A1              TSOLIB   TXTLIB    A2
VRSIZE   TEXT      A1              IVPX     VEXEC     A2
CMSLIB   TXTLIB    A2              End of Tape 1 @ 800 bpi
```

CMS files included in the second tape file are:

```
DMSABN   ASSEMBLE  A1              DMSGND   ASSEMBLE  A1
DMSACC   ASSEMBLE  A1              DMSGRN   ASSEMBLE  A1
DMSACF   ASSEMBLE  A1              DMSHDI   ASSEMBLE  A1
DMSACM   ASSEMBLE  A1              DMSHDS   ASSEMBLE  A1
DMSALU   ASSEMBLE  A1              DMSINA   ASSEMBLE  A1
DMSAMS   ASSEMBLE  A1              DMSINI   ASSEMBLE  A1
DRDARD   ASSEMBLE  A1              DMSINM   ASSEMBLE  A1
DMSARE   ASSEMBLE  A1              DMSINS   ASSEMBLE  A1
DMSARN   ASSEMBLE  A1              DMSINT   ASSEMBLE  A1
DMSARX   ASSEMBLE  A1              DMSIOW   ASSEMBLE  A1
DMSASD   ASSEMBLE  A1              DMSITE   ASSEMBLE  A1
DMSASM   ASSEMBLE  A1              DMSITI   ASSEMBLE  A1
DNSASN   ASSEMBLE  A1              DMSITP   ASSEMBLE  A1
DMSAUD   ASSEMBLE  A1              DMSITS   ASSEMBLE  A1
DMSBAB   ASSEMBLE  A1              DMSLAD   ASSEMBLE  A1
DMSBOP   ASSEMBLE  A1              DMSLAF   ASSEMBLE  A1
DMSBRD   ASSEMBLE  A1              DMSLBM   ASSEMBLE  A1
DMSBTB   ASSEMBLE  A1              DMSLBT   ASSEMBLE  A1
DMSBTP   ASSEMBLE  A1              DMSLDR   ASSEMBLE  A1
DMSBWR   ASSEMBLE  A1              DMSLDS   ASSEMBLE  A1
DMSCAT   ASSEMBLE  A1              DMSLFS   ASSEMBLE  A1
DMSCIO   ASSEMBLE  A1              DMSLGT   ASSEMBLE  A1
DMSCIT   ASSEMBLE  A1              DMSLIB   ASSEMBLE  A1
DMSCLS   ASSEMBLE  A1              DMSLIO   ASSEMBLE  A1
DMSCMP   ASSEMBLE  A1              DMSLKD   ASSEMBLE  A1
DMSCPF   ASSEMBLE  A1              DMSLLU   ASSEMBLE  A1
DMSCPY   ASSEMBLE  A1              DMSLOA   ASSEMBLE  A1
DMSCRD   ASSEMBLE  A1              DMSLSB   ASSEMBLE  A1
DMSCWR   ASSEMBLE  A1              DMSLST   ASSEMBLE  A1
DMSCWT   ASSEMBLE  A1              DMSLSY   ASSEMBLE  A1
DMSDBD   ASSEMBLE  A1              DMSMDP   ASSEMBLE  A1
DMSDBG   ASSEMBLE  A1              DMSMOD   ASSEMBLE  A1
DMSDIO   ASSEMBLE  A1              DMSMVE   ASSEMBLE  A1
DMSDLB   ASSEMBLE  A1              DMSNCP   ASSEMBLE  A1
DMSDLK   ASSEMBLE  A1              DMSNUC   ASSEMBLE  A1
DMSDMP   ASSEMBLE  A1              DMSOLD   ASSEMBLE  A1
DMSDOS   ASSEMBLE  A1              DMSOPL   ASSEMBLE  A1
DMSDSK   ASSEMBLE  A1              DMSOPT   ASSEMBLE  A1
DMSDSL   ASSEMBLE  A1              DMSOR1   ASSEMBLE  A1
DMSDSV   ASSEMBLE  A1              DMSOR2   ASSEMBLE  A1
DMSEDC   ASSEMBLE  A1              DMSOR3   ASSEMBLE  A1
DMSEDF   ASSEMBLE  A1              DMSOVR   ASSEMBLE  A1
DMSEDI   ASSEMBLE  A1              DMSOVS   ASSEMBLE  A1
DMSEDX   ASSEMBLE  A1              DMSPIO   ASSEMBLE  A1
DMSERR   ASSEMBLE  A1              DMSPNT   ASSEMBLE  A1
DMSERS   ASSEMBLE  A1              DMSPRT   ASSEMBLE  A1
DMSEXC   ASSEMBLE  A1              DMSPRV   ASSEMBLE  A1
DMSEXT   ASSEMBLE  A1              DMSPUN   ASSEMBLE  A1
DMSFCH   ASSEMBLE  A1              DMSRDC   ASSEMBLE  A1
DMSFET   ASSEMBLE  A1              DMSQRY   ASSEMBLE  A1
DMSFLD   ASSEMBLE  A1              DMSRNE   ASSEMBLE  A1
DMSFNC   ASSEMBLE  A1              DMSRNM   ASSEMBLE  A1
DMSFNS   ASSEMBLE  A1              DMSROS   ASSEMBLE  A1
DMSFOR   ASSEMBLE  A1              DMSRRV   ASSEMBLE  A1
DMSFRE   ASSEMBLE  A1              DMSSAB   ASSEMBLE  A1
DMSGIO   ASSEMBLE  A1              DMSSBD   ASSEMBLE  A1
DMSGLB   ASSEMBLE  A1              DMSSBS   ASSEMBLE  A1
```

DMSSCN	ASSEMBLE	A1	DMSTQQ	ASSEMBLE	A1
DMSSCR	ASSEMBLE	A1	DMSTRK	ASSEMBLE	A1
DMSSCT	ASSEMBLE	A1	DMSTYP	ASSEMBLE	A1
DMSSEB	ASSEMBLE	A1	DMSUPD	ASSEMBLE	A1
DMSSEG	ASSEMBLE	A1	DMSVAN	ASSEMBLE	A1
DMSSET	ASSEMBLE	A1	DMSVAS	ASSEMBLE	A1
DMSSLN	ASSEMBLE	A1	DMSVIB	ASSEMBLE	A1
DMSSMN	ASSEMBLE	A1	DMSVIP	ASSEMBLE	A1
DMSSOP	ASSEMBLE	A1	DMSVPD	ASSEMBLE	A1
DMSSQS	ASSEMBLE	A1	DMSVSR	ASSEMBLE	A1
DMSSRT	ASSEMBLE	A1	DMSVVN	ASSEMBLE	A1
DMSSRV	ASSEMBLE	A1	DMSVVS	ASSEMBLE	A1
DMSSSK	ASSEMBLE	A1	DMSXCP	ASSEMBLE	A1
DMSSTG	ASSEMBLE	A1	DMSZAP	ASSEMBLE	A1
DMSSTT	ASSEMBLE	A1	DMSZAT	ASSEMBLE	A1
DMSSVN	ASSEMBLE	A1	DMSZIT	ASSEMBLE	A1
DMSSVT	ASSEMBLE	A1	DMSZNR	ASSEMBLE	A1
DMSSYN	ASSEMBLE	A1	DMSZUS	ASSEMBLE	A1
DMSTIO	ASSEMBLE	A1	VMFDATE	ASSEMBLE	A1
DMSTMA	ASSEMBLE	A1	VMFLOAD	ASSEMBLE	A1
DMSTPD	ASSEMBLE	A1	VRSIZE	ASSEMBLE	A1
DMSTPE	ASSEMBLE	A1			

CMS files included in the third tape file are:

ABTAB	MACRO	A1	DMSFST	MACRO	A1
ADT	MACRO	A1	DMSKEY	MACRO	A1
ADTGEN	MACRO	A1	DMSLN	MACRO	A1
ADTSECT	MACRO	A1	DMSLNC	MACRO	A1
AFT	MACRO	A1	DMSLND	MACRO	A1
AFTSECT	MACRO	A1	DMSLNP	MACRO	A1
ANCHTAB	MACRO	A1	DMSLNU	MACRO	A1
BATLIMIT	MACRO	A1	DMSLNY	MACRO	A1
BBOX	MACRO	A1	DMSLNZ	MACRO	A1
BGCOM	MACRO	A1	DMSPID	MACRO	A1
CCB	MACRO	A1	DMSTMS	MACRO	A1
CMSAVE	MACRO	A1	DOSAVE	MACRO	A1
CMSCB	MACRO	A1	DOSCB	MACRO	A1
CMSCVT	MACRO	A1	DOSCON	MACRO	A1
COMPSWT	MACRO	A1	DTFCP	MACRO	A1
COMRG	MACRO	A1	EDCB	MACRO	A1
CORG	MACRO	A1	EOJ	MACRO	A1
CPMOD	MACRO	A1	EQUATES	MACRO	A1
DBGSECT	MACRO	A1	EXCP	MACRO	A1
DEVGEN	MACRO	A1	EXCPW	MACRO	A1
DEVSECT	MACRO	A1	EXTSECT	MACRO	A1
DEVTAB	MACRO	A1	FCB	MACRO	A1
DIAG	MACRO	A1	FCHTAB	MACRO	A1
DIOSECT	MACRO	A1	FICL	MACRO	A1
DISPW	MACRO	A1	FSCB	MACRO	A1
DMSABN	MACRO	A1	FSCBD	MACRO	A1
DMSABW	MACRO	A1	FSCLOSE	MACRO	A1
DMSCCB	MACRO	A1	FSENTR	MACRO	A1
DMSDM	MACRO	A1	FSERASE	MACRO	A1
DMSERR	MACRO	A1	FSOPEN	MACRO	A1
DMSERT	MACRO	A1	FSPOINT	MACRO	A1
DMSEXS	MACRO	A1	FSREAD	MACRO	A1
DMSFREE	MACRO	A1	FSSTATE	MACRO	A1
DMSFRES	MACRO	A1	FSTB	MACRO	A1
DMSFRET	MACRO	A1	FSTD	MACRO	A1
DMSFREX	MACRO	A1	FSWRITE	MACRO	A1
DMSFRT	MACRO	A1	FVS	MACRO	A1
DMSFRX	MACRO	A1	GETADT	MACRO	A1

```
GETFST      MACRO  A1
HNDEXT      MACRO  A1
HNDINT      MACRO  A1
HNDSVC      MACRO  A1
IKQACB      MACRO  A1
IKQEXLST    MACRO  A1
IKQRPL      MACRO  A1
IO          MACRO  A1
IOSECT      MACRO  A1
KEYSECT     MACRO  A1
KXCHK       MACRO  A1
LDM         MACRO  A1
LDRST       MACRO  A1
LINEDIT     MACRO  A1
LUBTAB      MACRO  A1
MAPPUB      MACRO  A1
NICL        MACRO  A1
NUCON       MACRO  A1
OPENR       MACRO  A1
OSFST       MACRO  A1
OVSECT      MACRO  A1
PCTAB       MACRO  A1
PDSSECT     MACRO  A1
PGMSECT     MACRO  A1
PIBTAB      MACRO  A1
PIB2TAB     MACRO  A1
PRINTL      MACRO  A1
PUBOWNER    MACRO  A1
PUBTAB      MACRO  A1
PUNCHC      MACRO  A1
RDCARD      MACRO  A1
RDTAPE      MACRO  A1
RDTERM      MACRO  A1
REGEQU      MACRO  A1
RELPAGES    MACRO  A1
STDM        MACRO  A1
STRINIT     MACRO  A1
STXIT       MACRO  A1
SUBSECT     MACRO  A1
SVCENT      MACRO  A1
SVCSAVE     MACRO  A1
SVCSECT     MACRO  A1
SYSCOM      MACRO  A1
SYSIR       MACRO  A1
SYSLOAD     MACRO  A1
SYSNAMES    MACRO  A1
TAPECTL     MACRO  A1
TSOBLKS     MACRO  A1
TSOGET      MACRO  A1
USE         MACRO  A1
USERSECT    MACRO  A1
WAITD       MACRO  A1
WAITT       MACRO  A1
WRTAPE      MACRO  A1
WRTERM      MACRO  A1
End of Tape @ 1600 bpi
End of Tape 2 @  800 bpi
```

VM/370 RSCS/IPCS TAPE: This tape contains files of the Remote Spooling Communications Subsystem (RSCS), files of the Interactive Problem Control System (IPCS), and files pertaining to the Environmental Recording, Editing, and Printing (EREP) program libraries. The tape consists of 12 files; its format follows

RSCS Source Files
EOF/TM
RSCS Copy and Macro Files
EOF/TM
RSCS Text Files
EOF/TM
RSCS MACLIB and Related Copy File
EOF/TM
RSCS Load and MACLIB EXEC Files
EOF/TM
IPCS Source Files
EOF/TM
IPCS Copy Files
EOF/TM
IPCS Text Files
EOF/TM
IPCS MACLIB File
EOF/TM
IPCS Control and EXEC Files
EOF/TM
IPCS Command EXECs and Modules
EOF/TM
EREPLIB AND ERPTFLIB TXTLIBs
EOF/TM

RSCS files included in the first tape file are:

