

## 5662-257 - OS/VS1 BASIC PROGRAMMING EXTENSIONS

### PURPOSE

The OS/VS1 Basic Programming Extensions program is supported on S/370, the 3031, 3032, 3033, and 4300 Processors in S/370 mode. It can also run on the 308X Processors under VM. It provides support for the 4331 Model Group 2 Processor, the 3262 Printer mdls 1 and 11, the 3848 Cryptographic Unit, the 3375 Direct Access Storage, the 4341 Model Group 10 and 11 Processors and enhanced dump facilities.

### DESCRIPTION

#### RELEASE 1

- Support for the 4331 Model Group 2 Processor.
  - Allows optimization of I/O Load Balancing algorithms.
- Support for the 3262 Printer mdls 1 and 11: The 3262 Printer mdl 1 is a 650 line-per-minute printer (nominal speed) using a 48-character-set print belt. The 3262 Printer mdl 11 is a 325 line-per-minute printer (nominal speed) using a 48-character-set print belt. Both printer models attach to the 4331 Processor. The OS/VS1 support allows the 3262 Printer to be used as a system printer, data management printer and as the output portion of a composite console.
- Enhanced Dump Facility I: The dump enhancements are:
  - Provide machine-readable abend dumps via a user SYSMDUMP data definition (DD). A SYSMDUMP will include the fixed nucleus, the partition and the pageable supervisor above the JES partition.
  - Allows multiple system dump data sets. This enhancement allows up to 99 system dump data sets which are installation-allocated and maintained.
  - Allows OS/VS1 handshaking with VM to have OS/VS system dumps taken via the VMDUMP command. This facility can be provided by initializing the VMDUMP parameter on the NIP member of SYS1.PARMLIB or at 'SPECIFY SYSTEM PARAMETERS' time or by using the VMDUMP keyword on the SET command.
  - Provides an in-storage console trace. The number of kilobytes to be reserved for a console trace area and the initial status of the trace can be specified on the NIP member of SYS1.PARMLIB or at 'SPECIFY SYSTEM PARAMETERS' time. The trace can be suspended and resumed (provided space was reserved) via the CNTRACE keyword on the SET command.
- Virtual Machine/VTAM Communications Network Application (VM/VCNA) support: VM/VCNA uses the IUCV (Inter-user Communication Vehicle) support provided by OS/VS1 Basic Programming Extensions to communicate with the VM/SP (Virtual Machine/System Product) control program. The IUCV support may be used by other privileged programs running on OS/VS1 Basic Programming Extensions.
- IOS Serviceability Enhancement: Prior to abending, a problem determination area is reserved and pertinent IOS data is stored to diagnose IOS abends.
- Support for 3848 Cryptographic Unit: The 3848 Cryptographic Unit is a channel-attached unit that enciphers and decipheres data. A new program product, the Cryptographic Unit program product (5740-XY6) can provide generation and management control functions for cryptographic keys.

#### RELEASE 2

- Support for the 4341 Model Group 2 Processor.
  - Allows optimization of I/O Load Balancing algorithms.
- Enhanced Dump Facility II: The dump enhancements are:
  - A dump management facility for system dumps.
  - Allows user machine-readable dumps to be taken via the DMDUMP command of VM/370.
  - Allows system dumps and user dumps to specify a VM userid for dumps taken via the VMDUMP command of VM/370.
- Provides support for the 3375 Direct Access Storage along with the program product Data Facility Device Support (5740-AM6).

#### RELEASE 3

- Support for the 4341 Model Group 10 and Model Group 11 Processors.
  - Allows optimization of I/O Load Balancing algorithms.
- Enhanced Dump Facility III.
  - Symptom strings will be provided for all system dump data sets except those being taken via the VMDUMP command of VM/370.
- Enhancements for the 3880 Control Unit Buffer.

- Support for the 3880 Storage Control Speed Matching Buffer feature for the 3375 (#6560).
- Support for the 3880 Storage Control Speed Matching Buffer feature for the 3380 (#6550)
- Provide support for the 3380 Direct Access Storage.
- Support for 4K Page Sizes.
  - Makes possible the execution of VS1 under VM on processors with 4K key-in-storage domains.

#### RELEASE 4

- Support for the 4341 Model Group 9 and 12, 4361 Model Group 4 and 5, and 4381 Model Group 1 and 2 Processors, which allows the OS/VS1 I/O load balancing algorithm to be optimized to the individual processor performance characteristics.
- Support for the 3380 Direct Access Storage and the 3380 Speed Matching Buffer of the 3880 (#6550). The channel commands for Dynamic Pathing are not supported. (The 3380 mdl AA4 can be used without this support.)
- Support for the 3880 Storage Controller, mdl 13.
- Support for the 4245 Printer including changes to SYSGEN for device recognition, and changes to allow their use as a DSO writer and JES writer.
- Support for the 3430 Magnetic Tape Subsystem.
- Addition of the System Authorization Facility Security Router, providing a standard interface common to MVS and VS1 for modules requesting security services and installation-written security processing routines.
- A repackaging of the Stand-Alone Dump program removing prior space limitations for several modules.

#### CUSTOMER RESPONSIBILITIES

The customer is responsible for ordering and installing OS/VS1 Release 7 prior to installing the OS/VS1 Basic Programming Extensions program product.

#### SPECIFIED OPERATING ENVIRONMENT

##### HARDWARE REQUIREMENTS

The OS/VS1 Basic Programming Extensions program product is supported on any IBM S/370, 3031, 3032, 3033, or 4300 Processors in S/370 mode. It can also run on the 308X Processors under VM.

##### SOFTWARE REQUIREMENTS

The OS/VS1 Basic Programming Extensions program product requires OS/VS1 Release 7 as a base. Also, Data Facility Device Support Release 1 Modification Level 1 is co-requisite with Release 3 of the Basic Programming Extensions and Data Facility Device Support Release 1 Modification Level 2 is co-requisite with Release 4 of Basic Programming Extensions.

**Starter System:** The starter system provided is a special OS/VS1 system ordered separately.

The starter systems provided have been updated from OS/VS1 Release 7 to include the OS/VS1 Basic Programming Extensions program product and require a minimum of 192K bytes of real storage. This starter system is only available to licensed users of the OS/VS1 Basic Programming Extensions program product.

A 3380-resident starter system with the OS/VS1 Basic Programming Extensions Release 4 program product applied will be available to licensed users of record of this program product. This starter system will be necessary for users with 3380 DASD as the only DASD attached to their processor. In addition to OS/VS1 Basic Programming Extensions Release 4, the user will require a license for OS/VS1 Data Facility Device Support Release 1.2 (5740-AM6). To install this starter system, the user will need the functions provided by the Data Facility Data Set Services (5740-UT3) program product, or its equivalent. The user may order the 3380 starter system with the Data Facility Data Set Services program product included in the starter system.

Starter systems residing on 2314, 3330, 3340 and 3350 DASD with the OS/VS1 Basic Programming Extensions Release 2 program product applied will still be available. These starter systems do not contain the OS/VS1 Data Facility Device Support program product, and therefore, do not support 3375 DASD.

Also still available is a 3375 starter system with Basic Programming Extensions Release 3 and Data Facility Device Support Release 1.1 applied.

The starter system has the basic elements necessary for system generation in a form that is directly usable by a majority of customers. The starter system functions with a variety of different I/O units at 'standard' addresses. Customers may use the starter system to perform system generation if there are appropriate matching units and addresses in their own configuration.

**OS/VS1 Basic Programming Extensions (cont'd)**

Dedicated Data Set Support is used in SYSGEN for the utility data sets in assemblies, link edits and data set copies.

The starter system runs on any IBM Processor supported by OS/VS1 which meets the minimum system requirements. RMS (Recovery Management System) routines for all S/370, 303X, 4300, 4361 and 4381 Processors are included in the system libraries, thus allowing processor independence of the Starter System.

Customers should be encouraged to match unit addresses with those of the starter system to the greatest degree practical. Unit addresses are established as part of the normal physical planning and cable order process; therefore, physical installation plans should be reviewed where appropriate. The following chart shows the devices supported by the starter system, the system functions for which they may be used, and the three character address assigned to each unit. The OS/VS1 starter system supports all the devices at the address specified.

**RPOs ACCEPTED: No**

**Notes:** The following notes are applicable to the "Starter System Requirements Chart":

1. DASD 3330/3333 mdls 1 and 11, 3340, 3375, 3380 and 3350 are generated on channel 1 and accessed on channel 1, with channels 2 through 4 as optional channels. (Some 3340 DASD are generated on channel 2 and accessed on channel 2, with channels 3 and 4 as optional.)
2. The three system generation utility data sets and the three object program data sets do not require additional direct access devices if sufficient space is available on the volumes that contain the new system and the starter system.
3. The 3138 and 3148 consoles use the 3158 console support (Display Mode).
4. 3286 mdl 2 optional printer for S/370 mdls 138/148.
5. 3138 and 3148 Console when IMPLIED in Printer/Keyboard mode.
6. 3420 Tapes are generated on channel 2 and accessed on channel 2, with channels 3 through 5 as optional.
7. The DLIB Installation and Build process requires space equal and additional to the distribution library space. The spindle(s) available after DLIB installation and build may be used for the new system being generated.
8. For 4300 Processors.
9. For 4331 Processors only.
10. 3375 and 3380 Starter Systems only.
11. 3775 requires OS/VS1 Data Facility Device Support program product.
12. 3375 and 3380 Starter Systems have addresses 180 and 181 only.
13. 3380 Starter System only.

PROGRAM PRODUCTS

OS/VS1 Basic Programming Extensions (cont'd)

STARTER SYSTEM REQUIREMENTS CHART

Min. Req'd	Function	Device	MPX Channel	Device Address (Note 1, 6)			Selector Chan 4	Selector Chan 5 (Note 10)
				Selector Chan 1	Selector Chan 2	Selector Chan 3		
1	System Console	3036	01A,01B					
1		3036 (Note 10)	0F2					
		3066	019		219			
		3158 (Note 3)	010,014					
		3213 (Note 4)	011,015					
			025					
		3210/3215 (Note 5)	009,01F		209,21F			
		3278-2A (Note 8)	01E					
		7443	01C,01D					
1	System Input	2540 Reader	00C,02C		20C			
		3505 Reader	012,029					
		1442 Reader/Punch	00A,02A					
		2400 (7-tr-DC) (Note 12)		180,181	280,281	380,381	480,481	
		2400 (9-track)		180,181	280,281	380,381	480,481	
	3420 (Note 10)		182,183	282,283	382,383	482,483		
				280,281,282	380,381,382	480,481,482	580,581,582	
				291,292,293	391,392,393	491,492,493	591,592,593	
		3430 (Note 13)		294,295	394,395	494,495		
1	Punch Output	2540 Punch	00D,02D		20D			
		1442 Reader/Punch	00A,02A					
		2400 (7-tr-DC) (Note 12)		180,181	280,281	380,381	480,481	
		2400 (9-track)		182,183,184	282,283,284	382,383	482,483	
		3525 Punch	013,026					
	3420 (Note 10)			280,281,282	380,381,382	480,481,482	580,581,582	
				291,292,293	391,392,393	491,492,493	591,592,593	
		3430 (Note 13)		294,295	394,395	494,495		
1	Print Output	3211	002,004,024		202			
		1403	00E,00F		20E			
				02E				
		2400 (7-tr-DC) (Note 12)		180,181	280,281	380,381	480,481	
		2400 (9-track)		182,183	282,283	382,383	482,483	
	3420 (Note 10)			280,281,282	380,381,382	480,481,482	580,581,582	
				291,292,293	391,392,393	491,492,493	591,592,593	
		3430 (Note 13)		294,295	394,395	494,495		
		3800	018,028	118	218			
		3203-4,5	016,017					
			027					
		3262-1,-11 (Note 9)	00B,02B		20B			
		3262-5	00B,02B		20B			
		4245 (Note 13)	02F		20F			
		4248	006		206			
3	New system	2305-2		1D0				
		2314 (or 2319)			130,131,132	230,231,232	330,331,332	
					133,134,135	233,234,235	333,334,335	
					190,191,192			
					193,194,195			
			3330-1/3333-1		150,151,152	250,251,252	350,351,352	450,451,452
					153,154	253,254	353,354	453,454
			3330-1,-11/3333-11		158,159,15A	258,259,25A	358,359,35A	458,459,45A
					15B	25B	35B	45B
			3340/3344		1C0,1C1,1C2	2C0,2C1,2C2	3C0,3C1,3C2	4C0,4C1,4C2
					1C3,1C4	2C3,2C4,200	3C3,3C4,300	4C3,4C4,400
						201,203,204	301,303,304	401,403,404
						205,210,211	305,310,311	405,410,411
						212,213,214	312,313,314	412,413,414
			3350		148,149,14A	248,249,24A	348,349,34A	448,449,44A
				14B	24B	34B	44B	
		3375 (Notes 10, 11)		120,121,122	220,221,222	320,321,322	420,421,422	
				123,160,161	223,260,261	323,360,361	423,460,461	
				162,163,1C8	262,263,2C8	362,363,3C8	462,463,4C8	
				1C9,1CA,1CB	2C9,2CA,2CB	3C9,3CA,3CB	4C9,4CA,4CB	
				1E0,1E1,1E2	2E0,2E1,2E2	3E0,3E1,3E2	4E0,4E1,4E2	
				1E3,1F0,1F1	2E3,2F0,2F1	3E3,3F0,3F1	4E3,4F0,4F1	
				1F2,1F3	2F2,2F3	3F2,3F3	4F2,4F3	
		3380 (Note 13)		170,171,172	270,271,272	370,371,372	470,471,472	
				173,1A0,1A1	273,2A0,2A1	373,3A0,3A1	473,4A0,4A1	
				1A2,1A3,1B0	2A2,2A3,2B0	3A2,3A3,3B0	4A2,4A3,4B0	
				1B1,1B2,1B3	2B1,2B2,2B3	3B1,3B2,3B3	4B1,4B2,4B3	

Starter System and Distribution Libraries (Note 7).

Three system generation utility data sets and the three object program data sets (Note 2).

## 5664-167 - VIRTUAL MACHINE/SYSTEM PRODUCT

### PURPOSE

The VM/System Product provides usability and performance extensions to VM/370; it is recommended for users running DOS/VS, VSE, VS1, SVS and MVS under VM/370 on processors supported by those SCPs, or users with high-speed paging devices, and CMS intensive users. The VM/System Product is designed to run on S/370 mdls 135, 135-3, 138, 145, 145-3, 155II, 158, 158-3, 158AP, 158MP, 165II, 168, 168-3, 168AP, 168MP and on 4321, 4331, 4341, 4361, 4381, 3031, 3031AP, 3032, 3033 Model Group N, 3033, 3033S, 3033AP, 3033AP-2, 3033MP, and the 2K storage protect key version of the 3081-D16 Processor Complex in S/370 mode.

### SPECIAL SALES INFORMATION

**Note:** Information on the availability of the VM/SP High Performance Option Licensed Program (5664-173) for VM/SP Release 3 will be available prior to the availability of VM/SP Release 3.

SQL/DS on VM/SP Release 3 will be supported on AP/MP, the 3081-D16 Processor, and the VM/SP High Performance Option concurrent with the above stated availability.

The VM/System Product Release 3 contains all the function previously available in the VM/370 Release 6 SCP, its priced extensions program products (VM/BSE and VM/SE), VM/SP Release 1, and VM/SP Release 2. Refer to the appropriate pages for an overview of the functions provided in each of these products.

### DESCRIPTION

**Multiprocessor Support:** The VM/System Product will offer to users of VM/370 the reliability and availability characteristics of a full multiprocessor environment. The VM/SP will support the 158MP, 168MP and 3033MP configurations with up to 16 channels per processor and a maximum of 32 channels per MP configuration.

**3042 Attached Processor Model 2 Support:** The VM/System Product, when generated in multiprocessor mode, will support I/O on both sides of a 3033 Attached Processor complex when the complex includes a 3042 Attached Processor mdl 2.

The 3042 mdl 2 offers a standard group of 6 channels, and an optional feature adds another group of 6, for configurations of 18, 22, 24 or 28 channels in a 3033 Attached Processor complex.

**3081 Processor in MP Mode:** When the 3081 is structured so that a channel set is available to each of the two integral central processors, the multiprocessor mode of VM/SP should be specified. This permits up to 16 channels per central processor and up to an aggregate capability of 24 channels. The 3081 Processor may be structured to limit a single channel set to one of the two central processors inherent in 3081 (AP mode).

**Note:** VM/SP does not simulate multi-processing for virtual machines other than under Single Processor Mode. A virtual machine will be dispatched by VM/SP on only one of the two processors in an MP configuration unless the Single Processor Mode of the VM/SP is in effect.

**Enhanced Attached Processor Support:** Several significant enhancements to the VM/370 AP environment are available in the VM/System Product, notably:

- Improved locking logic that may result in a reduction in contention on the global system lock.
- Extended channel error recovery.

In addition, for both the AP and MP environments, several CP commands have been improved to extend the system status and processor activity data available to the system operator.

### Improvements in Resource Management

**Throughput Improvements:** May be achieved in the following environments:

- Systems with real storage bottlenecks.

When a real storage bottleneck is indicated, the resource manager may reduce the effect and increase the level of multiprogramming. This is achieved through the use of improved scheduling and paging algorithms, which give rise to smaller working set size estimates and higher page steal ratios. The net result is that a given real storage size appears more able to contain the given load with improved throughput.

The resource manager also migrates swap tables of interactive users and frees up real storage for other purposes. This may increase the level of multiprogramming and improve throughput.

- Storage bound systems with long running non-interactive users and high multiprogramming levels.

Such systems devote a large part of their paging activity to swapping the long running users in and out of storage as each is given a timeslice. The resource manager reduces this paging overhead by swapping the longest running users into real storage less frequently but keeping them there for longer periods. This may

lower the overall level of paging activity with accompanying reduction in supervisor overhead and some increased throughput.

- Systems that need more paging space than is available on preferred paging devices.

The resource manager maintains active user pages on the high speed or primary paging devices using a page migration scheme. Page wait due to slow access times of secondary devices is reduced and improved processor utilization and throughput may result.

**Improved Response to Trivial Interactions:** May be achieved in the following environments:

- Where terminal interactions occur for both single trivial commands and nontrivial transactions during terminal I/O.

The resource manager distinguishes between the two types of transactions by tracking the resource consumption rate and giving higher priority to the smallest consumer.

- Where transactions are characterized by a wide range of resource requirements.

The fair share algorithms of the resource manager, which are effective in both compute-bound and paging-bound environments, distinguish between the different resource requirements of the users. Consequently, a better interactive/non-interactive split is achieved with improved responsiveness to trivial transactions.

**Improved Installation Management:** Over the services provided in the following environments:

- Where multiple users require a specific percentage of the processor.

The SET FAVOR command with percentage option may now be specified for more than one user.

- Where CMS batch facilities run non-interactively.

Directory priority controls may now be utilized to make CMS batch facilities either fully non-interactive to minimize impact on the system, or fully interactive to encourage its use.

### CP Performance Improvements

The storage management algorithm for returning free storage to the dynamic area was modified. A check is made every hour and also upon a user logging off, to determine if any dynamic area pages obtained for free storage purposes can be returned to the dynamic area.

The set favored command accepts a percentage specification of 100. This specification is handled as a special case by the scheduler where the designated user will be kept at the top of the run list.

CMS disk I/O (Diagnose 18) takes advantage of ECPS:VM/370 for CCW translation. The improvement is available with the existing ECPS:VM/370 assist on the 3135-3, 3138, 3145-3 and 3148 Processors. The improvement is also available with the ECPS:VM/370 assist on the 4341 Processor.

**Addition to ECPS:** ECPS for VM/370 on S/370 mdls 135-3, 138, 145-3 and 148, and on the 4321, 4331, 4341 and 4361 Processors has been enhanced to accelerate the processing of the DIAGNOSE Interface between a virtual machine and CP. Because CMS is a heavy user of DIAGNOSE, the CMS user may receive improved performance.

Operation of VM/SP on a 4321 processor is recommended in a VM/CMS-only environment.

**Small CP Option:** Small CP option reduces real memory requirements for CP which makes more pageable storage available to virtual machines.

**Shadow Page and Segment Table Maintenance:** VM/SP reduces overhead associated with maintaining shadow tables used to run virtual systems.

Multiple shadow tables will be maintained to reduce the overhead associated with building shadow tables when a different address space within a virtual machine is dispatched.

Shadow table entries will be selectively invalidated when VM/SP (extended by the VM/SP) steals a page from a virtual machine.

Shadow tables can be eliminated for V=R users running a production system.

Shadow table maintenance will be reduced for areas in a virtual system where the virtual address is equal to the real address.

**Extended Support:** VM/SP will support operating systems that utilize the S/370 Extended Facility of the 3031, 3032, 3033 and 3081 Processors, and the S/370 Extended Feature of the S/370 mdls 158 and 168, provided the S/370 Extended Feature is installed on the hardware. Thus, MVS/Systems Extensions and MVS/System Product can be run under the VM/System Product on these processors.

PROGRAM PRODUCTS

VM/SP (cont'd)

**MVS Guest Environment:** Release 1 of the MVS/System Product (JES2, program number 5740-XYS, and JES3, program number 5740-XYN) will be supported as guest operating systems under the VM/System Product.

The cross-memory services of Release 2 of the MVS/System Product (JES2 and JES3) will be supported in the guest operating system environment under the level of VM/System Product which is most current at the time of availability, or Release 2 of MVS/System Product. However, cross-memory services will use the hardware microcode implementation of the 3033 Extension Feature (Feature #6850) only when executing under VM/SP High Performance Option (5664-173).

RELEASE 3 ENHANCEMENTS

- **SQL/DS Support**  
SQL/DS is a Relational data base Licensed Program (5748-XXJ). CP and CMS enhancements have been included to allow SQL/DS Release 2 to operate on VM/SP Release 3 without a guest VSE operating system and without VSE/VSAM. These extensions have been provided in a generalized fashion so that other applications may take advantage of them. The CP/CMS Extensions for Application Programs sections below describe this support.
- **System Product Interpreter**  
The System Product Interpreter is a new command and macro processor. It can be used for interpreted applications, command processing and generation, for macros such as those used by the System Product Editor, as a desk calculator, mathematical problem solver, or for any other purpose for which an interpreted simple-to-use language is suitable. Syntax is in a high level form which is easy to learn.
- **Highlights of the System Product Interpreter include:**
  - Extended Control Structure:
    - If-Then-Else
    - Select-When-Otherwise-End
    - Do-Interactive-End
    - Iterate and Leave
  - Full set of arithmetic, character, and logical operators
  - Selection of Standard functions
  - Free Format, Mixed Case
  - Interactive Debug
  - In line Function and Subroutine calls
  - Decimal and Scientific arithmetic capability
  - Built-in string parsing instructions
- **The System Product Interpreter will be the primary interpretive command and macro processor for VM/SP in the future.** It is intended that all future enhancements will be applied to the System Product Interpreter. EXEC and EXEC2 will remain supported and will coexist with the more powerful System Product Interpreter.
- **Programmable Operator Enhancements**  
Several enhancements to the Programmable Operator Facility have been added. Among them are:
  - Message routing with nicknames - allow messages to be routed to other than the logical operator or to multiple operators via CMS "TELL". This enhances the ability to have SPOOL and/or TAPE operators at the remote site in addition to a system operator at the host.
  - Remote Node Availability - ability for periodic signaling between a host and remote system and alerting the host operator of the inability to communicate with a remote system. Improved availability is also provided with the capability to recover from Programmable Operator Facility ABENDs.
  - Enhanced text comparison - allows multiple text comparison strings in a routing table entry with logical operations on the strings.
  - EXEC Action Routines - ability for action routines to be written in all EXEC languages supported by CMS, including the new System Product Interpreter.
  - LOG recording and error handling enhancements.
- **Enhanced Serviceability**
  - Symptom Records - A new record will be created that will assist in problem identification. Information from this record can be useful in communicating problems to the IBM support center. The VM Interactive Problem Control Program System Extension (VM IPCS/E 5748-SA1) Release 2 at the then current service level is required to implement this enhancement.
  - S/370 Program Event Recording (PER) support - This enhancement provides CP command support to facilitate debugging in a virtual machine. It uses the S/370 hardware program event recording (PER) feature to monitor successful branches, instructions fetched within an address range, alteration of storage within an address range, and alteration of a specific general purpose register. In addition, the support provides the ability to trace within multiple ranges, compare altered storage and registers to specific values and execute CP commands on specific events.
- **CP Extensions for Application Programs**  
Several extensions to CP have been made to support Application programs:
  - A DASD Block I/O System Service allowing a virtual machine fast, device independent asynchronous access to fixed size blocks on CMS formatted virtual DASD I/O devices.
  - Inter-User Communication Vehicle (IUCV) extensions to provide:
    1. Fast communications through data specification in the parameter list and related protocol extensions.
    2. Extended mask capability for individual IUCV control interrupts
    3. Expanded trace capability
    4. Support for the DASD Block I/O System Service
  - Diagnose Zero support of time zone differential from Greenwich Mean Time
- **CMS Extensions for Application Programs**  
A number of enhancements to CMS have been included to support applications written to run on CMS:
  - CMS File System Extensions - The CMS File System Extensions include:
    - 512-byte length physical DASD blocks - A new block size of 512 bytes is supported and is available through a new option on the CMS FORMAT command.
    - DASD Block I/O Support - New and extended CMS commands and functions are provided to initialize CMS disks for use with the CP DASD Block I/O system service.
  - Update-in-Place  
The update-in-place facility allows you to write blocks back to their previous location on disk rather than in a new slot. The filemode number 6 differentiates CMS files with the update-in-place attribute from regular CMS files.
  - CMS IUCV Support  
Support for IUCV communication has been introduced into CMS. This support will allow multiple programs within a virtual machine to use IUCV functions. Included is the ability to initialize a CMS machine for IUCV communication and to invoke IUCV functions via new CMS macros. These macros will also allow the user to specify path-specific exits for IUCV external interrupts. CMS IUCV support can be used to access a CP DASD Block I/O system service.
  - CMS Wait on ECB - The ability to wait on an ECB or a list of ECBs will be supported via a new CMS macro. This macro will provide the capability to wait on OS and VSE format ECBs.
  - CMS ABEND Exit - A general CMS abnormal exit capability will be provided so that user programs may specify the address of a routine to get control before CMS ABEND recovery begins. An exit is established and cleared through a new CMS macro.
  - RDTERM Direct - A new option on the RDTERM macro will allow a program to read an input line directly from the console. Lines already stacked in the program or console stack will not read. This function will enable a program to prompt a terminal user for a response without disturbing the contents of the program or console stack.
  - Immediate Command Extensions - The immediate command capability of CMS will be extended by allowing users to define their own immediate commands.
  - EnhancementsZto GLOBALV  
The GLOBALV command has been enhanced to use the EXECCOMM interface available in EXEC2 and the System Product Interpreter. This makes it possible to set and retrieve global variables by specifying the name of the variable on the GLOBALV command call.
  - Removal of the CMSSEG Segment  
The discontinuous saved segment CMSSEG has been removed by merging modules from the CMSSEG segment into the CMS shared nucleus.
  - Enhancements to TELL EXEC, DEFAULTS EXEC  
The TELL EXEC has been enhanced to allow the use of the MSGNOH command instead of the default of MSG command for local messages. The DEFAULTS EXEC has been changed to support the enhancement made to the TELL EXEC.
  - EXECOS Command  
EXECOS is a new CMS command that resets the OS environment under CMS without returning to the interactive environment. It is intended for use in an EXEC2 or System Product Interpreter EXEC that either invokes several OS programs sequentially or invokes the same OS program repetitively. If VSAM is running, VSAM cleanup is also accomplished.
- **CMS Performance Enhancements**

**VM/SP (cont'd)**

- LISTFILE and RENAME  
The LISTFILE and RENAME functions, formerly executed in the transient area, are now reentrant, and have been moved to the CMS shared nucleus.
- XEDIT Interface  
Applications can have access to files in storage. They can read and write specific records without the overhead of using the disk or the program stack to transfer data to or from XEDIT.
- Enhanced VSAM Support
  - VSE/VSAM Release 3 Support  
CMS will support VSE/VSAM Release 3 which includes significant enhancements designed to improve catalog reliability and integrity while providing additional serviceability and usability. VSE/VSAM Release 2 is not supported.
  - 3380 DASD Support  
VM/SP Release 3 will support the use of 3380 DASD by VSE/VSAM through the OS/VSAM environment display.
  - Assembler Language VSAM Support  
All of the VSE/VSAM macros and their options and a subset of the OS/VSAM macros are supported by CMS. The OS/VSAM Assembler language macros supported for use in CMS are contained in the OSVSAM MACLIB that is distributed with VM/SP.
  - VSEVSAM Command  
VSEVSAM is a new CMS command which allows VSAM users to obtain the VSE/VSAM Assembler language macros from the Optional Source Statement Library tape. The VSEVSAM command creates the VSEVSAM MACLIB containing all of the VSE/VSAM Assembler language macros and some VSE MACROS.
  - CATCHCHECK Command  
CATCHCHECK is a new CMS command which allows CMS VSAM users to invoke the VSE/VSAM Catalog Check Service Aid to verify a complete catalog structure.

New and Improved System Product Editor (XEDIT) Functions  
Enhancements to the System Product Editor (XEDIT) to provide new or improved support in the following areas:

- Prefix macro support
- Selective line editing
- Screen Control
- Additional SET RESERVED capabilities
- Extended data stream (color)
- Vertical screen split
- Several new functions intended to provide additional data manipulating capabilities
- Modifications to miscellaneous existing XEDIT functions to improve flexibility and/or consistency between related subcommands

XEDIT provides all of the major capabilities available in EDIT. It is IBM's intent to provide all future VM/SP editing enhancements to XEDIT. XEDIT has attempted to provide the most useful capabilities available in various editors. A compatibility function for Display Editing System 5796-PJP (EDGAR) was provided in VM/System Product Release 1 to assist EDGAR users in the transition to XEDIT. Its primary purpose was for migration only.

A subset of the EDGAR functions was provided to aid in migration. Not all EDGAR commands or functions are supported in the same manner as in EDGAR. There will not be any changes or enhancements to this migration support. It is recommended that all those using this migration support should complete the migration to XEDIT when VM/SP Release 3 is installed. New XEDIT users should not use the EDGAR migration functions.

- Enhanced Publications  
The following publications have been revised and restructured to provide increased usability. The books have a new cover design, with a graphic that is printed in various colors according to the major task associated with a particular book. New binders are available for storing the manuals. Labels for the binders are also available.
  - VM/SP General Information, GC20-1838  
The content of this manual has been generalized to provide an executive level description of VM/SP. It also provides customer management and staff with information needed to evaluate the applicability of VM/SP to their installations.
  - VM/SP Introduction, GC19-6200  
This manual has been completely rewritten to provide basic information about VM/SP. It describes what VM/SP is and what it can do for the general user.
  - VM/SP Release 3 Guide, SC24-5240  
This manual is specifically intended to provide current users of VM/SP with a synopsis of the functional enhancements offered by the new release. It will improve customer productivity by

describing new functional enhancements, defining the related user interfaces, and giving examples of their use. It includes details for migrating from VM/SP Release 2 to VM/SP Release 3 and identifies new and changed modules.

- VM/SP Installation Guide, SC24-5237  
This manual provides procedural information about the VM/SP install process. It is published expressly to satisfy the requirements associated with the installation and service tasks.
- VM/SP Planning Guide and Reference, SC19-6201  
This manual, previously titled *VM/SP Planning and System Generation Guide*, has been revised to better meet the requirements of the planning task. This book identifies the hardware and software planning considerations for a VM/SP system, and the system definition files that must be prepared for a system generation.
- VM/SP Terminal Reference, GC19-6206  
This manual, previously titled *VM/SP Terminal User's Guide*, is completely reorganized and revised for ease-of-use. It discusses the characteristics of terminals in general, and the physical characteristics of different terminals and consoles. It contains a typical session that gives working examples from logon to logoff.
- VM/SP System Product Interpreter User's Guide, SC24-5238  
This manual is a step-by-step guide to using the System Product Interpreter for new users.
- VM/SP System Product Interpreter Reference, SC24-5239  
This manual is a complete compilation of reference information for using the System Product Interpreter.
- VM/SP System Product Interpreter Reference Summary, SX24-5126  
This publication provides quick synoptic reference information about System Product Interpreter statements and their use.

Additionally, two previously announced functions will be available in VM/SP Release 3. They are:

The Missing Interrupt support announced July 6, 1982. This function will monitor system I/O activity for interrupts not completing within a certain time period and attempt to correct the condition. See Programming Announcement 282-116 for additional information.

Support for the Speed Matching Buffer for the IBM 3375 announced July 30, 1982. This support provides the capability to use the hardware when connected to a 1.5 megabyte channel. This includes paging, spooling, and/or mini disks.

**RELEASE 2 ENHANCEMENTS**

- Programmable Operator Support  
The Programmable Operator facility can be used in a VM/SP system to reduce or eliminate system operator messages. This facility provides the capability to log messages, suppress messages, redirect messages, execute commands, and pre-program message responses, all under the control of an editable message routing table in a CMS file.  
  
The Programmable Operator facility can be used by a stand-alone VM/SP system or can allow the operation of a remote VM/SP system to be controlled by an operator at a host VM/SP system. Remote operation of a VM/SP system requires Release 2 or Release 3 of the RSCS Networking program product on both VM/SP systems. Installation of the RSCS Networking Release 3 program product will provide enhanced display utilization.
- New CMS End-user Functions  
Numerous end-user functions are being provided to assist the non-professional user as well as the professional user in utilizing the system. These functions are provided to enhance the system usability and to improve user productivity. These functions provide:
  - The new VM/SP SENDFILE and RECEIVE commands may be used in conjunction with the TSO/E Interactive Data Transmission Facility TRANSMIT and RECEIVE commands to exchange files between VM/SP Release 2 and MVS/TSO systems connected through an NJE/NJI network.
  - Enhanced full screen capability to display information about Reader Spool files. Allows the ability to review/browse through files, to discard files, or initiate other actions such as copy, or forward the file to other media/users.
  - A full screen capability to display file information (information presented is similar to what LISTFILE provides today) and issue CMS commands that perform some type(s) of action on the file(s) being displayed. Program function keys are also assigned to useful functions like EDIT, SORT or HELP.
  - Enhanced command capability such as:
    - a. Header Option on Print.

## PROGRAM PRODUCTS

**VM/SP (cont'd)**

- b. DISK LOAD extended to allow sequence identification and the ability to load a file and retain its original date/time.
  - c. Ability to specify '=' for any file identifier in the fileid2 operand of the COMPARE command.
  - d. LISTFILE enhanced to allow 'STACK', 'ARGS', 'BLOCK', 'TRACE', 'FIFO', 'LIFO' and extended pattern matching options.
  - e. UPDATE extended to keep a record of missing PTF files.
  - f. A new command to display environmental status such as userid, nodeid, date, time, zone.
  - New CMS Productivity Aids for the DP Professional CMS has been enhanced to provide the DP professional user with several productivity enhancements to make their system implementation easier. These productivity enhancements provide:
    - A CMS facility to allow I/O between a device and an EXEC program.
    - The ability to dynamically extend the CMS nucleus.
    - A routine to display at the console or stack virtual reader file characteristics.
    - An enhanced CMS QUERY command to display CMSLEVEL information such as product name, release identification, service level and information regarding virtual disks that are accessed. In addition, QUERY command results can be stacked.
    - A GLOBALV command which allows a user to maintain a collection of named values whose lifetime is either within a single IPL, within a session or across sessions.
    - The ability to specify that portions of a line should be displayed, highlighted, protected, and/or masked using the VM/SP editor.
    - The ability to directly access EXEC 2 variables. Variables may then be inspected and/or set from a program.
  - DIAL Command support for remote BSC 3270 users. This support provides the ability for remote BSC 3270 users to issue the DIAL command. The remote 3270 will appear to be a locally attached terminal to the dialed virtual machine.
 

In addition, this support removes the previous restriction of 16 remote communication lines. The maximum number of remote communication lines is now 256.
  - CMS Nucleus Restructured. The CMS nucleus has been restructure to provide a CMS system which is more flexible and extendible for development, serviceability and maintenance purposes.
  - CMS Tokenization. The eight-byte tokenization restriction has been eliminated for parameter passing.
  - Starter System Full Screen Support. The ability to operate the new CMS editor in full screen mode has been extended to the VM/SP Starter System running second-level. Previously, the new CMS editor would only run in single line mode.
  - HELP Files. The HELP files can now be placed on disks other than the S-DISK.
  - CMS/DOS Upgrade. CMS/DOS support has been upgraded to VSE/Advanced Functions Release 3 and VSE/VSAM Release 2 including support for the 3375 DASD.
  - Command Retrieve Capability. The CP SET Program Function command is enhanced to include the option "RETRIEVE". When specified, the system will save input lines. When the specified program function key is pressed, the saved input lines are redisplayed in the reverse sequence of entry. The number of saved lines depends upon buffer size and input line length.
  - QUERY Command Enhanced. The QUERY command is enhanced to allow the user to specify the operands "USERID" or "CPLEVEL". The Query USERID command responds with the userid and with the system identifier of the system that the user is logged on to.
 

The query CPLEVEL provides information relative to the software product's name (e.g., VM/SP), release number, service level number, Nucleus Creation Date and time, along with the IPL date and time.
  - Enhanced ASCII Support. ASCII support has been enhanced to support the 3101 user with the following:
    - Screen Management - Controlled scrolling of output.
    - Prompting - Linefeed prompting can be selected to allow data to be entered starting in column 1.
  - Read operations can be command-chained to write operations.
  - Linesize Control option has been added.
  - Enhanced 3800 Support. This enhancement allows the RSCS Networking Release 3 program product to pass to CP the 3800 attributes defined in an NJI header created by a system using the NJI protocol. This will also allow files created in these systems to print properly on a 3800 controlled by VM/SP Release 2. Copy group and burst attributes remain unsupported.
  - Support for 3375 DASD. VM/SP Release 2 will support the 3375 Direct Access Storage Device with the 3800 Storage Control Models 1 or 2.
 

The new DASD will be supported as a paging, spooling, system residence, T-disk, mini-disk and as a dedicated device to a virtual machine operating system that supports the 3375 DASD.
  - Support for 3380 DASD. VM/SP Release 2 will support the use of 3380 DASD by VSE/VSAM through the OS/VSAM environment of CMS only.
  - Support for the new Speed-Matching Buffer (Feature #6550). The 3880 Speed-Matching Buffer Feature support allows attachment of the new high speed 3380 DASD to processors with channel speeds slower than those normally required by the new devices. Refer to Announcement Letter 280-61 for details regarding the hardware support.
 

VM/SP support for the Speed-Matching Buffer is provided for use of CMS, via Diagnose 18, as well as by the CP component of the operating system.
  - Trace Table Recording Facility. A new serviceability enhancement is provided to record a history of system operations on spool. This facility is controlled by a new Class C command. Selective recording of CP trace entries by type, VMBLOK address, interrupt code and device type is provided. In addition, user generated information from a virtual machine and CP information can be included.
 

A utility program is also provided. This utility provides the user with the capability to print the collected information or display it on a terminal.
- As a customer convenience, the Class 2 SCP Stand-alone Device Support Facility is being shipped in conjunction with VM/System Product. Device Support Facility is a utility used to initialize DASD volumes or mini disks and performs data analysis and recovery either stand-alone or in a virtual machine under VM/SP.

**RELEASE 1 ENHANCEMENTS**

**Dynamic SCP Transition To and From Native Mode:** An installation can have the ability to run another SCP in native mode on the same system used for running VM/SP with a minimum of disruption to the system's operation; it is possible to switch from VM/SP to another SCP, run that SCP in native mode and then switch back to VM/SP without IPLing the system. The guest SCP must run in a V=R area. It can be MVS, SVS or VS1 in non-handshaking mode.

When the transition is made to native mode, the OS/VS SCP is operating without VM/SP. The performance of the OS/VS system will be equivalent to that OS/VS system running native with the same amount of storage and the same I/O configuration it was using in the VM/SP V=R area. When the installation again requires VM/SP services, the operator returns control to VM/SP and the installation again has all the advantages that result from using VM/SP.

This gives an installation operational flexibility that it did not have before. It is possible to run both VM/SP and OS/VS in native mode on the same system, without the disruption of an IPL when a switch is made between VM/SP and OS/VS. This capability is particularly valuable when running an application that cannot be shut down, such as DB/DC.

**Note:** This function is not supported for MVS on the 4300 processors.

**Single Processor Mode:** It is possible to run VM/SP in Single Processor Mode (SPM). SPM will allow an installation to restrict VM/SP to a single processor of an AP or MP system, leaving the other processor for the exclusive use of a virtual machine running MVS. In SPM, MVS must be IPLed in a V=R area. MVS will then initialize the other processor and run in AP or MP mode.

**IPL Command Enhancement:** This enhancement allows a user to activate an OS/VS1 system without any operator intervention. It is similar to the capability provided by the DOS/VSE Automatic System Initialization (ASI) Facility.

**Virtual Machine Storage Preservation:** In VM/SP, during a warm start or an abnormal termination by VM/SP, the virtual storage of specified virtual machines will be preserved. Specifically, virtual machine IPL was changed so that it no longer uses a page of the user's virtual storage, and the V=R area under VM/SP will be preserved during warm start. In addition, specific virtual machines can be identified such

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**VM/SP (cont'd)**

that at VM/SP abend, or when that virtual machine is abnormally terminated by VM/SP, the registers and main storage for that virtual machine will be saved.

The improved integrity of virtual storage is particularly beneficial to IMS/VS users running in a virtual machine who need to have storage preserved so that they can run a stand-alone program to recover IMS/VS Log Buffers. In addition, stand-alone dumps that are IPL'd from an external storage device will now accurately reflect the user's virtual storage, because VM/SP will no longer use a page of that storage.

**Single Console Image Facility:** This support enables the operator of a virtual machine to control multiple virtual machines from one physical terminal. Availability is improved in cases where there is a console failure because control can be automatically passed to the virtual console of another user. This capability is available for use by any guest machine.

Functions that enhance the reliability, availability and serviceability characteristics of the VM/SP system include:

- An enhancement that will detect missing I/O interrupts and notify a system operator of the problem.
- Enhancements to allow an installation to dynamically allocate space for a dump after an IPL and to reserve sufficient contiguous DASD space for one or more system dumps.
- Expansion of the checkpoint limit for spool files from the current limit of 2,048 to a new limit of 9,900, the maximum allowable number of spool files in the system.

New functions that enhance the integrity and security of the VM/SP system include:

- A system option that will automatically clear allocated T-Disk DASD space and prevent access to residual data.
- A function to prevent the system operator from being automatically logged on during an automatic system restart if the operator was not logged on the primary system console when the system ABEND occurred.
- An enhancement to the SPTAPE command to support the DUMP and LOAD functions for CP DUMP reader files.

**Full Screen Console Support Via SIO Interface:** Full screen console support will enable a guest machine (for example, VSE DOC or OS/VS DIDOCS) and CP to share a locally-attached display terminal controlled by CP. The guest machine can use a display terminal as a graphics device in full screen mode while CP shares the terminal and uses it as a line device. A Start I/O (SIO) instruction is the interface for this support. A guest machine can use either the existing DIAGNOSE interface or the SIO interface, but not both simultaneously.

**Systems Network Architecture (SNA) Support:** Full VM/370 operator console capabilities are provided to the SNA terminal users. These console functions include full CP/CMS command processing capabilities, CMS editor processing mode and full screen support for 3270 display terminal devices. This support requires that the Virtual Machine/VTAM Communications Network Application (VM/VCNA) program product and its prerequisites be installed.

**Inter-User Communication Capability:** The inter-user communication vehicle (IUCV) facilitates the transfer of messages among virtual machines and between a virtual machine and CP.

- All IUCV interfaces are provided to the user at a macro level.
- A user can selectively establish and terminate communications paths.
- Two users can establish multiple paths between themselves.
- A virtual machine can receive messages and reply either synchronously without an interrupt or asynchronously via an external interrupt.
- An installation can restrict the number of messages outstanding on each communication path.
- A receiver can selectively reject messages.
- IUCV coexists with VMCF and provides extended inter-user communication capabilities.

**CP Spooling Enhancements**

- Association of a form number with each spool file and spool device. Features of form number support are:
  - An eight character alphanumeric form number.
  - Optional automatic prompting of the spool operator for forms changes.
  - Optional "setup mode" to allow the spool operator to align forms.

- Ability to order, change, purge, transfer, spool-to-tape and query spool files by form number. ....
- Default form numbers that are installation specified.
- Optional installation specified translation from user form numbers to operator form numbers.
- Ability to transfer spool files between the reader and printer queues, or the reader and punch queues.
- Capturing of the Load FCB, Fold and Unfold CCWs in a virtual printer spool file, and their subsequent execution on the real printer.
- Ability to select spool files for the QUERY command based on their hold status.
- An enhanced header page and a new trailer page for printed output. A file sequence number helps the spool operator distribute output correctly.
- Additional spool operator information:
  - A "waiting" message when a real spool device finishes work.
  - Ability to display the number of records left to print or punch in the currently active spool file.
  - Display of the distribution code and the new file sequence number for each file printed or punched.
- Ability for the installation to specify classification titles for selected spool file classes. The title will be printed on the separator page, and optionally on each page of output.
- Ability to specify the distribution code on SPOOL command.
- Increase in the allowable copy count to 255.

**Spool Files to Tape:** This support provides Class D commands which enable the spooling operator to store to tape, or retrieve from tape, those unit record output files which he or she wishes to schedule for real output at some later time on the VM/SP system. The restored files will retain the same characteristics as the original files, but will be assigned new spool-ids to avoid duplicate identification within the spooling system. The spooling operator can store or retrieve spool files selectively (by class or spool-id) or completely. An option is provided to allow the operator to scan the tape.

**Spooling of Accounting Records:** This support provides the installation with the ability to spool accounting data to a designated virtual machine with a designated class. The data can be spooled to provide punched output or spooled to a virtual machine's reader for additional processing. This eliminates the need to have a real card punch online at all times to get accounting records.

**CMS File System Enhancements:** The file system enhancements will provide the user with a more efficient and flexible file system. Specifically, the enhancements are:

- Removal of the limitations on the size of CMS disks and the number of files per CMS disk.
- Support for physical block sizes of 800, 1024, 2048 and 4096 bytes.
- Efficient handling of variable length files.
- Selective directory updating.
- Fixed Block Mode (FBM) device type support.
- Concurrent open for read and write of CMS files.
- CMS access to one system disk and up to 25 minidisks concurrently.

**Interactive Help Facility Under CMS:** The help facility is an informational, online display service available at the CMS terminal to guide the user in using CP and CMS commands and reacting to CP and CMS messages. As a result, the user can, in most cases, avoid referencing manuals during CMS sessions.

With the enhanced HELP Facility of VM/SP, the user will be able to issue CMS (including editor) and CP commands directly from the screen on which a HELP file is displayed. Because HELP files will be viewed via the new CMS editor, scrolling and locate facilities will be improved.

**The New CMS EXEC Interpreter:** VM/SP CMS will provide the user with more advanced EXEC processing capabilities and improved performance. The new EXEC interpreter:

- Accepts words of up to 255 characters each.
- Allows commands to be issued either to CMS or to specified subcommand environments; for example, to an editor.
- Provides new string manipulation functions.
- Provides arithmetic functions for multiplication and division.
- Provides debugging facilities.
- Supports user-defined functions and subroutines.



**VM/SP (cont'd)**

- Improves execution time.
- Coexists with the current CMS EXEC interpreter.

**The New CMS Editor:** The new CMS editor provides:

- Full screen support for 3270 display stations, including: multiple views of the same file or of different files, selective column viewing and automatic wrapping of lines larger than the screen.
- Ability to extend and tailor editor commands with a powerful macro mechanism which uses the new CMS EXEC interpreter.
- Extended string search facilities to improve text processing.
- Enhanced functions to handle program development including automatic update generation.
- Ability to define the screen format according to individual preferences.
- Data import and export facilities.
- Coexistence with the CMS editor.
- 3278-5 and 3279 terminal support.

**CMS OS Loader Capability:** The CMS OS Loader will enable OS relocatable load modules to be used under CMS. The load modules may be loaded from an OS partitioned data set or a CMS load library. This support also provides a facility to list, copy or compress members of a CMS load library and to merge CMS load libraries.

This support further allows use of the OS/VS Linkage Editor to create a CMS LOADLIB or a LOADLIB member. This is accomplished using the existing LKED command. The supported Linkage Editor options are defined in the *CMS Command and Macro Reference* (SC19-6209).

**CMS Use of CP Page Management Interfaces:** CMS now takes advantage of the existing page control interfaces to better communicate the true working set of pages to CP, thus better utilizing the page frame resources of the real machine.

**CMS Tape Command Performance Improvement:** To decrease overhead, a large block-size (4K) is supported for tape dump.

**CMS Support of Labeled Tapes:** CMS processes labelled tapes as follows:

- VOL 1 Labels
  - Processed by DOS or OS OPEN simulation routines.
  - Processed by CMS TAPPDS or TAPEMAC commands.
  - Displayed or written by CMS TAPE command.
- HDR Labels
  - Processed by DOS or OS OPEN simulation routines; exits are provided to allow access to user-written routines to process standard user (UHL) labels.
  - Processed by CMS TAPPDS or TAPEMAC commands.
  - Processed by a CMS macro designed for use in assembly language programs in conjunction with other CMS tape macros.
- EOF/EOV Labels
  - Processed by DOS or OS CLOSE simulation routines; exits are provided to allow access to user-written routines to process standard user (UTL) labels.
  - Processed by a CMS macro designed for use in assembly language programs in conjunction with other CMS tape macros.
- Non-Standard Labels
  - User exits are provided in DOS or OS OPEN and CLOSE simulation routines and in TAPPDS or TAPEMAC commands to allow access to user-written routines to process non-standard labels.

**Note:** The following are supported:

- Label processing for tapes which are read backwards.
- Multi-volume files.
- ASCII labels.

**CMS Support of Unlabeled Tapes:** CMS will process unlabeled tapes.

**Enhanced Support for the 3270 Information Display System Which Includes:**

**APL Text Feature:** The 3270 APL-TEXT feature provides the 3270 user with access to the full APL, TEXT and EBCDIC character sets. This makes it possible for the user to interact with the VS APL program product as well as text processing applications which run under CMS. This support extends the APL-TEXT function to users with 3274 Controllers/3278 Display Stations.

**Intensified Display:** VM/System Product takes advantage of the intensified display feature of the 3270 Information Display System as follows:

- The "Current Line" of the CMS Editor will be intensified.
- All CMS Edit messages will be intensified.
- An application program may supply a 3270 Start Field order and an attribute byte in a DIAGNOSE 58, CCW Code 19 (Virtual Console Interface) data stream. This provides an application program with the ability to define a field as normal intensity, intensified or non-display.
- Messages from the system operator or other users will be intensified.
- The re-display of user input is intensified so that it may be distinguished from output. The SET command will activate or deactivate intensification of input re-display.

**Support for the Enhanced Display Terminals:** The following terminals and associated printers are supported:

- 2250 mdl 3 Display Unit
- 2840 Display Control mdl 2
- 3250 Graphics Display System
- 3251 Display Station
- 3255 Display Control Unit
- 3258 Channel Control Unit
- 3262 Printer mdls 3 and 13
- 3274 Control Unit mdl 1B, 21B (3272 compatible)
- 3274 Control Unit mdl 1C, 21C, 31C, 51C (TP - BSC only)
- 3274 Control Unit mdl 1D, 21D, 31D (3272 compatible)
- 3276 Control Unit/Display Station mdl 2 (1920 character screen)
- 3276 Control Unit/Display Station mdl 3 (2560 character screen)
- 3276 Control Unit/Display Station mdl 4 (3440 character screen)
- 3278 Display Station mdl 2 (1920 character screen)
- 3278 Display Station mdl 3 (2560 character screen)
- 3278 Display Station mdl 4 (3440 character screen)
- 3278 Display Station mdl 5 (3564 character screen)
- 3279 Display Station (Multi-color display screen)
- 3268/3287/3289 Printer (Copy command support only)

This includes support for the 96-character set (94 characters plus space and null), and PF keys 13 through 24.

The VM/SP support for the 3279 provides a new data stream for communicating between the device and the host, multiple colors for data display, programmable symbol-set capability and extended highlighting attributes; extended highlight functions are character underscore, reverse video and blinking character. These attributes can be set and reset for the different areas of the display screen. VM/SP support for color enables the user to select colors for CP messages, virtual machine output, redisplay of user input, user input area and the CP status area.

**Support for the 3880 Storage Control Models 1, 2 and 3**

**Support for the 3800 Printing Subsystem as a Virtual Spooling Device:** The VM/SP will allow extended use of the font, image and copy capabilities of the 3800 Printing Subsystem. A user is able to print a file on a real 3800 or on any real spooling device supported by CP Spooling running in conjunction with the VM/SP.

**Dedication of Remote 328X Printers:** Remote bisynchronous 328X printers can now be dedicated to guest machines. This support further allows the Remote Spooling Communication Subsystem (RSCS) program product to spool and print VM/370 files on the 328X printers. (For further information, see the RSCS documentation.)

**Support for the 3289 Printer Model 4:** The 3289 mdl 4 is a 400 line-per-minute printer, functionally compatible with the 3203 Printer mdl 4 except in the area of UCS buffer load.

**Support for the 3262 Printer Models 1 and 11:** The 3262 mdls 1 and 11 are, respectively, 650 and 325 line-per minute printers.

**Support for the 3262 Printer Model 5:** The 3262 mdl 5 is a channel-attached 650 lines-per-minute printer functionally compatible with the 3262 mdl 1.

**Support for the 4245 Printer Model 1:** The 4245 Printer mdl 1 is a channel-attached, 2,000 line-per-minute printer.

**Support for the 4248 Printer Model 1:** The 4248 Printer mdl 1 is a channel-attached 2,200/3,300/3,600 lines-per-minute printer.

**Support for the 8809 Tape:** The 8809 is a two-speed tape drive (12.5 ips and 100 ips). It is supported at 12.5 ips in VM/370. The stand-alone dump-restore utility (DDR) supports the device at 100 ips to provide high-speed backup capability when executing on a stand-alone processor and 3310/3370 DASD.

**Support for the 3310/3370 Direct Access Devices:** The 3310/3370 are direct access devices that use Fixed Block Architecture. The Direct Access Storage Compatibility Feature (#7901) of the 4331 Processor for emulation of 2314, 3330 or 3340 format data on the 3310 or 3370 is supported. VM/SP supports 3310 or 3370 volumes containing

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VM/SP (cont'd)

emulated data which are dedicated to a guest operating system other than VM/SP or CMS.

**3380 DASD Support:** VM/SP supports the 3380 Direct Access Storage with the 3880 Storage Control mdl 2 and 3, using the Data Streaming Feature on the 3031, 3032 and 3033 Processors, or attached to a 3MB channel on the 4341 and 4381.

The 3380 DASD is supported by VM/SP as a paging, spooling, SYSRES, T-disk or mini-disk device and as a device dedicated to a virtual machine operating system that supports the 3380 DASD.

The 3380 DASD offers a new level of reliability and performance, with increased capacity for online data storage.

**Note:** VM/SP does not support the dynamic path selection capability of the 3380 DASD mdl A4.

**Missing Interrupt Handler:** System I/O activity is monitored to detect interrupts not occurring within an installation specified period of time. An attempt at corrective action is made and a message is sent to the system operator to advise of the results.

**Note:** Missing Interrupt Handler support for Release 2 of VM/System Product is available 4Q 1982.

CUSTOMER RESPONSIBILITIES

- Ordering and installing all of the required communications facilities.
- Generating the appropriate 3704/3705 Communications Controller programs.
- Allocating and formatting direct access storage space for the VM/SP control program, the CMS system residence area and user work areas.
- Generating and updating user directory and virtual machine descriptions.
- Making the final evaluation as to which programs should be run under VM/SP in his environment.
- Training personnel to operate the VM/SP system.
- Teaching users VM/SP commands and how to operate the remote terminals.

**Note:** To run SVS under the VM/System Product, PTF UY77568 must have been applied to the SVS system.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

VM/System Product is designed to run on IBM S/370 mdl 135, 135-3, 138, 145, 145-3, 148, 155II, 158, 158-3, 158AP, 158MP, 165II, 168, 168-3, 168AP, 168MP and on the 4321, 4331, 4341, 4361, 4381, 3031, 3031AP, 3032, 3033 Model Group N, 3033, 3033S, 3033AP, 3033AP-2, 3033MP and the 2K storage protect version of the 3081 Model D16 Processor Complex. **Note:** Support of the VM/System Product High Performance Option licensed program (5664-173) for VM/System Product Release 3 will be available in first quarter 1984.

VM/SP Release 3 support of AP/MP and the 3081-D16 Processors will be available in first quarter 1984. **Note:** The VM/SP requires as a prerequisite the application of EC #274276 (shipped in June 1980) to the 3031 uniprocessor and 3031 attached processor.

**Real Storage Requirement:** The VM/System Product requires a minimum user accessible storage of 512K.

Minimum machine requirements are listed for information only. Depending upon the number of terminals used, the total workload of the system, and the desired response time, all users should consider increasing real storage size as appropriate.

**Display Terminal Support:** The IBM 3278 mdl 5 and 3279 display terminals are supported.

Notes

1. VM/System Product supports a cardless environment. By using the facility to spool accounting records and altering the system generation procedures to use tape devices, the requirement for a card reader/punch can be eliminated. Specific details are contained in the *VM/SP Planning and System Generation Guide*.
2. Specific details relevant to the minimum configuration required for hardware maintenance should be directed to the Field Engineering Division.

ECPS:VM/370 Support

Model No.	VM/370	Availability
135-3	Level 18	EC #149136 and later
138	Level 18	EC #149136 and later
145-3	Level 18	EC #356901 and later
148	Level 18	EC #147710 and later
3031	Level 19	EC#274276 and later
3131AP	Level 19	EC#274276/388860

		and later
4321	Level 19	At shipment of processor
4331MG1	Level 19	EC 364290 and later
4331MG2	Level 19	EC 364415 and later
4341MG1	Level 19	EC 154315 and later
4341MG2	Level 19	EC 856093 and later
4361	Level 20	at shipment of processor
4381	Level 21	EC 866902 and later

Notes

1. The VM/System Product will execute on the 135-3, 138, 145-3 and 148 processors at earlier EC levels, but the hardware assist will not be used.
2. The 3031, 4321, 4331, 4361 and 3031AP Processors support only a subset of ECPS:VM/370 function.
3. If users running the VM/SP on S/370 mdl 135-3, 138, 145-3 or 148 with ECPS for VM/370 also choose to use the shadow table maintenance functions of the VM/SP, they will not realize the full benefit of ECPS. This is because the shadow table maintenance algorithms will be used in preference to some ECPS algorithms.
4. CMS disk I/O (Diagnose 18) has been modified to take advantage of ECPS:VM/370 for CCW translation. The improvement is available with the existing ECPS:VM/370 assist on the S/370 135-3, 138, 145-3 and 148 Processors. The improvement is also available with the ECPS:VM/370 assist on the 4341 and 4381 Processors.
5. The ECPS:VM/370 and ECPS:MVS options on the 4341 Model Group 1 are mutually exclusive. The 4341 Model Group 1 Processor MVS users who have specific throughput or terminal response requirements and who plan to run the MVS/System Products in conjunction with the VM/SP should carefully review their configurations to ensure that executed performance needs are met.
6. The ECPS:VM/370 and ECPS:MVS options may be concurrently utilized on the 4381 and 4341 Model Group 2 Processor, whenever ECPS:VM/370 and ECPS:MVS are both selected at IML time. With this joint selection, functions of the shadow table bypass assist defined in *Virtual Machine Assist and Shadow Table Bypass Assist* (GA22-7074) are included. These functions are designed to enhance the performance of MVS running under VM/370 in a V=R environment with the VM/System Product.

**Shadow Table Bypass Support:** On the 3031 and 3031 AP processors, an engineering change (EC #276271 and later) is available to improve the performance gains of the shadow table function of the VM/SP. Because system performance is dependent on a number of variables, IBM will not warrant that improvement in performance will be realized in all cases where the VM/SP shadow table function is activated.

SOFTWARE REQUIREMENTS

VSE/VSAM Release 3 program product support and CMS/DOS services for VSE/Advanced Function Release 3 are supported by VM/SP Release 3.

COMPATIBILITY

Application programs that currently execute under the VM/Basic System Extensions program product or the VM/System Extensions program product or the VM/System Product Release 1 and are not dependent on internal CD or CMS structure and/or control blocks, should also run on the VM/System Product Release 2.

For ease of migration, the existing CMS editor continues to be supported in the VM/SP. However, the existing CMS editor

Migration macros. If he or she desires, the user can invoke the existing CMS editor.

The new VM/SP editor includes among its enhancements some of the functions contained in the Display Editing System (DES) IUP, order number 5796-PJP. Macros are provided to aid users in migrating from DES to the new editor by providing a DES display format for command input. The Macros provide a SYGSET of the EDGAR functions. Not all functions will work exactly as EDGAR native mode.

CONVERSION

SPOOL file information has been changed in Release 3. A conversion aid will be available via the SPTAPE function to allow those users who currently have VM/SP Release 1 or Release 2 installed and do not want to perform a COLD start the ability to migrate their SPOOL files to VM/SP Release 3.

VM/SP Release 2 Programmable Operator Routing Tables must be converted to the VM/SP Release 3 routing table format. A CMS EXEC will be provided to aid in this conversion.

Other than the optional compatibility macros announced in VM/SP Release 1, and the above items, no conversion aids are required to move from VM/Basic System Extensions Release 2, VM/System

## PROGRAM PRODUCTS

**VM/SP (cont'd)**

Extensions Release 2, or VM/SP Releases 1 or 2 to Release 3 of VM/SP.

**DOCUMENTATION**  
(available from Mechanicsburg)

<b>Title</b>	<b>Order Number</b>
Virtual Machine System Product:	
Introduction	GC19-6200
Glossary and Master Index	GC19-6207
Planning and System Generation Guide	SC19-6201
Operator's Guide	SC19-6202
System Programmer's Guide	SC19-6203
System Messages	SC19-6204
OLTSEP and ERROR Recording Guide	SC19-6205
Terminal User's Guide	GC19-6206
Remote Spooling Communications Subsystems (RSCS) User's Guide	GC20-1816
CMS Command and Macro Reference	SC19-6209
CMS User's Guide	SC19-6210
CP Command Reference for General User's	SC19-6211
Operating Systems in a Virtual Machine	GC19-6212
Interactive Problem Control System (IPCS) User's Guide	GC20-1823
VM/SP Quick Guide for General Users	SX20-4400
VM/SP Commands (General Users) Reference Summary	SX20-4401
VM/SP Commands (Other than General Users) Reference Summary	SX20-4402
EXEC 2 Reference	SC24-5219
System Product Editor User's Guide	SC24-5220
System Product Editor Command and Macro Reference	SC24-5221

**RPQs ACCEPTED: No**

## 5664-169 - VM/XA MIGRATION AID RELEASE 1 and 2

### PURPOSE

The VM/XA Migration Aid is provided for the MVS user who will be migrating to MVS/XA. It is designed to operate on any 4381 Group 1 and Group 2 Processors, 4381, 3081, 3083 or partitioned 3084 Processor. Its purpose is to support, concurrently, one MVS/SP production virtual machine and one or more MVS/XA test machines. VM/System Product CMS will be supported for VM/XA Migration Aid installation and service, and for MVS/XA conversion requirements. The objectives of the VM/XA Migration Aid are: Maximize performance and provide high availability and recoverability of the MVS/SP production machine ... support one or more MVS/XA test machines with extended test facilities.

### RELEASE 2 ENHANCEMENTS

- Support of additional production and test environments (VSE/AF and OS/VS1):  
Support is provided to allow VSE/AF (Release 3 at Service Level 8205 and beyond) and OS/VS1 (Release 7 with Basic Programming Extensions Release 3) to run in non-paging mode either in the V=V area, or to run as a preferred guest in the V=R area. This will extend the capability of the VM/XA Migration Aid to those VSE/AF and OS/VS1 customers who have the need to migrate to MVS/XA.
- Full support for the 3203 mdl 5 Printer:  
Provides full support of the 3203 mdl 5 Printer including error recovery, device simulation, and the printing of SPOOL files.
- Full support for the 3380 and 3375 DASD:  
Provides full support for the 3375 and 3380 for minidisks, utilities (format, directory, dumping and restoring), and for all system data (paging, spooling, tdisk, directory and nucleus) and error recovery.
- Support for the 3088 as a dedicated channel-to-channel adapter:  
Allows use of the 3088 as a dedicated channel-to-channel adapter for the inter-connection of processors.

### DESCRIPTION

#### THE VIRTUAL MACHINE

A virtual machine control program manages the resources of 4381 Group 1 and Group 2 Processors, 3081, 3083 or partitioned 3084 Processor to provide virtual processor, I/O, and storage support through the implementation of virtual machines.

A virtual machine user appears to have the functional capabilities of a dedicated system available (either S/370 or extended architecture). The terminal acts as the virtual systems console for the virtual machine. Other users may be running batch, or testing jobs concurrently, and also having the functional characteristics of dedicated system.

Each user can specify the configuration required; the number, type and I/O addresses of all devices to be used; and from 64K bytes to 999 million bytes of storage, provided sufficient resources are available with the real machine's configuration.

Each user's virtual system comprises an operator's console (the user's terminal), a virtual processor, a virtual storage size ranging from 64K bytes to 999 megabytes, and virtual I/O channels and I/O devices. Virtual machine configurations may also include dedicated transmission control units and channel-to-channel adapters. Virtual I/O devices are controlled by the virtual machine's operating system and not by the VM/XA Migration Aid with the exception of those virtual unit record devices that are spooled by the VM/XA Migration Aid to/from disk. The basic device support for the proper number and type of I/O devices must be generated into the virtual machine's supervisor or nucleus.

- Processor or timing dependencies may not exist. For example there is no reliance on a certain action or activity being completed within a fixed interval of time.
- The Diagnose instruction may not be used for machine control by an operating system running in a virtual machine.
- Limited dynamic modification of channel programs is permitted.