```
DMTAKE ASSEMBLE A1          DMTCOM ASSEMBLE A1
DMTASK ASSEMBLE A1          DMTCRE ASSEMBLE A1
DMTASY ASSEMBLE A1          DMTDSP ASSEMBLE A1
DMTAXS ASSEMBLE A1          DMTEXT ASSEMBLE A1
DMTCMX ASSEMBLE A1          DMTGIV ASSEMBLE A1
```

```
DMTINI ASSEMBLE A1                DMTREX ASSEMBLE A1
DMTIOM ASSEMBLE A1                DMTSIG ASSEMBLE A1
DMTLAX ASSEMBLE A1                DMTSML ASSEMBLE A1
DMTMAP ASSEMBLE A1                DMTSTO ASSEMBLE A1
DMTMGX ASSEMBLE A1                DMTSVC ASSEMBLE A1
DMTMSG ASSEMBLE A1                DMTSYS ASSEMBLE A1
DMTNPT ASSEMBLE A1                DMTVEC ASSEMBLE A1
DMTPST ASSEMBLE A1                DMKWAT ASSEMBLE A1
DMTQRQ ASSEMBLE A1
```

RSCS files included in the second tape file are:

```
ASYNE    COPY   A1                IOE      COPY   A1
AXSROUTE COPY   A1                IOTABLE  COPY   A1
DIAG     MACRO  A1                LINKTABL COPY   A1
FREEE    COPY   A1                ROUTE    COPY   A1
FREEZE   MACRO  A1                RSCSMSG  COPY   A1
GENLINE  MACRO  A1                RSSEQU   COPY   A1
GENLINK  MACRO  A1                SVECTORS COPY   A1
GENQ     MACRO  A1                TAG      COPY   A1
GENROUTE MACRO  A1                TAREA    COPY   A1
GENTAGQ  MACRO  A1                TASKE    COPY   A1
GIVEE    COPY   A1
```

RSCS files included in the third tape file are:

```
DMTAKE   TEXT   A1                DMTMGX   TEXT   A1
DMTASK   TEXT   A1                DMTMSG   TEXT   A1
DMTASY   TEXT   A1                DMTNPT   TEXT   A1
DMTAXS   TEXT   A1                DMTPST   TEXT   A1
DMTCMX   TEXT   A1                DMTQRQ   TEXT   A1
DMTCOM   TEXT   A1                DMTREX   TEXT   A1
DMTCRE   TEXT   A1                DMTSIG   TEXT   A1
DMTDSP   TEXT   A1                DMTSML   TEXT   A1
DMTEXT   TEXT   A1                DMTSTO   TEXT   A1
DMTGIV   TEXT   A1                DMTSVC   TEXT   A1
DMTINI   TEXT   A1                DMTVEC   TEXT   A1
DMTIOM   TEXT   A1                DMTWAT   TEXT   A1
DMTLAX   TEXT   A1                LDT   DMTSAVNC   A1
DMTMAP   TEXT   A1
```

RSCS files included in the fourth tape file are:

```
DMTMAC   MACLIB A1
DMTMAC   COPY   A1
```

RSCS files included in the fifth file are:

```
DMTR30   CNTRL  A1
DMTLOAD  EXEC   A1
DMTMAC   EXEC   A1
```

IPCS files included in the sixth file are:

```
DMMCPA ASSEMBLE A1                DMMGET ASSEMBLE A1
DMMDIR ASSEMBLE A1                DMMGRC ASSEMBLE A1
DMMDSC ASSEMBLE A1                DMMHEX ASSEMBLE A1
DMMEDM ASSEMBLE A1                DMMIDM ASSEMBLE A1
DMMFED ASSEMBLE A1                DMMINI ASSEMBLE A1
DMMFEX ASSEMBLE A1                DMMINT ASSEMBLE A1
```

```
DMMIOB ASSEMBLE A1                  DMMSCR ASSEMBLE A1
DMMLOC ASSEMBLE A1                  DMMSEA ASSEMBLE A1
DMMMAP ASSEMBLE A1                  DMMSTA ASSEMBLE A1
DMMMOD ASSEMBLE A1                  DMMSUM ASSEMBLE A1
DMMPRG ASSEMBLE A1                  DMMTRC ASSEMBLE A1
DMMPRM ASSEMBLE A1                  DMMTRN ASSEMBLE A1
DMMPRO ASSEMBLE A1                  DMMVMB ASSEMBLE A1
DMMREG ASSEMBLE A1                  DMMWRT ASSEMBLE A1
DMMRMV ASSEMBLE A1
```

IPCS files included in the seventh file are:

```
DMMSAVE  COPY   A1
EXCONST  COPY   A1
INTSECT  COPY   A1
MSGCNTRL COPY   A1
SYMSECT  COPY   A1
MSGP     MACRO  A1
```

IPCS files included in the eighth file are:

```
DMMCPA   TEXT   A1                  DMMMOD   TEXT   A1
DMMDIR   TEXT   A1                  DMMPRG   TEXT   A1
DMMDSC   TEXT   A1                  DMMPRM   TEXT   A1
DMMEDM   TEXT   A1                  DMMPRO   TEXT   A1
DMMFED   TEXT   A1                  DMMREG   TEXT   A1
DMMFEX   TEXT   A1                  DMMRMV   TEXT   A1
DMMGET   TEXT   A1                  DMMSCR   TEXT   A1
DMMGRC   TEXT   A1                  DMMSEA   TEXT   A1
DMMHEX   TEXT   A1                  DMMSTA   TEXT   A1
DMMIDM   TEXT   A1                  DMMSUM   TEXT   A1
DMMINI   TEXT   A1                  DMMTRC   TEXT   A1
DMMINT   TEXT   A1                  DMMTRN   TEXT   A1
DMMIOB   TEXT   A1                  DMMVMB   TEXT   A1
DMMLOC   TEXT   A1                  DMMWRT   TEXT   A1
DMMMAP   TEXT   A1
```

The IPCS ninth file contains:

```
DMMMAC   MACLIB  A1
```

IPCS files included in the tenth file are:

```
DMMR30   CNTRL  A1
DMMMAC   EXEC   A1
```

IPCS included in the eleventh file are:

```
PRB      EXEC   A2                  STAT     MODULE A2
VMFDUMP  EXEC   A2                  SUMMARY  MODULE A2
DUMPSCAN MODULE A2                  VMFDUMP1 MODULE A2
PROB     MODULE A2                  VMFDUMP2 MODULE A2
```

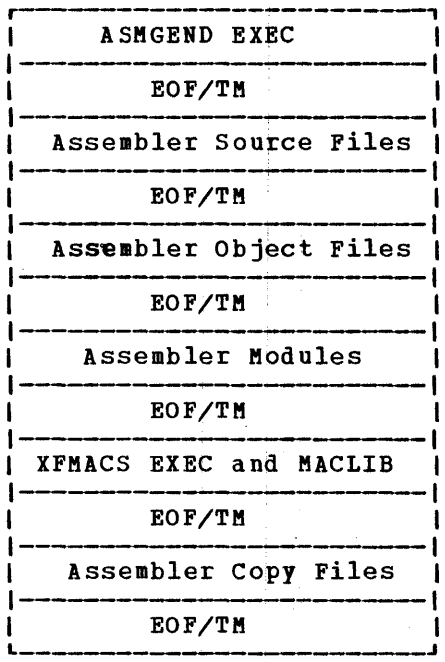
CMS files included in the twelfth tape file are:

```
EREPLIB  TEXLIB A2
ERPTFLIB TEXLIB A2
```

VM/370 PLC TAPE: The PLC tape contains all source updates, text decks, modules, macros and macro libraries, and procedures required to build the latest level of CP, RSCS, CMS and IPCS. The "Memo to Users" is the second file on the PLC tape.

Optional Tapes

The optional XF assembler tape contains six files. Its format is:



Files contained in the first tape file are:

```
ASMGEND  EXEC      A1
```

Files contained in the second tape file are:

```
DMSASM   ASSEMBLE  A1
DMSASD   ASSEMBLE  A1
IFNX1A   ASSEMBLE  A1
IFNX1J   ASSEMBLE  A1
IFNX1K   ASSEMBLE  A1
IFNX1S   ASSEMBLE  A1
IFNX2A   ASSEMBLE  A1
IFNX3A   ASSEMBLE  A1
IFNX3B   ASSEMBLE  A1
IFNX3K   ASSEMBLE  A1
IFNX3N   ASSEMBLE  A1
IFNX4D   ASSEMBLE  A1
IFNX4E   ASSEMBLE  A1
IFNX4M   ASSEMBLE  A1
IFNX4N   ASSEMBLE  A1
IFNX4S   ASSEMBLE  A1
IFNX4T   ASSEMBLE  A1
IFNX4V   ASSEMBLE  A1
IFNX5A   ASSEMBLE  A1
IFNX5C   ASSEMBLE  A1
IFNX5D   ASSEMBLE  A1
IFNX5F   ASSEMBLE  A1
IFNX5L   ASSEMBLE  A1
IFNX5M   ASSEMBLE  A1
IFNX5P   ASSEMBLE  A1
IFNX5V   ASSEMBLE  A1
IFNX6A   ASSEMBLE  A1
IFNX6B   ASSEMBLE  A1
IFNX6C   ASSEMBLE  A1
IFOX0A   ASSEMBLE  A1
IFOX0B   ASSEMBLE  A1
IFOX0C   ASSEMBLE  A1
IFOX0D   ASSEMBLE  A1
IFOX0E   ASSEMBLE  A1
IFOX0F   ASSEMBLE  A1
IFOX0G   ASSEMBLE  A1
IFOX0H   ASSEMBLE  A1
IFOX0I   ASSEMBLE  A1
IFOX0J   ASSEMBLE  A1
```

Files contained in the third tape file are:

DMSASM	TEXT	A1	IFNX5D	TEXT	A1
DMSASD	TEXT	A1	IFNX5F	TEXT	A1
IFNX1A	TEXT	A1	IFNX5L	TEXT	A1
IFNX1J	TEXT	A1	IFNX5M	TEXT	A1
IFNX1K	TEXT	A1	IFNX5P	TEXT	A1
IFNX1S	TEXT	A1	IFNX5V	TEXT	A1
IFNX2A	TEXT	A1	IFNX6A	TEXT	A1
IFNX3A	TEXT	A1	IFNX6B	TEXT	A1
IFNX3B	TEXT	A1	IFNX6C	TEXT	A1
IFNX3K	TEXT	A1	IFOX0A	TEXT	A1
IFNX3N	TEXT	A1	IFOX0B	TEXT	A1
IFNX4D	TEXT	A1	IFOX0C	TEXT	A1
IFNX4E	TEXT	A1	IFOX0D	TEXT	A1
IFNX4M	TEXT	A1	IFOX0E	TEXT	A1
IFNX4N	TEXT	A1	IFOX0F	TEXT	A1
IFNX4S	TEXT	A1	IFOX0G	TEXT	A1
IFNX4T	TEXT	A1	IFOX0H	TEXT	A1
IFNX4V	TEXT	A1	IFOX0I	TEXT	A1
IFNX5A	TEXT	A1	IFOX0J	TEXT	A1
IFNX5C	TEXT	A1			

Files contained in the fourth tape file are:

IFOX00	MODULE	A1	IFOX11	MODULE	A1
IFOX01	MODULE	A1	IFOX21	MODULE	A1
IFOX02	MODULE	A1	IFOX31	MODULE	A1
IFOX03	MODULE	A1	IFOX41	MODULE	A1
IFOX04	MODULE	A1	IFOX42	MODULE	A1
IFOX05	MODULE	A1	IFOX51	MODULE	A1
IFOX06	MODULE	A1	IFOX61	MODULE	A1
IFOX07	MODULE	A1	IFOX62	MODULE	A1

CMS files included in the fifth tape file are:

XFMACS	EXEC	A1
XFMACS	MACLIB	A1

Files contained in the sixth tape file are:

ASM	COPY	A1	JCALL	COPY	A1
EMDSECTS	COPY	A1	JCHECK	COPY	A1
CONTAINS	COPY	A1	JCOMMON	COPY	A1
CONTENTS	COPY	A1	JCSECT	COPY	A1
DBV	COPY	A1	JDUMP	COPY	A1
DCDSWORK	COPY	A1	JENTRY	COPY	A1
DSW	COPY	A1	JERMSGCD	COPY	A1
EDSECT	COPY	A1	JERRCD	COPY	A1
ERMS	COPY	A1	JEXTRN	COPY	A1
EVALWORK	COPY	A1	JFIND	COPY	A1
GENCOM	COPY	A1	JFLEBLK	COPY	A1
GENERR	COPY	A1	JFRECORE	COPY	A1
GENOP	COPY	A1	JGEN	COPY	A1
GENTAB	COPY	A1	JGENERR	COPY	A1
GOIF	COPY	A1	JGENIN	COPY	A1
GOIF1	COPY	A1	JGETCORE	COPY	A1
GOIF3	COPY	A1	JGETL	COPY	A1
GOTO	COPY	A1	JHEAD	COPY	A1
ICOMMON	COPY	A1	JINCOM	COPY	A1
IEZBITS	COPY	A1	JINPUT	COPY	A1
IEZIOB	COPY	A1	JINST	COPY	A1