**Note:** See the *General Information Manual* for further clarification.

#### THE CONTROL PROGRAM

The control program of the VM/XA Migration Aid creates and controls virtual machines, multiprogramming the resources of the real computer to offer concurrent execution of multiple virtual machines.

All virtual machines execute under Start Interpretive Execution, providing the basic mechanism for control by permitting either the control program or Start Interpretive Execution hardware feature to trap and process all interrupts and privileged instructions.

Execution under the VM/XA Migration Aid does not require communication between the control program and the virtual machine operating system since, subject to the restrictions listed above, the virtual machine interface is that of the real machine. Communication is available between the virtual machine and the control program through

use of the Diagnose interface: The CMS provided utilizes the DIAGNOSE instruction for many operations including I/O operations.

**TIME MANAGEMENT:** The control program periodically gives each virtual machine access to the real processor for a small amount of time, called a "time-slice". Since the primary focus is the preferred virtual machine and since one entire processor is being dedicated to that virtual machine, the scheduling of that virtual machine is straightforward. "Round Robin" scheduling will be used by the 'master' processor which runs all other virtual machines so that each V=V virtual machine will get a share of the processor resource.

**STORAGE MANAGEMENT:** Each virtual machine's storage is created and controlled by the control program as virtual storage and is organized into 4K blocks called pages and 1M blocks called segments. For each virtual machine, the control program creates and maintains a set of segment and page tables to describe the virtual storage and to reflect the allocation in real storage. The active pages from all virtual machines and from the pageable routines of the control program compete for available page frames. When the number of page frames available for allocation falls below a threshold value, the control program determines which virtual storage pages currently allocated to real storage are relatively inactive and initiates suitable page-out operations.

**VIRTUAL I/O MANAGEMENT:** Because virtual machines execute in emulation mode, the control program gains control whenever an I/O instruction is issued by a virtual machine operating system. If necessary the control program copies into its own work area the channel command list, and pages into real storage all virtual storage locations required for data transfer. If a virtual device is a minidisk, any cylinder numbers specified are modified to reflect the true location of the data; the virtual device address number is mapped to the real device address. The virtual machine is given a condition code to indicate the status of the START I/O operation, and the control program reflects the interrupts caused by the I/O operation to the virtual machine.

**SPOOLING:** The control program spooling facilities allow multiple virtual machines to share unit record devices by intercepting and modifying the Start I/O operations to those virtual unit record devices designated as spooled in the virtual machine configuration. The control program uses its paging I/O mechanism to create the disk records which act as intermediate storage between the real unit record devices and the virtual machines.

The spooling facilities allow data files to be transferred between virtual machines or between different operating systems executing at different times in the same virtual machine. In addition, virtual machine console input/output data may be spooled to disk for later printing.

**CONTROL PROGRAM COMMANDS:** The control program commands allow control of the real computing system and the VM/XA Migration Aid and provide user control of virtual machines and associated control program facilities. The control program commands can be used at any time without regard to which operating system is executing in the virtual machine. A user's privilege class(es), defined as part of the virtual machine configuration, define the allowable subset of the control program commands.

#### EXTENDED ARCHITECTURE SUPPORT

The VM/XA Migration Aid will exploit the extended architecture by providing support for extended real storage, extended virtual storage, hardware assisted emulation for S/370 and extended architecture virtual machines, and the new extended architecture channels.

**LARGE REAL STORAGE:** The VM/XA Migration Aid will support all real storage configurations allowed by the extended architecture (extended architecture provides for offerings of real main storage up to two gigabytes).

**LARGE VIRTUAL STORAGE:** Extended architecture includes a new mode which allows the use of 31-bit storage addresses and one-megabyte storage segments. Extended architecture virtual machines can define storage sizes up to 999 megabytes of storage. The System/370 Extended Architecture virtual machine can use CCWs in either S/370 format (format 0) or extended architecture format (format 1) for its I/O operations. Translated channel programs are always in extended architecture format.

The VM/XA Migration Aid will allow MVS/370 virtual machines to define storage sizes up to 32 megabytes.

**START INTERPRETIVE EXECUTION:** A new instruction, Start Interpretive Execution, is associated with the extended architecture emulation facility. The emulation facility is used by the VM/XA Migration Aid to provide hardware support for several areas of virtual machine operation, such as: Interval timer, prefixing, address translation, and privileged instruction handling.

The VM/XA Migration Aid will dispatch all virtual machines by executing the Start Interpretive Execution instruction. The virtual machine receives control in emulation mode and will continue to execute in this mode until an interruption or interception condition occurs.

## VM/XA Migration Aid (cont'd)

The VM/XA Migration Aid also simulates the Start Interpretive Execution instruction to allow the VM/XA Migration Aid to be tested and serviced in a virtual machine.

**NEW CHANNEL SUPPORT:** The VM/XA Migration Aid will support the new extended architecture channel interface. At the control unit interface, 3081/3083/3084/4381 channels are similar to S/370 channels. However, at the programming interface, 3081/3083/3084/4381 channels permit the offloading of some function from the SCP to the channels. Many of the S/370 channel functions have been replaced with new ones that are MP and performance oriented. The hardware now handles the alternate path and I/O queuing management.

The I/O supervisor of the VM/XA Migration Aid will use new extended architecture I/O instructions in order to communicate with the channels. In the extended architecture, interrupts are recognized by class instead of by channel. There is no software association of devices to control units or channels. Subchannels are the addressable units in extended architecture and represent individual devices. The new extended channels use new CCW formats allowing addressing up to two gigabytes.

### PRODUCTION MVS/SP VIRTUAL MACHINE

**PREFERRED VIRTUAL MACHINE:** Preferred virtual machine means that the preferred virtual machine executes with minimum interpretive execution. The preferred virtual machine derives performance benefits from a one to one virtual to real storage addressing. The size of this preferred area is specified in megabyte increments and physically begins at absolute zero of real storage.

**Note:** Only MVS/SP version 1 (release 1 with enhancement and release 3) is supported as the preferred virtual machine.

**SET ADDRESS LIMIT:** The integrity of the preferred virtual machine is enhanced by the VM/XA Migration Aid use of the Set Address Limit instruction. Using the Set Address Limit instruction will cause the System/370 Extended Architecture channel hardware to restrict I/O operations for dedicated devices for the preferred virtual machine below its boundary, and restrict for all other I/O above the boundary.

**VIRTUAL S/370 I/O:** The VM/XA Migration Aid supports S/370 architecture virtual machines, with all S/370 I/O operations being automatically intercepted out of Start Interpretive Execution. The virtual I/O simulation routines will recognize an S/370 virtual machine and convert all of its I/O from S/370 to S/370 Extended Architecture I/O operations. The S/370 virtual machine will have no knowledge of the extended architecture processor on which it is running as the virtual I/O simulator will maintain the S/370 interfaces. Virtual S/370 I/O will be simulated as if each virtual device is on a non-shared S/370 subchannel.

**MASTER/DEDICATED MULTIPROCESSING SUPPORT:** Master/Dedicated MP support provides a multiprocessing environment where the 'master' processor performs most VM/XA Migration Aid control program (CP) work, and then runs virtual machines when all control program work is completed. The 'dedicated' processor is used to run only the MVS/SP V1 preferred virtual machine.

**DEDICATED PROCESSOR:** With Dedicated Processor support, the MVS/SP preferred virtual machine is run in the 'dedicated' processor and all other virtual machines are run in the 'master' processor. Dedicated Processor support therefore eliminates all contention from the other virtual machines for that processor's compute power. If the 'dedicated' processor is not used to run an MVS/SP preferred virtual machine, that processor will be placed in an enabled wait state.

**DEDICATED PROCESSOR I/O:** The preferred virtual machine will have a 'fast path IOS' to handle most S/370 SIOF initiation and I/O interrupts without having to go to the 'master' processor.

This is done in a Master/Dedicated MP system by devoting an interrupt subclass to the dedicated devices of the preferred virtual machine. By running the preferred virtual machine on the dedicated CPU enabled only for the dedicated interrupt subclass, the operating system can eliminate the overhead of stacking and unstacking I/O interrupts for other virtual machines and can avoid CPU switching.

**PREFERRED VIRTUAL MACHINE RECOVERY:** The facility attempts to resume execution of the preferred virtual machine after the VM/XA Migration Aid has terminated with an abend and initiated an automatic restart.

### SYSTEM PROGRAMMER TEST FACILITIES

**VIRTUAL MP:** The Virtual Multiprocessor facility will provide functional simulation of a S/370 Extended Architecture multiprocessing computing system. The virtual MP facility is provided through extensions to virtual machine definition, dispatching, and command processing. Console commands are provided to create and destroy, stop, start and query virtual processors.

**Note:** Virtual MP will only be supported for extended architecture virtual machines.

**VIRTUAL MACHINE DEBUGGING:** The debugging facilities of VM/XA Migration Aid will provide a significant tool to aid in debugging a virtual machine or virtual MP in the extended architecture environment. For example:

- A BEGIN command starts execution of the virtual machine's processor (or the virtual extended architecture MP).
- To look at a virtual machine's storage, the DISPLAY facility displays storage at the user's terminal, and the DUMP facility prints storage to the user's virtual printer.
- A STORE command can be used to alter storage and certain architected areas of the virtual machine (such as general registers, control registers, and PSW).

**TRACE FACILITY:** The trace function provides the ability to trace the following events in a virtual machine:

- Any activity against an I/O device or against a range of devices.
- Any storage alteration or alteration within a range of storage. A value may be specified such that the event traced is signaled when that value is set.
- Any general register alteration may be traced with an optional value to be set.
- Selected mnemonics and special instructions can be traced.

**ACCOUNTING:** Accounting records are created when:

- A virtual machine logs off.
- A minidisk, t-disk, or a dedicated device is detached.
- A user application issues a diagnose instruction.
- The operator enters a CP ACNT command.

These records are used to measure the usage of system resources. This information can be used to account for virtual machine resource utilization.

**SYSTEM LOADER:** The VM/XA Migration Aid Loader provides the facility to perform system generation directly under CMS or build a load tape or card deck for system generation as a standalone operation in a S/370 or 370-XA real or virtual machine. System generation directly under CMS is limited to systems which, including their preferred region, will fit within the free storage available within the CMS virtual machine.

**ADDITIONAL FUNCTION:** The following functions, available in the VM/System Product, will be available in this migration aid:

- Channel Check Reflection - for MVS/SP RAS.
- Machine Check Reflection - for MVS/SP RAS.
- Vary Processor - for VM/XA Migration Aid RAS.
- VMCF - for the VM/XA Migration Aid recording and accounting.
- VMSERV - for the VM/XA Migration Aid service.

### VM/XA MIGRATION AID DEVICE SUPPORT LIST

#### Supported DASD:

- 2305 mdl 2
- 3330 mdl 1, 11
- 3333 mdl 1, 11
- 3340
- 3344
- 3350 mdl A2, B2, C2
- 3375 (Dedicated Only)
- 3380 (Dedicated Only)
- 3850 (Dedicated Only)

#### Supported DASD Control Unit:

- 2835 mdl 2
- 3830 mdl 2, 3
- 3851 (Dedicated Only)
- 3880 mdl 1
- 3880 mdl 2, 3, 11, 13 (Dedicated Only)
- 3880 Speed Matching Buffer (Dedicated Only)

#### Tapes Supported:

- 3420 mdl 3, 4, 5, 6, 7, 8

#### Tape Control Unit Supported:

- 3803

#### Printers Supported:

- 1403 mdl 2, 3, 5, N1
- 3211 mdl 1
- 3262 mdl 1, 5, 11
- 3800 (Dedicated Only)
- 4245 mdl 1
- 4248 mdl 1

## VM/XA Migration Aid (cont'd)

### Readers/Punches Supported:

3525 mdl P1, P2, P3  
3505 mdl B1, B2  
2540 mdl 1  
2501 mdl B1, B2

### Unit Record Control Unit Supported:

3811  
3505  
2821

### Display Printers Supported:

(Key operator initiated copy only)

3287 mdl 1, 1C, 2, 2C  
3286  
3284  
3288  
3289 mdl 1, 2

### Terminals/Consoles Supported:

3277 mdl 2  
3278 mdl 2, 3, 4  
3279 mdl 2A, 2B, 3A, 3B (4 Color Only)

### Terminal Control Unit Supported:

3274 mdl 1B, 1D  
3274 mdl 21B, 21D, 31D  
3272 mdl 2

### Transmission Control Unit Supported:

3704 (Dedicated Only)  
3705 (Dedicated Only)

### Miscellaneous Supported:

CTCA (Dedicated Only)

**ALTERNATE PATH SUPPORT:** The control required for alternate path management is provided by the extended architecture channels.

**DEDICATED DEVICES:** Dedicated devices can be accessed through multiple paths by a virtual machine if there are multiple paths to the real device. Minidisks and simulated devices however will be accessible only through the first path. The Channel Path Identifiers will be the same for the dedicated device as for the real device which supports it.

**Note:** Support for 3340 and 3344 alternate tracks is only provided in dedicated mode by the virtual machine.

### CUSTOMER RESPONSIBILITIES

- Allocating and formatting direct access storage space for the control program and the CMS system residence area.
- Generating and updating user directory and virtual machine descriptions.
- Making the final evaluation as to which operating systems should be run under the VM/XA Migration Aid in the customer's environment.
- Generating the VM/XA Migration Aid system.
- Training personnel to operate the system.
- Teaching users VM/XA Migration Aid commands.

### SPECIFIED OPERATING ENVIRONMENT

#### HARDWARE REQUIREMENTS

The VM/XA Migration Aid is supported on all models of the 4381 and 308X Processors operating in 370/XA mode to provide multiple MVS/XA testing environments.

**STORAGE ESTIMATES:** The resident nucleus for the VM/XA Migration Aid will be approximately 1M, and the minimum supported storage size will be 4M.

#### SOFTWARE REQUIREMENTS

Assembler H Version 2 Release 1 (5668-962) is required for system generation of the VM/XA Migration Aid and for the service of this product.

**PROGRAM INTERFACES:** The VM/XA Migration Aid Release 1 will support only the following systems:

- MVS/System Product Version 1 (JES2 or JES3) in a V=R preferred area in UP mode.
- MVS/XA in a V=R preferred area in UP mode.
- VM/SP in a V=R preferred area in UP mode.
- VM/SP High-Performance Option in a V=R preferred area in UP mode.

- MVS/System Product Version 1 (JES2 or JES3) in a V=V area in UP mode.
- VM/SP in a V=V preferred area in UP mode.
- VM/SP High-Performance Option in a V=V area in UP mode.
- MVS/XA in a V=V area in UP or virtual MP mode.
- VM/XA Migration Aid in a V=V area in UP or virtual MP mode.
- CMS in a V=V area.

**Note:** MVS System Product means either MVS/SP Release 1 enhancement or Release 3 and later releases.

The VM/XA Migration Aid Release 2 is designed to support the following operating systems as virtual machines:

- All of the Release 1 environments plus:
  - OS/VS1 in a V=V or a V=R preferred area in UP mode.
  - VSE/AF in a V=V or a V=R preferred area in UP mode.

**PACKAGING:** The VM/XA Migration Aid will be shipped with the combined components of:

1. VM/XA Migration Aid Control Program
2. VM/XA Migration Aid CMS
3. Dump Viewing Facility

### COMPATIBILITY

While the VM/XA Migration Aid is a Virtual Machine Facility, its functions will not be equivalent to any of IBM's VM/370 Products. For example, VM/XA Migration Aid does not support:

1. The following devices (except when used in a dedicated mode by an MVS Virtual Machine)
  - 3375
  - 3380
  - 3800
  - 3850
  - 3705
2. Interactive Networking
3. Program products (excluding RSCS, Pass-Thru Virtual Machine, Remote 3270 Display Option and Assembler H Version 2)
4. Remote terminals (other than through Pass-Thru Virtual Machine program product with the Remote 3270 Display Option program product)
5. Monitoring facilities
6. CMS use other than for installation and service of the VM/XA Migration Aid, and migration from MVS/SP to MVS/XA

The VM/XA Migration Aid user is an MVS customer who is ready to migrate to MVS/XA and would like to continue MVS/SP production work while testing MVS/XA and associated subsystems. On a 3081 Processor, MVS/SP, MVS/XA, VM/SP or VM/SP High Performance Option may run as the preferred virtual machine on one processor of the complex, and cannot be run in virtual AP or MP mode. The test virtual machines and CMS activity will run on the other processor of the complex.

### FIELD ENGINEERING CONSIDERATIONS

**IMPROVED RAS:** This product uses some of the 4381 Group 1 and Group 2 Processor or 308X hardware RAS features to provide system availability enhancements and to put emphasis on recovery. The following will have a positive effect on RAS:

- Reflection of machine checks to S/370 virtual machines.
- Preferred Virtual Machine Recovery.
- Extended Architecture channel processor.
- Set Address Limit.
- CP trace table entries.

### RELIABILITY

**MACHINE CHECK REFLECTION:** This function reflects machine checks to the MVS/SP preferred virtual machine to improve the reliability and availability of the preferred virtual machine.

**ERROR RECORDING:** EREP records are created when I/O and machine errors occur. These error records are built by the CP modules that handle error recovery. An analysis of these records can provide valuable information concerning current and potential hardware problems.

**VM/XA Migration Aid (cont'd)**
**AVAILABILITY**

**SCHEDULER:** The objective for the scheduler in the VM/XA Migration Aid is the support of a specific environment: The migration of MVS/SP to MVS/XA. There will be no external controls in the VM/XA Migration Aid since the environment is very specific. Since the primary focus for performance is the preferred virtual machine and one entire processor is being dedicated to that virtual machine, the scheduling of that virtual machine is straightforward. "Round Robin" scheduling will be used on the 'master' processor which runs all other virtual machines so that each virtual machine will get a share of the processor.

**VIRTUAL MACHINE TERMINATION (SOFT ABEND FUNCTION):** In order to reduce the number of system terminations, every attempt will be made to isolate an error to a virtual machine. That virtual machine will be reset or the error will be reflected to the virtual machine via machine check or I/O error. In some instances, diagnostic information will be taken and the system will continue operation.

**MISSING INTERRUPT DETECTOR:** The VM/XA Migration Aid will have a missing interrupt detector. The MVS missing interrupt handler will be able to take appropriate actions for any of its missing interrupts. The time intervals will be based on the device type. Upon detection of a missing interrupt, the operator will be notified.

**HOLD AND FREE COMMAND:** A LOGON option can be used to prevent a user from logging on to the VM/XA Migration Aid. If an installation has a user that repeatedly causes system abends, that user can be denied access to the VM/XA Migration Aid by using the HOLD LOGON command, until the problem is solved. When the problem is solved, access can be restored via the FREE LOGON command.

**PREFERRED VIRTUAL MACHINE RECOVERY:** This facility attempts to resume execution of the preferred virtual machine after the VM/XA Migration Aid has terminated with an abend and initiated an automatic restart.

**SERVICEABILITY**

**MAINTENANCE AND SUPPORT SYSTEM FACILITY (MSSF):** MSSF support will be included in this product. In addition, limited support is provided for handling the MSSF commands when they are issued by a virtual machine. Some MSSF commands will be fully handled by the VM/XA Migration Aid product for a virtual machine. Other MSSF commands may be issued by the virtual machine but will have an error response indicated.

**ABNORMAL TERMINATION DUMPS:** Abnormal termination (ABEND) dumps may be taken when the control program (CP) detects internal errors. There are two types of ABENDS, hard and soft. A hard ABEND is taken when an error condition is detected that cannot be isolated to a single virtual machine or system integrity is endangered. A soft ABEND is taken when an error can be isolated to a single virtual machine or when system integrity is not endangered. When a hard ABEND is taken, optionally all control program storage may be written onto the dump device, and then the system is optionally warm started. When a soft ABEND is taken, only selected pages of control program storage are written into a spool file and the affected virtual machine is given a system reset. The affected virtual machine is notified, if possible.

**STAND-ALONE DUMPS:** A stand-alone dump utility (S/A DUMP) will be provided with the VM/XA Migration Aid. There will be versions of the S/A DUMP utility that can be IPLed from any supported TAPE device or control program formatted DASD device that is not a control program SYSRES device. The VM/XA Migration Aid stand-alone utility will support the use of the IPL device as the dump device for tapes. The output devices supported by the S/A DUMP utility will be tape and printer (except advanced function printers such as the 3800).

**VM/XA MIGRATION AID CMS:** VM/XA Migration Aid CMS will be supported only for the service, installation and conversion requirements of the VM/XA Migration Aid. No program products, IUPs, or FDPs that run under CMS, except RSCS, PVM, the Remote 3270 Display Option and the Assembler H program product, will be supported.

**SERVICE:** The VM/XA Migration Aid will use the PLC type modification concept, and there will be no versioned modules in the control program.

**CP TRACE:** The CP TRACE facility maintains a history of system activity by recording events in a trace table. Two types of events are tracked:

1. Control Program Events - Significant activities within control program. Examples are resource allocation/deallocation and privileged operation simulation.
2. I/O Events - I/O device activities. Examples are I/O operation initiation and I/O interrupts.

Each event is recorded as a trace table entry using the extended architecture TRACE instruction. A trace table entry contains a trace table entry code, a time stamp and up to 20 bytes of event-unique information. The trace table entry code defines the event being traced, and the time stamp reflects the time-of-day when the entry was made. Each trace table entry will have a CPU identifier.

**EXECUTION CHARACTERISTICS**

**START INTERPRETIVE EXECUTION:** Start Interpretive Execution will provide many benefits to the virtual machine environment such as privileged instruction handling, prefixing, and timer handling. (Start Interpretive Execution will also take care of the function provided by shadow tables.) Once a virtual machine is dispatched under Start Interpretive Execution, the control program need not get involved unless there is an I/O interrupt, an external interrupt, or an intercept condition.

**EXTENDED ARCHITECTURE CHANNEL GROUP:** The System/370 Extended Architecture channel group allows much of the function in the I/O Supervisor to be done by the floating channel group microcode. In addition, since any device can be accessed by any processor, the control program overhead for path selection and processor affinity will be deleted.

**LARGE REAL STORAGE:** Extended architecture allows up to 2 gigabytes of real storage.

**SERVICE PROGRAMS**

**DIRECTORY PROGRAM:** The VM/XA Migration Aid directory program will run only under CMS.

**LOADER:** The VM/XA Migration Aid loader can be run in S/370 mode or System/370 Extended Architecture mode.

**FORMAT/ALLOCATE:** The VM/XA Migration Aid format program can only be invoked as a CP command.

**DASD DUMP RESTORE:** This service routine has two versions, one that runs stand-alone on a S/370 mode machine, and one that runs under CMS.

**SECURITY**

The VM/XA Migration Aid will include several facilities to ensure the security and integrity of the system. Minidisk security will be provided by a password facility to control both read-only and read-write access. The VM/XA Migration Aid will examine channel programs to determine if the access mode is being violated by the channel program.

The password will not be shown on the command lines for LOGON and AUTOLOG. For the LOGON command, the password must be entered where the area is print inhibited. For the AUTOLOG command, there is no password. The directory entry for the autologged virtual machine will indicate that the virtual machine can be autologged on and the userid of the virtual machine that can autolog it on.

**DOCUMENTATION**

(available from Mechanicsburg)

*VM/XA Migration Aid General Information* (GC19-6213), is available. Additional publications will be available at general availability.

**HIGH-ACCURACY ARITHMETIC  
SUBROUTINE LIBRARY (ACRITH)  
5664-185**

**PURPOSE**

The ACRITH subroutine library provides a set of subroutines (VS FORTRAN and Assembler) for solving problems of numerical analysis with algorithmically verified accuracy for execution under VM/SP. It takes advantage of the High-Accuracy Arithmetic Facility which consists of new floating-point instructions for computations with maximum accuracy. An ISPF-based training component operating under VM/SP can be used for familiarization with the numerical properties of the algorithms in an interactive environment, and to solve smaller problems in conversational mode.

**SPECIAL SALES INFORMATION**

Today's commercial and engineering/scientific computing environments are often plagued by inaccurate solutions of difficult problems. The particular danger lies in the inability of the computer to give indication of an incorrect result.

The ACRITH subroutine library provides the user with a beneficial and unique feature: The ability to obtain the numerical results with algorithmically verified and maximum accuracy. This will be especially productive for the user who is not a sophisticated numerical analyst, and who cannot do the error analysis for her/his problem, and also for those users who do not want to spend the effort of going through such a person- and machine-time consuming error analysis.

A key element of the ACRITH concept is the use of the High-Accuracy Arithmetic Facility, which employs a long accumulator, thus solving hidden and known accuracy problems in numerical computations. These problems are generally expressed as exponent range or mantissa length limitations of a particular computer architecture.

**HIGHLIGHTS**

- Optimal floating-point arithmetic newly developed by:
  - Prof. U. Kulisch, Karlsruhe University (Germany) and
  - W. Miranker, IBM Research, Yorktown Heights (USA).
- Algorithms for linear algebra provide:
  - Numerical results with verified accuracy.
  - Solutions with verified existence, uniqueness and validity.
  - User notification, if a verified solution cannot be found.
- Based on High-Accuracy Arithmetic Facility:
  - New floating-point instructions with directed results.
  - For computational results with maximum accuracy.
- Online training component with capability to solve smaller problems in conversational mode.
- Application areas:
  - Professional personal computing.
  - Education in numerical mathematics.
  - Research in numerical methods.
  - Cross-industry mathematical problem solving (structural analysis, optimization, nuclear energy, power net distribution, forecasting, robotics, etc.).

**DESCRIPTION**

The ACRITH subroutine library provides a set of subroutines (VS FORTRAN and Assembler) for the solution of problems in numerical analysis. The results are delivered with maximum accuracy in most cases, and are automatically verified by the mathematical algorithms.

The subroutines are available for S/370 hexadecimal short and/or long floating-point formats for the following numerical problems:

- Evaluation of arithmetic expressions.
- Polynomial evaluations and zeros of polynomials.\*
- Linear equations.
- Matrix inversion.
- Linear optimization.\*
- Eigenvalues and eigenvectors.\*
- Vector operations.
- Scalar product.
- Matrix multiplication

\* Note: Long format only.

Also included are format conversion routines from decimal to hexadecimal, and from hexadecimal to decimal, both available with directed rounding.

The subroutines use the High-Accuracy Arithmetic Facility according to the Kulisch/Miranker theory (K.-M.: *Computer Arithmetic in Theory and Practice*, Academic Press 1981). These new instructions compute the basic arithmetic functions (+, -, x, /) and the scalar product (dot product) with maximum accuracy, and provide directed rounding (upwards, downwards, to the nearest number, towards zero) for the hexadecimal short and long floating-point formats. The scalar product instructions use a long accumulator with the internal size of 328

hexadecimal digits. Maximum accuracy is defined such that between the computed floating-point result and the exact result (infinite precision) there is no floating-point number.

The subroutines for linear equations and for eigenvalues/eigenvectors accept as input (coefficients, right-hand side) point or interval data. The output is usually provided in form of intervals, within which the results are verified to exist and to be unique. The vector operations also support point and interval data with the option of directed rounding.

It is a property of the algorithms that all subroutines deliver their results with verified bounds, and if the condition of the problem allows, also with maximum accuracy. The existence, uniqueness and validity of the solution are also verified within these bounds. If for an extremely ill-conditioned problem a verified solution cannot be achieved, an appropriate return code will be issued.

The Online Training Component can be used to familiarize the user with the functions of the ACRITH subroutines. It is based on ISPF, and offers similar panel layout and menu techniques. In the course of execution of an option, random input data can be generated or actual values from a mathematical problem can be entered, thus providing a very comfortable way to solve smaller problems in conversational mode. A tutorial is included that can give an introduction to the Online Training Component, to ISPF and to editing functions.

**CUSTOMER RESPONSIBILITIES**

The customer is responsible for the installation of the ACRITH subroutine library.

**Installation:** The ACRITH subroutine library, including the Online Training Component, requires six megabytes of disk storage. The virtual storage required is application dependent. For a typical problem to solve, e.g., a system of linear equations for a 50 x 50 matrix, 125K bytes for the program and 225K bytes for the data including the workspace are required.

**SPECIFIED OPERATING ENVIRONMENT**

**HARDWARE REQUIREMENTS**

The ACRITH subroutine library has been designed to operate under VM/SP in all IBM S/370 mdl 135 and above, the IBM 303X and 308X Processors, and the IBM 4300 Processors. On IBM 4361 Processors, microcode support is provided for the new floating-point instructions.

**SOFTWARE REQUIREMENTS**

The ACRITH subroutine library is designed to operate with the following program products:

Program	Ver.	Rel.	Modif.	Program No.
VM/SP	1	2 or 3	0	5664-167
VS FORTRAN Comp. & Lib	1	2 or 3	0	5748-FO3 (1)
VS FORTRAN (Lib. only)	1	2 or 3	0	5748-LM3 (1)
ISPF Dialog Manager	1	1	0	5668-960 (2)

**Notes:**

- (1) For execution of the ACRITH subroutines, either VS FORTRAN library is required.
- (2) Required for the Online Training Component only.

**COMPATIBILITY**

The ACRITH subroutines adhere to two interface levels:

- The FORTRAN call interface: All ACRITH subroutines that can be called in user main programs obey the specifications of the CALL statement as described in the *VS FORTRAN Reference Manual*. Assembler routines called by the ACRITH subroutines follow the respective VS FORTRAN linkage conventions from the *VS FORTRAN Application Program Guide*.
- The High-Accuracy Arithmetic Facility: All ACRITH subroutines adhere to the specifications of the High-Accuracy Arithmetic Facility.

**CONVERSION**

VS FORTRAN programs which use the ACRITH subroutine library can be executed on all supported S/370 processors without the need for recompilation.

Programs using the new simulated instructions assembled for execution on processors without the ACRITH microcode support must be reassembled with the appropriate ACRITH macro library in order to gain from the performance benefits when executed on processors with the ACRITH microcode support.

Existing VS FORTRAN programs which want to utilize the power of the ACRITH program product must be rewritten for the arithmetic portions and the problem solving routines.



**ACRITH (cont'd)****PERFORMANCE CONSIDERATIONS**

The ACRITH subroutines are different from conventional subroutines both with respect to the algorithms used and to the results provided. Therefore, any simple comparison of run times can be misleading. In addition to the run time required, the algorithmically verified accuracy of the results must be considered. Because of the verified existence, uniqueness and validity of the solution, it is not required to conduct time consuming forward and/or backward error analysis.

For many problems that previously computed in long or extended hexadecimal floating-point format for accuracy reasons, the High-Accuracy Arithmetic subroutine library now delivers accurate results in short floating-point format.

On the 4361 Processors, microcode support is provided for the new ACRITH instructions for improved instruction execution times. Measurements show an average acceleration factor of approximately 2.0 (ranging from 1.1 to 4.5).

**DOCUMENTATION**

(available from Mechanicsburg)

*ACRITH Subroutine Library: Program Summary (GC33-6161)\* ... Licensed Program Specifications (GC33-6162) ... General Information (GC33-6163) ... User's Guide and Operation Manual (SC33-6164) ... Reference Summary (GX33-9009) ... System/370 RPQ: High-Accuracy Arithmetic (SA27-7093) ... VS FORTRAN Application Programming: Language Reference (GC26-3986).*

\* Available at announcement. Others available at shipment.

**RPQs ACCEPTED:** No

PROGRAM PRODUCTS

**5740-XC6 - MVS/SP-JES2 V2.1.1**  
**5665-291 - MVS/SP-JES3 V2.1.1**  
**MVS/SYSTEM PRODUCT-JES2**  
**VERSION 2 RELEASE 1 Modification Level 1**  
**MVS/SYSTEM PRODUCT-JES3**  
**VERSION 2 RELEASE 1 Modification Level 1**

**PURPOSE**

MVS/SP 2.1.1 is an enhancement to the first release of MVS/System Product Version 2 (which will be identified as MVS/SP 2.1.0 in this document). MVS/SP 2.1.1 contains additional virtual storage constraint relief over the prior release, additional serviceability items for large system complexes, and additional operational improvements and device support. MVS/SP 2.1.1 incorporates most of the new functions announced for MVS/SP Version 1 Release 3.0, MVS/SP Version 1 Release 3.1, MVS/SP Version 1 Release 3.2, and MVS/SP Version 1 Release 3.3.

**INTRODUCTION**

MVS/SP 2.1.1 will be used as a generic term to refer to both: MVS/System Product-JES2 Version 2 Release 1 Modification Level 1 ... MVS/System Product-JES3 Version 2 Release 1 Modification Level 1.

MVS/SP 2.1.0 is the base on which subsequent releases are to be installed, and is a prerequisite to MVS/SP 2.1.1.

**DESCRIPTION**

Items included are listed below:

- Identification of the releases of the licensed programs.
- Highlights of each release of the licensed programs.
- A description of the Base Control Program.
- A description of the JES2 support.
- A description of the JES3 support.
- The identification of pre-requisite and co-requisite items.
- Information concerning configuration requirements, system generation and maintenance requirements.
- Information concerning related products which will probably be used in this environment.

**IDENTIFICATION of the MVS/SP VERSION 2 RELEASES**

**MVS/SP 2.1.1:** There are two licensed programs offered in this release. The Base Control Program is the same in both licensed programs. The licensed programs are:

- MVS/System Product-JES2 Version 2 Release 1 Modification Level 1.

This licensed program consists of a Base Control Program and Job Entry Subsystem 2 (JES2). This release has the following characteristics:

- The JES2 component of this release is functionally equivalent to the JES2 component of MVS/SP 1.3.3.
- MVS/SP-JES2 2.1.0 is a pre-requisite.
- Data Facility Product (DFP) Release 1.1 is a co-requisite.

- MVS/System Product-JES3 Version 2 Release 1 Modification Level 1.

This licensed program consists of a Base Control Program and Job Entry Subsystem 3 (JES3). This release has the following characteristics:

- The JES3 component of this release is functionally equivalent to the JES3 component of MVS/SP 1.3.1. This JES3 component is also functionally equivalent to the JES3 component of MVS/SP 2.1.0.
- MVS/SP-JES3 2.1.0 is a pre-requisite.
- Data Facility Product (DFP) Release 1.1 is a co-requisite.

**MVS/SP 2.1.0:** Two licensed programs were announced on October 21, 1981. The Base Control Program is the same in both licensed programs. The licensed programs are:

1. MVS/System Product-JES2 Version 2 Release 1 Modification Level 0.

This consists of a Base Control Program and Job Entry Subsystem 2 (JES2). This release has the following characteristics:

- The JES2 component of this release is functionally equivalent to the JES2 component of MVS/SP 1.3.0.
- MVS/SP 2.1.0 must be installed on OS/VS2 MVS Release 3.8.
- Data Facility Product (DFP) Release 1.0 is a corequisite.
- A SYSGEN is required.

2. MVS/System Product-JES3 Version 2 Release 1 Modification Level 0.

This consists of a Base Control Program and Job Entry Subsystem 3 (JES3). This release has the following characteristics:

- The JES3 component of this release is functionally equivalent to the JES3 component of MVS/SP 1.3.1.

- MVS/SP 2.1.0 must be installed on OS/VS2 MVS Release 3.8.
- Data Facility Product (DFP) Release 1.0 is a corequisite.
- A SYSGEN is required.

**TERMINOLOGY**

The following terms will be used throughout:

- **MVS/System Product Version 2 (MVS/SP V2)**  
This term will be used to identify topics which are common to all releases and all modification levels of MVS/System Product Version 2.
- **Data Facility Product (DFP)**  
DFP is a licensed program which contains data management support, device support, program library management support, and utility functions.
- **MVS/XA**

MVS/System Product-JES2 V2 or MVS/System Product-JES3 V2 is a required part of MVS/XA. MVS/SP V2, the co-requisite Data Facility Product (DFP) (5665-284) licensed program, plus selected modules and macro instructions from OS/VS2 MVS Release 3.8 comprise MVS/XA.

MVS/XA supports the following systems when they are operating in S/370 Extended Architecture mode:

- 3081 Processor Complex
- 3083 Processor Unit
- 3084 Processor Complex

MVS/XA provides many enhancements, particularly in areas that address constraints connected with programming. Examples of the enhancements are: Additional virtual storage and an additional number of I/O devices. These and other enhancements will be described in the following topics.

**INSTALLATION AND MAINTENANCE REQUIREMENTS**

**SYSGEN Requirements**

- MVS/SP 2.1.0 requires a SYSGEN.
- If MVS/SP 2.1.0 was previously installed, a SYSGEN is not required for MVS/SP 2.1.1 (MVS/SP 2.1.1 may be applied directly to the users' system libraries using an appropriate level of the system maintenance program).

See the section "Installation Considerations" for additional information.

**Optional Program Products:** For installations desiring to use the following programs, the specific releases stated below are required to function with MVS/SP V2:

- For users of Resource Measurement Facility (RMF), the RMF Version 3 licensed program is required. This is a new version of RMF and is a total replacement for existing RMF support.
- For users of TSO TEST, TSO Command Package, or TSO/E for MVS/370, the TSO/E for MVS/XA licensed program or equivalent is required.

**MVS/SP 2.1.1 - HIGHLIGHTS**

The major items in this release are:

- Support for the 3880 model 11 and model 13.
- Virtual Storage Constraint Relief of approximately 400K bytes, providing additional capacity for large subsystems and applications. The virtual storage constraint relief in MVS/SP 2.1.1 is in addition to that in MVS/SP 2.1.0. It was obtained by moving system modules and data areas from the virtual storage area below 16 megabytes to the area above the first 16 megabytes. Further information is contained in the section "Virtual Storage Considerations".
- Improvements in the processing of the system link library concatenation, to eliminate the need to tune the LNKLST libraries for performance and to reduce the complexity of system maintenance for many large systems.
- Automated dump analysis and suppression of duplicate dumps by selected components along with many other serviceability enhancements, to improve system programmer productivity.
- Numerous RAS enhancements, including the ability to restart SMF after a failure without an IPL and the movement of SMF to a private address space.

**MVS/SP-JES2 V2.1, MVS/SP-JES3 V2.1 (cont'd)**

The changes to SMF combine to make SMF more reliable and provide improved availability of SMF, which is particularly important with the continued growth in processor capacity and the resultant dependence on SMF data to monitor and report on the workload of the system.

- Improved operation and control for multi-system environments by allowing the SYS1.LOGREC data set to reside on a volume other than SYSRES, by allowing multiple PAKLST parmlib members, and concatenated LPALIBs. (Each of these items is described below).

– Support of Separate SYS1.LOGREC data sets.

The LOGREC change allows an installation to share SYSRES for multiple systems and to keep a separate SYS1.LOGREC data set for each system. The separate LOGREC data sets will be located through the Master Catalog. The SYSRES volume will remain the default.

– Support for multiple PAKLSTs.

Multiple PAKLST parmlib members allow an installation to define separate parmlib members (IEAPAKxx) for each system which must be maintained rather than having separate copies of SYS1.PARMLIB. The PAKLST parmlib members are specified via a new system parameter keyword, 'PAK'. If the keyword is not specified, the default will be 'PAK=00', thus maintaining compatibility for current installation procedures.

– Support for Concatenated LPALIBs:

This allows an installation to have separate data sets for the individual systems that must be maintained rather than alternate copies of the entire SYS1.LPALIB. The data sets are specified in a set of LPALSTxx members in SYS1.PARMLIB, and they will be concatenated to SYS1.LPALIB in order to form the list of data sets to be used when constructing the Pageable Link Pack Area (PLPA). The LPALST parmlib members are specified via a new system parameter keyword 'LPA'. If the keyword is not specified, SYS1.LPALIB will be used.

In addition, MVS/SP 2.1.1 contains support for the program function recently announced for MVS/System Product Version 1. These items include:

- Support to allow multiple copies of ACF/TCAM Version 2 Release 4 (5735-RC3) program product to operate concurrently in the same processor.
- ISAM space recovery (previously available in MVT and SVS).
- Deferred mounting of volumes supported by dynamic allocation.
- 3800 Printing Subsystem keywords supported by dynamic allocation.
- Support for the MVS/Operator Communication Control Facility (MVS/OCCF) in the JES2 environment. MVS/OCCF is a program which allows one or more remote MVS Systems to be operated from a host MVS System. The following support is provided for MVS/OCCF:
  - The MVS/OCCF user can acquire or alter the use of a console. This support allows MVS/OCCF to obtain and release a console, change the routing/destination codes of a console, or request whether messages are to be broadcast to all subsystems.
  - Commands can be issued at a console on the remote system with the result displayed on the host MVS/OCCF console, with the converse capability being available.
  - Multiple console Support (MCS) consoles can be initialized at IPL via the command PARMLIB facility. After IPL, the master console operator or an operator at an MVS/OCCF console may direct commands to other consoles to correct systems problems related to MCS consoles.
- Eleven additional JES2 user exits

– Exit 0 - Pre-Initialization Exit.

Allows an installation to change the initialization options, alter JES2 control blocks, and initialize installation-defined control blocks. It can also instruct JES2 to bypass the initialization options or to terminate initialization processing.

– Exit 14 - Job Queue Work Select Exit.

Allows the algorithm in the user exit routine to search the JOB Queue and return a JOB Queue Element or allow normal JES2 searching.

– Exit 15 - Output Data Set/Copy Select Exit.

Allows the user to create separation pages for each data set or copy of a data set, instead of creating separation pages only at the start and end of a job.

– Exit 16 - Notify Exit.

Allows the user to examine or modify the message text before the \$WTO for the notify message is sent.

– Exit 17 - BSC RJE Signon/Signoff.

Allows the user in a BSC RJE environment to implement additional security checks over the standard password check, limit the number and types of remote devices that can be on a system at any one time, and at Signoff to gather statistics of terminal usage.

– Exit 18 - SNA RJE Logon/Logoff.

Allows the user in a SNA RJE environment to implement additional security checks over the standard password, check, limit the number and types of remote devices that can be on a system at any one time, and at signoff to gather statistics of terminal usage.

– Exit 19 - Initialization Statement Exit.

Allows the user to implement additional checking of the initialization statement, make alterations to the values supplied or to implement installation initialization statements.

– Exit 20 - End of Job Input.

Gives the user the opportunity to specify or override the System Affinity (SYSAFF), the execution mode and priority of the job.

– Exit 21 - SMF Record Exit.

Makes available the JES2 control blocks which are required by the SMF exit (IEFU83). This exit will be taken whenever a JES2 processor submits an SMF record (for processing by the JES2 subtask which actually issues the SMF WTM's).

– Exit 22 - Cancel/Status Exit.

Allows the users to define their own criteria for job selection and job ownership to the Subsystem Interface's Cancel/Status Interface.

– Exit 24 - Post Initialization Exit.

Gives the user the ability to make modifications to JES2 control blocks prior to the end of initialization. The exit may also initialize and process installation-defined control blocks.

- User Control of JES2 Sysout Data Set Grouping.

JES2 Improvements to the usability and operational characteristics of output processing and its associated command processing.

– New Output JCL statements which allow the user to specify which data sets are to be contained in an output work unit. The user can also specify the setup characteristics and the priority for the output group.

– Operational enhancements provide improved procedures for limiting the formation of demand setup groups, limiting which output device will process demand setup groups, limiting the use of user-specified priorities for output and reducing operator intervention. Overall these enhancements will assure that the efficient processing of the user's output will not be disrupted by the increase in the amount of demand setup work.

- Dynamic Add/Delete of Spool Data Sets

A new JES2 facility which gives an installation the capability to dynamically add and delete spool data sets (without warm starts) with minimal impact to the normal processing of work.

– Capability for the operator to dynamically add or delete spool data sets eliminating the need to resort to a warm start which impacts the normal processing of work.

– A number of operator commands will be enhanced to display the jobs on a volume or the volumes used by a job.

**MVS/SP 2.1.0 - HIGHLIGHTS**

The major items in this release are:

- 31-bit Virtual Addressing: The memory map allows the full range of 31-bit virtual addressing to be utilized by system and user programs executing in 31-bit addressing mode. The new memory map provides complementary extended areas above 16 megabytes for most of the areas that exist below 16 megabytes (e.g., Private and Extended Private, Nucleus and Extended Nucleus, PLPA and Extended PLPA, SQA and Extended SQA).

MVS/SP V2 allows programs to execute in 24-bit addressing mode or in 31-bit addressing mode. The 24-bit addressing mode is provided for programs that were designed for execution in MVS/370 and for programs that do not require greater than the 24-bit addressing range (16 megabytes). Extensive support has been provided to insure that programs prepared for 24-bit environments (i.e., 24-bit addressing mode) will execute correctly.

**MVS/SP-JES2 V2.1, MVS/SP-JES3 V2.1 (cont'd)**

Insertions, deletions and changes which have been made to system interfaces, and to system control block structures will be identified.

In 31-bit addressing mode, programs may utilize the entire 31-bit (two gigabyte) virtual addressing range. In this release, the user can begin to take advantage of the 31-bit virtual addressing support provided by system services. Many Base Control Program services fully support 31-bit virtual addressing while others support a 31-bit interface (but still require parameters and data to be below 16 megabytes virtual). Other interfaces only support the MVS/370 level of interface.

The EXCP Processor provides a new interface to support 31-bit virtual addresses for data transfer operations (e.g., address of the I/O area specified in read or write requests). In this support, the user supplies the 31-bit virtual address in an Indirect Data Address Word (IDAW) associated with the CCW.

- Virtual Storage Constraint Relief (VSCR): Programs that were designed for 24-bit virtual addressing will continue to execute and use storage below 16 megabytes. These programs will benefit from MVS/SP V2's use of the two gigabyte address range. Many system data areas have been moved to extended system areas and many system programs have been modified to execute in the address range above 16 megabytes, thus making available increased virtual storage below 16 megabytes for those programs that require it. Specific changes include:
  - Most of the storage management control blocks have been moved to locations above 16 megabytes virtual.
  - Most programs which support the Generalized Trace Facility (GTF), recovery/termination, print dump, Region Control Task (RCT), and dumping services have been moved to Extended Pageable Link Pack Area (i.e., above 16 megabytes Virtual).
  - Selected control blocks that currently reside in SQA have been moved to Extended SQA.
  - The system trace table has been moved from SQA to a private address space.
  - Portions of the nucleus have been moved to an extended nucleus which resides above 16 megabytes virtual.

In S/370 Extended Architecture, the segment boundaries occur at one megabyte intervals. Since MVS/SP V2 uses segment entries to provide isolation, the effect of rounding must be considered in all assessments of virtual storage requirements.

The 31-bit virtual addressing capabilities provide a base whereby programs can be designed to take full advantage of the large address range.

- Nucleus changes: The Nucleus of MVS/XA has been relocated so that it resides partially below and partially above the 16 megabyte virtual address boundary. The requirement for contiguous error free real storage has been reduced. Sections of the nucleus are protected from accidental destruction by erroneous stores or modification to these areas.

Those portions of the nucleus that execute DAT-off have been placed in a new nucleus module IEAVEDAT and it is referred to as the DAT-off nucleus. This module is loaded in contiguous high real storage and is not virtually addressable in any address space. The remainder of the nucleus continues to be named IEANUC0x and is referred to as the DAT-on nucleus.

- Increased number of I/O devices: The new maximum number of devices is 4,096.
- Enhanced support for real addresses above 16 megabytes: The locations above 16 megabytes real are supported for I/O operations as well as space for backing virtual pages, system data areas and programs. I/O support for these locations is provided by Indirect Data Address Words (IDAWs) with the existing Channel Command Word format (Format 0 CCW), and with a new Channel Command Word format (Format 1 CCW).

Most user programs have no dependencies on real addresses. Thus, this extended real storage support will be transparent to most user programs. Some programs, however, depend on real addresses. For example, programs that execute Virtual=Real (V=R) or existing programs that use EXCPVR require real storage below 16 megabytes. For these programs, MVS/SP V2 will automatically supply real frames below 16 megabytes when a page fix is requested. Users may also request virtual storage which is backed below 16 megabytes. To make more real storage below 16 megabytes available for those programs that require it, MVS/SP V2 has relocated portions of major system areas (such as the Nucleus, LSQA and SQA) to frames above 16 megabytes.

Interactive environments such as TSO can use additional real storage for working set pages, thereby reducing demand paging and increasing capacity and responsiveness.

- Support of the S/370 Extended Architecture Channel: The I/O Supervisor and related areas support the increased flexibility and

improved RAS characteristics of the S/370 Extended Architecture Channel.

Operating under MVS/SP V2, the dynamic reconnection facility of the dynamic path selection function of the 3380 Direct Access Storage (model AA4) allows the device to reconnect to any channel path identified by the originating system. By improving the probability of finding an available path from a device, this function may increase the effective throughput or it may improve response time. In addition to changes in the I/O Supervisor (IOS), the Systems Resources Manager (SRM) component has been modified to allow higher thresholds of channel utilization in support of this function.

- S/370 Extended Architecture Trace: The S/370 Extended Architecture includes additional trace capability. A queue of trace buffers is provided for each processor. System trace, which supports the S/370 Extended Architecture, provides branch tracing, address space ID tracing and explicit software-initiated tracing. Provisions are made for the system operator to control the new trace facilities through extensions to the TRACE operator command.

The system trace now operates concurrently with GTF.

- RAS Enhancements

RAS Overview: As IBM products and systems play a more important role in the operation of our customers' business, there is increased dependence on the reliability, availability, and serviceability of products and systems.

MVS/SP V2 includes new and improved reliability, availability, and serviceability (RAS) features. These features provide significant improvements in error detection and recovery, error data capture, operations, and dumping and dump formatting options. These features are designed to improve system reliability and availability, to enhance operator and installation control of MVS/XA, and to decrease the problem determination and debug time for both system and user dumps.

These new and improved RAS features are an indication of the on-going focus on large systems RAS.

- RAS Highlights

- Error Detection and Recovery Improvements

Improvements in error detection improve the ability of MVS/XA to protect itself from errors. New capabilities improve the ability to detect and correct error conditions.

- A new hardware protection mechanism is used to protect selected key system areas from overlays. This protection is applied to individual 4K pages.

- The S/370 Extended Architecture Channel is used to provide improved access to all I/O devices in the event of a processor failure.

- The Missing Interrupt Handler (MIH) is initialized as part of every IPL.

- Additional FRRs were added to IOS, VSM, RSM.

- Allocation detects and recovers from I/O errors on devices being allocated.

- Error Data Capture Improvements

Problem determination and debugging are simplified by the collection of additional error data.

- On system mode errors, RTM captures key debugging information before it can be changed by recovery processes.

- Tracing enhancements include support of the new hardware trace mechanism, operator control of dynamic trace options, new trace table entries, and improvements in trace entry content and formatting. Also, the trace buffers have been placed in a separate address space.

- GTF improvements include extended support for user trace entries, new I/O architecture support, and concurrent tracing with the system trace.

- A new SLIP-SVCDUMP interface has been created to improve the content of dumps requested by SLIP.

- Changes to the I/O Supervisor (IOS) storage manager permit better tracking of the use of IOS storage areas.

- Dumping and Dump Formatting Improvements

Some new dumping and formatting options have been provided to assist the collection and presentation of the information needed for debugging but to eliminate that which is not needed.

- New SNAP/ABDUMP options allow the dumping of selected portions of subtask data, and of user selected subpools.

## MVS/SP-JES2 V2.1, MVS/SP-JES3 V2.1 (cont'd)

Subtask data will automatically be supplied on dumps resulting from x22 ABENDs (cancels).

- Output of the SNAP/ABDUMP subpool (SPLS) option will be in ascending address order.
- Support is provided for exit routines that receive control when SNAP/ABDUMPs are requested and before the dump is taken.
- New SVCDUMP options allow the selection of areas by subpool number and storage key.
- SNAP/ABDUMP and SVCDUMP provide options to reduce the amount of nucleus data dumped.
- SVCDUMP will dump storage around the location (i.e., PSW instruction address) at which an error was detected.
- Support is provided for exit routines to receive control after SVCDUMPs have been taken.
- New formatters for IOS, Virtual Storage Manager (VSM), Real Storage Manager (RSM) and Auxiliary Storage Manager (ASM) are provided for use with PRINT DUMP.
- A new PRINT DUMP formatter is provided to format the System Trace table.
- The PRINT DUMP SUMMARY, FORMAT, and LPAMAP verbs are enhanced.
- Improvements have been made to the PRINT DUMP user exit interface to improve its usefulness.

### - IPCS Support

IPCS will provide interactive dump viewing and problem analysis capabilities for MVS/XA. IPCS will also provide usability improvements.

### - Miscellaneous Enhancements

Additional improvements have been made to assist problem identification.

- New operands on the ABEND, CALLRTM, and SETRP macros permit the specification of the abend reason code.

### • Operational Improvements:

Operational improvements aid the operator and the installation to control the MVS/XA system. In addition, operational improvements are provided that permit simplified and improved problem determination.

- Authorized programs may add, modify, or delete entries in the SVC Table through use of the new SVCUPDTE macro instruction.
- IOS Recovery attempts to move RESERVEs so as to avoid the requirement to stop systems which are sharing the device(s).
- IOS Recovery avoids stopping other tightly coupled processors when communicating with the operator.
- HOT I/O (i.e., an invalid repeated interruption condition caused by a hardware malfunction) recovery actions can be defaulted, thus bypassing the need for operator intervention.
- The system trace table size and tracing options may be changed dynamically by the system operator.
- The CANCEL and FORCE commands have been enhanced to terminate address spaces that are not cancellable today. Address spaces are also cancellable by Address Space Identifier (ASID).
- Dumps that are normally not needed for problem determination will be suppressed. The SLIP NODUMP function has been extended to consider dump type as selection criteria.
- A new operator command, DUMPDS, permits the dynamic connection, disconnection, or clearing of SYS1.DUMP data sets.
- Extensions to the SYS1.DUMP data set support permits use of the DUMP option of the IEASYSxx member of SYS1.PARMLIB for selection of the SYS1.DUMP data sets. Up to 100 SYS1.DUMP data sets may be connected to SVCDUMP at one time. Suffixes to the SYS1.DUMP data set name may be numbers from 00 to 99.
- Enhancements have been made to the DISPLAY DUMP command to assist problem determination for dumps in the SYS1.DUMP data sets.
- Improvements have been made to Stand-Alone Dump to improve its usability and to provide additional control. Stand-alone dump will support 'shared (non-dedicated) paths' to output tapes and DASD devices.
- New operator console support permits the installation to control the use of up to seven colors, underscoring, blinking, and reverse image display through specifications in SYS1.PARMLIB.

- When AMDPRDMP is used to offload a SYS1.DUMP data set, it will provide a brief description of important information about the dump. This information will be helpful for both dump management and problem determination.

- JES2: The JES2 component supplied with MVS/SP 2.1.0 is functionally equivalent to the JES2 component supplied with MVS/SP 1.3.0. (See "Installation Considerations".)

In loosely-coupled (multiaccess spool) JES2 environments, co-existence can occur only between processors using the same level of JES2.

- JES3: The JES3 component supplied with MVS/SP 2.1.0 is functionally equivalent to the JES3 component supplied with MVS/SP 1.3.1. (See "Installation Considerations".)

In loosely-coupled JES3 environments, co-existence can occur only between processors using the same level of JES3 components.

**SYSTEM INTEGRITY:** System Integrity is described in the General Information Section, Page C50.1.

### DESCRIPTION OF MVS/SP V2

**MVS/SP V2 BASE CONTROL PROGRAM (BCP):** The MVS/SP V2 BCP is composed of routines which assist in the:

- Entering and scheduling of work.
- Supervising the execution of work.
- Managing of system resources.
- Satisfying of I/O Requests.
- Recovering from errors.
- Support of Multiprocessing.
- Monitoring of system activity.

Each of these areas is described in the following sections.

#### ENTERING AND SCHEDULING OF WORK

**JOB MANAGEMENT:** Job Management controls the processing of jobs. It performs a variety of functions that include processing commands, reading and interpreting job and step definitions, allocating data sets and I/O devices, scheduling jobs, and writing system messages and job output.

Job management functions are performed by the master scheduler, the job entry subsystem (JES2 or JES3), and the job scheduler.

The master scheduler initializes the system and responds to operator commands by initiating the requested actions. The job entry subsystem reads job definitions, schedules the jobs for processing, and records job output data. The job scheduler builds control blocks in the scheduler work area (SWA) and initiates and terminates the processing of jobs and job steps.

**MASTER SCHEDULER:** The master scheduler is a system-initiated task that is established when the system is loaded. Its functions can be divided into two categories: Initialization and command processing.

Master scheduler initialization includes:

- Initiating the console communications address space (COMTASK) to handle all communication with the operator consoles.
- Initializing the subsystem interface.
- Initiating the allocation address space.
- Initialization will diagnose invalid entries in the current Eligible Device Table (EDT).
- Initializing the event notification facility.
- Establishing an ESTAE environment to handle system task failures during initialization.
- Initializing the system management facilities (SMF).
- Initializing the missing interruption handler.

Command processing includes the reading, scheduling, and executing of operator commands issued through a console device, an input job stream or a remote workstation.

The scheduling of a command consists of preserving the command and readying a task to continue processing the command. A command scheduling routine operates under either the console communications task (when the command was issued from a console device), or the reader task (when the command was issued through an input job stream).

The executing of a command is the performance of the function specified by the command. The functions are performed either as new tasks (established by the master scheduler or COMTASK) or as parts of existing system tasks.

**JOB ENTRY SUBSYSTEMS:** The Job Entry Subsystem is assigned the responsibility of readying of jobs and removal of job output (while the supervision of job execution is assigned to MVS/SP V2 BCP components).

There are two job entry subsystems available for use with MVS/XA: Job Entry Subsystem 2 (JES2), and Job Entry Subsystem 3 (JES3). A

**MVS/SP-JES2 V2.1, MVS/SP-JES3 V2.1 (cont'd)**

fundamental difference between the two subsystems is the manner in which they manage multiple processor complexes.

The JES2 concept is one of decentralized control and a common job queue -- each JES2 processor operates independently of the others, but each may add jobs to or select jobs from the common job queue.

JES3 exercises centralized control over all processors. JES3 also uses a common job queue, but all jobs reach the queue only through one central JES3 component that selects and distributes work to the processors. This permits centralized resource control for devices, volumes, and data sets and gives the opportunity for fuller resource utilization.

**JOB MANAGEMENT FACILITIES**

Some of the major facilities provided for job management are multiple console support, system log, hardcopy log, and system management facilities.

**MULTIPLE CONSOLE SUPPORT - MCS:** Multiple console support (MCS) allows one operating system to use many operator consoles. Each console in a multiple console configuration is defined by specifying the operator commands the system will accept from that console, a console to act as an alternate if a failure occurs, and the types of messages the console will receive.

In a system with MCS, one console acts as the master console and the rest (up to ninety-eight) are secondary consoles. The master console is the basic console required for operator-system communication; it alone can accept all possible operator commands, change the status of the hardcopy log and the messages to be recorded on it, switch to a different master console, and receive all messages not specifically assigned to any other console. A secondary console is any console other than the master console; it handles one or more functions assigned to it (for example, it might handle tape activity).

The following list identifies the types of consoles supported by MVS/SP V2. MVS/SP V2 requires a minimum of one full-capability console. Note: The MVS/SP V2 minimum console requirement is in addition to the consoles required by the IBM processor operating in S/370 Extended Architecture mode.

**Devices supported by Multiple Console Support (MCS)**

MVS/SP V2 supports the following as consoles:

<b>Input/Output Console (3)</b>	<b>Control Unit</b>
2250 mdl 3	2848
3251 (when SYSGENED as 2250M3)	3258
3277 mdl 2 (2)	3272, 3274-1B, 1D, 21B, 21D, 31D
3278 mdls 2, -2A, -3, -4	3274-1B, 1D, 21B, 21D, 31D
3279 mdls 2A, -2B, -3A, -3B (4)	3274-1D, 21D, 31D
<b>Output only Console (1) (3)</b>	
3277 mdl 1 (2)	3272, 3274-1B, 1D, 21B, 21D, 31D
3278 mdl 1	3274-1B, 1D, 21B, 21D, 31D
3284 mdls 1 and 2 (2)	3272, 3274-1B, 1D, 21B, 21D, 31D
3286 mdls 1 and 2 (2)	3272, 3274-1B, 1D, 21B, 21D, 31D
<b>Composite Console</b>	
Combination Card Reader/Printer (1)	
<b>Card Readers:</b>	
2501	
2540	2821
3505	
<b>Printers:</b>	
1403	2821
3211	3811
3203-5	
3262-5 (supported as a 4248)	
4245	
4248 mdl 1	

**Remote Console**  
2740

**Notes:**

- (1) A composite console must consist of a printer-keyboard or a card reader and printer to simulate the actions of a printer-keyboard. MCS allows output only consoles as secondary consoles.
- (2) The 3277 mdl 1, 3284 mdl 1 and 3286 mdl 1 attach via a 3272 mdl 1 or 2. The 3277 mdl 2, 3284 mdl 2, and 3286 mdl 2 attach via a 3272 mdl 2 only.
- (3) DIDOCS supported.
- (4) Use of seven colors and extended highlighting are supported on the 3279-2B and the 3279-3B. Specification of their use is governed by the Message Processing Facility (MPF) members of SYS1.PARMLIB.

**DEVICE INDEPENDENT DISPLAY OPERATOR CONSOLE SUPPORT (DIDOCS):** Device independent display operator console support (DIDOCS) is a facility that enables graphic display devices to be used as operator consoles. Its use can result in faster communication between the system and the operator than can be achieved with standard printer-keyboard or composite console devices.

DIDOCS provides the following advantages to the operator:

- Ability to respond to a message or enter a command while messages are being written to the screen.
- Ability to see action messages to be answered and to delete any no longer needed.
- Ability to use the cursor, or selector light-pen when available, to delete messages and perform other display-oriented functions.
- Ability to initiate automatic command entry either with the selector light-pen or with the program function keyboard by an operator command.

**STATUS DISPLAY SUPPORT (SDS):** SDS provides a clear and understandable presentation of information to a system operator. It provides the following advantages to the operator: Ability to obtain a contiguous out-of-line display within specified display screen areas ... ability to obtain a dynamic status display from an operator command.

**SYSTEM LOG:** The system log is recorded in a SPOOL data set. It contains communications between problem programs, operators, and the system. It may contain the following kinds of information: Operating data entered by problem programs using a write-to-log (WTL) macro instruction ... Descriptions of unusual events that occurred during a shift ... Write-to-operator (WTO) and write-to-operator with reply (WTOR) messages ... Accepted replies to WTOR messages ... Commands issued through operator's consoles and the input stream, and commands issued by the operating system.

**HARDCOPY LOG:** The hardcopy log is a permanent record of system activity that is mandatory for systems with an active display console or multiple active consoles; for other systems, the primary console device serves as the hardcopy log. The hardcopy log is kept on another, non-display, console device or can also be kept on the system log.

Since multiple console support allows more than one console in a system, an installation should find it helpful to record all the messages issued by and to a system. The hardcopy log is a place to collect these messages, and therefore, an installation can review system activity by reviewing message activity.

**SUPERVISING the EXECUTION of WORK**

**MVS/SP V2 SUPERVISOR:** The Supervisor provides global functions for all work being done in the system. The Supervisor, in general, automatically controls the use of the Processor, I/O, real storage, and virtual storage. It provides a variety of services such as program loading, storage allocation, serialization services, timer services, work dispatching and interruption handling. To perform its function, the supervisor receives control following an I/O, external, or program interruption or through a program-requested supervisor call (SVC) interruption.

**SUPERVISOR FUNCTIONS:** Supervisor functions include:

- Managing system resources.
- Managing the content of virtual storage (Contents Supervision).
- Satisfying I/O requests.
- Recovering from errors.
- Supporting Multiprocessing.
- Monitoring system activity.
- Supporting Cross Memory Services.

Areas involved include:

**INTERRUPTION PROCESSING:** When an interruption occurs, the supervisor receives control, saves the status of the interrupted routine, analyzes the interruption, and passes control to the appropriate routine to process the interruption.

**CREATING DISPATCHABLE UNITS OF WORK:** Units of work are represented by control blocks in order to identify and keep track of all work in the system. The two types of control blocks which represent units of work are Task Control Blocks (TCBs) and Service Request Blocks (SRBs).

**SERVICE MANAGEMENT (SRB SUPPORT):** The service management function consists of dispatching and queuing techniques allowing system components to provide services that execute enabled, unserialized, and in parallel. The basic control structure used by the service manager incorporates two levels of system priority, global and local. Service requests (SRBs) queued at the global level are given a higher priority than that of any address space, regardless of the address space in which they will be dispatched. SRBs queued at the local level are given a priority equal to that of the address space in which they will be dispatched, but higher than any task within that address space.

**DISPATCHING WORK:** After supervisor routines process interruptions, the dispatcher determines the unit of work which has the highest priority and passes control to that unit of work.

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**SERIALIZING THE USE OF PROCESSORS:** In a multiprogramming system, instruction sequences can be interrupted, to be resumed later. The supervisor offers services that can be used to prevent other programs from using resources owned by the interrupted routine. This support includes the management of locks, support of local requests to enqueue (ENQ) resources, and Global Resource Serialization (GRS).

**MANAGING SYSTEM RESOURCES**

The System Resource Manager (SRM) has two objectives:

- To distribute the system's resources among address spaces according to the installation's performance objectives.
- To achieve the optimal use of those resources from the viewpoint of system throughput.

An installation specifies its requirements for the first objective in a member of SYS1.PARMLIB called the Installation Performance Specification (IPS).

The system programmer can also influence many of the decisions of SRM by means of information stored in another member of the SYS1.PARMLIB data set.

**RESOURCE MANAGEMENT:** The control program can dynamically regulate the utilization of most system resources. A central set of system resource management routines coordinates the scheduling of various system resources attempting to both maintain efficient resource utilization and also to satisfy installation specified performance objectives.

With this support each job/user will belong to one of several installation-defined performance groups. The scheduling of system resources will then be controlled so that each job/user receives resources at a rate prescribed for the associated performance group by the installation. Jobs or TSO transactions can be associated with different resource consumption objectives as a function of the resource demand of the job or transaction. This is specified by having multiple performance group periods for a performance group.