```
JMODID    COPY    A1
JNOTE     COPY    A1
JNOTELB   COPY    A1
JOUTCOM   COPY    A1
JPARM     COPY    A1
JPATCH    COPY    A1
JPOINT    COPY    A1
JPOINTLB  COPY    A1
JPRINT    COPY    A1
JPUNCH    COPY    A1
JPUTL     COPY    A1
JPUTM     COPY    A1
JREAD     COPY    A1
JRELSE    COPY    A1
JRETURN   COPY    A1
JSAVE     COPY    A1
JTEXT     COPY    A1
JTMTXT    COPY    A1
JTPRINT   COPY    A1
JTRUNC    COPY    A1
JWRITE    COPY    A1
OP        COPY    A1
RSYMRCD   COPY    A1
RXLPMTS   COPY    A1
SET       COPY    A1
TBLGEN    COPY    A1
XDCDS     COPY    A1
XDICT     COPY    A1
XEVAL     COPY    A1
XFOUR     COPY    A1
XSTBL     COPY    A1
X5COM     COPY    A1
X5ERRL    COPY    A1
```

The optional CP assembly listings comprise four 800 bpi tapes or two 1600 or 6250 bpi tapes:

```
CPEREP   LISTING
DMKACO   LISTING
DMKBLD   LISTING
DMKBOX   LISTING
DMKBSC   LISTING
DMKCCH   LISTING
DMKCCW   LISTING
DMKCDB   LISTING
DMKCDS   LISTING
DMKCFC   LISTING
DMKCFD   LISTING
DMKCFG   LISTING
DMKCFM   LISTING
DMKCFP   LISTING
DMKCFS   LISTING
DMKCFT   LISTING
DMKCKP   LISTING
DMKCKS   LISTING
DMKCNS   LISTING
DMKCPB   LISTING
DMKCPE   LISTING
DMKCPI   LISTING
DMKCPV   LISTING
DMKCQG   LISTING
DMKCQP   LISTING
DMKCQR   LISTING
DMKCSO   LISTING
DMKCSP   LISTING
DMKCST   LISTING
DMKCSU   LISTING

End of 1st tape at 800 bpi

DMKCVT   LISTING
DMKDAS   LISTING
DMKDDR   LISTING
DMKDEF   LISTING
DMKDGD   LISTING
DMKDIA   LISTING
DMKDIR   LISTING
DMKDMP   LISTING
DMKDRD   LISTING
DMKDSP   LISTING
DMKEDM   LISTING
DMKEIG   LISTING
DMKEMA   LISTING
DMKEMB   LISTING
DMKERM   LISTING
DMKFCB   LISTING
DMKFMT   LISTING
DMKFRE   LISTING
DMKGIO   LISTING
DMKGRF   LISTING
DMKHVC   LISTING
DMKHVD   LISTING
DMKIOC   LISTING
DMKIOE   LISTING
DMKIOF   LISTING
DMKIOG   LISTING
DMKIOS   LISTING
DMKISM   LISTING
DMKLD00E LISTING
DMKLNK   LISTING
DMKLOC   LISTING

End of 1st tape at 1600/6250 bpi

DMKLOG   LISTING
DMKMCC   LISTING
DMKMCH   LISTING
DMKMID   LISTING

End of 2nd tape at 800 bpi

DMKMON   LISTING
DMKMSG   LISTING
DMKMSW   LISTING
DMKNEM   LISTING
DMKNES   LISTING
DMKNET   LISTING
DMKNLD   LISTING
DMKOPR   LISTING
DMKPAG   LISTING
DMKPER   LISTING
DMKPGS   LISTING
DMKPGT   LISTING
DMKPRG   LISTING
DMKPRV   LISTING
DMKPSA   LISTING
DMKPTR   LISTING
DMKQCN   LISTING
DMKRGA   LISTING
DMKRGB   LISTING
DMKRND   LISTING
DMKRNH   LISTING
DMKRPA   LISTING
DMKRSE   LISTING
DMKRSP   LISTING
DMKSAV   LISTING
DMKSCH   LISTING
DMKSCN   LISTING
DMKSEP   LISTING
DMKSEV   LISTING
DMKSIX   LISTING
DMKSNC   LISTING
DMKSNT   LISTING
DMKSPL   LISTING
DMKSSP   LISTING
DMKSTK   LISTING

End of 3rd tape at 800 bpi

DMKSYM   LISTING
DMKTAP   LISTING
DMKTBL   LISTING
DMKTBM   LISTING
DMKTDK   LISTING
DMKTHI   LISTING
DMKTMR   LISTING
DMKTRA   LISTING
DMKTRC   LISTING
DMKTRM   LISTING
```

```
DMKUCB   LISTING
DMKUCS   LISTING
DMKUDR   LISTING
DMKUNT   LISTING
DMKUSO   LISTING
DMKVAT   LISTING
DMKVCA   LISTING
DMKVCH   LISTING
DMKVCN   LISTING
DMKVDB   LISTING
DMKVDR   LISTING
DMKVDS   LISTING
DMKVER   LISTING
DMKVIO   LISTING
DMKVMA   LISTING
DMKVMI   LISTING
DMKVSP   LISTING
DMKWRM   LISTING
IBCDASDI LISTING

End of fourth tape at 800 bpi
End of second tape at 1600 or 6250 bpi
```

The optional CMS assembly listings comprise two tapes at 1600 or 6250 bpi tapes or three tapes at 800 bpi. The tapes contain the following files:

```
DMSABN   LISTING
DMSACC   LISTING
DMSACF   LISTING
DMSACM   LISTING
DMSALU   LISTING
DMSAMS   LISTING
DMSARD   LISTING
DMSARE   LISTING
DMSARN   LISTING
DMSARX   LISTING
DMSASD   LISTING
DMSASM   LISTING
DMSASN   LISTING
DMSAUD   LISTING
DMSBAB   LISTING
DMSBOP   LISTING
DMSBRD   LISTING
DMSBTB   LISTING
DMSBTP   LISTING
DMSBWR   LISTING
DMSCAT   LISTING
DMSCIO   LISTING
DMSCIT   LISTING
DMSCLS   LISTING
DMSCMP   LISTING
DMSCPF   LISTING
DMSCPY   LISTING
DMSCRD   LISTING
DMSCWR   LISTING
DMSCWT   LISTING
DMSDBD   LISTING
DMSDBG   LISTING
DMSDIO   LISTING
DMSDLB   LISTING
DMSDLK   LISTING
DMSDMP   LISTING
DMSDOS   LISTING
DMSDSK   LISTING
DMSDSL   LISTING
DMSDSV   LISTING
DMSEDC   LISTING
DMSEDF   LISTING
DMSEDI   LISTING
DMSEDX   LISTING
DMSERR   LISTING
DMSERS   LISTING
DMSEXC   LISTING
DMSEXT   LISTING
DMSFCH   LISTING
DMSFET   LISTING
DMSFLD   LISTING
DMSFNC   LISTING
DMSFNS   LISTING
DMSFOR   LISTING
DMSFRE   LISTING

End of 1st tape at 800 bpi

DMSGIO   LISTING
DMSGLB   LISTING
DMSGND   LISTING
DMSGRN   LISTING
DMSHDI   LISTING
DMSHDS   LISTING
DMSINA   LISTING
DMSINI   LISTING
DMSINM   LISTING
DMSINS   LISTING
DMSINT   LISTING
DMSIOW   LISTING
DMSITE   LISTING
DMSITI   LISTING
DMSITP   LISTING
DMSITS   LISTING
DMSLAD   LISTING
DMSLAF   LISTING
DMSLBM   LISTING
DMSLBT   LISTING

End of 1st tape at 1600/6250 bpi

DMSLDR   LISTING
DMSLDS   LISTING
DMSLFS   LISTING
DMSLGT   LISTING
DMSLIB   LISTING
DMSLIO   LISTING
DMSLKD   LISTING
DMSLLU   LISTING
DMSLOA   LISTING
DMSLSB   LISTING
DMSLST   LISTING
DMSLSY   LISTING
DMSMDP   LISTING
DMSMOD   LISTING
DMSMVE   LISTING
DMSNCP   LISTING
DMSNUC   LISTING
DMSOLD   LISTING
DMSOPL   LISTING
DMSOPT   LISTING
DMSOR1   LISTING
DMSOR2   LISTING
DMSOR3   LISTING
DMSOVR   LISTING
DMSOVS   LISTING
DMSPIO   LISTING
DMSPNT   LISTING
DMSPRT   LISTING
DMSPRV   LISTING
DMSPUN   LISTING
DMSQRY   LISTING
DMSRDC   LISTING
DMSRNE   LISTING
DMSRNM   LISTING
DMSROS   LISTING

End of 2nd tape at 800 bpi

DMSRRV   LISTING
```

```
DMSSAB   LISTING
DMSSBD   LISTING
DMSSBS   LISTING
DMSSCN   LISTING
DMSSCR   LISTING
DMSSCT   LISTING
DMSSEB   LISTING
DMSSEG   LISTING
DMSSET   LISTING
DMSSLN   LISTING
DMSSMN   LISTING
DMSSOP   LISTING
DMSSQS   LISTING
DMSSRT   LISTING
DMSSRV   LISTING
DMSSSK   LISTING
DMSSTG   LISTING
DMSSTT   LISTING
DMSSVN   LISTING
DMSSVT   LISTING
DMSSYN   LISTING
DMSTIO   LISTING
DMSTMA   LISTING
DMSTPD   LISTING
DMSTPE   LISTING
DMSTQQ   LISTING
DMSTRK   LISTING
DMSTYP   LISTING
DMSUPD   LISTING
DMSVAN   LISTING
DMSVAS   LISTING
DMSVIB   LISTING
DMSVIP   LISTING
DMSVPD   LISTING
DMSVSR   LISTING
DMSVVN   LISTING
DMSVVS   LISTING
DMSXCP   LISTING
DMSZAP   LISTING
DMSZAT   LISTING
DMSZIT   LISTING
DMSZNR   LISTING
DMSZUS   LISTING
VMFDATE  LISTING
VMFLOAD  LISTING
VRSIZE   LISTING

End of 3nd tape at 800 bpi
End of 2nd tape at 1600/6250 bpi
```

The 26 RSCS listing files are contained on one tape; the files are:

DMTAKE	LISTING	DMTMAP	LISTING
DMTASK	LISTING	DMTMGX	LISTING
DMTASY	LISTING	DMTMSG	LISTING
DMTAXS	LISTING	DMTNPT	LISTING
DMTCMX	LISTING	DMTPST	LISTING
DMTCOM	LISTING	DMTQRQ	LISTING
DMTCRE	LISTING	DMTREX	LISTING
DMTDSP	LISTING	DMTSIG	LISTING
DMTEXT	LISTING	DMTSML	LISTING
DMTGIV	LISTING	DMTSTO	LISTING
DMTINI	LISTING	DMTSVC	LISTING
DMTIOM	LISTING	DMTVEC	LISTING
DMTLAX	LISTING	DMTWAT	LISTING

The 29 IPCS files are contained on one tape; the files are:

DMMCPA	LISTING	DMMMOD	LISTING
DMMDIR	LISTING	DMMPRG	LISTING
DMMDSC	LISTING	DMMPRM	LISTING
DMMEDM	LISTING	DMMPRO	LISTING
DMMFED	LISTING	DMMREG	LISTING
DMMFEX	LISTING	DMMRMV	LISTING
DMMGET	LISTING	DMMSCR	LISTING
DMMGRC	LISTING	DMMSEA	LISTING
DMMHEX	LISTING	DMMSTA	LISTING
DMMIDM	LISTING	DMMSUM	LISTING
DMMINI	LISTING	DMMTRC	LISTING
DMMINT	LISTING	DMMTRN	LISTING
DMMIOB	LISTING	DMMVMB	LISTING
DMMLOC	LISTING	DMMWRT	LISTING
DMMMAP	LISTING		

PRINTING ASSEMBLY LISTINGS FROM THE OPTIONAL CP, CMS, RSCS AND IPCS TAPES: In order to selectively print a given listing, use the CMS TAPE command to forward space the tape to the given file. Then use the following CMS commands to print the listing.