The load on various system resources is monitored and resource scheduling decisions are made which will attempt to correct detected imbalances and overloads. For example, SRM monitors I/O interrupt activity and adjusts the number of processor(s) available for handling I/O interrupts.

The number of address spaces resident in real storage and eligible to use system resources (the multiprogramming level) is dynamically controlled based on contention for system resources. This is accomplished by swapping address spaces in and out of real storage.

The ability of address spaces resident in real storage to use the processor(s) can be controlled and dynamically changed as necessary to meet the installations' responsiveness and throughput goals.

Real storage is distributed among address spaces by the Real Storage Manager (RSM) under the direction of the SRM.

Real storage can be allocated to address spaces based on their demand relative to other address spaces for maximum throughput. Real storage can be allocated to address spaces with specific response time goals in mind and the amount can be dynamically adjusted to control the paging rate of the address spaces within acceptable limits. The SRM will use real storage, if available, to contain address spaces that are not demanding system resources, such as TSO address spaces waiting for the terminal user to enter a command.

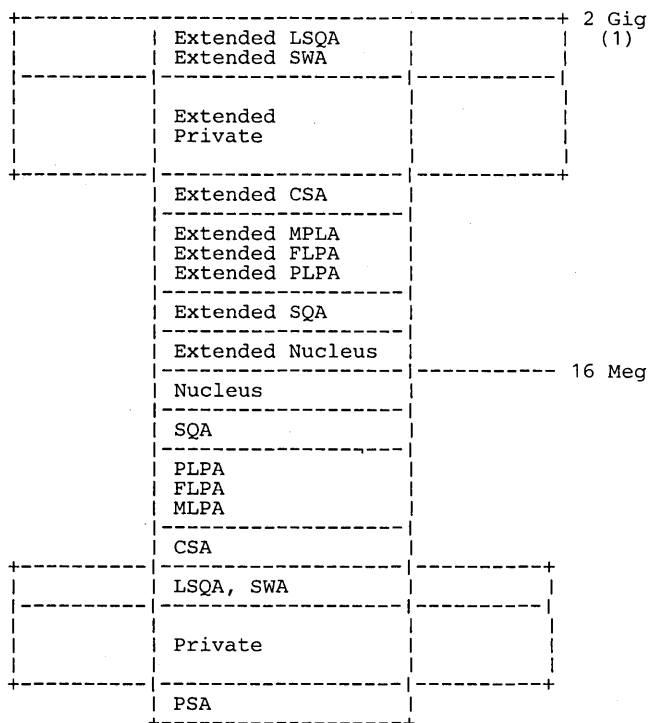
The allocation of data sets for which no specific device has been explicitly or implicitly requested is controlled by the SRM. The selection of a device is based on the contention on the paths to devices and contention on the devices themselves.

**STORAGE MANAGEMENT:** Multiple address space supervision is provided by system resource management routines, real storage management routines, auxiliary storage management routines, and virtual storage management routines.

- The virtual storage manager (VSM): VSM's main function is to control the allocation and deallocation of virtual storage within each address space as directed by requesting GETMAIN and FREEMAIN macro instructions. See Figure 1 for a presentation of the MVS/XA Virtual Storage Map. In addition, VSM is comprised of routines that perform the following functions:

- Address Space Creation and Deletion:
  - Creates and deletes the VSM control blocks necessary to describe new address spaces.
- Task Initialization and Termination - initializes the VSM control blocks necessary to describe storage that is related to individual tasks.
- Obtain/Free User Regions - creates and deletes the VSM control blocks necessary to describe the portion of the user's private area that is used for the user's problem programs.
- Support the following VSM services:

- VSMLIST - Provides information about the allocation of virtual storage within an address space.
  - VSMLOC - Verifies that a given storage area is getmained.
  - VSMREGN - Provides the starting address and size of the non-extended and extended private area.
  - CPOOL- Provides a high performance, general purpose cell management service.
- VSM has been restructured to:
- Support a full two-gigabyte virtual address space. This support allows for movement of code and data to the extended virtual area and can provide relief to users currently constrained by the 16-megabyte virtual storage address limit.
  - Provide functionally oriented routines and remove inter-component dependencies for easier serviceability.
  - Enhance recovery for a higher degree of availability.



**Figure 1. MVS/XA Virtual Storage Map<sup>2</sup>**

Note 1: 'GiG.' = gigabytes = 2<sup>30</sup>

Note 2: Figure not drawn to scale

- The real storage manager (RSM): RSM provides backing of virtual pages and directs the movement of virtual pages between real storage and auxiliary storage. RSM has been restructured to:
  - Support extended real addressing.
  - Handle virtual page requests for Page Fix, Page Free, Page Load, Page Out, Page Release, and Page Anywhere.
  - Create segment and page tables for each virtual address space.
  - Direct address space swapping.
- Provide service for the VIO facility.
- The auxiliary storage manager (ASM): ASM initiates the paging I/O necessary to transfer pages in and out of real storage (both individual page requests and block paging requests, such as swapping). ASM performs space management for all external page storage data sets. ASM also maintains and retrieves copies of the temporary virtual I/O (VIO) data set pages.

ASM has three types of direct access data sets. These types are: Page data sets, swap data sets, and SYS1.STGINDEX (ASM's journaling data set).

- Page data sets are VSAM data sets that make up the page space portion of auxiliary storage. ASM uses this page space to store the paged-out portions of all virtual storage address spaces and VIO data set pages. Each data set is formatted in 4096-byte records called slots.

To page efficiently, ASM divides the pages of the system into classes, namely PLPA, common, and local. A fourth class

**MVS/SP-JES2 V2.1, MVS/SP-JES3 V2.1 (cont'd)**

(duplex), is optional and provides system recoverability. The four types of page data sets and their usage are:

1. PLPA (pageable link pack area) page data set -- contains pageable LPA pages of the system plus ASM control information (including the quick start record). This page data set is filled during a cold start IPL and becomes effectively a read-only data set once PLPA has been constructed. The only exception occurs when overflow from the common page data set is written to this area.
2. Common page data set -- contains the non-PLPA virtual pages in the system common area.
3. Duplex page data set (optional) -- used for a secondary copy of the PLPA and common page data sets to provide system recoverability for a permanent I/O error on either of these data sets.
4. Local page data sets -- contain private address space unique pages, VIO data sets, and LSQA pages if there were no swap data sets available.

Local page data sets are placed on one of two circular queues to optimize performance.

- Swap data sets are VSAM data sets that are used to store and retrieve the set of LSQA (local system queue area) pages and working set pages belonging to an address space. Working set pages are private area pages that are swapped in with the address space.

Each data set is formatted in 4,096-byte slots, but ASM utilizes them in groups of twelve slots called swap sets. The contiguous slots of a swap set allow ASM to process the critical LSQA pages more quickly in groups instead of as individual pages.

- SYS1.STGINDEX data set is a key-sequenced VSAM data set used to store journal information. For example, ASM maintains a copy of the last checkpointed association between VIO pages and auxiliary storage on this data set. This provides recoverability in a step restart situation or warm start IPL.

ASM will assign paging and swapping devices to a higher Interruption Subclass (ISC) than other I/O devices in the system. This will allow paging completions to be presented to the system with a higher priority than other I/O interruptions that are pending.

#### MANAGING THE CONTENT OF VIRTUAL STORAGE (CONTENTS SUPERVISION)

**CONTENTS SUPERVISION:** This support provides the facilities that respond to both system and user application requests which identify a requirement for a specific program (i.e., load module). The external interfaces to this function include: ATTACH, LINK, XCTL and LOAD.

**LNKLST Processing:** When Contents Supervision detects the need to search for a load module in LNKLST (i.e., SYS1.LINKLIB and any program libraries concatenated to it), it will employ a mechanism which eliminates channel and device contention caused by directory searches.

This support also:

- Eliminates the need to tune the LNKLST library directories for performance.

This improves system programmer productivity, particularly in a large multi-system environment.

- Improves dynamic update of modules in these program libraries.
- Raises the maximum number of data sets that can be concatenated in LNKLST.
- Allows non-APF authorized libraries to be included with APF authorized libraries in the LNKLST concatenation.

Channel and device contention caused by LNKLST directory searches are removed by providing an in-storage, hashed directory for the LNKLST concatenation. After the hashed directory is created at system initialization, there is no I/O issued to the actual LNKLST data set directories, thus reducing contention on the channel and LNKLST devices. The hashed directory is created from the concatenated list of data sets specified in the LNKLSTxx PARMLIB members. The directory is kept in a separate LNKLST Lookaside (LLA) address space and the function is invoked directly from BLDL, so there is no customer intervention required to activate it. The resident BLDL table is eliminated.

The need to tune the LNKLST library directories for performance has been eliminated. The search for a module in the LNKLST concatenation is now performed against the hashed directory, thus performance is not dependent on the order of data sets in the concatenation. With this performance dependency eliminated, the requirement for tuning the order of data sets in the LNKLST concatenation or moving modules between data sets has been eliminated. The occurrence of multiple copies of the same module in multiple data sets continues to be supported by the LNKLST Lookaside (LLA) function. The processing

performed in this case is the same as with the previous mechanism, that is, the first occurrence of the module in the concatenation will be used.

Two other restrictions on LNKLST concatenation processing have been removed in MVS/SP 2.1.1. First, if specified by the operator, non-APF authorized libraries included in the LNKLST concatenation will remain non-APF authorized and only those LNKLST libraries named in the APF table will be APF authorized. This new function allows the installation to include non-authorized, user libraries in the LNKLST concatenation, thus avoiding the need for separate JOBLIBs or STEPLIBs for each user. Secondly, the restriction of 16 data sets in the LNKLST concatenation has been removed. (The limit of data sets is now governed by similar restrictions to the data management restrictions.)

The LLA function provides a new mechanism to control updates to modules accessed through the LNKLST concatenation. An operator command is provided to refresh the hashed directory. When it is invoked by the operator, a new hashed directory is built by the LLA function. In this manner, any modules in the LNKLST concatenation which have been changed or added since the last creation of the hashed directory will be included in the new directory. After the new directory is created, the old directory is deleted, and any subsequent searches will use the new directory. The LLA function serializes access to and update of the directory by a locking mechanism. The operator can issue a command to stop the LLA function. This command provides a mechanism to synchronize use of the LLA directories across multi-system complexes.

The use of a separate address space for the LLA function can provide a high degree of availability because it lessens the chance of an unintentional modification which might cause a system outage or error. In addition, the use of the separate address space allows the customer to influence the performance of the LLA function by putting it in a separate SRM performance group. The separate performance group allows the customer to monitor and influence the working set size for the LLA function and thus the amount of paging done for the LNKLST directory.

The combination of these changes provides greatly simplified system tuning and library maintenance (particularly for multi-system complexes) and has reduced the channel and device constraints caused by the heavy utilization of the LNKLST libraries.

#### SATISFYING I/O REQUESTS

**IOS:** The Input Output Supervisor (IOS) provides a central facility to control and conduct I/O activity through MVS/XA. IOS has been restructured to:

- Support and utilize the S/370 Extended Architecture Channel.
- Provide functionally oriented routines to handle the many differing types of events connected with the initiation of I/O, the completion of I/O, and unsolicited I/O events.

Included in the functionally oriented design of IOS are:

- A routine to perform I/O initiation (including the handling of the subchannel, device control, I/O initiation and subchannel redrive).
- Disabled I/O interrupt handler. This routine performs the initial processing of solicited or unsolicited I/O interrupts, including the analysis of the Interruption Response Block (IRB) and the invocation of the caller's Disabled Interrupt Exit Routine (DIE), if one was specified.
- I/O Completion Enabled Handling routines which complete the processing of I/O interrupt events. These routines interfaces with I/O Driver exit routines and with Error Recovery Procedures (ERPs), when required.
- Channel Recovery routines which handle channel errors reported through Machine Check Interrupts.
- Missing Interrupt routines which monitor and report missing I/O interrupt conditions, and mount requests.
- Routine handling the Purging and Restoring of I/O requests.

In support of the S/370 Extended Architecture Channel, IOS utilizes the extended capabilities of the Channel Subsystem. In this environment, the following aspects are significant:

- The program (i.e., IOS) view is independent of the physical structure of the channel, the configuration of channel paths, and the addressability of control units and devices.
- Any processor can access the channel to execute any I/O instruction.
- Access to channel facilities is independent of the physical structure of the channel and the current channel, control unit, or device state.
- The channel can request an I/O interruption on any processor.

In this environment, there is a dedicated subchannel for each device. I/O operations are initiated by issuing the START SUBCHANNEL instruction. The channel will accept (and either initiate or hold for later initiation) one I/O request per subchannel (i.e., per device). To a large degree, the channel has assumed the responsibility of scheduling the I/O requests. IOS is no longer responsible for attempting to locate alternate paths to a device (if the initial path to the device is busy at the time an I/O request is initiated).



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I/O operations can be initiated on any processor. Initially, only the processor that executed the IPL process is enabled for I/O interrupts. SRM will monitor the I/O operations and optionally will adjust the number of processor(s) currently handling I/O interrupts.

The S/370 Extended Architecture Channel establishes several formally defined interfaces connected with the I/O events. One of these is the Operation-Request Block (ORB). This control block is the required parameter to the START SUBCHANNEL Instruction. Additional architected interfaces have been established in connection with I/O Interruption processing (e.g., Interruption Response Block (IRB), and Extended Status Word (ESW)).

**RECOVERY ROUTINES ASSOCIATED WITH IOS**

**THE SUBCHANNEL LOGOUT HANDLER (SLH):** SLH handles interrupt status which contain logout data. The main functions provided are:

- Processing of the Extended Status Word (ESW) upon detection of situations where the subchannel logs out this information.
- Record the error on the SYS1.LOGREC data set.
- Build an Error Recovery Procedure Information Block for subsequent use by the Error Recovery Procedure (ERP).
- Issue message to the operator to inform him of the event.
- The Subchannel Logout Handler processes situations where the sub-channel has logout data to be presented to the system. These situations include:
  - Storage or key errors which may have occurred on the data buffer, the CCWs or the IDAWs.
  - Inability to present measurement data. This has no effect on the I/O operation itself, but does affect the statistics normally presented concerning I/O operations.
  - Interface Control Checks.
  - Channel Control Checks.

The SLH presents status to the Real Storage Manager (for storage or key checks) or to the Monitoring Facility (for measurement checks).

**CHANNEL RECOVERY:** The Channel Recovery functions within IOS handle channel anomalies which are reported through Channel Report Words.

The goal is to report any/all abnormal situations and to initiate recovery operations where possible or appropriate. The S/370 Extended Channel Architecture provides for the ability to localize error reporting to the specific area of failure (e.g., sub-channel, channel path, etc.).

**ALTERNATE PATH RETRY (APR):** APR ensures that an alternate path to a device is tried (whenever possible) when a failing path is detected.

The operator may vary paths to a device online or offline by means of the VARY PATH command. He can vary offline all paths except those to shared direct access storage devices which have an outstanding RESERVE.

**UNCONDITIONAL RESERVE SUPPORT (Alternate Path Recovery):** The Unconditional Reserve Support determines the need (and applicability) of invoking the Unconditional Reserve Error Recovery Procedure. Factors involved in the analysis include:

- Type of condition which triggered the event.
- Type of device (support limited to DASD).
- Type of control unit.

When Unconditional Reserve is issued, the 3770-2 or 3880 Storage Control will:

- Clear the indicators in the control unit that indicate that the addressed device is reserved to a particular path.
- Set indicators in the control unit indicating that the addressed device is reserved to the current path.

Additional actions are taken in cases where a string switch feature is present.

When the command is accepted, all of the above operations are executed unconditionally and without regard for the current status of the control unit or the string switch.

**THE MISSING INTERRUPTION HANDLER (MIH):** MIH is a standard facility that notifies the operator if a device-end, channel-end, or mount interruption is not received within a specified period of time. (MIH also detects 'start pending' and 'request queued plus device idle' situations). A SYS1.PARMLIB member can be used to establish the time interval for each device or for groups of devices. The absence of such interruptions may mean that a mount message has not been satisfied or that a device has malfunctioned. Specific actions an operator may have to take depend upon the conditions he encounters. He may be required to ready a device on which a volume has been mounted, examine indicator lights on the device for abnormal signs, or terminate the job. In the case of channel end interruptions, MIH will invoke I/O restart to attempt to retry. Additionally, MIH will record via recovery management when device-end or channel-end interruptions are not received.

**INPUT/OUTPUT CONFIGURATION PROGRAM (IOCP)**

The channel operations of the IBM processor operating in S/370 Extended Architecture mode are controlled by the External Data Controller (EXDC). The EXDC requires specific data about the hardware I/O configuration so that channel operations can be performed. In order to define the input/output configuration, the IOCP is executed with the following input data:

- Channel paths on the processor complex.
- Control units attached to the channel paths.
- I/O devices assigned to the control units.

The MVS/XA system generation process is modified to allow MVS/XA users, in most cases, to create a single set of statements which can be used as input to both the MVS/XA system generation process and to the IOCP.

To meet changing I/O requirements, IOCP can be used to define a new I/O configuration.

IOCP is available in two versions:

- An MVS/XA version which can be executed as an MVS/XA job via JCL statements; and,
- A stand-alone version which can be executed from the system or service support console.

The I/O configuration data is stored in two I/O configuration data sets which reside on the integrated processor controller file in the IBM processor operating in S/370 Extended Architecture mode. Two levels of the data are provided to allow the definition and testing of a new configuration without affecting an existing configuration. At power-on reset, either of the two definitions can be utilized to control I/O operations.

IOCP can read from both levels of the configuration data in order to produce reports which describe the I/O configuration.

**EXCP PROCESSOR**

The EXCP Processor provides services for direct use by application programs and for many of the data management access methods (which issue the EXCP request on behalf of the application program).

Areas of support include:

- Construction of a copy of the channel program that was supplied with the request. The new copy of the channel program is constructed utilizing real main storage addresses (as opposed to the virtual main storage addresses supplied in the original copy).
- Page Fixing the required areas involved in the I/O operation.
- Notifying the requestor on the completion of the request. This includes notification of successful or unsuccessful termination of the operation.
- For authorized users, the EXCPVR interface is supported. At this interface, the user provides his own real channel program and is responsible for Page Fixing all areas involved in the request.

The EXCP Processor supports the Format 0 Channel Command Word.

The EXCP Processor supports the Indirect Data Address Word (IDAW) when specified in the user's channel program for data transfer operations. This support is provided to permit the user to supply 31-bit virtual addresses in an IDAW. When EXCP is issued, the channel program may contain CCWs with the IDAW flag on. The EXCP Processor will support this indicator by referencing the addressed IDAW and will use its content as the basis for building the executable channel program.

**RECOVERING FROM ERRORS**

**RECOVERY MANAGEMENT:** Recovery management monitors the flow of control through recovery processing for system, address space, and task failures, and performs normal and abnormal task and address space termination processing. It provides to system functions, and optionally to problem programs, the means necessary to intercept, attempt recovery, and record unexpected or expected error situations. The recovery processing is designed to operate at different levels of control. If a recovery routine for a process operating at one level of control is unable to recover from an error, the error is passed to a recovery routine at a previous (higher) level of control.

In addition to the recovery routines described below, the I/O Supervisor (IOS) contains specialized error recovery routines. These routines were described under 'Satisfying I/O Requests' earlier in this section.

**THE MACHINE CHECK HANDLER (MCH):** MCH records, via recovery management, all machine checks and determines if recovery from a malfunction was made by the Instruction Retry or Error Correction Code facilities of the IBM processor operating in S/370 Extended Architecture Mode. If the malfunction is not corrected by the machine facilities, MCH performs certain analyses and provides a record of the analysis to the Recovery Termination Manager. The appropriate software recovery routines are then invoked. In a tightly-coupled multiprocessing (MP)

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environment, MCH may initiate ACR on a non-failing processor (as described later in this section).

**DYNAMIC DEVICE RECONFIGURATION (DDR):** DDR allows a demountable volume not marked permanently resident to be moved from one device to another. The request to move a volume may be initiated by the system or by the operator. The system will initiate a DDR request to the operator upon detection of a permanent error.

**ALTERNATE CPU RECOVERY (ACR):** ACR processing is invoked when a Processor in a tightly-coupled multiprocessing (MP) environment can no longer function. ACR processing is invoked by a signal that is sent by the failing Processor before it enters a permanent wait or stopped state. This signal is either a hardware-generated malfunction alert (MFA) or a software-generated emergency signal (EMS). When ACR processing is invoked on a non-failing Processor, it monitors the recovery processing of tasks from the failing Processor in an attempt to recover those activities which were on the failing Processor and continue system operations.

In S/370 Extended Architecture, I/O operations need not be monitored (by ACR) since all processors have access to all devices.

**DUPLICATION OF SYSTEM DATA AREAS:** Any common pageable system areas (e.g., Link Pack Area) will optionally be written to two separate paging data sets which may be on two separate devices. The additional copy will be utilized if on the first attempt to access the information, an I/O failure occurs.

**SUPPORTING MULTIPROCESSING**

Multiprocessing (MP) is a capability of the control program that supports tightly-coupled processors with shared real storage. MP is an integral part of MVS/System Product V2. The Processors are treated as system resources and are assigned by the supervisor to process any dispatchable unit of work. Multiprocessing is designed to provide more efficient and more flexible allocation of execution time and main storage for a single job stream than uniprocessing with separate processors. Availability on multiprocessors is supported by:

- Any processor can access the channel to execute any I/O operation. Hence, any processor can take over the I/O responsibility for the complex.
- Commands which allow the logical and physical reconfiguration of hardware resources.
- Recovery management support that reduces the impact of software and solid hardware failures.
- Alternate Processor Recovery processing that allows a non-failing Processor to attempt recovery of tasks in progress on a failing processor.

A locking structure providing a number of locks in the control program allows more parallelism over previous systems. With the use of separate address spaces for jobs and subsystems, queues and control blocks associated with only one virtual address space can be manipulated without preventing another Processor from performing similar control program functions in other address spaces.

**MONITORING SYSTEM ACTIVITY**

**SYSTEM MANAGEMENT FACILITIES - (SMF):** SMF collects and records system information. The information obtained can be used in management information reports that describe system efficiency, performance, and usage. The SMF records contain such data as: System configuration ... Job and job step identification ... Processor and input/output device usage ... Device Connect Time ... Temporary and non-temporary data set usage and status ... Virtual and real storage usage ... Status of removable direct access volumes ... Paging statistics.

The SMF component is critical to MVS accounting, performance analysis and capacity planning. The SMF component has been modified to execute in a separate address space. This improves the reliability of SMF by isolating it from unintentional modification. It also improves overall system availability since SMF is now restartable after a failure. The installation no longer has to re-IPL the system in order to resume SMF recording after a failure. To protect the reliability of SMF, repeated abends in user exits will no longer cause SMF to terminate. Instead, SMF will mark the failing exit inactive.

Processing for the SMF data set has also been improved. The data set will be preformatted with dummy records rather than binary zeroes. In this way, the SMF dump program will not have to read to physical end of file when processing a partially full data set. Instead, it will recognize the dummy record as the end of the data set. Data sets that have been preformatted for the previous level of SMF (i.e., with binary zeroes) can also be processed by this new level of SMF.

The use of an SMF address space has also allowed an increase in the number of buffers for SMF use. The buffers are no longer kept in common storage, thus the number of buffers is limited only by the amount of private area virtual storage available.

SMF provides exits to installation-supplied routines that can monitor the operation of a job or job step and generate the installation's own SMF records. The exit routines can cancel jobs, write records to the SMF data set, open and close user-defined data sets, suppress the

writing of certain SMF records, and enforce installation standards (such as identification of users). The IEFUSI (User Step Initiation) exit can be employed to monitor (or change) the region size parameter. Dummy routines are automatically provided for all unused exits. SMF records contain additional accounting information to reflect new system environmental characteristics ... SMF provides an exit from the system control program, which receives control each time an SMF record has been formatted and is ready to be written out; this exit can prevent the record from being written ... an exit is provided whenever a job is ready to be purged from the system ... SMF recording data sets must reside on a direct access device ... OUTLIM is supported.

**SUPPORTING CROSS MEMORY SERVICES**

Cross memory services increase the efficiency of communication between address spaces by reducing the requirement for communicating through the common area. Cross memory services allow programs to pass control to programs in other address spaces and allow direct data movement between two defined address spaces. When cross memory services are utilized by areas of the control program (see list below), the use of these services is transparent to the user.

Cross memory services, together with auxiliary address spaces for some system components and subsystems, reduces the system virtual storage (nucleus, PLPA, SQA, CSA) requirements for specific environments. Additionally this storage is protected by being isolated in a separate private address space. Examples of functions that use cross memory services are:

- **Global resource serialization**  
The use of cross memory services permits global resource serialization to place ENQ/DEQ control blocks in the private area of a separate address space. This reduces common storage usage and provides RAS benefits.
- **JES3**  
JES3 allows an installation to significantly reduce its use of common storage for buffers and staging areas by storing some of this data in the private area of a JES3 auxiliary address space and using cross memory services to access the data.
- **PROGRAM MANAGER**  
A program manager extension, virtual fetch, tailored for IMS/VS, uses cross memory services and provides a performance potential for IMS installations. This enhancement reduces execution time and channel contention for program fetching during application scheduling.
- **CONSOLE COMMUNICATIONS TASK**  
This use of cross memory provides virtual storage savings by having the communications task execute in its own address space and use cross memory services to communicate with user address spaces and the master address space. The communications task control blocks for console support, write-to-operator messages, and console message queuing, previously located in the common service area (CSA), are now in the private area of the communications task address space.

**MVS/SP V2 RAS CHARACTERISTICS/IMPROVEMENTS**

Improvements have been made in the system RAS characteristics. These include:

- Support of page protection which will detect and prevent any erroneous attempts to change the contents of selected portions of the nucleus, PLPA (including the Extended PLPA), MLPA (including the extended MLPA), and the FLPA (including the Extended FLPA). The MLPA and FLPA may be optionally unprotected.  
The protection is on the basis of a 4K page (where previously protection was for a segment).
- **MVS/SP V2 trace facilities enhancements:**
  - The IBM processor operating in S/370 Extended Architecture mode provides new hardware support for tracing certain branch instructions and address space tracing. A new TRACE instruction is provided to record significant software events. The MVS/SP V2 System Trace supports these new hardware tracing mechanisms.
  - The system trace options and trace table size may be changed dynamically. In MVS/SP V2, the System Trace tables are constructed in a new (separate) address space.
  - New trace table formatting options are provided.
  - Both GTF and the new S/370 Extended Architecture trace can be executed concurrently.
  - GTF has been enhanced to trace additional events.
  - GTF support for CCW Trace is integrated into MVS/SP V2.
- New dumping and formatting options have been provided to assist the collection and presentation of the information needed for debugging, eliminating that which is not needed.

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At the time a dump is taken, any WTO type messages which were issued by disabled or locked routines and which still remain in the in-storage buffer, will contain a timestamp (time of day clock). This will permit the coordination of such messages with entries in the System Trace Table and the headers for LOGREC entries. These buffered messages can be key to quick problem resolution and (with the addition of the timestamp) pertinent messages can be distinguished from those that are irrelevant. During normal operation, the timestamp will not appear when the message is sent to the operator.

Improvements to SVCDUMP will improve system availability and assist the management of SYS1.DUMP data sets. Enhancements have been made to stand-alone dump to improve its usability.

- Printdump has been enhanced through these improvements:
  - MVS/SP V2 printdump will execute on MVS/SP V2 or MVS/SP V1 to format MVS/SP V2 dumps.
  - ASM, VSM, RSM and IOS Control Block Formatters are provided.
  - A new formatter for the system trace table is provided. The system trace entries will be formatted in first-in, first-out order, so as to resemble a hardcopy log of events. This new format should improve system programmer productivity since it eliminates the need to search for and decode the trace buffer in the hexadecimal portion of the dump. This function is invoked through a new Print Dump verb, TRACE.
  - The title page is expanded to include parts of the dump header information which may be helpful in performing problem determination and problem management.
  - New options on the FORMAT verb permit selection of the address spaces to be formatted. The default is to format only the address spaces for which error indicators are set or were current at the time of the dump.
  - The output of the SUMMARY formatter is restructured for ease-of-use.
  - A dump index will be provided to indicate the starting pages in the dump of the output of each of the print dump formatters, plus additional data depending upon the formatter. An INDEX DD statement may be used to cause the index to appear at the front of the dump.
  - LPAMAP will list all the modules in the link pack area. A new operand is used to indicate whether the module list is to be sorted by entry point address or by module name.
  - The interface provided to user exits (formatters) is enhanced. Exits can now obtain up to 4K bytes of dump data at a time. Exits can now access real storage, processor status records, or the dump header record.
- SNAP/ABDUMP provides the following new support:
  - The SUBTASKS option causes the inclusion of subtask data in a dump. This subtask data is always automatically included in x22 ABEND dumps.
  - The SYMPTOM option provides concise information about the error (ABDUMP only).
  - The SUM option provides information about the areas being used by the program at the time of error plus user selected control blocks (ABDUMP only).
  - The SUBPLST option dumps the data in the selected subpools.
  - The ALLNUC option dumps the complete DAT-on nucleus. The existing NUC option will dump only the non-protected parts of the DAT-on nucleus.
  - The dump index will be expanded to identify the page number in the dump of the job's active load module(s).
  - User subpool areas (requested by the SPLS option) will be printed in ascending address order.
  - New pre-ABDUMP exit support will allow an installation to tailor or suppress abend dumps.
- SVCDUMP provides the following new support:
  - The SUBPLST option causes the dumping of the data in the specified subpools.
  - The KEYLST option causes the dumping of the data in the specified keys within the subpools specified by the SUBPLST option.
  - The ALLNUC option causes the dumping of the complete nucleus (DAT-on and DAT-off). The NUC option will dump only the non-protected parts of the virtual nucleus.
  - New information is put into software error (SYS1.LOGREC) records to identify the results of an unsuccessful attempt to take an SVCDUMP.
  - SVCDUMP-SLIP interface is used to allow the dumping of the areas in use at the time of the SLIP event. This improves the usefulness of dumps requested by SLIP.
  - SVCDUMP insures that the area around the point of error is included in the dump regardless of the options selected.
  - A new task termination resource manager will attempt to protect the system from SVCDUMP errors by freeing resources and resetting the system dispatchable before task termination completes.

- A new command, DUMPDS, is provided to connect, disconnect, or clear SYS1.DUMP data sets.
- An extension to the DUMP option of the IEASYSxx SYS1.PARMLIB member can be used to identify the SYS1.DUMP data sets to be initialized for use at IPL time. Thus, many SYS1.DUMP data sets may be cataloged in the system master catalog, but only the selected ones are used by MVS/SP V2.
- MVS/SP V2 will support up to 100 SYS1.DUMP data sets.
- New post-SVCDUMP exit support will allow an installation to provide exit routines to automate the offloading of SYS1.DUMP data sets, to perform some automated dump screening, or to take other actions that the installation desires.
- Enhancements have been made to Stand-Alone Dump.
  - SADMP now supports devices (tape, DASD, console) attached on 'shared (non-dedicated) paths'.
  - The console address list has been expanded from 1 to 21, and SADMP will only consider the listed devices to be consoles. This will avoid having SADMP respond to any device that presents the first attention interrupt.
  - SADMP previously required the residence volume, output device, and console to be attached to the same processor (Channel set). This restriction is removed.
  - A means to specify additional storage to be dumped has been added to both the residence volume initialization process (to allow local defaults) and to operator prompting (to allow dynamic additions). This can be used, for example, to dump selected areas of private storage.
  - SADMP will prompt the operator when a labeled tape is mounted instead of unloading it. SADMP will display the volume serial number and request permission to erase the label. This removes the requirement that non-labelled tapes be kept available for SADMP.
  - The user may now choose where SADMP will load itself (instead of having a fixed location). With knowledge of the local configuration, this can be used to avoid storage areas with defective locations.
  - Residence volume initialization has been simplified from a SYSGEN-like two stage process to a single step batch job.
  - Informational messages, which slow stand-alone dump, may optionally be suppressed.
- Enhancements have been made to SLIP.
  - SLIP dumps now contain registers and related data areas, some control registers from time of interrupt.
  - SLIP dump suppression may be tailored by type of dump (i.e. SYSABEND, SYSUDUMP, SYSDUMP, or SVCDUMP).
  - SLIP supports the keyword, REASON=x which filters non-PER traps based on the reason code of the ABEND or CALLRTM macro. The syntax rules for the REASON keyword are the same as those for the COMP (completion) keyword, and can only be used in a SLIP trap where the COMP keyword has been specified.
  - SLIP users may perform logical AND and OR functions on any number of DATA triplets.
  - The user may specify the name of a nucleus module when defining a PER or non-PER trap. This is done through the keyword NUCMOD=x.
  - A parameter on the ACTION keyword (ACTION=NOSUP) will prevent DAE and other dumping services from suppressing the dump for a particular error.
- The S/370 Extended Architecture Channel provides RAS improvements.
  - The channel selects and controls the paths to I/O devices.
  - Because I/O devices are not associated with a processor, I/O recovery in the event of a processor failure is no longer necessary.
- Additional Functional Recovery Routines
  - Additional FRRs have been added to IOS, VSM and RSM.
- Operational improvements are provided.
  - New SYS1.PARMLIB support allows the installation to control the display output at the MVS/XA Operator Console. Seven colors, reverse image, underscore and blinking may be selected.
  - The CANCEL command will be executed to support termination of tasks which are:
    - Not initialized to the point where a job name has been assigned.
    - Not unique (i.e., two started tasks with the same name).
  - The FORCE command will be extended to support termination of address spaces which are:
    - Non-cancellable.
    - Not initialized to the point where a job name has been assigned.
  - SLIP commands are automatically set to suppress dumps that are normally valueless. These SLIP commands are maintained in

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a new SYS1.PARMLIB member (IEACMD00) that can be modified by the installation.