```
FILEDEF INMOVE TAP1 (BLOCK 8107 LRECL 121 DEN 1600[1] RECFM FB PERM
FILEDEF OUTMOVE PRINTER (BLOCK 121 LRECL 121 RECFM FA PERM
MCVEFILE
```

Note: The tape to be printed must be attached as 181.

The CP and CMS assembly listing tapes contain 121-character records with a blocksize of 8107.

---

[1]If 800 bpi tapes are being used, this must be changed to 800. If 6250 bpi tapes are being used, this must be changed to 6250.

SECTION 7. VM/370 RESTRICTIONS

A virtual machine created by VM/370 is capable of running an IBM System/360 or System/370 operating system as long as certain VM/370 restrictions are not violated. Virtual machine restrictions and certain execution characteristics are stated in Section 7.

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 CPU). However, some dynamically modified channel programs are given special consideration by CP: specifically, 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; and those generated by the OS/VS Telecommunications Access Method (TCAM) Level 5, with the VM/370 option.

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 VM/370 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 VM/370 directory entry for the OS/VS virtual machine.

Virtual machines using OS/VS TCAM (Level 5, generated or invoked with the VM/370 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.

The restriction against dynamically modified channel programs does not apply if the virtual machine has the virtual=real performance option and the NOTRANS option has been set on.

MINIDISK RESTRICTIONS

The following restrictions exist for minidisks:

1. In the case of read home address with the skip bit off, VM/370 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. 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.

3. 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 zero). There is no such restriction for DOS ISAM or OS/VS ISAM running virtual=virtual.

4. VM/370 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.

5. If the user's channel program for a minidisk does not perform a seek operation, then to prevent accidental accessing, VM/370 inserts a positioning seek operation into the user's channel program. Thus, certain channel programs may generate a condition

code (CC) of zero on a SIO instead of an expected CC of one, which is reflected to the virtual machine. The final status is reflected to the virtual machine as an interrupt.

6. A DASD channel program directed to a 3330, 3340, or 3350 device may give results on dedicated drives which differ from results on minidisks having non-zero relccation factors 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.

   Note: 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.

7. The IBCDASDI program cannot assign alternate tracks for a 3330, 3340, or 3350 minidisk.

8. 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 conditicn due to an invalid command sequence.

9. When performing DASD I/O, if the record field of a search ID argument is zero when a virtual Start I/O is issued, but the search ID argument is dynamically read by the channel program before the search ID CCW is executed, then 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.

TIMING DEPENDENCIES

Timing dependencies in input/output devices or programming do not function consistently under VM/370:

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/370 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 an 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.
- 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/370 if issued from third level storage. For example, a reset poll macro has a NOP effect if executed from a virtual=virtual storage under VS1 which is running under VM/370.)

2. Programming that makes use of the PCI channel interrupt for channel program modification or processor signalling must be written 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/370 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 available 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.

CPU MODEL-DEPENDENT FUNCTIONS

On the System/370 Model 158 only, the Virtual Machine Assist feature cannot operate concurrently with the 7070/7074 compatibility feature (Feature #7117).

Programs written for CPU model-dependent functions may not execute properly in the virtual machine under VM/370. The following points should be noted:

1. Programs written to examine the machine logout area do not have meaningful data since VM/370 does not reflect the machine logout data to a virtual machine.

2. Programs written to obtain CPU identification (via the Store CPU ID 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. Programs written to obtain channel identification (via the Store Channel ID instruction, STIDC) receive information from the virtual channel block. Only the virtual channel type is reflected; the other fields contain zeroes.

4. No simulation of other CPU models is attempted by VM/370.

VIRTUAL MACHINE CHARACTERISTICS

Other characteristics that exist for a virtual machine under VM/370 are as follows:

1. 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/370 CPU 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.

2. VM/370 has no multiple path support and, hence, does not take advantage of the two-channel switch. However, a two-channel switch can be used between the IBM System/370 running a virtual machine under VM/370 and another CPU.

3. The DIAGNOSE instruction cannot be issued by the virtual machine for its normal function. VM/370 uses this instruction to allow the virtual machine to communicate system services requests. The Diagnose interface requires the operand storage addresses passed to it to be real to the virtual machine issuing the DIAGNOSE instruction. For more information about the DIAGNOSE instruction in a virtual machine, see the VM/370: System Programmer's Guide.

4. 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.

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

6. The VM/370 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.

7. VM/370 does not support count control on the virtual 1052 operator's console.

8. Programs that use the integrated emulators function only if the real computing system has the appropriate compatibility feature. VM/370 does not attempt simulation. The DOS emulator running under OS or OS/VS is not supported under VM/370.

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

10. The System/370 SET CLOCK instruction cannot be simulated and, hence, is ignored if issued by a virtual machine. The System/370 STORE CLOCK instruction is a nonprivileged instruction and cannot be trapped by VM/370; it provides the true TOD clock value from the real CPU.

11. 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.

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

13. 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 overlayed 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 20,000, whichever is smaller.

14. 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.

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

15. When an I/O error occurs on a device, the System/370 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/370, 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.

16. 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.

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

18. 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.

19. 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. See VM/370: System Messages for additional information.

CMS RESTRICTIONS

The following restrictions apply to CMS, the conversational subsystem of VM/370:

1. CMS executes only on a virtual IBM System/370 provided by VM/370.

2. The maximum sizes in cylinders of CMS minidisks are as follows:

Disk	Maximum Cylinders	CMS/VSAM
2314/2319	203	200
3330 Series	246	404
3340 Model 35	349	348
3340 Model 70/3344	682	696
3350 Series	115	not supported in native mode

3. CMS employs the spooling facilities of VM/370 to perform unit record I/O. However, a program running under CMS can issue its own SIOs to attached dedicated unit record devices.

4. Only those OS and DOS facilities that are simulated by CMS can be used to execute OS and DOS programs produced by language processors under CMS.

5. 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 DOS virtual machines under VM/370, the writing and updating of non-VSAM OS data sets and DOS files are not supported under CMS.

6. CMS can read sequential and partitioned OS data sets and sequential DOS files, by simulating certain OS macros.

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

- 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.
- Keys in data sets with 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 DOS files that reside on DOS disks:

- Only DOS 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 DOS sequential files.
- The following types of DOS files cannot be read:

  --DOS DAM and ISAM files.

  --Files with the input security indicator on.

  --DOS files that contain more than 16 user label and/or data extents. (If the file has user labels, they occupy the first extent; therefore the file must contain no more than 15 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 DOS 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, since the CMS/DOS implementation of the DUMMY statement corresponds to the DOS/VS implementation. Specifying the DUMMY option with the DLBL command will cause an execution-time error.

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

MISCELLANEOUS RESTRICTIONS

1. If you intend to run VM/370 Release 1 and pre-PLC 9 Release 2 systems alternately, apply Release 1 PLC 14 or higher (APAR V1179) to your Release 1 system, to provide compatibility and to prevent loss of spool files in case of a warm start. Changes to the spool file format in PLC 9 of Release 2 require a cold start when switching between pre-Release 2 PLC 9 and post-Release 2 PLC 9 systems.

2. 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.

3. If you intend to define more than 73 virtual devices for a single virtual machine, be aware that any single request for free storage in excess of 512 doublewords (a full page) may cause the VM/370 system to abnormally terminate (ABEND code PTR007) if the extra storage is not available on a contiguous page. Therefore, two contiguous pages of free storage must be available in order to log on a virtual machine with more than 73 virtual devices (three contiguous pages for a virtual machine with more than 146 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 73 devices should be the first to log on after IPL. The larger the real machine size, the lesser the possibility of this occurring.

4. For remote 3270s, VM/370 supports a maximum of 16 binary synchronous lines, minus the number of 3704/3705 Communications Controllers in NCP mode minus one (if there are any 3704/3705 Communications Controllers in emulation mode).

5. 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.

SECTION 8. RELEASE 2 APAR MODIFICATIONS INCORPORATED INTO RELEASE 3

The VM/370 Release 3 base system incorporates code and documentation modifications caused by Release 2 APAR (Authorized Program Analysis Report) activity.

Following is a list of APAR numbers that reflect Release 2 APAR problems that have been resolved prior to Release 2 PLC 22. Further Release 2 APAR problems that apply to Release 3 will be contained on Release 3 PLC tapes, as they become available.

APARs affecting CP

W1066DMK	W1632DMK	W1774DMK	W1983DMK
W1138DMK	W1634DMK	W1775DMK	W1985DMK
W1188DMK	W1638DMK	W1782DMK	W1989DMK
W1227DMK	W1639DMK	W1786DMK	W2003DMK
W1299DMK	W1643DMK	W1791DMK	W2004DMK
W1330DMK	W1645DMK	W1793DMK	W2008DMK
W1331DMK	W1647DMK	W1803DMK	W2009DMK
W1337DMK	W1652DMK	W1807DMK	W2011DMK
W1365DMK	W1653DMK	W1811DMK	W2014DMK
W1382DMK	W1656DMK	W1813DMK	W2015DMK
W1384DMK	W1660DMK	W1816DMK	W2018DMK
W1388DMK	W1662DMK	W1826DMK	W2023DMK
W1435DMK	W1665DMK	W1827DMK	W2040DMK
W1453DMK	W1666DMK	W1833DMK	W2049DMK
W1455DMK	W1667DMK	W1834DMK	W2050DMK
W1460DMK	W1668DMK	W1836DMK	W2052DMK
W1464DMK	W1670DMK	W1855DMK	W2053DMK
W1468DMK	W1672DMK	W1863DMK	W2055DMK
W1477DMK	W1679DMK	W1872DMK	W2056DMK
W1491DMK	W1682DMK	W1876DMK	W2058DMK
W1504DMK	W1683DMK	W1877DMK	W2059DMK
W1506DMK	W1684DMK	W1879DMK	W2062DMK
W1513DMK	W1687DMK	W1880DMK	W2064DMK
W1525DMK	W1688DMK	W1881DMK	W2075DMK
W1542DMK	W1689DMK	W1882DMK	W2077DMK
W1550DMK	W1700DMK	W1883DMK	W2094DMK
W1553DMK	W1705DMK	W1886DMK	W2099DMK
W1570DMK	W1709DMK	W1891DMK	W2100DMK
W1576DMK	W1709DMK	W1892DMK	W2106DMK
W1578DMK	W1711DMK	W1912DMK	W2130DMK