- Improvements have been made to the DISPLAY DUMP command to provide information which may be useful for problem determination.
- Enhancements have been made to the MIH, including support for installation options via PARMLIB specification. A SYS1.PARMLIB member can be used to establish the time interval for each device or for groups of devices.
- Usability Enhancements: At the installation's option, the SYS1.PARMLIB data set may be blocked and multi-extent.
- A restartable wait state is loaded to inform the operator that IPLs may not succeed since the nucleus is in more than one extent.

**TIMESHARING OPTION - TSO**

TSO provides users a general purpose timesharing capability. Terminal users share remote access to the facilities of the system for conversational interaction -- preparation, syntax checking, execution, updating of programs and data -- concurrently with normal background operations. TSO provides conversational remote access to the system environment for both the experienced professional programmer and the individual with little or no experience with computers.

**TIMESHARING:** Each timesharing user has a private virtual address space.

The edit and scheduling functions of timesharing are integrated in the Base Control Program.

The data set handling commands allow allocation of multi-volume and multi-unit data sets, non-direct access data sets, and VSAM and virtual I/O data sets. Terminal users can allocate and unallocate concatenated data sets (other than VSAM and ISAM). Timesharing users may be selectively authorized by the installation to allocate data sets requiring volume mounting. Under installation control, timesharing users can direct SYSOUT data sets to remote stations defined to either Job Entry Subsystem.

The installation may specify a time interval which establishes a period that will permit a timesharing user to reconnect to the system in the event of a line disconnect. Should the interval lapse prior to the user reconnecting to the system, then the system will automatically save any data set which the user was in the process of editing.

Remote Entry Subsystem workstations are identified to the system in the same manner as TSO terminal users.

**FEATURES**

- General purpose time sharing capability operating concurrently with background operation within one operating system.
- Each timesharing user is assigned to an individual virtual address space.
- Data sets can be dynamically allocated by programs executing in the time sharing address space. Devices can also be dynamically allocated.
- Real storage utilization reflects the actual requirements to execute the program in the time shared address space.
- Time sharing provides an environment for creating and executing conversational programs. A device-independent BSAM/QSAM interface to terminals is provided for ease of development and installation of terminal-oriented application programs.
- Programming languages and data management are compatible between conventional (batch) programs and programs developed at the terminal. Batch or terminal-developed programs can be stored, retrieved and executed locally (at the computer center) or from the remote terminal allowing the use of data sets by time shared or other address spaces.
- Use of ACF/TCAM or ACF/VTAM to handle timesharing terminal types allows the same terminal and/or communications lines to be used for timesharing or other applications.
- The ACCOUNT facility may be executed in a background environment. It enables a batch-entry or remote user to update the user attribute data set (UADS) and the broadcast data set (BROADCAST) in a background environment.

The TEST facility of TSO is supported by TSO Extensions for MVS/XA licensed program. See the appropriate pages for a description of the support.

TSO offers language support for online development, debugging and execution of programs in COBOL, FORTRAN, PL/I, BASIC, APL, PASCAL and Assembler. For more detailed descriptions of the language products designed for use under TSO, see the Program Products section. As previously stated, the TEST facility is supported through the TSO Extensions for MVS/XA licensed program.

Language facilities available to the terminal user include: Compilation, usually invoked with a single command ... Linkage editing or loading ...

Program execution with terminal I/O capabilities for interactive application.

Command Procedure allows the user to specify compiler-type functions to control execution of his CLISTS, with control options to handle error exiting, including nesting of CLISTS, If/Then/Else and Do While/End Syntax, Read/Write to/from CLIST, local and global options, external file - I/O and symbolic substitution.

The use of ACF/VTAM or ACF/TCAM allows the use of many SNA terminal types.

TSO users may wish to consider using the Time Sharing Option 3270 Display Support and Structured Programming Facility licensed program. See the appropriate section for further information.

**JOB ENTRY SUBSYSTEMS**

**JES2 COMPONENT DESCRIPTION:** JES2 is a specialized component of MVS/SP-JES2 which operates in the same processor with MVS/XA to perform the peripheral functions associated with batch job processing. JES2 is started as a job entry subsystem. Control of designated unit-record devices is assumed, the specified intermediate storage direct access device(s) are initialized, and job processing begins. JES2 has four major processing stages which relate to its four major external functions. These are:

1. **INPUT STAGE** - This stage reads jobs simultaneously from a variable number of various types of online card readers and remote terminals. These jobs are then entered into a priority queue to await processing by the next stage.
2. **CONVERTER STAGE** - This stage passes the Job Control Language (JCL) to the MVS/SP V2 Converter which merges the specified procedures from the appropriate Procedure Library, performs a basic syntactical scan, and converts the JCL statements into an 'internal text' format which JES2 SPOOLS for later use by the MVS/SP V2 Interpreter. The jobs are then queued by job class to await processing by the next stage.
3. **EXECUTION STAGE** - This stage removes jobs based upon priority and class from the queue established by the Converter Stage and passes those jobs to MVS/SP V2 for processing. Input cards are supplied as required to the executing program and print and punch records are received and written onto JES2 intermediate storage. At the completion of a job, it is placed in a queue to await processing by the next stage.
4. **OUTPUT STAGE** - This stage transcribes the print and punch output generated by jobs in the previous stage to printers and punches. A variable number of various types of printers, punches and remote terminals can be operated simultaneously.

**JES2 STANDARD FEATURES:** The standard features of JES2 include:

- **JOB INPUT SERVICE** provides for low-overhead reading of job streams and storing of data on SPOOLing volumes for later high-speed retrieval for up to 99 concurrently active local card readers in any combination of devices as follows: 2540 reader ... 2501 reader ... 3505 reader (80-column punched cards only) ... 3525 punch (with read feature).
- **CONVERTER SERVICE** provides for the merging of the submitted JCL with user-selected or installation-selected procedure libraries and for an early scan of this combined JCL for syntactical errors.
- **EXECUTION SERVICE** provides for selection of jobs and execution monitoring for up to 99 concurrently executing jobs as follows: Selection of jobs based upon job class and initiator priority class list of up to 36 classes for each initiator ... automatic delaying of jobs with duplicate OS jobnames ... automatic deblocking and blocking of user SYSIN/SYSOUT data ... counting of lines, cards, and execution duration with optional operator notification and/or cancellation ... interface for SMF counting of SYSIN data.
- **MULTIPLE SPOOLING VOLUME SUPPORT** provides for balanced utilization of up to 36 volumes for any combination of any models of the following devices (one required): 3330 ... 2305 mdl 2 ... 3340 ... 3350 ... 3375 ... 3380. Warm start capability provides for checkpointing critical JES2 information sufficient for: Optionally restarting jobs which were executing ... restarting print and punch at the last checkpoint.
- **JOB OUTPUT PRINT SERVICE** provides for low overhead printing of job streams, system message, and user data print output for up to 99 concurrently active local printers in any combination of devices as follows: 1403 Printer mdls 2, 7, N1 ... 3211 Printer ... 3800 Printing Subsystem ... 3203 mdl 4 and 5. Note: Only the 3203 mdl 5 can be attached to IBM processors operating in S/370 Extended Architecture mode.
- **SPECIAL FORMS SUPPORT** provides for the routing of print (on a job or data set basis) and punch data (on a data set basis) to special forms output queued for output as directed by the operator.
- **INTERNAL READER FACILITY** provides the ability for any task within the system to submit jobs to JES2 for batch execution as though entered from a JES2 card reader.

## MVS/SP-JES2 V2.1, MVS/SP-JES3 V2.1 (cont'd)

- CONSOLE SUPPORT provides for direct entry for JES2 commands and JES2 abbreviated replies to WTORs through MVS/SP V2 operator consoles.
- JES2 interfaces directly with the MVS/SP V2 SMF writer to produce seven SMF records (types 6, 26, 43, 45, 47, 48 and 49). JES2 also provides two user SMF exits (IEFUSO and IEFUJP).
- JOB OUTPUT PUNCH SERVICE provides for low overhead punching of job stream user punch output for up to 99 concurrently active local punches in any combination of devices as follows: 2540 punch ... 3525 punch.
- EXECUTION BATCHING provides the facility for passing jobs directly to a processing program such as a 'one-step' monitor, reducing the overhead of OS scheduling and allocation for short running jobs requiring limited system facilities.
- PRIORITY AGING provides for automatically increasing the JES2 scheduling priority of jobs which have been in the system for extended periods of time.
- REMOTE JOB ENTRY provides for high speed communications with binary synchronous and SNA batch workstations which may be used for job stream input and output as well as operator control of the devices and jobs associated with the remote (see 'JES2 RJE Features').

### USER EXIT FACILITIES

- The JES2 User Exit facilities enable installations to individually tailor the JES2 component of MVS/System Product-JES2 to the requirements of their own operating environment.
- Specific IBM-defined exit points are provided at strategic points in JES2 code. The installation-supplied exit routines are 'logical extensions' of the JES2 environment. The exit code is assumed to be authorized.
- The installation is also provided with the general facility to specify its own exit points by coding the exit macros in the source code of JES2.
- Individual exit points can be controlled by initialization parameters and by system operator commands.

### SPOOL OFFLOAD FACILITY

- A facility is provided to give the installation the capability to dump and later restore the data from the JES2 spool. This facility will function using either tape, DASD or MSS virtual volumes as the offload media.
- Release and spool device-independent data formats allow customers to use the spool offload facility as a future JES2 cold start circumvention mechanism when migrating from release to release or changing spool devices. At present, a cold start can cause loss of jobs and sysout data; this facility would permit a cold start to be performed without such losses or the need to drain the system.

### SPOOL PARTITIONING FACILITY

- Spool Partitioning provides a means of reducing the impact of the failure of a single storage device on the total spool space. The total number of volumes eligible for spool space allocation for each job can be limited. Through the use of this facility, the probability of a job's data becoming inaccessible due to a device failure can be reduced. Exit points are provided to enable the installation to control the allocation of spool space: The installation will also have the option of doing a warm start without all previously mounted volumes available.

### USER CONTROL OF SYSOUT DATA SET GROUPING

- The SYSOUT Data Set Grouping support provides new Output JCL statements which allow the user to specify which data sets are to be contained in an output work unit. The user can also specify the setup characteristics and the priority for the output group.
- Operational enhancements provide improved procedures for limiting the formation of demand setup groups, limiting which output device will process demand setup groups, limiting the use of user-specified priorities for output and reducing operator intervention. Overall, these enhancements will assure that the efficient processing of user's output will not be disrupted by the increase in the amount of demand setup work.

### DYNAMIC ADD/DELETE OF SPOOL DATA SETS

- Dynamic Add/Delete of Spool Data Sets provides a capability for the operator to dynamically add or delete spool data sets. This eliminates the need to resort to a warm start which impacts the normal processing of work.
- A number of operator commands will be enhanced to display the jobs on a volume or the volumes used by a job.

### ERROR RECOVERY FACILITY

- This facility, similar in structure to the operating system's ESTAE/FRR recovery scheme, allows internal JES2 'processors' to deal with programming errors which previously caused JES2 termination. SYS1.LOGREC recording of all JES2 errors, regardless of whether recovery is successful, is also provided.

JES2 MULTI-ACCESS SPOOL FEATURE (MAS): JES2 allows from two to seven MVS/370 and MVS/XA Systems to share the JES2 input, job and output queues through the use of Shared DASD. This feature may be used to share the workload or a pool of JES2-controlled devices among processors. Jobs may be routed to any specific system or all systems in this multi-access spool complex. Furthermore, JES2-controlled unit record and remote devices need not, but may, be attached to each processor.

Each processor operates asynchronously within the multi-access spool complex, i.e., there is no master-slave relationship. Because of this operating design, any system in the complex can recover the workload accepted into the complex by any other system. Another system in the complex can have the RJE, TSO and unique unit record devices of the failing system physically switched to it and continue processing those jobs previously entered into the spool queue.

Another function supplied by the JES2 multi-access spool feature is the ability to isolate a processor for testing purposes. A processor may be designated as operating in independent mode, and in so doing, will only process jobs that are both routed to it and are themselves designated to be executed on that processor in independent mode.

JES2 RJE FEATURES: Those features common to all JES2 RJE configurations are as follows:

- JES2 RJE supports up to 1,000 remote workstations communicating over nonswitched (point-to-point) or switched lines.
- JES2 RJE provides for concurrent operations over as many as 1,000 lines assigned to unique communication line adapter addresses of the following types: SDA Type II on a 2701 for Binary Synchronous ... 3704 providing 270X emulation ... 3705 providing 270X emulation ... 3704/3705 SNA.
- Output routing control provides for print and punch output to be directed to the devices attached to the remote, to the central system, or to other remotes as designated by JES2 initialization parameters, by control cards submitted with the job, or by operator command.
- Remote operator control provides a subset of the JES2 operator commands for display of information and control of jobs and devices associated with the remote.
- Operator message output provides for transmission of messages and responses to remote operators with online MULTI-LEAVING workstations with consoles immediately, and optional saving of messages for all other remotes until the remote is online and has a printer available.
- Workstation programs, when required, are supplied as extensions of JES2 and are contained on the MVS/SP V2 distribution libraries in source form.
- Terminal support on the central system provides for communication with: 2772 (Binary Synchronous) ... 2780 (Binary Synchronous) ... 3780 (Binary Synchronous) ... 5110 Computer (as a 2772 BSC) ... S/360 mdls 20, 25, 30, 40, 50, 65, 65MP, 67 (in 65 mode), 75, 85, and 195 (MULTI-LEAVING) ... All virtual storage S/370 processors (MULTI-LEAVING) ... IBM processor (operating in S/370 or S/370 Extended Architecture mode) (MULTI-LEAVING) ... 1131 (MULTI-LEAVING) ... System/3 (MULTI-LEAVING) ... System/32 or System/34 (MULTI-LEAVING as a System/3) and System/32 or System/34 (SNA as a 3770) (MULTI-LEAVING as a System/3 or MULTI-LEAVING as a S/360 or S/370) and System/36 (SDLC as a 3770 or multiple logical units) ... 8100/DPPX (multiple logical unit SNA) ... 8100/DPPX/SP (multiple logical unit SNA).

To achieve this flexibility of terminal-sharing, JES2 uses the VTAM application program interface for the support of the SNA terminals which are attached to a 3704/3705 in network control mode.

SNA terminals supported by JES2 in MVS/SP V2 are the non-programmable models of the 3771, 3773, 3774, 3775, 3776 and 3777 Communication Terminals, the System/32 (as a 3770), the System/34 (as a 3770), the System/34 (as a 3770 with multiple logical units), the System/36 (as a 3770 with multiple logical units), the 6670 Information Distributor (through the program product MVS/Information Distribution Workstation Support, 5740-AMA), the 3790 Communication System and the 8100/DPCX Information System. Support for the 3770 family of devices includes the the 3262 Line Printer mdls 2 and 12, the 3784 Line Printer, the 3521 Card Punch, the 3501 Card Reader and the 2502 Card Reader.

- The signon feature provides for remote identification and line security through remote and line passwords.

## MVS/SP-JES2 V2.1, MVS/SP-JES3 V2.1 (cont'd)

- Remote characteristics support utilizes the unique features on each remote as follows: Full text transparency (required for object decks) ... text compression ... print line width truncation ... outer size and blocking capabilities. Note: Multipoint or multidrop line features are prohibited.
- Remote job priority adjustment provides for favoring or limiting the JES2 scheduling priority of jobs submitted from each remote workstation.
- Line restart feature provides for warm starting of print output after remote workstation or line failures.

**NJE FEATURES:** The Network Job Entry (NJE) facility provides for the transmission of selected jobs and in-stream data sets, system output (SYSOUT) data sets, operator commands and messages, and job accounting information from one computer system to another across a communication link.

A job entry network consists of one or more interconnected computer systems (called nodes), running under MVS/XA, OS/VS2 MVS, VM/370, or DOS/VSE. These nodes have the capability of communicating with one another and passing the information indicated above from one node to the next. The number of JES2 nodes which can exist within a job entry network ranges from one to 1,000.

The JES2 nodes can be single processors (UP/AP), tightly coupled multiprocessor processors, dyadic processors, or multi-access spool systems.

In a JES2 node, a job may enter the network via any local or remote input device and will be queued for transmission to another node if the node of entry is not the execution node. A job designated for execution at another node is either transmitted directly to that node or is transmitted through intermediate nodes located along a path to the execution node. Transmission of jobs along BSC communications links is handled on a store-and-forward basis; that is, a job must be completely received by a node before any action will be taken to either execute the job or transmit the job to another node. Once a job has been completely received by a node, the transmitting node frees the resources that were allocated to the transmitted job. Transmission of jobs through ACF/VTAM links is logically direct to the execution node.

At each JES2 node, appropriate accounting information is collected and produced for local accounting. In addition, network accounting number support is provided by JES2 NJE. This permits accounting numbers to be assigned across the network and provides initialization parameters, conversion tables and routines and user exits to convert local accounting numbers to network accounting numbers and vice versa. All accounting information is produced through standard System Management Facilities (SMF) in JES2 nodes.

**NETWORK PATH MANAGER:** A network path manager running in each JES2 processor in the job network interfaces with JES2 and the multi-access spool facility to communicate with all other network path managers. The network path managers control the routing of data through the network by providing best-path and alternate-path information to other NJE components. No single node is designated as a network manager; any subset of an NJE network can function entirely on its own.

### JES3 COMPONENT DESCRIPTION

**JOB ENTRY SUBSYSTEM 3 - JES3:** The JES3 component of MVS/SP-JES3 is designed to improve the operational environment of the computer installation by aiding many of the operator functions. JES3 can improve installation workload scheduling, increase the workload capacity, and reduce turnaround time. JES3 provides a single system image for the execution of many jobs concurrently on the connected processors.

JES3 can support up to eight JES3 processors, any of which can be a tightly coupled multiprocessor, operating under the control of MVS/SP-JES3. A JES3 configuration consists of a global processor that controls all job input and output, and the scheduling of time sharing users, batch jobs and, optionally, devices. One to seven additional JES3 processors, called JES3 local processors, can be connected to the JES3 global processor. Each processor is attached to the JES3 global processor by a channel-to-channel (CTC) adapter which is used to communicate control information. The JES3 global processor handles all SYSIN and SYSOUT data to and from peripheral devices.

JES3 design and the shared spool concept help to improve the overall complex availability by permitting any JES3 local processor, if properly configured, to assume JES3 global functions. Should the JES3 global processor fail in a loosely coupled configuration, the operator can move the JES3 global function to any properly configured JES3 local processor. The degree of this availability depends on the presence of appropriate alternate CTC paths and switchable peripheral devices.

As the installation workload grows, capacity can be increased by increasing the size of processors, by using multiprocessor configurations, and/or by adding additional JES3 local processors, operating under the control of MVS/SP-JES3. JES3 enables such expansion with minimal disruption to the operational environment. Jobs are distributed to available processors depending on job priority, device

requirements, user specification, and processor dependencies. (A processor dependency is an attribute of a job that requires it to execute on a specific JES3 processor. For example, if a job uses a device that is attached to only one processor, then the job has a processor dependency and must execute on the processor that can access the device.)

Remote job processing from binary synchronous communications (BSC) and systems network architecture (SNA) terminals is supported. JES3 also provides multiprogrammed background utilities which the operator can invoke.

### SOME OF THE FEATURES OF JES3 ARE:

- Single operator interface to the entire system.
- Complex-wide data set integrity.
- Job Networking (BSC).
- Automatic scheduling of interdependent jobs (dependent job control).
- Optional auxiliary address space to reduce CSA requirements.
- Generalized peripheral scheduling and improved output service that includes related INQUIRY/MODIFY processing.
- Performance features, for example:
  - Ordered seek I/O queuing
  - SIO drivers for RJP, CTCs, spool and printers
  - Unserialized path for allocation
  - VTAM authorized path
  - Main store resident control blocks
- Optional invocation of JES3 writer processing as a separate JES3 task in the JES3 address space. This provides more utilization of IBM's tightly coupled processors.
- Extensive RAS capability, for example:
  - Functional recovery routines
  - ESTAE recovery routines
  - Alternate Path Channel-to-channel (ACTC)
  - Dynamic system interchange
  - Spool I/O error recovery, partitioning and RAS support
  - HOTSTART of JES3 address space with or without an IPL WARMSTART of JES3 system
- Facilities to help prevent and recover from JES3 out of storage conditions.
- Automatic scheduling of up to seven attached local processors (including multiprocessors).
- Centralized console service with message suppression.
- Logical device grouping with consoles defined for the group.
- Installation-specified, operator-controlled job selection algorithms for scheduling local processors.
- Numerous user exits.
- Deadline scheduling.
- Simulated console support for non-programmable remote terminals (2770, 2780, 3780).
- Multitasking of the Converter/Interpreter and locates.
- Checkpoint/Restart support for jobs.
- SMF support.
- Early JCL diagnosis through JES3's use of the VS2 Converter and Interpreter.
- Support of TSO Foreground Initiated Background functions.

**JOB NETWORKING:** This facility provides for the transmission of selected jobs, in-stream data sets, operator commands and messages, system output data sets and job accounting information from one computer complex to another across binary synchronous telecommunications facilities or channel-to-channel adapters. The use of standard interface protocols enables communication among similar and dissimilar operating systems such as MVS/SP-JES3, MVS/SP-JES2 and VM/SP and the RSCS Networking licensed program. Routing from the originating network node to the destination node is controlled by a routing table at each node in the path. Strings of duplicated characters are compressed into shorter representations, reducing data flow between nodes. Operator commands permit manual intervention to control the network. JES3 Networking utilizes the security functions normally in effect at each node.

### REMOTE JOB PROCESSING (RJP)

**BINARY SYNCHRONOUS COMMUNICATION (BSC):** JES3 Remote Job Processing (RJP) permits the input, processing and output of jobs to and from terminals remote from the installation. This function is achieved through the use of the 3704 or 3705 Communications Controller (emulator mode), or the 2701 Data Adapter interface with binary synchronous communication (BSC) terminals. BSC remote terminals are used as remote card readers, printers and card punches, with job output routed optionally to any remote terminal or local output device.

For more detailed information related to JES3 BSC RJP, see *Introduction to JES3* (GC28-0607).

**SYNCHRONOUS DATA LINK CONTROL (SDLC):** JES3 SNA RJP provides JES3 remote job processing support for SNA terminals in a terminal-sharing environment where multiple applications may establish logical connections with the terminal on a per-session basis. To achieve this flexibility of terminal-sharing, JES3 uses the VTAM

**MVS/SP-JES2 V2.1, MVS/SP-JES3 V2.1 (cont'd)**

application program interface for the support of the SDLC terminals which are attached to a 3704/3705 in network control mode.

SDLC job entry stations supported by JES3 are the 8100 Information System under DPPX or DPPX/SP, the 8100/DPCX Information System, the 5280 Distributed Data System, the 3790 Communication System and the 3770 Data Communication System (except for the 3773 mdls P1, P2 and P3, all SDLC models are supported). Multiple Logical Unit (MLU) 3776 mdls 3, 4 and 3777 mdls 3, 4 with up to six independent and concurrent sessions are supported. Also supported are the 3262 Line Printer mdls 2, 12, the 3784 Line Printer, the 3203 Printer mdl 3, the 3521 Card Punch, the 3501 Card Reader, and the 2502 Card Reader when attached to a 3770. In addition, JES3 supports the 6670 Information Distributor (SNA version) through the MVS/Information Distribution Workstation Support licensed program (5740-AMA). The 3790 Communication System and 8100/DPCX Information System support a single RJE workstation which can handle up to five logical concurrent processing sessions with JES3.

Functional characteristics of the JES3 SNA RJP support for SDLC terminals are as follows:

- Half duplex session flow.
- Multidrop operation.
- 3770 diskette, 8100/DPPX or 8100/DPPX/SP disk operations, 8100/DPCX disk operations, and 3790 disk operations are transparent to JES3.
- Data stream provides compression of repeated characters outbound to the 8100 Information System under DPPX with DPPX/RJE or under DPPX/SP with DPPX/SP/RJE, the 3790 Communication System, the 8100/DPCX Information System, and to the 3770 Data Communication System.
- Data compaction is supported outbound to the 8100 Information System under DPPX with DPPX/RJE or under DPPX/SP with DPPX/SP/RJE, the 3790 Communication System, the 3776 mdls 3 and 4, the 3777 mdls 1, 3 and 4 of the 3770 Data Communication System, and the 8100/DPCX Information System.
- Single or multiple LUs (allowing multiple sessions) in a job entry station.
- Provides device setup for the 3790, the 8100 Information System under DPPX with DPPX/RJE or under DPPX/SP with DPPX/SP/RJE, and 8100/DPCX by use of the Peripheral Data Stream Information Record (PDIR).

**JES3 JOB MANAGEMENT**

**INPUT SERVICE:** Input Service consists of two phases, each consisting of several non-resident modules:

- **READER PHASE:** Jobs are read from an input device and placed on a spool in batches.
- **CONTROL STATEMENT PROCESSING PHASE:** Jobs are read from the spool and processed.

**INTERPRETER SERVICE:** Interpreter service converts JCL statements to scheduler control blocks (SCBs) for use by the scheduler component. It also determines resource requirements and creates control blocks for use by JES3 main device scheduler (MDS) function. Every job must pass through the interpreter service before it can be scheduled for execution. This service comprises primarily the converter/interpreter (CI) dynamic support programs (DSPs).

The critical option in creating MDS control blocks is choosing the type of setup for JES3-managed devices. The setup options available with JES3 are:

1. **JOB SETUP:** The interpreter assigns each unique volume used throughout the job to a separate device, except where JCL explicitly indicates otherwise. This type of setup generally improves job turnaround at the expense of efficient device usage.
2. **HIGH WATERMARK SETUP:** The interpreter assigns a number of mountable devices (discounting permanently resident or reserved volumes) of each device type equal to the maximum number of volumes required in any single job step, unless the JCL explicitly indicates otherwise. This type of setup makes efficient use of devices, but may slow job turnaround due to dismounting and mounting of volumes.
3. **EXPLICIT SETUP:** The programmer specifies in a JES3 control statement which DD statements are (and which are not) to be setup.

The entire MDS function is optional, and additionally, the automatic setup options (job and high watermark) are separately selectable for DASD, tape and MSS virtual devices. These options are supplied as an installation default and can be overridden by JES3 control statements.

**DATA RESOURCE MANAGEMENT:** The main device scheduler (MDS) is a JES3 facility that controls the setup of resources (devices, volumes and data sets) associated with job execution on a processor. MDS services consist of volume fetching, allocation of data resources, volume mounting and verification, and deallocation of data resources. MDS services are part of the main scheduler element in normal job processing. Once a job is in execution, MDS services can also be invoked to process dynamic allocation requests.

**VOLUME FETCHING:** MDS determines a job's requirements for mountable volumes and issues operator messages to a tape or DASD library, requesting that the required volumes be 'fetched' to the computer area. As an installation option, after the issuing of these messages, MDS will either make the job immediately eligible for data resource allocation, or will wait for operator 'go ahead' that the required volumes are available.

**DATA RESOURCE ALLOCATION:** Data resource allocation facilities fall into three overlapping categories: (1) Selection of a job relative to other jobs competing for resources; (2) selection of an eligible processor on which to attempt allocation; (3) assignment of devices, volumes and data sets to the selected job.

**SELECTING A JOB:** In general, jobs are considered for data resource allocation in priority order. The first job that can acquire data resources on an eligible processor will be granted those resources.

**SELECTING A PROCESSOR:** This choice of a 'setup' processor does not restrict the eligibility of that job to run on only that processor. In allocating devices, preference is given to devices that are shared by other processors eligible to execute the job. If all devices allocated to the job are shared by another processor, that processor also remains eligible to run the job.

**ALLOCATING DATA SETS, VOLUMES AND DEVICES:** JES3 provides data set integrity protection across processors in the JES3 complex in accordance with the JCL-specified data set disposition and dynamic allocation. This means that a job which holds exclusive access to a data set will prevent other jobs from allocating successfully.

MDS keeps track of the volume currently mounted on each device to minimize volume movement and attempts to satisfy further requests for the volume on the device where it is already mounted. MDS supports dynamic device reconfiguration (DDR) through the subsystem interface for JES3-managed tape and disk drives.

**VOLUME MOUNTING AND VERIFICATION:** Once all required resources have been assigned to a job, MDS issues 'mount' messages, requesting that the operator mount the first required volume on a specified device. MDS then verifies that each volume has been correctly mounted by reading its volume label.

Once all required volumes for a job have been mounted and verified, the job is passed to the generalized main scheduler (GMS) for execution processing selection.

**JES3 3850 MSS FEATURES INCLUDE:** Allocation to mounted volumes for non-specific requests for new, non-VSAM data sets.

Access to Mass Storage Volumes can be shared by all JES3 system processors physically connected to the same 3850.

Virtual units may be partitioned (fenced) for use by specific job class groups or dependent job networks.

Data reuse is encouraged (without access to 3850 controller tables).

JES3 algorithms attempt to equalize the amount of staging/destaging activity across Staging Drive Groups.

Multiple 3850s can be supported in a JES3 loosely coupled processor configuration, where each 3850 is attached to a separate host (as previously announced, one operating system can only be attached to one MSS).

**DEALLOCATION OF DATA RESOURCES:** During job execution, MDS or DYNAL is notified, as each step completes, to deallocate resources that are not required by subsequent steps of the job (early resource release). Data resources may also be returned in the midst of job step execution via the dynamic deallocation subsystem interface. Tape volumes used by a job can be optionally made available to other jobs at the end of volume. Finally, any resources still held at job end are released at that time. In all cases, returned resources immediately become available for assignment to other jobs.

**JOB SCHEDULING:** JES3 functions as a resource manager and job scheduler. The scheduling and selection of jobs for execution are major functions of the job entry subsystem. JES3 provides a unique set of these functions that are especially designed for a loosely coupled environment. These functions are generalized main scheduling, which determines which jobs should be scheduled to execute on a processor; deadline scheduling, increasing the priority of a job when it has been scheduled to make the best use of the available resources; and dependent job control which allows jobs to be executed in a specified order.

Selection of a job for a processor is based on the capacity of that processor to provide sufficient resources. JES3 supports pooled devices among processors to further control job/processor selection.

**GENERALIZED MAIN SCHEDULING:** Jobs are selected for execution by the generalized main scheduling (GMS) facility of JES3. Initialization parameters define the characteristics of each processor, job-selection mode criteria, and jobs categorized by class.

GMS uses the priority parameters specified at initialization to help select jobs for execution. The hierarchy of priorities is:

PROGRAM PRODUCTS

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1. Processor priority (dynamic)
2. Job Class priority.

The priority aging feature allows JES3 to increase the priority of a job after it has been passed over for selection by JES3 an installation-specified number of times, because of a low priority relative to that of other jobs in the system. At an installation-specified priority barrier, JES3 will attempt to prevent lower priority jobs from capturing idle resources if they are known to be needed by a job at or above the barrier priority.

**DEADLINE SCHEDULING:** Deadline scheduling provides job scheduling algorithms that increase the probability of a job being scheduled by a specific time. The job's selection priority may be dynamically incremented as the job approaches its deadline for entering execution.

The deadline scheduling feature allows the installation to specify a time of day by which the job should be scheduled. If the job is not scheduled by this time, JES3 will increase the priority of the job at user-defined intervals until it is scheduled.

**DEPENDENT JOB CONTROL:** Dependent Job Control (DJC) allows jobs to be executed in a specific order. DJC is a function within the JES3 system that manages jobs that are dependent upon each other. Job dependencies may occur because of data dependencies; they may be defined so as to achieve better device utilization; or they may be defined so as to manage job streams.

**CONSOLES SUPPORTED - JES3 IN MVS/XA ENVIRONMENT:** The following consoles are supported by JES3 in an MVS/XA environment:

**Input/Output Consoles**  
 2250 mdl 3  
 3277 mdl 2  
 3278 mdls 2, -2A, -3, -4, -5  
 3279 mdls 2A, -2B, -3A, -3B

**Output only Consoles**  
 1403  
 3203 mdl 5  
 3211  
 3284 mdls 1, -2, -3  
 3286 mdls 1, -2  
 3287 (Supported as a 3284 mdl 3)  
 3288 mdl 2  
 3289 mdls 1, -2  
 3262 mdl 5 (supported as a 4248)  
 4245 mdl 1  
 4248 mdl 1

**Remote Console**  
 2740

**RAS TOOLS - SERVICE AIDS**

**GENERALIZED TRACE FACILITY (GTF):** GTF is a component of MVS/SP V2. It is a service aid program that assists users in performing problem determination and diagnosis by tracing system events, user events, or both.