W1580DMK	W1714DMK	W1913DMK	W2132DMK
W1581DMK	W1719DMK	W1914DMK	W2137DMK
W1586DMK	W1725DMK	W1915DMK	W2139DMK
W1587DMK	W1726DMK	W1918DMK	W2142DMK
W1594DMK	W1727DMK	W1930DMK	W2143DMK
W1597DMK	W1730DMK	W1935DMK	W2145DMK
W1599DMK	W1731DMK	W1938DMK	W2149DMK
W1601DMK	W1733DMK	W1940DMK	W2153DMK
W1603DMK	W1740DMK	W1941DMK	W2179DMK
W1607DMK	W1742DMK	W1942DMK	W2180DMK
W1613DMK	W1762DMK	W1949DMK	W2182DMK
W1616DMK	W1767DMK	W1962DMK	W2192DMK
W1622DMK	W1770DMK	W1964DMK	W2195DMK
W1624DMK	W1771DMK	W1965DMK	W2203DMK
W1629DMK	W1772DMK	W1977DMK	W2207DMK

W2223DMK	W2709DMK	W3150DMK	W3430DMK
W2227DMK	W2712DMK	W3157DMK	W3431DMK
W2229DMK	W2715DMK	W3161DMK	W3434DMK
W2233DMK	W2716DMK	W3162DMK	W3436DMK
W2251DMK	W2718DMK	W3163DMK	W3437DMK
W2254DMK	W2743DMK	W3169DMK	W3438DMK
W2255DMK	W2747DMK	W3170DMK	W3443DMK
W2256DMK	W2760DMK	W3176DMK	W3448DMK
W2257DMK	W2766DMK	W3177DMK	W3463DMK
W2259DMK	W2771DMK	W3178DMK	W3468DMK
W2264DMK	W2776DMK	W3179DMK	W3472DMK
W2267DMK	W2778DMK	W3180DMK	W3474DMK
W2276DMK	W2779DMK	W3182DMK	W3475DMK
W2277DMK	W2785DMK	W3183DMK	W3478DMK
W2292DMK	W2787DMK	W3185DMK	W3492DMK
W2296DMK	W2792DMK	W3186DMK	W3502DMK
W2307DMK	W2796DMK	W3188DMK	W3503DMK
W2313DMK	W2805DMK	W3189DMK	W3505DMK
W2316DMK	W2808DMK	W3194DMK	W3507DMK
W2332DMK	W2811DMK	W3195DMK	W3511DMK
W2334DMK	W2814DMK	W3197DMK	W3516DMK
W2337DMK	W2818DMK	W3198DMK	W3517DMK
W2338DMK	W2830DMK	W3260DMK	W3519DMK
W2339DMK	W2834DMK	W3261DMK	W3542DMK
W2350DMK	W2836DMK	W3262DMK	W3543DMK
W2358DMK	W2847DMK	W3263DMK	W3545DMK
W2361DMK	W2848DMK	W3281DMK	W3547DMK
W2364DMK	W2849DMK	W3284DMK	W3562DMK
W2382DMK	W2863DMK	W3286DMK	W3565DMK
W2383DMK	W2869DMK	W3287DMK	W3566DMK
W2384DMK	W2884DMK	W3291DMK	W3567DMK
W2386DMK	W2886DMK	W3292DMK	W3573DMK
W2390DMK	W2887DMK	W3293DMK	W3582DMK
W2397DMK	W2888DMK	W3298DMK	W3583DMK
W2402DMK	W2901DMK	W3299DMK	W3584DMK
W2423DMK	W2902DMK	W3320DMK	W3585DMK
W2431DMK	W2971DMK	W3321DMK	W3587DMK
W2450DMK	W2975DMK	W3322DMK	W3597DMK
W2481DMK	W2985DMK	W3323DMK	W3605DMK
W2483DMK	W2991DMK	W3326DMK	W3608DMK
W2491DMK	W2992DMK	W3327DMK	W3612DMK
W2497DMK	W2994DMK	W3330DMK	W3616DMK
W2503DMK	W2998DMK	W3331DMK	W3618DMK
W2504DMK	W3013DMK	W3335DMK	W3618DMK
W2510DMK	W3030DMK	W3338DMK	W3619DMK
W2514DMK	W3036DMK	W3350DMK	W3652DMK
W2518DMK	W3041DMK	W3351DMK	W3655DMK
W2536DMK	W3049DMK	W3352DMK	W3658DMK
W2537DMK	W3060DMK	W3358DMK	W3670DMK
W2553DMK	W3061DMK	W3372DMK	W3674DMK
W2554DMK	W3065DMK	W3374DMK	W3675DMK
W2557DMK	W3071DMK	W3381DMK	W3678DMK
W2559DMK	W3072DMK	W3383DMK	W3679DMK
W2570DMK	W3090DMK	W3384DMK	W3683DMK
W2573DMK	W3098DMK	W3387DMK	W3685DMK
W2583DMK	W3105DMK	W3389DMK	W3687DMK
W2588DMK	W3106DMK	W3393DMK	W3688DMK
W2607DMK	W3109DMK	W3394DMK	W3689DMK
W2609DMK	W3123DMK	W3395DMK	W3691DMK
W2628DMK	W3128DMK	W3397DMK	W3693DMK
W2630DMK	W3144DMK	W3398DMK	W3696DMK
W2639DMK	W3145DMK	W3410DMK	W3704DMK
W2644DMK	W3147DMK	W3412DMK	W3710DMK
W2672DMK	W3148DMK	W3413DMK	W3720DMK
W2708DMK	W3149DMK	W3414DMK	W3722DMK

W3723DMK	W3814DMK	W4002DMK	W4113DMK
W3724DMK	W3816DMK	W4009DMK	W4115DMK
W3725DMK	W3817DMK	W4020DMK	W4137DMK
W3732DMK	W3818DMK	W4021DMK	W4139DMK
W3738DMK	W3831DMK	W4022DMK	W4140DMK
W3750DMK	W3832DMK	W4026DMK	W4144DMK
W3758DMK	W3834DMK	W4028DMK	W4151DMK
W3761DMK	W3841DMK	W4040DMK	W4152DMK
W3772DMK	W3848DMK	W4044DMK	W4157DMK
W3775DMK	W3871DMK	W4045DMK	W4160DMK
W3785DMK	W3873DMK	W4048DMK	W4161DMK
W3786DMK	W3892DMK	W4062DMK	W4162DMK
W3787DMK	W3893DMK	W4064DMK	W4163DMK
W3788DMK	W3897DMK	W4065DMK	W4164DMK
W3795DMK	W3954DMK	W4067DMK	W4165DMK
W3799DMK	W3955DMK	W4079DMK	W4200DMK
W3800DMK	W3957DMK	W4083DMK	W4202DMK
W3802DMK	W3962DMK	W4087DMK	W4204DMK
W3803DMK	W3982DMK	W4088DMK	W4206DMK
W3804DMK	W3983DMK	W4090DMK	W4211DMK
W3806DMK	W3991DMK	W4091DMK	W4212DMK
W3809DMK	W3993DMK	W4093DMK	W4214DMK
W3811DMK	W3998DMK	W4094DMK	W4219DMK
W3812DMK	W4000DMK	W4098DMK	W4235DMK
W3813DMK	W4001DMK	W4112DMK	

APARs affecting CMS

W1100DMS	W1757DMS	W2247DMS	W2566DMS
W1154DMS	W1759DMS	W2287DMS	W2568DMS
W1260DMS	W1841DMS	W2321DMS	W2569DMS
W1316DMS	W1843DMS	W2322DMS	W2592DMS
W1346DMS	W1844DMS	W2323DMS	W2593DMS
W1363DMS	W1845DMS	W2324DMS	W2596DMS
W1367DMS	W1846DMS	W2326DMS	W2599DMS
W1388DMS	W1921DMS	W2328DMS	W2604DMS
W1419DMS	W1924DMS	W2329DMS	W2610DMS
W1443DMS	W1926DMS	W2348DMS	W2616DMS
W1445DMS	W1950DMS	W2370DMS	W2633DMS
W1447DMS	W1952DMS	W2371DMS	W2650DMS
W1467DMS	W1953DMS	W2373DMS	W2653DMS
W1484DMS	W1954DMS	W2374DMS	W2657DMS
W1486DMS	W1957DMS	W2376DMS	W2659DMS
W1489DMS	W1990DMS	W2378DMS	W2691DMS
W1530DMS	W1991DMS	W2410DMS	W2692DMS
W1533DMS	W1997DMS	W2415DMS	W2693DMS
W1535DMS	W1998DMS	W2417DMS	W2698DMS
W1536DMS	W2035DMS	W2418DMS	W2699DMS
W1537DMS	W2039DMS	W2419DMS	W2732DMS
W1538DMS	W2083DMS	W2440DMS	W2735DMS
W1539DMS	W2086DMS	W2445DMS	W2750DMS
W1560DMS	W2088DMS	W2449DMS	W2751DMS
W1561DMS	W2089DMS	W2470DMS	W2752DMS
W1567DMS	W2110DMS	W2474DMS	W2754DMS
W1602DMS	W2112DMS	W2476DMS	W2756DMS
W1693DMS	W2117DMS	W2520DMS	W2757DMS
W1695DMS	W2167DMS	W2521DMS	W2758DMS
W1696DMS	W2169DMS	W2523DMS	W2759DMS
W1699DMS	W2219DMS	W2525DMS	W2820DMS
W1750DMS	W2241DMS	W2528DMS	W2821DMS
W1751DMS	W2242DMS	W2548DMS	W2822DMS
W1756DMS	W2244DMS	W2563DMS	W2823DMS

W2824DMS	W3086DMS	W3532DMS	W3972DMS
W2828DMS	W3087DMS	W3533DMS	W3973DMS
W2829DMS	W3130DMS	W3535DMS	W3976DMS
W2851DMS	W3132DMS	W3536DMS	W3978DMS
W2853DMS	W3133DMS	W3537DMS	W3979DMS
W2854DMS	W3136DMS	W3571DMS	W4010DMS
W2855DMS	W3139DMS	W3572DMS	W4014DMS
W2856DMS	W3251DMS	W3620DMS	W4015DMS
W2857DMS	W3253DMS	W3621DMS	W4016DMS
W2870DMS	W3255DMS	W3623DMS	W4019DMS
W2871DMS	W3257DMS	W3626DMS	W4052DMS
W2872DMS	W3258DMS	W3665DMS	W4055DMS
W2874DMS	W3259DMS	W3666DMS	W4057DMS
W2876DMS	W3298DMS	W3668DMS	W4072DMS
W2879DMS	W3313DMS	W3713DMS	W4074DMS
W2961DMS	W3314DMS	W3714DMS	W4076DMS
W2963DMS	W3316DMS	W3717DMS	W4077DMS
W2965DMS	W3361DMS	W3760DMS	W4100DMS
W2967DMS	W3362DMS	W3763DMS	W4103DMS
W2968DMS	W3364DMS	W3764DMS	W4105DMS
W2969DMS	W3366DMS	W3767DMS	W4106DMS
W3000DMS	W3368DMS	W3768DMS	W4107DMS
W3002DMS	W3369DMS	W3771DMS	W4109DMS
W3003DMS	W3403DMS	W3854DMS	W4120DMS
W3005DMS	W3406DMS	W3858DMS	W4129DMS
W3006DMS	W3409DMS	W3882DMS	W4190DMS
W3007DMS	W3450DMS	W3883DMS	W4191DMS
W3020DMS	W3452DMS	W3885DMS	W4192DMS
W3027DMS	W3453DMS	W3886DMS	W4193DMS
W3028DMS	W3455DMS	W3887DMS	W4194DMS
W3054DMS	W3458DMS	W3889DMS	W4196DMS
W3056DMS	W3530DMS	W3971DMS	W4199DMS
W3059DMS			

APARs affecting RSCS

W3110DMT	W3304DMT	W3424DMT	W3740DMT
W3111DMT	W3305DMT	W3425DMT	W3741DMT
W3112DMT	W3306DMT	W3426DMT	W3742DMT
W3113DMT	W3307DMT	W3480DMT	W3743DMT
W3114DMT	W3308DMT	W3482DMT	W3744DMT
W3115DMT	W3340DMT	W3487DMT	W3745DMT
W3119DMT	W3341DMT	W3488DMT	W3749DMT
W3273DMT	W3342DMT	W3489DMT	W3821DMT
W3274DMT	W3343DMT	W3520DMT	W3860DMT
W3275DMT	W3344DMT	W3522DMT	W3862DMT
W3276DMT	W3345DMT	W3523DMT	W3863DMT
W3277DMT	W3347DMT	W3527DMT	W4030DMT
W3278DMT	W3348DMT	W3529DMT	W4032DMT
W3279DMT	W3349DMT	W3640DMT	W4035DMT
W3300DMT	W3420DMT	W3643DMT	W4039DMT
W3301DMT	W3421DMT	W3645DMT	W4171DMT
W3302DMT	W3422DMT	W3647DMT	W4173DMT
W3303DMT	W3423DMT	W3649DMT	W4174DMT

SECTION 9. LEVEL REQUIREMENTS OF OTHER SUPPORTED PROGRAMS FOR VM/370 PROGRAM COMPATABILITY

The following list defines the updates that must be applied to DOS/VS when using it with the VM/370 Release 3 CMS component:

DOS/VS Release 31		DOS/VS Release 32	
APAR Number	PTF Number	APAR Number	PTF Number
E07175	5745-04924	E07175	5745-10041
E07151	5745-04925	E09907	*
E05450	5745-04927	E09908	*
E09907	*	DY09921	5745-10407
E09908	*	E07151	5745-10077
DY09921	5745-04528		
DY-7173	5745-04675		
DY07106	5745-04924		
E05489	*		

The following list defines the updates that should be applied to VM/370 supported Program Products when using them with Release 3 of CMS.

Program	APAR	PTF Number
OS PL/I Optimizing Compiler	PP43073	*

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*The asterisk indicates that no PTF number was assigned to designated APAR at the time this publication went to press. Current APAR and PTF information is available from your IBM Programming Support Representative.

APPENDIX A: CMS/DOS - PROVISIONS AND LIMITATIONS

This appendix contains detailed information on the extent of DOS/VS support in CMS. This is detailed information. It is for system programmers and assembler language programmers familiar with VM/370 and DOS/VS, so they may make a more accurate assessment of the usability of CMS/DOS for their installation.

DOS/VS MACROS, ROUTINES, AND CONTROL BLOCKS SUPPORTED BY CMS/DOS

DOS/VS Supervisor and I/O Macros Supported by CMS/DOS, Detailed Information

CMS/DOS supports the DOS/VS supervisor macros and the SAM and VSAM I/O macros to the extent necessary to execute the DOS/VS COBOL Compiler and the DOS PL/I Optimizing Compiler under CMS/DOS. CMS/DOS supports Release 31 and 32 of DOS/VS supervisor macros. These macros are described in detail in the IBM DOS/VS Supervisor and I/O Macros, Order No. GC33-5373.

Sequential Access Method - Declarative Macros: CMS/DOS supports the following declarative macros:

- DTFCD
- DTFCN
- DTFDI
- DTFMT
- DTFPR
- DTFSD

The CDMOD, DIMOD, MTMOD, PRMOD, and SDMOD macros generate the logical IOCS routines that correspond to the declarative macros. The operands that CMS/DOS supports for the DTF are also supported for the macro.

Descriptions of the supported macros follow. These descriptions show the extent of each macro's support in CMS/DOS.

DTFCD Macro - Defines the File for a Card Reader

CMS/DOS does not support the ASOCFLE, FUNC, TYPEFILE=CMBND, and OUBLKSZ operands of the DTFCD macro. CMS/DOS ignores the SSELECT operand and any mode other than MODE=E. Figure A-1 describes the DTFCD macro operands and their support under CMS/DOS. An asterisk (*) in the status column indicates that CMS/DOS support differs from DOS/VS support.

Operand	Status	Description
DEVADDR=SYSxxx		Symbolic unit for reader-punch used for this file.
IOAREA1=xxxxxxxx		Name of the first I/O area.
ASOCFLE=xxxxxxxx	*	Not supported.
BLKSIZE=nnn	*	Length of one I/O area, in bytes. If omitted, 80 is assumed. If CTLCHR=YES is specified, BLKSIZE defaults to 81.
CONTROL=YES		CNTRL macro used for this file. Omit CTLCHR for this file. Does not apply to 2501.
CRDERR=RETRY	*	Retry if punching error is detected. Applies to 2520 and 2540 only. However, this situation is never encountered under CMS/DOS because hardware errors are not passed to the LIOCS module.
CTLCHR=xxx		(YES or ASA). Data records have control character. YES for S/370 character set; ASA for American National Standards Institute character set. Omit CONTROL for this file.
DEVICE=nnnn	*	(2501, 2520, 2540, 3505, or 3525). If omitted, 2540 is assumed.
EOFADDR=xxxxxxxx		Name of your end-of-file routine.
ERROPT=xxxxxx	*	IGNORE, SKIP, or name. Applies to 3505 and 3525 only.
FUNC=xxx	*	Not supported.
IOAREA2=xxxxxxxx		If two cutput areas are used, name of second area.
IOREG=(nn)		Register number, if two I/O areas used and GET or PUT does not specify a work area. Omit WORKA.

Figure A-1. CMS/DOS Support of DTFCD Macro (Part 1 of 2)

Operand	Status	Description
MODE=xx	*	Only MODE=E is supported.
MODNAME=xxxxxxxx		Name of the logic module that is used with the DTF table to process the file.
OUBLKSZ=nn	*	Not supported.
RDONLY=YES	*	Causes a read-only module to be generated.
RECFORM=xxxxxx		(FIXUNB, VARUNB, UNDEF). If omitted, FIXUNB is assumed.
RECSIZE=(nn)	*	Register number if RECFORM=UNDEF.
SEPASMB=YES		DTFCD is to be assembled separately.
SSELECT=n	*	Ignored.
TYPE=xxxxxx	*	Input or output.
WORKA=YES		I/O records are processed in work areas instead of the I/O areas.

Figure A-1. CMS/DOS Support of DTFCD Macro (Part 2 of 2)

DTFCN Macro - Define the File for a Console

CMS/DOS supports all of the operands of the DTFCN macro. Figure A-2 describes the operands of the DTFCN macro and their support under CMS/DOS. The status column is blank because the CMS/DOS and DOS/VS support for DTFCN are the same.

Operand	Status	Description
DEVADDR=SYSxxx		Symbolic unit for the console used for this file.
IOAREA1=xxxxxxxx		Name of I/O area.
BLKSIZE=nnn		Length in bytes of I/O area (for PUTR macro usage, length of output part of I/O area). If RECFORM=UNDEF, maximum is 256. If omitted, 80 is assumed.
INPSIZE=nnn		Length in bytes for input part of I/O area for PUTR macro usage.
MODNAME=xxxxxxxx		Logic module name for this DTF. If omitted, IOCS generates a standard name. The logic module is generated as part of the DTF.
RECFORM=xxxxxx		(FIXUNB or UNDEF). If omitted, FIXUNB is assumed.
RECSIZE=(nn)		Register number if RECFORM=UNDEF. General registers 2-12, written in parentheses.
TYPEFLE=xxxxxx		(INPUT, OUTPUT, or CMBND). Input processes both input and output. CMBND must be specified for PUTR macro usage. If omitted, INPUT is assumed.
WORKA=YES		GET or PUT specifies work area.

Figure A-2. CMS/DOS Support of DTFCN macro