GTF is a system service that can be optionally started from an operator console. It executes as a system task in its own address space. When GTF is started, the user has the option of tracing internally in the GTF region or externally to a data set on an auxiliary device. The GTF output is trace records of any combination of:

- System events
- Specific incidences of one type of system event
- Defined events

The EDIT control statement of the AMDPRDMP service aid program provides the user with a selective data reduction capability for the trace data set and formats GTF trace records from a storage dump produced by STAND ALONE DUMP or the SYS1.DUMP data set. It runs as a problem program and can be invoked via JCL.

**SYSTEM TRACE:** The System Trace supported in MVS/SP V2 assists in the determination of system problems by providing an on-going record in main storage of significant software events. This trace replaces the System Trace available in earlier systems. The new trace utilizes the trace facilities available on the IBM processors operating in S/370 Extended Architecture mode. There are three types of entries in the trace table:

- Branch tracing (e.g., successful BALR, BASR, and BASSM instructions).
- Address Space ID tracing (execution of PROGRAM CALL, PROGRAM TRANSFER and SET SECONDARY ASID).
- Explicit software-initiated tracing of significant software events such as normal system interrupt and dispatch events (through execution of the TRACE instruction which creates an entry in the trace table).

The new system trace table consists of a queue of trace buffers per processor. These queues of trace buffers are maintained in a separate address space.

The MVS/SP V2 support consists of routines to initialize, manage and format the trace table. Support is also provided for the new tracing instruction to place explicit entries in the trace table. The TRACE ST operator command provides operational control of tracing. Through this command, the operator can start or stop tracing, specify trace table size, and activate the branch tracing option.

Turning the tracing on or off activates or deactivates explicit and ASID tracing. Branch tracing can be activated only if tracing is already on.

New facilities are provided to merge and format the trace table entries during dump formatting. The TRACE control statement of the AMDPRDMP service aid program provides the user with a selective data reduction capability.

**AMASPZAP:** This service aid program assists authorized personnel to:

- Inspect and modify instructions and data in any load module that exists as a member of a partitioned data set.
- Inspect and modify data in a specific data record that exists in a direct access data set.
- Dump an entire data set, a specific member of a partitioned data set, or any portion of a data set residing on a direct access device.

**AMDSADMP:** This service aid is a macro instruction that allows the user to generate a stand-alone dump program that is specifically tailored to his needs. AMDSADMP can generate two types of dump programs: One high-speed, the other low-speed. The high-speed version can write the control registers, contents of real storage, and selected portions of paged out storage onto a tape volume in machine readable format. The low-speed version can write the control registers and the contents of real storage to a printer or tape volume in unblocked, printable format.

**AMDPRDMP:** This service aid program formats and prints dump data sets produced by AMDSADMP and other system programs. The dump data sets may contain dumped real or virtual storage.

Selective printing and formatting of the dump data sets is completely controlled by the user of AMDPRDMP via control statements.

The FORMAT control statement (with no operands) will now format only the control blocks for the current address spaces and those address spaces that are in error. The readability of the output from the SUMMARY control statement has been enhanced.

The user may use this information to determine what further formatting is required and proceed to get the required formatting by selecting the proper AMDPRDMP control statements.

An interface is provided whereby the user may write formatting modules to do additional (user-tailored) formatting during AMDPRDMP execution.

**ONLINE TEST EXECUTIVE PROGRAM - (OLTEP)**

**Note:** OLTEP is Class 2 System Control Program (SCP). A brief introduction is included with the RAS TOOLS - SERVICE AIDS information because it is expected that OLTEP will be utilized in an MVS/XA environment. A copy of this program will be supplied with MVS/SP V2.

The Online Test Executive Program (OLTEP) is a function designed to direct the selection, loading, and execution of the Online Test sections (OLTs) within the MVS/System Product V2 environment.

OLTEP with the related OLTs is designed to allow the testing of Input/Output Hardware components of a system, concurrent with the running of customer jobs.

The OLTEP/OLT system is designed for: Providing an interface with RETAIN/370 ... Diagnosing I/O errors ... Verifying I/O hardware repairs and Engineering Changes ... Exercising a device requiring dynamic adjustments ... Checking I/O hardware ... Preserving integrity of customer data while testing.

As a job under MVS/SP V2, it is called by standard Job Control Language and is under the control of the operating system at all times. It uses the facilities of MVS/SP V2 to accomplish the testing and competes with other jobs in the system for use of these facilities when running in a multiprogramming environment.

Definition of test to be run can be entered via console or non-console devices. FieldEngineering supplies the OLTs and device configuration information to the customer on magnetic tape or cards. The Field Engineer reformats and link edits the OLTs into a partitioned data set so that they can be used under the operating system. Device configuration information is required for each device to be tested by OLTEP/OLTs.

The OLTEP interface to RETAIN/370 provides the ability to transfer Diagnostic Test results to the RETAIN/370 center and allows the RETAIN/370 center to modify Diagnostic Test requests and options. The RETAIN/370 interface is provided in OLTEP via the console.

OLTEP must normally be executed as a V=R job. The Logout Analysis program operates in virtual storage. Since use of OLTEP is now restricted by APF, all OLTEP programs must be online in protected system libraries.



**MVS/SP-JES2 V2.1, MVS/SP-JES3 V2.1 (cont'd)**

OLTEP must normally be executed in a minimum of 76K bytes. The logout analysis program will operate in the paged virtual storage.

**SPECIFIED OPERATING ENVIRONMENT**

**HARDWARE REQUIREMENTS**

MVS/System Product Version 2 Release 1.1 is designed to operate on IBM processors operating in IBM S/370 Extended Architecture mode.

**SOFTWARE REQUIREMENTS**

MVS/System Product Version 2 Release 1.1 is designed to be installed on an MVS Release 3.8-based system. MVS/System Product Version 2 Release 1.0 is a prerequisite and the Data Facility Product (DFP) (5665-284) Release 1.1 is a co-requisite. (DFP Release 1.0 is a prerequisite for DFP Release 1.1.)

See the section "Installation Considerations" for additional information.

**PLANNING INFORMATION**

**MIGRATION**

In order to facilitate the migration to MVS/XA, IBM has authorized the use of the components and macros (migration aids) listed below on a processor running MVS/370 in a location\* where MVS/SP Version 2 and DFP are licensed. Use of these migration aids is permitted on another processor running MVS/SP Version 1 Releases 3.0, 3.1, 3.2, or 3.3 in the location for a period of 18 months after shipment from IBM of the first MVS/SP Version 2 and DFP program products for that location.

- Linkage editor provided with DFP
- MVS/SP Version 2 IPCS
- MVS/SP Version 2 AMDPRDMP
- MVS/XA SYS1.MACLIB

Procedures for adding this linkage editor to an MVS/370 system will be provided in the DFP program directory. A jobstream will be provided with MVS/SP Version 2 Release 1.0 to create a library with IPCS and AMDPRDMP modules for use with MVS/370 systems.

These procedures will also update the MVS/SP Version 2 control data set and ensure that service applied by SMP to the MVS/SP Version 2 libraries will be applied to the libraries created for use with the MVS/370 system. Therefore, maintenance will be synchronized.

**PRODUCT CLASSIFICATION**

This product contains "restricted availability" material. On receipt of the product, material marked "Restricted information of IBM" must be kept in accordance with the terms and conditions outlined in the IBM Program Product license agreement.

**COMPATIBILITY AND CO-EXISTENCE**

Compatibility has been maintained between MVS/SP V2 and MVS/SP V1 R3 for user-written programs. With minor exceptions, programs that use published external interfaces<sup>1</sup> will continue to execute on MVS/SP V2. Details are included in the section titled "Source/Object Compatibility".

JCL and user data set formats are completely compatible between MVS/SP V2 and MVS/SP V1 R3. In addition, most of the operator messages and commands are unchanged.

MVS/SP V1 R3 SYSGEN decks and I/O Configuration Program (IOCP) decks can be used unchanged with MVS/SP V2. To take advantage of new functions in MVS/SP V2 however, some changes may be desirable.

Any installation performance specification (IPS) that is compatible with MVS/SP V1 R3 can also be used unchanged with MVS/SP V2. As always, the IPS should be reviewed to ensure that optimum tuning is achieved. Some changes to take advantage of new functions in MVS/SP V2 may be desirable.

Programs that use system-generated records (e.g., LOGREC, GTF, SMF records) should be evaluated for compatibility. New record types have been defined for LOGREC, GTF and SMF, and in some cases record formats have changed.

If the installation chooses to use new SMF data for accounting, the installation may have to change accounting procedures after MVS/SP V2 is installed. Installation procedures that account for virtual storage usage may need to be changed; some system control blocks that reside in the private area have been moved to extended virtual storage, and

**Note 1:** In the context of this information, published external interfaces refers to information in the following IBM SRLs:

*OS/VS2 MVS JCL* (GC28-0692) *OS/VS2 Supervisor Services and Macros* (GC28-1114) ... *OS/VS2 TSO Command Language Reference* (GC28-0646) ... *OS/VS2 Guide to Writing a Command Processor or Terminal Monitor Program* (GC28-0648) ... *OS/VS2 Data Management Macro Instructions* (GC26-3873) ... *OS/VS2 Access Method Services* (GC26-3841) ... *OS/VS Virtual Storage Access Method VSAM) Programmers Guide* (GC26-3838).

therefore, most programs will reflect a corresponding change in private area, virtual storage size. SMF collects additional information on virtual storage usage both above and below 16 megabytes. Installations may want to take this information into account as users begin to implement programs that use storage above 16 megabytes.

**PROGRAM COMPATIBILITY USING 24-BIT ADDRESSING MODE AND 31-BIT ADDRESSING MODE:** Compatibility for MVS/370 problem programs is maintained in MVS/SP V2 by using the dual addressing mode capability of the S/370 Extended Architecture, which allows programs to run in either 24-bit addressing mode or 31-bit addressing mode. In 24-bit addressing mode, S/370 addressing architecture is applied. Only the low-order 24 bits of a word are used to address storage; the high-order eight bits are ignored. In 31-bit addressing mode, all but the high order bit of a word are used to address storage. For some instructions the high order bit of a word is used to indicate and save addressing mode.

In the absence of any address mode specification, MVS/SP V2 will default programs to 24-bit addressing mode. Programs will be loaded into the assigned address space in the area that is addressable with 24-bit addresses.

**SOURCE/OBJECT COMPATIBILITY**

**PROBLEM-STATE PROGRAMS** that execute on MVS/SP V1 R3 will continue to execute on MVS/SP V2 with the following exceptions:

- The SVC 33 interface has been modified for MVS/SP V2. PTFs are available on MVS/SP V1 and OS/VS2 MVS Release 3.8 for the IOHALT macro which generates the SVC 33 interface. With this PTF, the SVC 33 interface for MVS/SP V1 and OS/VS2 MVS Release 3.8 is made compatible with MVS/SP V2, and programs may be re-assembled prior to migration to MVS/SP V2.
- The STOP.SYNCH option of the STATUS macro is no longer supported.
- With MVS/SP V2, when a program completes, any SPIE environments created by the program are deleted. This may create an incompatibility for MVS/SP V1 R3 programs which depend on the SPIE environment remaining in effect. Details will be supplied at general availability.

Programs that interrogate system control blocks or depend on internal system structure may require modifications. Detailed information concerning changes can be found in the *MVS/Extended Architecture Conversion Notebook* (GC28-1143).

**SOURCE CODE COMPATIBILITY** is maintained between MVS/SP V1 R3 and MVS/SP V2 for published external interfaces. There are a set of macros which have two levels of expansion, an MVS/SP V1 R3 level and an MVS/SP V2 level. Detailed information concerning this can be found in the *MVS/Extended Architecture Conversion Notebook* (GC28-1143).

**DEVICE SUPPORT:** The devices supported by MVS/SP V2 are the same as those supported by MVS/SP V1 R3.0 with the exception that MVS/SP V2 does not support the following devices. For completeness, the following list includes devices not supported because they cannot be attached to the IBM processors operating in S/370 Extended Architecture mode.

Device	Control Unit
• Disk, Fixed Head Storage Module: 2305 model I Fixed Head Storage Module	2775
2314 Disk Storage	2314, 2844
2319 Disk Storage	2314
• Magnetic Tape: 2401 Magnetic Tape	2803, 2804
2402 Magnetic Tape	2803, 2804
2403 Magnetic Tape	2803, 2804
2404 Magnetic Tape	2803, 2804
2420 Magnetic Tape	2803
3410/3411 Magnetic Tape	
• Card I/O and Printers: 1053 mdl 4	2848
1443 N01 Printer	
2520 Card Reader/Punch	
• Cartridge Readers: 2495 Magnetic Tape Cartridge Reader	
• Transmission Controllers: 2702 Transmission Control	
2703 Transmission Control	
2715 Transmission Control	
• OCR/MICR: 1287 Optical Reader	
1288 Optical Page Reader	
1419 MICR Reader/Sorter	
3886 Optical Character Reader	
3895 Document Reader/Inscriber	

PROGRAM PRODUCTS

**MVS/SP-JES2 V2.1, MVS/SP-JES3 V2.1 (cont'd)**

- **Consoles:**  
 1052-7 Console-Printer/Keyboard (2150 Control Unit)  
 2150 Console  
 2250 mdl 1  
 3210 Console-Printer/Keyboard  
 3213 Console-Printer  
 3215 Console-Printer/Keyboard
- **Systems:**  
 1060 Data Communications System                    1061  
 2790 Data Communications System                    2715  
 (local)  
 3670 Brokerage Branch Office System
- **Other:**  
 2816 Tape Switch Unit                                    2803  
 3540 Diskette Input/Output unit  
 7770 Audio Response Unit

**CO-EXISTENCE OF MVS/SP V2 AND MVS/SP V1  
 IN MULTI-SYSTEM ENVIRONMENTS**

IBM anticipates that many customers will have both MVS/370 and MVS/XA systems in the same data center. Therefore, co-existence in a loosely coupled environment between these systems is important. The following considerations apply.

- **JES2**  
 Coexistence in a Multi-Access Spool environment can only occur between processors using the same level of the JES2 component. The level of JES2 shipped in MVS/SP-JES2 1.3.0, 1.3.1, and 1.3.2 and MVS/SP-JES2 2.1.0 is the same level, and will work in both an MVS/370 and an MVS/XA environment. Also, the level of JES2 shipped with MVS/SP-JES2 1.3.3 and MVS/SP-JES2 2.1.1 is the same level, and will work in both an MVS/370 and an MVS/XA environment.

- **JES3**  
 Coexistence in a loosely-coupled JES3 complex can only occur between processors using the same level of the JES3 component. The level of JES3 shipped in MVS/SP-JES3 1.3.1, 1.3.2, 1.3.3, and MVS/SP-JES3 2.1.0 and 2.1.1 is the same level and will work in both an MVS/370 and MVS/XA environment.

- **Data sharing with Global Resource Serialization**  
 The Global Resource Serialization component of MVS/SP 2.1.1 is both upward and downward compatible with respect to data sharing. That is, data may be shared between systems running MVS/SP 2.1.1 and systems running either MVS/SP 2.1.0, or MVS/SP Version 1 Release 3 at all Modification Levels.

The Reserve/DEQ (dequeue) functions may also be used between MVS/370 and MVS/XA systems.

- **MSS**  
 The MSS may be shared between MVS/370 and MVS/XA. MSSE with the MVS/XA Facility is required on the MVS/XA system.

**VIRTUAL STORAGE CONSIDERATIONS**

MVS/SP V2 provides a base for eliminating virtual storage constraint. By moving system programs and data areas above 16 megabytes MVS/SP V2 makes more system or private area virtual storage below 16 megabytes available to other subsystems and new applications, or for current application growth. System programs and data areas have been moved from the nucleus, PLPA, SQA and LSQA. In addition, as users start to implement programs which utilize 31-bit virtual addresses, those programs will not be constrained by the 16 megabyte virtual storage limit.

With MVS/SP 2.1.0, the base control program (BCP) is providing the following reductions in the use of virtual storage below 16 megabytes:

- A significant amount of nucleus code and portions of PLPA are moved above 16 megabytes, yielding a projected savings of approximately 1.3-1.6 megabytes.
- Additional savings of 4K bytes per megabyte of configured real storage are realized by relocating the page frame table above the first 16 megabytes of virtual storage. For example, on a 32 megabyte system, 128K bytes of virtual storage savings will be realized.
- Further savings are achieved by moving many control blocks and data areas residing in SQA and LSQA to areas above 16 megabytes. The amount of savings realized in this area is heavily dependent on the installation's environment and is therefore variable.

**MVS/SP 2.1.1** Approximately 400K bytes of system modules and data areas have been moved from the virtual storage area below 16 megabytes, to the area above the first 16 megabytes.

This constraint relief was achieved by modifying the Allocation component and portions of the Scheduler Work Area manager to

execute in the address range above 16 megabytes. In addition, the creation of a new SMF address space has allowed removal of the SMF buffers from common storage making additional virtual storage below 16 megabytes available to system and user applications. For each SMF buffer defined by the installation, 4,096 bytes are removed from Common storage and reside in the private area of the new SMF address space.

The virtual storage constraint relief in MVS/SP 2.1.1 is in addition to that in MVS/SP 2.1.0.

The total amount of virtual storage savings below 16 megabytes that an installation may realize is dependent upon many environmental factors, such as hardware configuration, type of workload, and other software products installed. Therefore, no assurance can be given that an individual installation will achieve the projected savings or a specified minimum amount of savings.

The segment boundary between the common area and the private area is a megabyte boundary on MVS/XA. This causes a 'rounding' of the common area to a full megabyte. For example, if the nucleus, LPA, SQA, and CSA areas require 8.5 megabytes below 16 megabytes, MVS/SP V2 will set aside an additional half-megabyte in the common area in order to 'round-up' this area to a full megabyte boundary, (i.e., 9 megabytes). It is therefore important that the installation take care when selecting sizes for LPA, SQA, and CSA at system initialization, so as to optimize the use of virtual storage. The virtual storage savings enumerated above do not take this common area rounding into consideration.

**INSTALLATION CONSIDERATIONS**

**MVS/SP 2.1.1**

MVS/SP 2.1.1 must be installed, with its co-requisite licensed program, Data Facility Product (DFP) Release 1.1 (5665-284), on distribution libraries which are at MVS/SP 2.1.0 level.

The following items are required for installation and maintenance:

- System Maintenance Program (SMP) -- either:
  - System Maintenance Program (SMP) Release 4. The maintenance level of this program which is current at the time of availability must be installed, or,
  - System Maintenance Program/Extended (SMP/E) (5668-949) licensed program.
- Assembler H Version 2 licensed program.
- The Linkage Editor which is available with the Data Facility Product licensed program must be used to perform SYSGEN and to apply maintenance.

A SYSGEN is not required for MVS/SP 2.1.1. Review the description of the co-requisite licensed program (MVS/XA DFP 1.1) for cases where a SYSGEN is required.

**MVS/SP 2.1.1 - JES2 Installation Considerations:** The JES2 component of MVS/SP-JES2 2.1.1 is functionally equivalent to the JES2 component of MVS/SP-JES2 1.3.3. Customers currently at that level of JES2 need not re-install it. However, if the customer wishes to remain at that level of JES2 in an MVS/XA environment, the MVS/SP 2.1.1 level of the Base Control Program must be installed.

MVS/SP-JES2 2.1.1 requires a JES2 cold start.

The Base Control Program in MVS/SP 2.1.1 is compatible with the level of JES2 which was shipped with MVS/SP-JES2 2.1.0 and MVS/SP-JES2 1.3.0. Thus, customers at that level of JES2 may install the new function in the Base Control Program of MVS/SP 2.1.1, without changing their JES2 component.

**MVS/SP 2.1.1 - JES3 Installation Considerations:** The JES3 component of MVS/SP-JES3 2.1.1 is functionally equivalent to the JES3 component of MVS/SP-JES3 2.1.0. (The same level of JES3 was also shipped with MVS/SP-JES3 1.3.1, 1.3.2, and 1.3.3). Customers currently at that level of JES3 need not re-install it. Thus, customers may install the new function in the Base Control Program of MVS/SP 2.1.1, without changing their JES3 component. This level of JES3 component is the only level which operates in an MVS/SP V2 environment.

**MVS/SP 2.1.0**

MVS/SP V2 must be installed, with its co-requisite product Data Facility Product (DFP) Release 1.0 (5665-284) licensed program on distribution libraries which are at a minimum at OS/VS2 MVS Release 3.8 level.

The Input/Output Configuration Program (IOCP) must be executed and a SYSGEN must be performed to obtain an operational MVS/XA system.

The distribution libraries on which the installation is performed may be the user's current OS/VS2 MVS Release 3.8 distribution libraries, or the latest version of OS/VS2 MVS Release 3.8 obtainable from PID.

PROGRAM PRODUCTS

**MVS/SP-JES2 V2.1, MVS/SP-JES3 V2.1 (cont'd)**

Installation, SYSGEN, and subsequent maintenance may be performed under the control of a supported MVS/370 Release or MVS/SP V2 System.

Assembler H Version 2 must be installed on the operational system that will control the installation, SYSGEN and subsequent maintenance of MVS/SP V2. See information above concerning programs required for installation and maintenance.

In addition, if installation, SYSGEN and maintenance are performed under the control of MVS/370, the SYSGEN must be performed by a system with the linkage editor available with DFP installed.

MVS/SP V2 replaces and, therefore, completely deletes the BCP portion of OS/VS2 MVS Release 3.8. The CDS and ACDS for the BCP is zeroed and therefore any of the following offerings that were installed will also be deleted from the installation's distribution libraries.

- MVS Processor Support 2 selectable unit (5752-VS2)
- MVS/System Extensions program product (5740-XE1)
- MVS/System Product Version 1 (5740-XYS and 5740-XYN) (BCP Component)
- TSO Command Package (Selectable Unit 11) (5740-XT6)
- TSO Extensions for MVS/370 (5665-285)
- Measurement Facility 1 (MF1)
- Display Exception Monitoring Facility (DEMF)

MVS/SP V2 contains all of the TSO functions available in OS/VS2 MVS Release 3.8 with the exception of TSO TEST. The TSO Extensions for MVS/XA must be installed to obtain TSO TEST functions. Significant modifications have been made to TSO TEST to allow the testing of problem state programs which execute and reference data areas using 31-bit addresses.

**MVS/SP 2.1.0 - JES2 Installation Considerations:** The JES2 component supplied with MVS/SP 2.1.0 is functionally equivalent to the JES2 component supplied with MVS/SP 1.3.0.

**MVS/SP 2.1.0 - JES3 Installation Considerations:** The JES3 component supplied with MVS/SP 2.1.0 is functionally equivalent to the JES3 component supplied with MVS/SP 1.3.1.

**SYSTEM CONFIGURATION CONSIDERATIONS**

MVS/SP V2 executes in environments which provide:

- IBM processor operating in S/370 Extended Architecture mode.
- Main storage requirement - the following areas of main storage are required (each item is a separate (additional) requirement):
  - A 256K block of contiguous error free area so that NIP can be loaded (and complete its execution).
  - 8K contiguous error free area for the DAT-off Nucleus.
  - Two contiguous error free frames (4K each) for each segment table.
  - I/O measurements require a block containing 32 bytes for each generated tape and DASD device and for each additional device being measured by RMF. The optional Channel Measurement Block (CMB) system parameter specifies which device classes, in addition to tape and DASD, RMF is to measure. Execution may continue with possibly degraded system performance if the space is not available for at least the tape and DASD entries.
- Software configuration: Data Facility Product (DFP) is a corequisite.
- Minimum I/O configuration: In addition to requirements for operational maintainability of the IBM processors operating in S/370 Extended Architecture mode (see below) and sufficient I/O to satisfy user application requirements, the following is required:
  - Consoles - A full-capability console device (in addition to the system console) is needed to satisfy the requirements of the control program. Supported console device(s) are identified in the Multiple Console Support description earlier in this section.
  - DASD - Six 3330/3333 DASD spindles. This requirement may be satisfied by substituting 3340, 3350, 3375, or 3380 spindles where appropriate.
  - A SYSIN device (card reader or tape).
  - A SYSOUT printer (printer or tape).
  - A SYSOUT punch (punch or tape).
  - A 9-track 1600 bpi or 6250 bpi tape drive. Distribution of MVS/SP V2, component releases, and PTFs are made on a 9-track 1600 bpi tape or 6250 bpi tape; therefore, a 9-track tape on the system (or access to another system meeting the minimum configuration requirements and having a 9-track tape at the customer installation is required for system generation and maintenance).
- If ACF/TCAM, ACF/VTAM, or BTAM/SP is specified, at least one transmission control unit or communications controller is required

for operation of remote terminals (ACF/VTAM requires a 3704/3705-1/3705-II in network control mode).

**FEATURE SUPPORT**

**FEATURES SUPPORTED, IBM PROCESSORS OPERATING IN SYSTEM/370 EXTENDED ARCHITECTURE MODE:** The following features are supported. Other features, not listed, have no specific programming support; their existence is ignored by the control program. Attempts to use the system with unsupported features may cause unpredictable results. For brevity this list does not include those basic features or control units which are required to connect a supported device.

Features supported (may be model dependent):

- Real storage:
  - 8,388,608 bytes
  - 16,777,216 bytes
  - 25,165,824 bytes
  - 33,554,432 bytes
  - 50,331,648 bytes
  - 67,108,864 bytes
- Channels:
  - 6, 8, 12, 16, 24 or 48 channels
  - Channel-to-Channel Adapter (on 3082 and 4381)
    - First, feature #1850
    - Second (#1850 required), feature #1851
    - Third, feature #1852
    - Fourth (#1852 required), feature #1853
- Required Consoles:
  - Integrated Service Support Console. (The integrated Service Support Console is a part of the IBM processors operating in S/370 Extended Architecture mode.
  - 3278 Display Console mdl 2A as a system console.
  - 3279 Display Console mdl 2C as a system console.
  - A full-capability console device (in addition to the system console) is needed to satisfy the requirements of the control program. Supported console device(s) are identified in the Multiple Console Support description earlier in this section.
- Requirements for Operational Maintainability of the IBM processors operating in S/370 Extended Architecture mode. See the Machine pages for a complete statement of the requirements.

**Features Supported, I/O Devices:** The following I/O Device Features are supported when these devices are attached locally:

- 1052 Printer - Keyboard (Note 1)
- 1403 Printer (mdls 2, 7, N1):
  - Supported: #8640 - Universal Character Set
  - #8641 - Universal Character Set
- 2250 Display Unit (mdl 3)
  - Required: #2840 Display Control (mdl 2)
- 2305 Fixed Head Storage (mdl 2):
  - Required: #2835 Storage Control
- 2501 Card Reader (mdls B1, B2):
  - Supported: #1531 - Card Image
- 2540 Card Read Punch (mdl 1):
  - Supported: #1531 - Card Image
- 2821 Control Unit (mdls 1, 2, 3, 5, 6):
  - Supported: #1990 - Column Binary (for problem program use only)
  - #8637-8639 - Universal Character Set Adapter
- 3203 Printer (mdl 5)
- 3211 Printer (mdl 1):
  - Required: 3811 Printer Control Unit
  - Supported: #5554 - 18 Additional Print Positions
- 3251 Display Station
  - Required: IBM 3255 Display Control
  - IBM 3258 Control Unit
- 3262 Printer mdl 5 (supported as a 4248)
- 3275 Display Station (mdls 1, 2) (Note 1)
- 3276 Display Station (mdls 1, 2) (Note 1)
- 3277 Display Station (mdls 1, 2) (Note 2)
  - Supported: #6350 - Selector Light-Pen
  - Program Function Keys (Dependent on specified keyboard)
  - #1090 - Audible Alarm
  - #4999 - Operator Identification Card Reader

PROGRAM PRODUCTS

MVS/SP-JES2 V2.1, MVS/SP-JES3 V2.1 (cont'd)

	#4690 - Keyboard Numeric Lock	Supported:	#5553 - Additional (18) Print Positions
3278 Display Station (mdls 1, 2, 2A, 3, 4, 5) (Note 2)	Supported:	3830 Storage Control (mdl 2):	Supported:
	Features equivalent to 3277. (See above).		#8170 - Two-Channel Switch
	#5781, 5782 - Programmed Symbols (mdls 1, 2, 3, 4, 5).		#8171 - Two-Channel Switch Additional
3279 Display Station (mdls 2A, 2B, 3A, 3B) (Note 2)	Supported:	3830 Storage Control (mdl 3):	Supported:
	Features equivalent to 3277. (See above).		#8170 - Two-Channel Switch
	#5781, 5782 - Programmed Symbols (mdls 2B, 3B).		#8171 - Two-Channel Switch, Additional
3284 Printer (mdls 1, 2)		3851 Mass Storage Facility (mdls A1, A2, A3, A4, B1, B2, B3, B4) (Note 3)	Supported:
3286 Printer (mdls 1, 2)			#8171, 8172 - Two-Channel switch, additional
3288 Printer (mdl 2) (supported as a 3286-2)			#4901,4902 - MSC Port
3330 Disk Storage (mdls 1, 2, 11):	Required:	3880 Storage Control (mdls 1, 2, 3)	Supported:
	3333 Disk Storage and Control, or 3830 Storage Control, or 3880 Storage Control (mdls 1, 2 or D11)		#8170 - Two-Channel Switch Pair
3333 Disk Storage and Control (mdls 1, 11):	Required:		#8171 - Two-Channel Switch Pair, Additional
	3830 Storage Control, or 3880 Storage Control (mdl 1, 2 or D11)		#8172 - Eight-Channel Switch feature (requires #8170 and #8171)
	Supported:		#6550 - Speed Matching Buffer for 3380
	#8150 - String Switch		#6560 - Speed Matching Buffer for 3375
3340 Direct Access Storage (mdls A2, B1, B2):	Required:	3880 Storage Control (mdls B13, D13)	Supported:
	3340 mdl A2 and 3830 Storage Control, or 3880 Storage Control (mdl 1 or 2)		#8170 - Two-Channel Switch Pair
	Supported:		#8171 - Two-Channel Switch Pair, Additional
	#6201,6202 - Rotational Position Sensing	3880 Storage Control (mdl D11)	Supported:
	#8150 - String Switch		#8170 - Two-Channel Switch Pair
3344 Direct Access Storage (mdls B2,B2F)	Required:		#8171 - Two-Channel Switch Pair, Additional
	3340 mdl A2	3890 Document Processor (mdls A1, A2, A3, A4, A5, A6, B1, B2, B3, B4, B6):	Supported:
3350 Direct Access Storage Facility (mdls A2, A2F, B2, B2F, C2, C2F):	Required:		#5111 - Microfilming
	3830 Storage Control, or 3880 Storage Control (mdls 1, 2 or D11)		#4666 - Item Number/Endorsing
	Supported:	3890 Document Processor (mdls E3, E4, E5, E6, F3, F4, F5, F6):	Supported:
	#8150 - String Switch		#4667 - Item Number/Endorsing
3375 Direct Access Storage (mdls A1, B1, D1)	Supported:	4248 Printer mdl 1	Supported:
	#8150 - String Switch		#3157 - Additional (36) Print Positions
	Required:		
	3880 Storage Control mdl 1 or 2		
3380 Direct Access Storage (mdls A4, AA4, and B4):	Required:		
	3880 Storage Control mdl 2, 3, B13 or D13		
3420 Magnetic Tape Unit (mdls 3, 5, 7):	Supported:		
	#3550 - Dual Density		
	#6407 - 7-track		
	#6631 - Single Density		
3420 Magnetic Tape Unit (mdls 4, 6, 8):	Supported:		
	#6420 - 6250 Density		
	#6425 - 6250/1600 Density		
3505 Card Reader (mdls B1, B2):	Supported:		
	#5450 - Optical Mark Read		
	#6555 - Selective Stacker		
3525 Card Punch (mdls P1, P2, P3):	Supported:		
	#1533 - Card Read		
	#5272 - Multiple Card Print		
	#8338 - Two-Line Card Print		
3800 Printing Subsystem (mdl 1):	Supported:		
	#1490 - Burster-Trimmed-Stacker		
	#5401 - 127 Character Generation Storage Positions		
	#8170 - Two-Channel Switch		
3803 Tape Control (mdl 1):	Supported:		
	#1792 - Two-Control Switch		
	#1793 - Three-Control Switch		
	#1794 - Four-Control Switch		
	#3551 - Dual Density		
	#6408 - Seven-Track		
	#9071 - Communicator 1-2		
	#9073 - Communicator 3-4		
3803 Tape Control (mdl 2):	Supported:		
	#1792 - Two-Control Switch		
	#1793 - Three-Control Switch		
	#1794 - Four-Control Switch		
	#5310 - Nine-Track NRZI		
	#6320 - Seven-Track NRZI		
	#8100 - Two-Channel Switch		
	#9071 - Communicator 1-2		
	#9073 - Communicator 3-4		
3811 Printer Control Unit (mdls 1, 2):			

**Note 1:** These devices are supported by one or more of the following licensed programs:

ACF/VTAM, ACF/TCAM, BTAM/SP

(Refer to description of those licensed programs to determine the features supported).

**Note 2:** These devices are supported as operator consoles and by one or more of the following licensed programs:

ACF/VTAM, ACF/TCAM, BTAM/SP

(Refer to description of those licensed programs to determine the features supported).