DTFDI MACRO - Define the File for Device Independence for System Logical Units

CMS/DOS supports all the operands of the DTFDI macro. Figure A-3 describes the operands of the DTFDI macro and their support under CMS/DOS. The status column is blank because the CMS/DOS and DOS/VS support for DTFDI are the same.

Operand	Status	Description
DEVADDR=SYSxxx		(SYSIPT, SYSLST, SYSPCH, or SYSRDR). System logical unit. CMS/DOS issues an error message if the logical unit specified on the DTF does not match the logical unit specified on the corresponding DLBL command.
IOAREA1=xxxxxxxx		Name of the first I/O area.
EOFADDR=xxxxxxxx		Name of your end-of-file routine.
ERROPT=xxxxxxxx		(IGNORE, SKIP, or name of your error routine). Prevents termination on errors.
IOAREA2=xxxxxxxx		If two I/O areas are used, name of second area.
IOREG=(nn)		Register number. If omitted and two I/O areas are used, register 2 is assumed. General registers 2-12, written in parentheses.
MODNAME=xxxxxxxx		DIMOD name for this DTF. If omitted, IOCS generates a standard name.
RDONLY=YES		Generates a read-only module. Requires a module save area for each routine using the module.
RECSIZE=nnn		Number of characters in record. Assumed values: 121 (SYSLST), 81 (SYSPCH), 80 (otherwise).
SEPASMB=YES		DTFDI to be assembled separately.
WLRERR=xxxxxxxx		Name of your wrong-length-record routine.

Figure A-3. CMS/DOS Support of DTFDI Macro

DTFMT Macro - Define the File for a Magnetic Tape

CMS/DOS does not support the ASCII, BUFOFF, HDRINFO, LENCHK, and READ=BACK operands of the DTFMT macro. Tape I/O operations are limited to reading in the forward direction.

CMS/DOS creates unlabeled tapes and bypasses standard labels. User-written label processing routines are used, when supplied. CMS/DOS handles tapes labels as follows:

If	Then
Input tape has no label	The CMS/DOS open routine positions the tape at the first data record.
Input tape has a standard label	The CMS/DOS open routine positions the tape to the first data record (that is, standard labels are bypassed). If user labels are detected and if a user label routine is specified (LABADDR=xxxxxxxx) in the DTF table for the file, CMS/DOS exits to the

	user's routines to read and process the user labels.
Input tape has nonstandard label	The CMS/DOS open routine exits to the user's routine specified by the LABADDR=xxxxxxxx operand of the DTFMT macro. If no user routine is specified, the tape is positioned at the first data record.
Tape opened for output	CMS/DOS treats all tapes (standard labeled tapes, nonstandard labeled tapes, and unlabeled tapes) as if they were unlabeled. If a tape with a standard or nonstandard label is opened for output, CMS/DOS writes over the label. This is also true for tape work files because they are opened for output first.

The CMS/DOS close routine does not perform trailer label checking on input files. No trailer label processing is provided for input or output tape files.

Figure A-4 describes the DTFMT macro operands and their support under CMS/DOS. An asterisk (*) in the status column indicates that CMS/DOS support differs from DOS/VS support.

Operand	Status	Description
BLKSIZE=nnnnn		Length of one I/O area in bytes (maximum = 32,767).
DEVADDR=SYSxxx		Symbolic unit for tape drive used for this file.
EOFADDR=xxxxxxxx		Name of your end-of-file routine.
FILABL=xxxx	*	(NO, STD, or NSTD). If NSTD specified, include LABADDR. User label routines are only supported for header labels on input tapes.
IOAREA1=xxxxxxxx		Name of first I/O area.
ASCII=YES	*	Not supported.
BUFOFF=nn	*	Not supported.
CKPTREC=YES		Checkpoint records are interspersed with input data records. IOCS bypasses checkpoint records.
ERREXT=YES		Additional errors and ERET are desired.

Figure A-4. CMS/DOS Support of DTFMT Macro (Part 1 of 3)

Operand	Status	Description
ERROPT=xxxxxxxx		(IGNORE, SKIP, or name of error routine). Prevents job termination on error records.
HDRINFO=YES	*	Not supported.
IOAREA2=xxxxxxxx		If two I/O areas are used, the name of the second area.
IOREG=(nn)		Register number. Use only if GET or PUT does not specify a work area or if two I/O areas are used. Omit WORKA. General registers 2–12, written in parentheses.
LABADDR=xxxxxxxx	*	Name of your label routine if FILABL=NSTD, or if FILABL=STD and user-standard labels are processed. Note: User Label routines are only supported for header labels on input tapes.
LENCHK=YES	*	Not supported.
MODNAME=xxxxxxxx		Name of MTMOD logic module for this DTF. If omitted, IOCS generates standard name.
NOTEPNT=xxxxxx		(YES or POINTS). YES if NOTE, POINTW, POINTR, or POINTS macro used. POINTS if only POINTS macro used.
RDONLY=YES		Generate read-only module. Requires a module save area for each routine using the module.
READ=xxxxxxx	*	CMS/DOS only supports READ=FORWARD.
RECFORM=xxxxxx		(FIXUNB, FIXBLK, VARUNB, VARBLK, SPNUNB, SPNBLK, or UNDEF). For work files use FIXUNB or UNDEF. If omitted, FIXUNB is assumed.
RECSIZE=nnnn		If RECFORM=FIXBLK, number of characters in the record. If RECFORM=UNDEF, register number. Not required for other records. General registers 2–12, written in parentheses.
REWIND=xxxxxx		(UNLOAD or NORWD). Unload on CLOSE or end-of-volume, or prevent rewinding. If omitted, rewind only.
SEPASMB=YES		DTFMT is to be assembled separately.
TPMARK=NO		Prevent writing a tapemark ahead of data records if FILABL=NSTD or NO.
TYPEFLE=xxxxxx		(INPUT, OUTPUT, or WORK). If omitted, INPUT is assumed.

Figure A-4. CMS/DOS Support of DTFMT Macro (Part 2 of 3)

Operand	Status	Description
VARBLD=(nn)		Register number, if RECFORM=VARBLK and records are built in the output area. General registers 2-12, written in parentheses.
WLRERR=xxxxxxxx		Name of wrong-length-record routine.
WORKA=YES		GET or PUT specifies a work area. Omit IOREG.

Figure A-4. CMS/DOS Support of DTFMT Macro (Part 3 of 3)

DTFPR Macro - Define the File for a Printer

CMS/DOS does not support the ASOCFLE, ERROPT=IGNORE, and FUNC operands of the DTFPR macro. Figure A-5 describes the operands of the DTFPR macro and their support under CMS/DOS. An asterisk (*) in the status column indicates that CMS/DOS support differs from DOS/VS support.

Operand	Status	Description
DEVADDR=SYSxxx		Symbolic unit for the printer used for this file.
IOAREA1=xxxxxxxx		Name for the first output area.
ASOCFLE=xxxxxxxx	*	Not supported.
BLKSIZE=nnn	*	Length of one output area, in bytes. If omitted, 121 is assumed.
CONTROL=YES		CNTRL macro used for this file. Omit CTLCHR for this file.
CTLCHR=xxx		(YES or ASA). Data records have control character. YES for S/370 character set; ASA for American National Standards Institute character set. Omit CONTROL for this file.
DEVICE=nnnn	*	(1403, 1443, or 3211). If omitted, 1403 is assumed.
ERROPT=xxxxxxxx	*	RETRY or the name of your error routine for 3211. Not allowed on other devices. Ignore is not supported.
FUNC=xxxx	*	Not supported.
IOAREA2=xxxxxxxx		If two output areas are used, name of second area.
IOREG=(nn)		Register number; if two output areas used and PUT does not specify a work area. Omit WORKA.

Figure A-5. CMS/DOS Support of DTFPR Macro (Part 1 of 2)

Operand	Status	Description
MODNAME=xxxxxxxx		Name of PRMOD logic module for this DTF. If omitted, IOCS generates standard name.
PRINTOV=YES		PRTOV macro used for this file.
RDONLY=YES		Generate a read-only module. Requires a module save area for each routine using the module.
RECFORM=xxxxxx		(FIXUNB, VARUNB, or UNDEF). If omitted, FIXUNB is assumed.
RECSIZE=(nn)		Register number if RECFORM=UNDEF.
SEPASMB=YES		DTFPR is to be assembled separately.
STLIST=YES		1403 selective tape listing feature is to be used.
UCS=xxx		(ON) process data checks. (OFF) ignores data checks. Only for printers with the UCS feature or 3211. If omitted, OFF is assumed.
WORKA=YES		PUT specifies work area. Omit IOREG.

Figure A-5. CMS/DOS Support of DTFPR Macro (Part 2 of 2)

DTFSD Macro - Define the File for a Sequential DASD

CMS/DOS does not support the FEOVD, HOLD, and LABADDR operands of the DTFSD macro. Figure A-6 describes the operands of the DTFSD macro and their support under CMS/DOS. An asterisk (*) in the status column indicates that CMS/DOS support differs from DOS/VS support.

Operand	Status	Description
BLKSIZE=nnnn		Length of one I/O area, in bytes.
EOFADDR=xxxxxxxx		Name of your end-of-file routine.
IOAREA1=xxxxxxxx		Name of first I/O area.
CONTROL=YES		CNTRL macro used for this file.
DELETFL=NO	*	If DELETFL=NO is specified, the work file is not erased. Otherwise, when the work file is closed, CMS/DOS erases it.

Figure A-6. CMS/DOS Support of DTFSD Macro (Part 1 of 3)

Operand	Status	Description
DEVADDR=SYSnnn	*	Symbolic unit. This operand is optional. If DEVADDR is not specified, all I/O requests are directed to the logical unit identified on the corresponding CMS/DOS DLBL command. If a valid logical unit is specified with the DEVADDR operand of the DTF and a different, but also valid, logical unit is specified on the DLBL command, the unit specified on the DLBL command overrides the unit specified in the DTF. However, CMS/DOS issues an error message if a valid logical unit is specified in the DTF and no logical unit is specified on the corresponding DLBL command.
DEVICE=nnnn	*	(2314, 3330, 3340). If omitted, 2311 is assumed at compilation time. At execution time, when the CMS/DOS $$BOPEN routine is opening a DTFSD work file, the device code in the DTF corresponds to the device code of the device the logical unit is assigned to. All DTFSD output files and DTFSD input files that reside on CMS disks are handled in the same manner. This device code cannot be overridden by the compilers. Specify the DEVICE=nnnn operand correctly for inuput files residing on DOS disks; otherwise, CMS/DOS issues an error.
ERREXT=YES		Additional error facilities and ERET are desired. Specify ERROPT.
ERROPT=xxxxxxxx		(IGNORE, SKIP, or name of error routine). Prevents job termination on error records. Do not use SKIP for output files.
FEOVD=YES	*	Not supported.
HOLD=YES	*	Not supported. HOLD=YES is specified for DTFSD update or work files to provide a track hold capability. However, the CMS/DOS open routine sets the track hold bit off and bypasses track hold processing.
IOAREA2=xxxxxxxx		If two I/O areas are used, name of second area.
IOREG=(nn)		Register number. Use only if GET or PUT does not specify work area or if two I/O areas are used. Omit WORKA.
LABADDR=xxxxxxxx	*	Not supported.

Figure A-6. CMS/DOS Support of DTFSD Macro (Part 2 of 3)

Operand	Status	Description
MODNAME=xxxxxxxx		Name of SDMODxx logic module for this DTF. If omitted, IOCS generates standard name.
NOTEPNT=xxxxxxxx		(YES or POINTRW). YES if NOTE/POINTR/POINTW/ POINTS used. POINTRW if only NOTE/POINTR/ POINTW used.
RDONLY=YES		Generates a read-only module. Requires a module save area for each routine using the module.
RECFORM=xxxxxx		(FIXUNB, FIXBLK, VARUNB, SPNUNB, SPNBLK, VARBLK, or UNDEF). If omitted, FIXUNB is assumed. For work files use FIXUNB or UNDEF. Although work files contain fixed-length, unblocked records, the CMS file system handles work files as variable-length record files.
RECSIZE=nnnnn		If RECFORM=FIXBLK, number of characters in record. If RECFORM=SPNUNB, SPNBLK, or UNDEF, register number. Not required for other records.
SEPASMB=YES		DTFSD is to be assembled separately.
TRUNCS=YES		RECFORM=FIXBLK or TRUNC macro used for this file.
TYPEFLE=xxxxxx		(INPUT, OUTPUT, or WORK). If omitted, INPUT is assumed.
UPDATE=YES		Input file or work file is to be updated.
VARBLD=(nn)		Register number if RECFORM=VARBLK and records are built in the output area. Omit if WORKA=YES.
VERIFY=YES		Check disk records after they are written.
WLRERR=xxxxxxxx		Name of your wrong-length-record routine.
WORKA=YES		GET or PUT specifies work area. Omit IOREG. Required for RECFORM=SPNUNB or SPNBLK.

Figure A-6. CMS/DOS Support of DTFSD Macro (Part 3 of 3)

Sequential Access Method - Imperative Macros

CMS/DOS supports the following imperative macros:

- Initialization macros: OPEN and OPENR
- Processing macros: GET, PUT, PUTR, RELSE, TRUNC, CNTRL, ERET, and PRTOV. (No code is generated for the CHNG macro.)

- Work file macros for tape and disk: READ, WRITE, CHECK, NOTE, POINTR, POINTW, and POINTS.

- Completion macros: CLOSE and CLOSER

CMS/DOS supports work files containing fixed-length, unblocked records and undefined records. Disk work files are supported as single-volume, single-pack files. Normal extents and split extents are supported.

SUPERVISOR MACROS

CMS/DOS supports physical IOCS macros and control program function macros for DOS/VS. Figure A-7 lists the physical IOCS macros and describes their support and Figure A-8 lists the control program function macros and their support.

Macro	Support
CCB (command control block)	The CCB is generated.
EXCP (execute channel program)	The REAL operand is not supported; all other operands are supported.
WAIT	Supported. Issued whenever your program requires an I/O operation (started by an EXCP macro) to be completed before execution of program continues.
SECTVAL (sector value)	Supported for VSAM.
DTFPH	Not supported.
OPEN/OPENR	Supported. Activates a data file.
LBRET (label processing return)	LBRET 3 is not supported. Labels cannot be rewritten in CMS/DOS.
FEOV (forced end-of-volume)	Not supported.
FEOVD (forced end-of-volume DASD)	Not supported.
SEOV (system end-of-volume)	Not supported.
CLOSE/CLOSER	Supported. Deactivates a data file.

Figure A-7. Physical IOCS Macros Supported by CMS/DOS

Macro	SVC No.	Support
Program Loading Macros		
FETCH		SYS=YES or NO operand is ignored.
	02	Reads a logical transient into storage and passes control to an entry point.
	01	Reads any phase into storage and passes control to an entry point.
GENL	--	Generates a directory list with a 34-byte entry for each of the specified phases.
LOAD		SYS=YES or NO operand is ignored.
	04	Reads any phase into storage and returns control to the calling phase.
Virtual Storage Macros		
PFIX	67	No operation performed.
PFREE	68	No operation performed.
RELPAG	85	No operation needed.
FCEPGOUT	86	No operation performed.
PAGEIN	87	No operation performed.
RUNMODE	66	Returns code indicating program is running in virtual mode.
SETPFA	71	No operation performed.
VIRTAD	70	Not supported. Execution terminates with error message.
REALAD	69	Not supported. Execution terminates with error message.
GETVIS	61	Supported for VSAM.
FREEVIS	62	Supported for VSAM.
Program Communication Macros		
COMRG	33	Returns address of background partition's communication region.
MVCOM	05	Modifies specified bytes within bytes 12-23 of the partition communication region.
Releasing Macros		
RELEASE	64	Supported for VSAM.
Time of Day Macro		
GETIME	34	Gets time of day. The GMT operand is not supported.

Figure A-8. Control Program Function Macros for DOS/VS (Part 1 of 3)

Macro		SVC No.	Support
Interval Timer and Exit Macros			
SETIME		10 24	No operation performed.
STXIT	(PC)	16	Provides/terminates supervisor linkage to user's PC (program check) routines. Under CMS/DOS, if a program check occurs in a simulated transient routine, a check is made to determine if linkage has been established to an AB routine. If it has, control is passed to the AB routine. If not, the program is canceled. If a check occurs in a program other than a simulated transient, and if linkage has been established to a PC routine, control is passed to that routine. If no PC routine is available, a check is made to see if linkage has been established to an AB routine. If so, control is passed to the AB routine. If no PC or AB routine is available, the program is canceled.
	(IT)	18	No operation performed.
	(OC)	20	No operation performed.
	(AB)	37	Provides/terminates supervisor linkage to user's AB routine for abnormal termination of the routine. Many of the DOS/VS abnormal termination codes are not meaningful under CMS/DOS. Control is given to an abnormal termination routine on the following selected hexadecimal codes: 1A, 20, 21, 22, 25, 26, 27, 2B.
EXIT	(PC)	17	Return from user's PC routine.
	(IT)	19	Not supported. Execution terminates with error message.
	(OC)	21	Not supported. Execution terminates with error message.
TECB		---	TECB control block generated. However, CMS/DOS does not support the use of the Timer Event Control Block.
TTIMER		52	Zero seconds are returned in register 0 as the time remaining in the interval.
WAIT		07	Wait for I/O completion.
WAITM		29	Not supported. Execution terminates with error message.

Figure A-8. Control Program Function Macros for DOS/VS (Part 2 of 3)

Macro	SVC No.	Support
PDUMP	—	Provides hexadecimal dump of general registers and the virtual storage area contained between two addresses. After CP DUMP is issued from the CMS/DOS environment to direct the dump to the printer, processing continues with the next instruction. CMS/DOS uses CP DUMP command to direct dump to the printer.
DUMP	—	Provides hexadecimal dump of the partition and general registers. CMS/DOS uses CP DUMP command to direct dump to the printer. The routine then terminates the invoking program.
JDUMP	—	Same as for DUMP.
CANCEL	06	Terminates processing.
EOJ	14	Processing terminates normally.
CHKPT	—	Not supported. Execution terminates with error message.
Multitasking Macros		
ATTACH	38	Not supported. Execution terminates with error message.
DETACH	39	Not supported. Execution terminates with error message.
RCB	—	RCB control block generated. However, CMS/DOS does not support the use of Request Control Block.
ENQ	41	No operation performed.
DEQ	42	No operation performed.
WAITM	29	Not supported. Execution terminates with error message.
POST	40	Posts ECB (Byte 2 Bit 0 on). The SAVE=savearea operand is ignored by CMS/DOS.
FREE	36	No operation performed.
Program Linkage Macros		
CALL	—	Passes control from a program to a specified entry point in another program.
SAVE	—	Stores the contents of specified registers in the save area provided by the calling program.
RETURN	—	Restores registers whose contents were saved and returns control to the calling program.

Figure A-8. Control Program Function Macros for DOS/VS (Part 3 of 3)

DOS/VS Transient Routines

CMS/DOS uses the DOS/VS LIOCS transient routines without change. CMS/DOS accesses the LIOCS routines directly from a DOS/VS system or private library. For this reason, DOS/VS must be ordered and installed before CMS/DOS can be used.

However, CMS/DOS simulates the DOS/VS transients that are fetched by macro expansion or by the LIOCS modules. These simulation routines contain enough of the transient's function to support the DOS/VS COBOL compiler and DOS PL/I Cptimizing Compiler. These routines which simulate the DOS/VS transients execute in the CMS/DOS discontiguous segment.

The following DOS/VS transients are simulated by CMS/DOS:

Transient	Function under CMS/DOS
$$BOPEN	Fetched by DOS/VS OPEN macro expansion or by DOS/VS LIOCS modules. $$BOPEN performs DTF initialization, dependent upon device type, to ready the file for I/O operations. At entry to $$BOPEN, register 0 points to a list of fullword addresses containing a pointer to the DTFs. $$BOPEN checks for supported DTF types, and initializes DTFs in accordance with the device type. (The CMS STATE command is issued to verify existence of the input files.) $$BOPEN is invoked to supply additional extent information for multi-extent real DOS data sets. $$BOPEN is also called to initialize DTFs with EXTENT information for private and system DOS libraries. The OPEN transient is responsible for providing the proper extent information as a result of POINTR/POINTS requests. If a VSAM file is being opened (decimal byte 20 = X'28' in the ACB), control is passed to the VSAM open routine. When opening DTFSD files for output or DTFCP/DTFDI disk files for output, if a file exists on a CMS disk with the same filename, filetype, and filemode, the file is erased.
$$BOPNLB	Fetched by COBOL Compiler Phase 00 to read appropriate system or private source statement library directory record, and to determine whether active members are present for the library.
$$BCLOSE	Fetched by DOS/VS CLOSE macro expansion to deactivate a file.
$$BDUMP	Fetched when abnormal termination condition is encountered. Control is not passed to a STXIT routine. CMS/DOS performs a CP dump to a virtual printer. The routine is canceled.
$$BOPENR	Fetched by DOS/VS OPENR macro expansion. The function of $$BOPENR is to relocate all DTF table address constants from the assembled addresses to executable storage addresses. At entry to $$BOPENR, register 0 points to an assembled address constant followed by a list of DTF table addresses that require address modification.
$$BOPNR3	Fetched by $$BOPENR to relocate all DTF table address constants for unit record DTFs.
$$BOPNR2	Fetched by $$BOPNR3 to relocate all DTF table address constants for DTFDI or DTFCP.

EXCP Support in CMS/DOS

CMS/DOS simulates the EXCP (execute channel program) routines to the extent necessary to support the LIOCS routines described earlier in "DOS/VS Supervisor and I/O Macros Supported by CMS/DOS".

Because CMS/DOS uses the DOS/VS LIOCS routines unchanged, it must simulate all I/O at the EXCP level. The EXCP simulation routines convert all the I/O that is in the CCW format for CMS disk I/O and unit record I/O to CMS physical I/O requests. That is, CMS macros (such as RDBUF/WRBUF, CARDRD/CARDPH, PRINTIO, and WAITRD/TYPLIN) replace the CCW strings. If CMS/DOS is reading from DOS disks, the I/O requests are handled via the Diagnose interface.

When an I/O operation completes, CMS/DOS posts the CCB with the CMS return code. Partial RPS (rotational position sensing) support is available for I/O operations to CMS disks because CMS uses RPS in its channel programs. However, RPS is not supported when real DOS disks are read. In addition, DOS/VS LIOCS routines are also not supported in CMS/DOS.

DOS/VS Supervisor Control Blocks Simulated by CMS/DOS

CMS/DOS supports DOS/VS program development and execution for a single partition: the background partition. Because CMS/DOS does not support the four foreground partitions, it also does not simulate the associated control blocks and fields for foreground partitions. CMS/DOS simulates the following DOS/VS supervisor control blocks:

- ABTAB -- Abnormal Termination Option Table
- PCTAB -- Program Check Option Table
- LUB -- Logical Unit Block
- PUB -- Physical Unit Block
- FICL -- First in Class
- NICL -- Next in Class
- PUBOWNER -- Physical Unit Block Ownership Table
- PIBTAB -- Program Information Table
- PIB2TAB -- Program Information Block Table Extension
- BBOX -- Boundary Box
- SYSCOM -- System Communication Region
- BGCCM -- Background Partition Communication Region

ABTAB Simulation

ABTAB, the Abnormal Termination Option Table, contains one 8-byte entry for the background partition.

Bytes	Value	Meaning
0-3	Zero	No STXIT macro was issued.
	Address of entry point of user's abnormal termination routine	A STXIT macro specifying the rtnaddr operand, was issued.
4-7	Zero	Either no STXIT macro was issued or one was issued that did not have the savearea operand coded.

Bytes	Value	Meaning
4-7	Address of 72-byte save area used by the DOS/VS supervisor to store the interrupt status information and the contents of general registers	A STXIT macro specifying the savearea operand was issued.

The address of the ABTAB is in bytes X'54'-X'55' of the system communication region (SYSCOM).

PCTAB Simulation

PCTAB, the Program Check Option Table, contains one 8-byte entry for the background partition.

Bytes	Value	Meaning
0-3	Zero	No STXIT macro was issued.
	Address of user program check routine	STXIT macro was issued.
	Complement of address of user program check routine	STXIT macro was issued but the user routine was already in use.
4-7	Zero	No STXIT macro was issued.
	Address of the user save area	STXIT macro was issued.

The address of the PCTAB is in bytes X'64'-X'65' of the partition communication region (BGCOM).

LUB Simulation

The LUB, Logical Unit Block, is a device table that has one 2-byte entry for each symbolic name used by CMS/DOS. The simulated LUB has 255 entries: 14 entries for the system logical units and 241 entries for programmer logical units.

The address of the LUB table is at displacement X'4C' of the background communication region.

PUB Simulation

The PUB, Physical Unit Block, is a table of the physical devices being used by CMS/DOS. The simulated PUB has eighteen 8-byte entries: one entry for each device supported by CMS. The possible entries are:

- One printer
- One console
- One card reader
- One card punch

- Four tapes (at addresses 181-184, designated as TAP1, TAP2, TAP3, and TAP4
- Ten disks (one entry corresponding to each of the CMS disk mode letters: A, B, C, D, E, F, G, S, Y, and Z)

The address of the PUB table is found at displacement X'40' of the background communication region.

FICL Simulation

The FICL, first in class table, is a 2-byte table in CMS/DOS. The first byte points to the first system logical unit in the LUB table; this is always the first entry in the LUB table. The second byte points to the first programmer logical unit in the LUB table.

The address of the FICL is found at displacement X'48' in the background communication region.

NICL Simulation

The NICL, number in class table, is a 2-byte table in CMS/DOS. The first byte contains the number of system logical units and the second contains the number of programmer logical units.

The address of the NICL is found at displacement X'4A' of the background communication region.

PUBOWNER Simulation

The PUBOWNER, Physical Unit Block Ownership Table, has a 2-byte entry for each entry in the PUB table. For CMS/DOS there are eighteen 2-byte entries.

Byte	Value	Meaning
0	X'00'	The physical unit is reserved.
	X'40'	CMS/DOS is waiting for the volume to be mounted.
1	X'01'	Background partition owns the physical unit.

The address of the PUBOWNER table is at displacement X'78' in the system communication table.

PIBTAB Simulation

Only the following fields of the PIBTAB, Program Information Block, are simulated by CMS/DOS:

Bytes	Value	Meaning
5-7	Zero	Inactive
	Address of LTA (logical transient area) save area	Active
9-11	Zero	Inactive
	Address of save area	Active
13	LUB index for background partition	

The address of PIBTAB is at displacement X'5A' of the background communication region.

PIB2TAB Simulation

Only the following fields of the PIB2TAB, Program Information Block Extension, are simulated by CMS/DOS:

Bytes	Contents
0-1	The 16-bit address of the partition communication region (BGCOM)
2-3	System LUB index
4-7	Interrupt information
12-13	Program interrupt key

There is one entry in the PIB2TAB for each entry in the PIBTAB. The address of the PIB2TAB is at displacement X'7C' of the background partition communication region.

BBOX Simulation

The BBOX, Boundary Box, contains the beginning and ending addresses of the background partition.

The address of the BBOX is at displacement X'DC' of the system communication region.

SYSCOM Simulation

CMS/DOS simulates only the following fields of the SYSCOM, system communication region:

Field Displacement	Field Contents
X'2C'	Number of partitions. For CMS/DOS this field is always 1.
X'54'-X'55'	Address of ABTAB.
X'78'	Address of PUBOWNER table.
X'CC'	Length of the PUB table, in bytes. For CMS/DOS, the length is 144 bytes (X'90').

Field Displacement	Field Contents
X'CE'	Number of active partitions. For CMS/DOS, this field is 1.
X'DC'	Address of BBOX.

The address of the system communication region is in the fixed storage location X'80'-X'83'.

BGCOM Simulation

CMS/DOS simulates only the following fields of BGCOM, the background partition communication region:

Field Displacement	Field Contents
X'00'	Date
X'0C'	Problem program use
X'17'	UPSI byte
X'18'	Jobname
X'20'	Highest storage address of the partition
X'24'	End address of last phase fetched or loaded
X'28'	Address of uppermost byte of phase with highest ending address
X'2E'	PIK
X'30'	End of virtual storage address
X'34'	Machine configuration byte
X'35'	System configuration byte
X'36'	Standard language translator I/O options
X'37'	Dump, log options
X'38'	Job control byte
X'39'	Linkage control byte
X'3A'	Language translator control byte
X'3B'	Job duration indicator byte
X'40'	Address of PUBTAB
X'48'	Address of FICL
X'4A'	Address of NICL
X'4C'	Address of LUBTAB
X'4E'	Line count for SYSLST
X'5A'	Address of PIB table
X'64'	Address of PC option table less 8 bytes
X'6E'	Logical transient key
X'7C'	Address of PIB table extension
X'84'	Address of BG communication region
X'87'	System configuration byte 2
X'8C'	Standard job control options
X'8D'	Temporary job control options
X'8E'	Disk configuration
X'9F'	81 bytes SYSIN indicator

The address of BGCOM is found at the fixed storage location X'14'-X'17'.

CMS SUPPORT OF DOS/VS SUPERVISOR MACROS AND LOGICAL TRANSIENTS FOR VSAM

CMS support of VSAM is based on the DOS/VS VSAM support; CMS supports the VSAM macros that are required by the OS and DOS COBOL and PL/I compilers and by VS BASIC. Figure A-9 shows the DOS/VS supervisor macros which are used by the DOS/VS VSAM routines and supported by CMS.

Macro	SVC Number	Extent of CMS Support
CDLOAD	65	DOS/VS macro for internal use only. Loads a VSAM core image phase. CMS searches the VSAM saved segments for the phase instead of the DOS/VS SVA area. If an anchor table entry does not exist, CMS fetches the phase, creates an anchor table entry, and sets register values as DOS/VS would set them.
FREE	36	No operation is performed by CMS.
FREEVIS	62	CMS invokes its free storage handler to return the storage that is no longer needed. CMS follows the DOS/VS register and return code conventions.
GETVIS	61	CMS invokes its free storage handling routines to obtain free storage; it follows the DOS/VS register and return code conventions. The SVA operand does not apply to CMS and is not supported. The PAGE and POOL operands are ignored by CMS.
HOLD	35	No operation is performed by CMS.
POST	40	When a POST macro is issued for an ECB, byte 2 bit 0 is set on. The SAVE=savarea operand is ignored by CMS.
RELEASE	64	CMS reduces the RURTBL counter for the resource by one.
SECTVAL	75	CMS uses the data in registers 0 and 1 to calculate the sector number and returns the sector number in register 0. If any errors occur, CMS returns X'FF' in register 0.
USE	63	DOS/VS macro for internal use only. CMS supports this macro only to the extent necessary to support VSAM. If a counter for a particular resource is zero, CMS increments the counter by one and returns a zero in register 0. If a counter is greater than zero, CMS increments the counter by one and returns an eight in register 0.

Figure A-9. DOS/VS Supervisor Macros Supported by CMS

CMS distributes the DOS/VS transients that are needed in the VSAM support. Thus OS users do not need to have the DOS/VS system pack online when they are compiling and executing VSAM programs.

CMS uses all of the DOS/VS VSAM B-transients except those that build and release JIBs (job information blocks). The JIB is not supported in CMS, and thus neither are the B-transients ($$BJIB00, $$BJIBFF, and $$BOVS03) that control the JIB.

The CMS/DOS discontiguous segment contains the B-transients that are simulated for DOS support in CMS. The B-transients that pertain only to VSAM are included in the VSAM saved segments: $$BOMSG1, $$BOMSG2, $$BOMSG7, and $$BENDQB.

APPENDIX B: CMS VSAM AND ACCESS METHOD SERVICES-PROVISIONS AND LIMITATIONS

The information that follows is provided for system programmers that are familiar with VSAM facilities to help them make a more accurate assessment of the usability of CMS VSAM support for their installation.

As mentioned earlier, CMS can read and update VSAM data sets that were created under DOS/VS or OS/VS. In addition, VSAM data sets created under CMS can be read and updated by DOS/VS or OS/VS. However, if you perform allocation on a minidisk in CMS, you cannot use that minidisk in an OS virtual machine in any manner that causes further allocation. DOS/VS VSAM (and thus CMS) ignores the format-5, free space DSCB on VSAM disks when it allocates extents. If allocation later occurs in an OS machine, OS attempts to create a format-5 DSCB. However the format-5 DSCB created by OS does not correctly reflect the free space on the minidisk. In CMS, allccation occurs whenever data spaces or unique data sets are defined, and space is released whenever data spaces, catalogs, and unique data sets are deleted.

CMS does not support the VSAM ISAM Interface Program (IIP). Thus, any program that creates and accesses ISAM (indexed sequential access method) data sets cannot be used to access VSAM key sequential data sets. There exceptions to this restriction. If you have (1) OS PL/I programs that have files declared as ENV (INDEXED) and (2) if the library routines detect that the data set being accessed is a VSAM data set, your programs will execute VSAM I/O requests.

Only the commands that specifically support VSAM can be used to manipulate VSAM data sets in CMS. These commands are AMSERV, DLBL, and LISTDS. The ASSGN command is available for CMS/DOS users who access VSAM data sets. CMS commands that manipulate CMS files (such as the PRINT, TYPE, EDIT, and COPYFILE commands) cannot be used for VSAM data sets because they are in a DOS/OS VSAM format, not the CMS file format.

For the DOS User: With SET DOS ON (VSAM) all of the DOS/VS Access Method Services are supported by CMS, except for the following:

- Non-VSAM data sets with data formats that are not supported by CMS/DOS (for example, BDAM and ISAM files are not supported).
- The SHAREOPTIONS operand has no function in CMS. However, you should specify SHAREOPTIONS 3 in your DEFINE control statement for more efficient operations. When you specify SHAREOPTIONS 3, CMS does not execute the code that attempts to reserve and release system resources.

For the CMS OS User: OS users can use all of the Access Method Services functions that are supported by DOS/VS, with the following exceptions:

- Non-VSAM data sets with data formats that are not supported by CMS/DOS (for example, BDAM and ISAM files are not supported).
- The SHAREOPTIONS operand has no function in CMS. However, you should specify SHAREOPTIONS 3 in your DEFINE control statement for more efficient operation. When you specify SHAREOPTIONS 3, CMS does not execute the code that attempts to reserve and release system resources.

- Do not use the AUTHORIZATION (entry point) operand in the DEFINE (and ALTER) commands unless your own authorization routine exists on the DOS core image library, the private core image library, or in a CMS DOSLIB file. In addition, results are unpredictable if your authorization routine issues an OS SVC instruction.

- Unlike OS, CMS Access Method Services supports the 3330-11 as a virtual 3330-1; only a maximum of 404 cylinders are used.

- The secondary space allocation parameter in the following DEFINE commands is not used by Access Method Services or DOS/VS VSAM: DEFINE SPACE, DEFINE USERCATALOG, and DEFINE CLUSTER with the UNIQUE parameter. However, you may code this parameter to make your control statement file compatible with an OS/VS VSAM control file.

- The OS Access Method Services GRAPHICS TABLE options and the TEST option of the PARM command are not supported.

- The filename in the FILE (filename) operand is limited to 7 characters. If an eighth character is specified, it is ignored.

- The OS Access Method Services CNVTCAT and CHKLIST commands are not supported in DOS/VS Access Method Services. In addition, all OS Access Method Services commands that support the 3850 Mass Storage System are not supported in DOS/VS Acccess Method Services.

- Figure B-1 is a list of OS operands, by control statement, that are not supported by the CMS interface to DOS/VS Access Method Services (for example, BDAM and ISAM files are not supported).

OS Access Method Services Control Statements	Operands not supported in CMS[3]
ALTER	EMPTY/NOEMPTY SCRATCH/NOSCRATCH DESTAGEWAIT/NODESTAGEWAIT STAGE/BIND/CYLINDERFAULT
BLDINDEX	INDATASET OUTDATASET
DEFINE	ALIAS EMPTY/NOEMPTY GENERATIONDATAGROUP PAGESPACE SCRATCH/NOSCRATCH DESTAGEWAIT/NODESTAGEWAIT STAGE/BIND/CYLINDERFAULT TO/FOR/OWNER[1]
DELETE	ALIAS GENERATIONDATAGROUP PAGESPACE SCRATCH/NOSCRATCH
EXPORT	OUTDATASET
IMPORT	INDATASET OUTDATASET IMPORTA
LISTCAT	ALIAS GENERATIONDATAGROUP LEVEL OUTFILE[2] PAGESPACE
PRINT	INDATASET OUTFILE[2]
REPRO	INDATASET OUTDATASET
VERIFY	DATASET

[1]The TO/FOR/OWNER operands are supported for the Access Method Services interface, but are not supported for the DEFINE NONVSAM control statement.
[2]The OUTFILE operand is supported by the Access Method Services interface, but is not supported for the LISTCAT and PRINT control statements.
[3]If nonsupported operands are specified via AMSERV, an appropriate error message is displayed and the operation terminates.

Figure B-1. OS Operands Not Supported In CMS

AMSERV can write SAM data sets only to a CMS disk, but can read them from DOS, OS, or CMS disks.

Because CMS is not a multitasking system, it does not support disk sharing within a single CMS virtual machine. However, disks containing VSAM data sets may be shared in read-only mode among several CMS virtual machines. If you wish to share a VSAM disk you must link to it in

read-only mode. The VSAM catalog can be on the same disk as the data sets, or on a separate disk. The disk containing the VSAM catalog for the VSAM data sets you are sharing may also be linked in read-only mode.

CMS does not accumulate read statistics as does DOS/VS and OS/VS when the disk containing the catalog is accessed in read-only mode; nor does CMS update read statistics for VSAM input files when it does not have write access to the catalog.

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