**Note 3:** The Licensed Program Mass Storage Systems Extension (MSSE) with the MVS/XA Facility is a prerequisite for the attachment of the 3850 Mass Storage System to an IBM 3081 Processor operating in S/370 Extended Architecture mode.

**DATA MANAGEMENT CONSIDERATIONS**

In MVS/XA, most data management functions are provided by licensed programs which are not part of MVS/SP V2. Examples of data management support include:

- Data Facility Product (DFP) (5665-284) licensed program.
- Advanced Communication Function/Virtual Telecommunications Access Method (ACF/VTAM) Version 2 (5662-280) licensed program.
- Advanced Communication Function/Telecommunications Access Method (ACF/TCAM) Version 1 Release 4 (5735-RC3) licensed program.
- Basic Telecommunications Access Method/System Product (BTAM/SP) (5665-279) licensed program.
- Execute Channel Program (EXCP) support which is contained within MVS/SP V2.
- Specialized access methods which are user-supplied or provided with a licensed program.

For those items mentioned above which are licensed programs, the Program Products section should be reviewed for additional information.



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PROGRAM PRODUCTS

**MVS/SP-JES2 V2.1, MVS/SP-JES3 V2.1 (cont'd)**

**GENERAL DOCUMENTATION**  
(available from Mechanicsburg)

*MVS/System Product Version 2 General Information Manual*  
(GC28-1118) ... *MVS/Extended Architecture Conversion Notebook*  
(GC28-1143).

**RPQS ACCEPTED:** No

**MVS SYSTEM INTEGRITY APPLIES:** Yes



PROGRAM PRODUCTS

**MVS/Bulk Data Transfer (cont'd)**

**VTAM Considerations:**

- MVS/BDT requires either ACF/VTAM Version 1 Release 3 with the Multisystem Networking feature (MSNF) or ACF/VTAM Version 2 Release 1.

**CONVERSION** (not applicable)

**DATA SECURITY**

MVS/BDT provides support for external security management through transaction and command authorization exits, session passwords, and logging facilities. User management is responsible for evaluating, selecting, applying and implementing such features and for the appropriate administrative and application controls.

**DOCUMENTATION**

(available from Mechanicsburg)

*General Information Manual* (GC28-1313).

**MVS SYSTEM INTEGRITY**

IBM will accept APARs describing any situation where the installation of MVS/Bulk Data Transfer (5665-302) causes an exposure to the system integrity of MVS.

**RPQs ACCEPTED:** No

## 5665-307 - PRINT MANAGEMENT FACILITY

### PURPOSE

Print Management Facility consists of several interactive utility programs and 66 character sets, in source form, to assist the user in defining and generating objects required to utilize the advanced printing capabilities of the 3800 mdl 3 when operating with Print Services Facility (5665-275). This program is designed to operate under MVS/SP with TSO and requires the functions of the following licensed programs: VS/APL and GDDM and either TSO/E or TSO Command Package (MVS/370 only).

### HIGHLIGHTS

The utilities are menu-driven from a 3277, 3278, or 3279 Display supported by GDDM. Each utility program is outlined below:

- Font Management Services which provides an ability to:
  - Edit, create, copy, rename, and delete character raster patterns and character groups, which are subsets within a character set, such as, all capital letters.
  - Define font raster patterns for use in three orientations (0, 90, 270 degrees). **Note 1:** Font raster patterns for the 3800 mdl 3 will not be defined in the 180-degree orientation since the printer does not print text in that orientation. **Note 2:** Within a defined orientation, characters can be rotated 0, 90, 180 or 270 degrees, but they will be printed along the baseline of the original orientation.
  - Change the scale of a character group, including the change from a 3800 mdl 1 to 3800 mdl 3 pel density. (The scale-change process produces 'new' characters which may require further refinement. These refinements can be done interactively on the display unit.)
  - Create and/or edit (copy, rename) the source form of a font.
  - Create and/or edit (copy, rename) the source form of a code-point assignment table (character arrangement table).
  - Build fonts, in object form, for the 3800 Printing Subsystem mdl 3.
- Form and Page Management Services which creates Form Definitions (FORMDEF) and Page Definitions (PAGEDEF). FORMDEFs define the physical print medium, including specification of:
  - The position of the logical page on the physical page (form).
  - Number of copies of a page to be printed.
  - Required electronic overlays by name.
  - Optical overlay control.
  - Suppression codes to be activated.
 PAGEDEFs describe how line data is to be formatted for printing, including specification of:
  - The logical page size and orientation.
  - Named fonts and page segments.
  - Line spacing.
  - Relative position of a line and/or a field of data.
  - Relative orientation of a line and/or a field of data.
  - 'Multiple-up' - two or more logical pages to be printed on a single physical page (form).
  - The font(s) to be used for all or part of a line.
  - Conditional suppression of all or part of a line.
  - Constant text data that was not generated by the application program.
  - Channel code values by line to terminate 'skipping'.**Note:** PAGEDEFs and FORMDEFs for several standard page layouts will be provided in source form with Print Management Facility.
- Conversion Services provides an ability to:
  - Retrieve and store 3800 mdl 1 library character sets (LCS) and graphic modification modules (GRAPHMOD) data sets stored in an internal library as a character group.
  - Convert 3800 mdl 1 character groups to the 3800 mdl 3 pel density.
  - Convert GRAPHMODs used in Compatibility mode on the 3800 mdl 3 to characters which can be used in all-points-addressable mode.
  - Produce IEBIMAGE source for use in Compatibility mode.

– Convert Forms Control Buffer data to a corresponding PAGEDEF and page format.

Conversion Services includes the functions of the licensed program Character Conversion Aid (5665-299).

- Page Segment Management Services provides an ability to:
  - Create a page segment from a set of graphic characters which were used to print a logo.
  - Create a page segment from raster data information.
  - Trim a page segment on any of the four sides (top, bottom, left, right).
  - Convert a page segment to its mirror image.
  - Rotate a page segment 0, 90, 180, or 270 degrees.
  - Convert a page segment to reverse light (black becomes white, white becomes black).
  - Specify that a page segment is to be printed using the 'double dot' function of the 3800 mdl 3.

**Note:** Page segments can also be generated by Print Management Facility for printing by the 4250 Printer.

- Library Services provide facilities to:
  - Import or move internal objects from one user's library to another.
  - Export objects to a data set.
  - Route the Print Management Facility printed output to a chosen destination.
  - Invoke TSO Command pass-through.
- General Help Services provide:
  - Detailed help screens about the utilities and their functions.
  - Accumulated messages for diagnostic purposes.

In addition to the above functions, Print Management Facility will provide, in source form, 66 character sets for the 3800 Printing Subsystem mdl 3. These character sets, which are for use in all-points-addressable mode, include the 59 character sets provided for Compatibility mode printing, three character sets for two-up printing (two 20-pitch and one 24-pitch), and also four additional 6670 fonts modified for printing on the 3800 mdl 3. These character sets will be included in object form in 0 and 90 degree orientations as part of Print Services Facility (5665-275).

### CUSTOMER RESPONSIBILITIES

Users planning to install the Print Management Facility must also install or have installed the licensed programs detailed under software requirements. The Print Management Facility will install on an MVS/370 or MVS/XA system by using either System Modification Program Release 4 (with PTF UR03129) or System Modification Program Extended (SMP/E, 5668-949).

The Print Management Facility program is not required on the system using Print Services Facility (PSF) with the 3800 mdl 3. PAGEDEFs, FORMDEFs, fonts and page segments will have to be in libraries of the PSF system only when a data set requiring these objects is printed. Electronic overlays also must be in a library of the PSF system, in order to be accessed and merged with the print data.

The Conversion Services output, characters to be used in 3800 mdl 3. Compatibility mode, must be processed by the enhanced IEBIMAGE utility component of MVS/370 Data Facility Product, MVS/XA Data Facility Product, or OS/VS2 Data Facility Device Support.

### SPECIFIED OPERATING ENVIRONMENT

#### HARDWARE REQUIREMENTS

The Print Management Facility is designed to run on IBM processors supported by the prerequisite licensed programs shown below. Also required is an IBM 3277, 3278, or 3279 Display and appropriate control unit. A terminal with an APL keyboard is recommended.

**Storage Requirements:** Virtual -- 3,000K bytes. No virtual system areas are required. Disk -- 15,000K bytes.

**Note:** The storage requirements for APL and GDDM also apply during execution of Print Management Facility.

#### SOFTWARE REQUIREMENTS

The Print Management Facility is designed to run on IBM processors supported by current releases of either MVS/370 or MVS/XA with TSO. Also required are the following licensed programs:

- VS/APL, Release 4 (5748-AP1).
- Graphical Data Display Manager (GDDM), Release 2 or higher (5748-XXH).



**Print Management Facility (cont'd)**

- TSO/E (5665-285) or TSO Command Package (5740-XT6, MVS/370 only).

**COMPATIBILITY and MIGRATION**

3800 mdl 1 applications can be printed using the advanced functions of the 3800 mdl 3 by using Print Management Facility in conjunction with Print Services Facility and Overlay Generation Language.

**MVS SYSTEM INTEGRITY**

IBM will accept APARS where the installation of Print Management Facility introduces an exposure to the system integrity of MVS/370 or MVS/XA. Refer to Programming Announcement dated October 21, 1981. This program is intended to run unauthorized.

**RPQs ACCEPTED:** No

**RESTRICTED PROGRAM MATERIALS AVAILABILITY**

Restricted Materials: No. Available in source code only.



**5665-308 - OVERLAY GENERATION LANGUAGE****PURPOSE**

The Overlay Generation Language program allows the user to easily define and create electronic overlays for the 3800 mdl 3 which accepts electronic as well as optical overlays. Forms costs can be reduced when pre-printed forms are replaced by electronic overlays.

**HIGHLIGHTS**

A 2-step process is used. First, the overlay is specified in a descriptive language. Second, the overlay is generated by the batch utility which interprets the definition statements and creates records to define the overlay. The records are then stored in a user library.

The general features of Overlay Generation Language are as follows:

- Descriptive Language. Special attention has been given to the language structure, syntax, vocabulary, flexibility, and semantics to provide clear commands. Comments may be interspersed throughout the command statements to improve readability.
- Error Handling - Overlay Generation Language has extensive error checking on input statements and data requirements. Error messages recommend corrective actions where possible.
- Command/Keyword Module - Overlay Generation Language contains a separate command and keyword module to allow the installation to specify unique synonyms or non-English language support.

The functional highlights include:

- All-points-addressability. Text or page segment placement can be specified at any defined point in the printable area of a page. Placement can be specified in millimeters, inches, or pels. It is also possible to position data in terms of lines-per-inch or characters-per-inch.
- Vertical and horizontal lines. These may be solid, dashed, or dotted. Lines may be repeated in either the horizontal or vertical direction and may have line weight (thickness) specified on a continuous picture element (pel) basis, starting at one pel, or by using a keyword to indicate light, medium, or bold weight.
- Boxes. Boxes may also have solid, dotted, or dashed lines with a user-specified weight and repetition in the horizontal or vertical direction. Box areas can be shaded. Invisible-perimeter boxes can be used to assist with text alignment and shading rectangular areas.
- Shading. The user can select from 32 levels of shading.
- Text Strings. In relation to the overlay origin, text can be defined in four orientations: 0, 90, 180 and 270 degrees. (When generating electronic overlays for the 3800 mdl 3, lines of text should not be defined that would require printing in the 180-degree orientation on the physical page since the printer does not print text in that orientation.)  
  
Mixed orientations of text on a single page are possible. Under-scoring can be specified. Multiple proportionally-spaced and fixed-space fonts can be specified for a line or within a box. Automatic line spacing, based on the size of the font specified for the text, can be done.
- Image. Overlay Generation Language allows the user to generate an image through the specification of a pel pattern. Rotation (0, 90, 180 or 270 degrees) can be specified for this generated pel pattern for each position it is used in an overlay. In addition, these pel patterns will be further rotated when an overlay is rotated to match the orientation specified for the overlay.  
  
Other images (not generated by Overlay Generation Language) also can be included as part of an overlay through use of page segments. In this case, any rotation required to match the overlay's orientation is a user responsibility.
- Mask Formats. A series of equally spaced horizontal and vertical lines can be superimposed on an overlay. This provides a coordinate grid to assist in designing and fine tuning overlays.
- Command Groups. Groups of commands can be defined once and specified at multiple positions on an overlay.

**CUSTOMER RESPONSIBILITIES**

The Overlay Generation Language program is not required on the system using Print Services Facility (PSF) with the 3800 mdl 3. The fonts used in the electronic overlay must be in a library of the system executing the Overlay Generation Language program. When printing, the fonts must be in a library of the PSF system.

The electronic overlays, once created, will also have to be in a library of the PSF system when printed. The overlay-print function, which allows a test printing of the newly generated overlay, can only be used on a system with PSF.

Data generated by 3800 mdl 1 applications can be printed by the advanced functions of the 3800 mdl 3 by using Overlay Generation

Language in conjunction with Print Services Facility and Print Management Facility.

A sample electronic form will be delivered with the Overlay Generation Language program.

**SPECIFIED OPERATING ENVIRONMENT****HARDWARE REQUIREMENTS**

An IBM Processor that is supported by MVS/370 or MVS/XA.

**Storage Requirements:**

Virtual Disk	400K bytes. No virtual system areas are required. 180K bytes.
--------------	--

**SOFTWARE REQUIREMENTS**

Overlay Generation Language is designed to operate under current releases of MVS/370 and MVS/XA.

**COMPATIBILITY and MIGRATION**

Output generated by 3800 mdl 1 applications can be printed by the advanced functions of the 3800 mdl 3 by using Overlay Generation Language in conjunction with Print Services Facility and Print Management Facility.

**MVS SYSTEM INTEGRITY**

IBM will accept APARS where the installation of Overlay Generation Language introduces an exposure to the system integrity of MVS/370 or MVS/XA. Refer to Programming Announcement dated October 21, 1981. This program is intended to run unauthorized.

RPQs ACCEPTED: No.

**RESTRICTED PROGRAM MATERIALS AVAILABILITY**

Restricted Materials: No. Available in object code only, except for the messages, keywords and commands modules which are in source form to allow user customization.

## PROGRAM PRODUCTS

**5665-309 - MVS FINANCIAL MANAGEMENT SYSTEM R1**
**PURPOSE**

MVS Financial Management System offers a framework for creating financial systems to be used in various accounting applications such as general ledger, cost control, budgeting, reporting and consolidation.

**HIGHLIGHTS**

MVS Financial Accounting System provides facilities for creation of accounting systems in the following application areas:

- Financial Accounting and Reporting
- General Ledger
- Management and Responsibility Accounting
- Budgeting
- Cost Accounting
- Project Accounting
- Consolidation Reporting

**DESCRIPTION**

**Introduction:** The licensed program offerings in the finance and accounting area can be divided into three major groups:

- **OPERATIONAL**, which cover applications such as order entry, invoicing, accounts payable and accounts receivable.
- **TACTICAL**, covering general ledger, budgeting, cost and project accounting and consolidation
- **STRATEGIC**, which includes various tools for planning and decision evaluation.

**Application Areas:** MVS Financial Management System is designed to provide a framework for creating financial systems to be used in the following application areas:

- **FINANCIAL ACCOUNTING and REPORTING**, incorporating **GENERAL LEDGER** (nominal ledger), profit and loss statement, balance sheet, financial adjustment, reserves, provisions, control accounts, and journals.
- **MANAGEMENT and RESPONSIBILITY ACCOUNTING**, incorporating revenue as well as costs, and profitability analysis by various cost centers and product types.
- **BUDGETING** with a distribution function to allocate a department budget to single accounts and with seasonal curve functions to distribute the budget over periods in the year within the account.
- **COST ACCOUNTING**, incorporating productivity analysis, determination of fixed and variable costs, variance analysis, and costing by product types and market place. It is within its application area complementary to **IBM COSTING**.
- **PROJECT ACCOUNTING**, incorporating project costs to date, as well as accruals and repayments allocated over future periods, budgets and budget revisions.
- **CONSOLIDATION REPORTS**, incorporating the structuring and merging of information over several divisions or companies within a group, very often from the base of completely different charts of accounts.
- In addition to the areas mentioned in the points above, various forms of statistical analysis, multilevel reporting, daily, weekly, and to-date, by product type, region, market location, etc. are also included. (That is, information which is already present in base accounts, but needs to be restructured and presented in a different format.)

These application areas are supported by an integrated system that:

- Gathers, processes, and consolidates financial data; ensures data integrity, audit trails, and data retention for analysis
- Maintains ledgers and prepares financial statements.
- Can provide cost accounting and reporting for products and/or responsibility centers.
- Assists in the creation of long- and short-range budgets, and stores current year budgets for performance comparisons.
- Prepares and maintains accounting, financial, statistical, and management data over many years.
- Supports auditing facilities and security functions.
- Provides controlled access to and display of data.
- Can be modified and can grow with the organization.
- In line with the above introduction, the MVS Financial Management System provides published interfaces to and complements the IBM program products Interactive Financial System 1 (IFS 1 - 5668-967), and Planning, Control and Decision Evaluation System (PLANCODE/S - 5740-XX9 and PLANCODE/I - 5840-XX8).

**System Overview:** MVS Financial Management System consists of three main components:

- The Multiple Ledger System (MLS), which is a batch component, used for building up and maintaining a set of data bases containing financial information.
- The Financial Management Display System (FDS), which provides functions for requesting and displaying reports and for creating input transactions via a display terminal. It also allows for graphic display of certain reports using the Interactive Chart Utility (ICU) component of GDDM.
- The Business Output/Tailoring System (BOS), which is used for creating reports, and tailoring the standard functions where user-defined enhancements are required. The Business Output/Tailoring System is a tool that requires programmers' assistance.

**Specific Functions:** Within each of these application areas, MVS Financial Management System provides specific functions such as the following:

- **OVERHEAD RECOVERY**, being the reallocation of fixed and indirect costs, possibly several times in the course of absorption. MVS Financial Management System provides a Calculation, Pricing, and Redistribution function to handle just this problem.
- **FOREIGN CURRENCY** requires that certain accounts be expressed in different currencies. MVS Financial Management System enables the user to define a special table containing conversion factors which may be used for converting values from one currency to another for presentation in printed output.
- Different **CHARTS of ACCOUNTS** can be handled by MVS Financial Management System, which enables the user to achieve faster corporate consolidation because all divisions and subsidiaries can be handled by the same system, even if their chart of accounts' structure is different. There are several facilities in MVS Financial Management System that simplify the restructuring of any specific chart of accounts that may arise due to changes of company or government accounting policy.
- **VARIABLE ACCOUNTING PERIODS** are often required, depending on the type of application. MVS Financial Management System is designed to operate with a 12- or 13-period fiscal year (representing monthly periods made up according to calendar months, four- and five-weekly accounting months, or even periods, split across different days of the week). However, weekly or quarterly periods may be accommodated.
- Generating **MULTIPLE TRANSACTIONS** from certain selected transactions simplifies data entry, such that copies of each individual transaction may be modified and directed to different accounts.
- **AUDIT CHECKS and BALANCES** are provided by Financial Management System through a comprehensive series of standard reports, which enable the user to trace postings right through from source to incorporation in the final account.
- Timely reports for decision making may be generated by the user and displayed on a terminal screen or printed on paper. The user can structure and group data for meaningful management analysis.

As well as the facilities mentioned above, MVS Financial Management System can accommodate those specific problems users might encounter in such areas as accounting for fixed assets and depreciation, changes in government policy regarding accounting for profit and loss, and handling various forms of accruals and repayments. The keyword that applies to MVS Financial Management System is the flexibility it provides to users for tailoring and enhancing the accounting system to meet their specific requirements when and as they arise. For example, customization facilities are provided including audit trails to enable the enhancement of standard functions, such as:

- Transforming input from other data processing systems into transactions for MVS Financial Management System.
- Generating output, including reports and records for other data processing applications.
- Processing user-defined information for inclusion into data bases.

**CUSTOMER RESPONSIBILITIES**

The following list provides an overview of major tasks necessary to accomplish a smooth product implementation for the MVS Financial Management System.

**Planning**

1. Define suitable initial application (pilot application).
2. Select members of the project group.
3. Accounting personnel, project leader, and systems analyst attend the Functions workshop.
4. Draw up preliminary project plan (time and resources).

PROGRAM PRODUCTS

**MVS Financial Management System (cont'd)**

5. Install Financial Management System and get acquainted with the sample problem.
6. Project leader, systems analyst and application programmer attend the BOS workshop.

**Design**

7. Specify requirements for printed reports.
8. Decide on chart of accounts structure (account number layouts).
9. Outline format of input data and relationships to feeder systems.
10. Determine segment layouts and space requirements for data bases.
11. Plan test environment and procedures.
12. System analyst and application programmer attend the BOS Advanced workshop.

**Implementation**

13. Start documenting the application design.
14. Draw up detailed project plan (time and resources).
15. Set up control information, chart of accounts.
16. Plan production environment and procedures (MLS and FDS).
17. Use BOS to:
  - Program/tailor output reports.
  - Convert data from existing feeder systems.
  - Modify standard functions, add new functions.
  - Tailor error handling routines.
18. Establish data entry procedures (including PREVDATA panels).
19. Develop framework for FDS and hoc report requests (PREVREQ panels).
20. Complete testing and plan switch-over to normal operation.
21. Educate users and complete system documentation.

**SPECIFIED OPERATING ENVIRONMENT**

**HARDWARE REQUIREMENTS**

This IBM program product is designed to operate on the following IBM machines: IBM S/370 mds 148, 158, 168, 303X, 308X and on 4300 Processors if operating in an MVS environment.

For the MVS Financial Management System sample problem, the F program (which is the largest), can be run in 1,000K bytes. A typical installation, however, might require 1,200K bytes of virtual storage. MVS Financial Management System itself does not require any fixed real storage.

The Display System (FDS) can use any of the following (or equivalent) terminals if equipped with at least 12 Program Function Keys:

- IBM 3276 Control Unit Display Station mds 2, 3, 4, 12, 13, or 14.
- IBM 3277 Display Station mdl 2.
- IBM 3278 Display Station mds 2, 3, 4 or 5.
- IBM 3279 Color Display Station mds 2A, 2B, 3A or 3B.
- IBM 3178 Display Station.
- IBM 3290 Information Panel.

**SOFTWARE REQUIREMENTS**

MVS Financial Management System executes under:

- MVS/SP-JES2 Version 1 Release 3 (5740-XYS).
- MVS/SP-JES3 Version 1 Release 3 (5740-XYN).

MVS Financial Management System also executes under MVS/XA:

- MVS/SP-JES2 Version 2 (5740-XC6).
- MVS/SP-JES3 Version 2 (5665-291).

As prerequisites for above MVS/SP products, MVS Release 3.8 with Processor Support 2 must be installed.

The following products or necessary upgrades as specified by MVS/XA are required:

- IMS/VS-DB Version 1 Release 2 (5740-XX2).
- OS/VS Sort/Merge Release 5 (5740-SM1).
- OS/VS COBOL Library Release 2 (5740-LM1).

- If FDS is to be used, then one of the following alternatives is required:

- The TSO function of MVS, or
- CICS/OS/VS Version 1 Release 6 (5740-XX1) and MVS/370 Data Facility Product Release 1 (5665-295). When interfacing with CICS/OS/VS, the Command Level Interface is used.

- If the graphic display capability of FDS is to be used, the Graphical Data Display Manager Release 3 (5748-XXH) with the Presentation Graphic Feature with Interactive Chart Utility must be installed. In an MVS/XA environment, GDDM Release 3 requires MVS/SP Version 2 Release 1.1.

- System Modification Program Release 4 (SMP4) is needed for the installation of MVS Financial Management System.

Subsequent releases and modification levels are supported unless otherwise stated.

**CONVERSION**

**Migrating from the IFP/FDP Version of Financial Management System (5785-NAC):** Migrating from the IFP version of Financial Management System to the program product MVS Financial Management System (still using TSO for the display system FDS) will be a small effort as the main design is kept consistent within the two products.

The migration activities are:

- Recompile BOS tailoring programs.
- Use a utility if saved report requests (PREVREQ) or data entry panels (PREVDATA) need to be brought over to the new system.

**Migrating from VSE/Financial Management System (5666-263):** Migrating from the VSE Financial Management System is of interest for customers who are moving all their activities from VSE to MVS. These customers are assumed to continue using CICS for the display system (FDS).

Also, these customers will benefit from the fact that the main design is kept consistent within the two products. Examples of this are described in the previous section.

In addition to normal migration activities when going from VSE to MVS, the only identified special migration activity is to recompile BOS tailoring programs.

**SECURITY/INTEGRITY**

General data security is provided by the use of DL/I data bases. This can be further extended if RACF (5740-XXH) is installed. In addition, specific functions are provided by MVS Financial Management System in the area of Security and Integrity:

- To get access to information about a company in the data bases from an online terminal, the user must be authorized for that company.
- Functions exist for input data validation, and tools are provided so the customer can extend these functions.

**DOCUMENTATION**

(available from Mechanicsburg)

*General Information Manual* (GH19-6274).

The following documents will be available at program availability:

*Multiple Ledger System User's Guide* (GH19-6276) ... *Licensed Program Specifications* (GH19-6275) ... *Financial Management Display System User's Guide* (SH19-6277) ... *The Business Output/Tailoring System Programmer's Guide* (SH19-6278)

**SYSTEM INTEGRITY**

IBM will accept APARs where the installation of MVS Financial Management System introduces an exposure to the system integrity of OS/VS2 (MVS). MVS Financial Management System is intended to run unauthorized. Refer to Programming Announcement dated October 27, 1981.

RPQs ACCEPTED: No

PROGRAM PRODUCTS

**REPORT MANAGEMENT AND DISTRIBUTION SYSTEM  
RELEASE 1.0 (5665-310)**

**PURPOSE**

The Report Management and Distribution System is a series of programs which provide the MVS user with a system to store, protect, view and print system output on demand. This system gives the user the potential for reducing operational costs, decreasing report turnaround time and increasing report handling productivity.

**HIGHLIGHTS**

- Stores user-designated SYSOUT datasets
- Controls user access to stored datasets
- Provides terminal viewing of stored datasets through IMS, TSO or CICS
- Permits demand printing of a stored dataset
- Provides indexing or decollate capability
- Provides report owner review of output prior to release
- Provides Extended Support for the 6670 Information Distributor
- Supports the 3290 Information Panel

**DESCRIPTION**

**STORES SYSOUT DATASETS:** User-designated SYSOUT datasets are stored by an MVS external writer. Unique report identifiers are established and used in managing data retrieval.

**CONTROLS USER ACCESS:** RACF or VSAM cluster passwords can be used to control access to a report or group of reports. When RACF is used, users are not aware of the existence of reports they are not authorized to view. SMF records are generated to provide a detailed audit trail of report creation and deletion, viewing and printing. A user exit is provided for an interface to a user-supplied security system.

**PROVIDES TERMINAL ACCESS:** Access to the stored report images is provided via TSO, CICS and/or IMS to the IBM 3270-type display terminals including the 3178 model C2 and the 3290 Information Panel. The following panels are currently available: Signon panel (IMS and CICS only), primary option panel, index panel, versions panel, display panel, and print panels. Predefined PF keys are available to aid the user in the manipulation of data being viewed. These viewing functions include paging forward and backward, scanning, and reformatting. (Actual stored data is never reformatted.) Help panels are also provided.

At initial availability, the 3290 Information Panel will be supported by the Report Management and Distribution System under TSO. CICS support will be available during the third quarter of 1983 and IMS support during the fourth quarter of 1983.

**PERMITS DEMAND PRINTING:** Viewers of a report can request printing of a report or portions of a report on a 328X network printer, system printer or the 6670 Information Distributor. Restrictions can be placed on a report to limit the capability of a user printing the report. These restrictions include the control of page ranges to be printed and other print parameters.

**INDEXING:** Reports may be logically subdivided into control levels based on user-defined fields. Utilizing this concept the archiver dynamically supplies an index indicating, like a table of contents, where the control fields change. The index is stored as additional pages at the end of the report. The user may then view this index to facilitate access to a desired portion of the report.

**DECOLLATING:** Another use of the control level concept allows selective access to logical portions of a report. The report continues to exist in its entirety, controlled by a designated owner. Other users only have access to their portions of the report for viewing and printing.

**REPORT REVIEW/RELEASE:** This feature provides the capability for the owner of a report to review the report prior to releasing it for printing or viewing by other users.

**EXTENDED SUPPORT FOR THE 6670 INFORMATION DISTRIBUTOR:** This support provides:

- The capability on the Report Management and Distribution System Viewer's 6670 Print Panel to select options by 'filling in the blanks.'
- The capability to request the printing to the 6670 of a report or reports, or a list of stored reports, or a list of the stored versions of a report.
- The capability to signon to the system directly from an SNA 6670.
- The capability to request distribution to the SNA 6670 of all reports not yet transmitted which the user is authorized to access or to request a single available report be transmitted to multiple SNA 6670s.

**SUPPORT FOR THE 3290 INFORMATION PANEL:** The productivity of report viewing on the Report Management and Distribution System and report readability is increased with the use of the 3290 Information Panel. The capabilities of the 3290 Information Panel work with the functions of the Report Management and Distribution System to:

- Display a report page up to 160 columns across and 59 lines in depth, eliminating the need to scroll the report page.

- Provide help information in a scrollable partition along side of the report page being viewed if the report is 132 columns or less.
- Use the 3290 Multiple Interactive Screens Function to display reports on one half of the screen while using the other half of the screen to view another report, or logon to a different application or system.
- Use the 3290 Multiple Copy Function to save portions of the report on another part of the screen while continuing to view the report.

**CUSTOMER RESPONSIBILITIES**

**INSTALLATION:** The customer is responsible for installation. The process of installation and verification is estimated to take no more than two days. The basic steps involved are installing the libraries from the distribution tape, updating the installation's VTAM Definition Libraries to recognize the system's online application program, updating the MVS program properties table and archiving the sample reports. Additionally, for IMS, an IMS system generation and MFS generation are required and for CICS, a CICS generation is required.

**EXITS:** To allow flexibility for an installation to tailor the Report Management and Distribution System the following exit points have been supplied: initialization, termination, security, SMF logging, archive page GET/PUT, and print. Exit code is provided at the RACF security and SMF logging exit points and may be used or overridden as desired. The customer must supply any code necessary to make use of the other exit points.

**AUDITABILITY AND CONTROL:** An IBM-supplied user exit is available in the Report Management and Distribution System to provide the capability to do SMF logging. SMF records can be generated to provide a detailed audit trail of report archiving, viewing, and printing.

**SPECIFIED OPERATING ENVIRONMENT**

The operating environment for the Report Management and Distribution System is described in terms of a host processor, user terminals, printers and programming systems.

**HARDWARE REQUIREMENTS**

The Report Management and Distribution System is designed to operate with an IBM host processor that supports MVS. The IBM 3270 terminals (3277 model 2; 3278 models 2, 3, 4, and 5; and 3279 models 2 and 3) with Program Function keys, an IBM 3178 model C2 or an IBM 3290 Information Panel are required for online viewing of a report. VTAM network 328X or system JES printers(s) or the IBM 6670 Information Distributor are required to print a report. The 6670 is supported via JES as a point-to-point BSC Nonprogrammable Workstation RJE terminal or via IDWS as multipoint SNA.

**SOFTWARE REQUIREMENTS**

The Report Management and Distribution System operates with the following IBM products: MVS 3.7 or later (including MVS/XA 24-bit addressing mode) with SU 32 (System Security Support) if desired; JES2 or JES3; ACF/VTAM (5735-RC2) Version 1, Release 3, or ACF/VTAM (5665-280) Version 2; OS/VS VSAM; SPF/MVS (5668-009) or ISPF (5668-960); IMS/DC (5740-XX2) or CICS (5740-XX1); VTAM DSPRINT (5798-CPF) if printing to a VTAM cluster printer in the TSO environment is used, and IDWS (5740-AMA) for distribution to the SNA 6670.

**CONVERSION**

If an installation is currently using FCO (File Cabinet Option) (5798-CPY and DCG), an FCO to Report Management and Distribution System utility is available to convert the FCO directory to a Report Management and Distribution System directory. The utility can also move FCO archived reports onto the Report Management and Distribution System. Current FCO users may take the option to convert only their directories and view new versions of reports under the Report Management and Distribution System.

**SECURITY/INTEGRITY**

Customer management is responsible for the selection, application, and adequacy of security controls for their environment. RACF security or VSAM password protection for the reports is available.

**PERFORMANCE and PHYSICAL RESOURCE CONSIDERATIONS**

Actual performance of the Report Management and Distribution System Viewer may vary due to many factors such as system size and load, available storage and TSO, IMS, or CICS tuning. Data Streams used for display of the Report Management and Distribution System report data are blank compressed to keep the transmission time to a minimum.

The system can move varying large quantities of report data to and from storage. It is possible only to estimate the system load by monitoring activity. In an MVS/SP environment, the Hierarchical Storage Manager program product (5740-XRB) can be used to automate much of the storage management. If archived reports are to be defined to virtual (MSS) DASD, it is recommended for performance reasons that the directory be placed on real DASD.



PROGRAM PRODUCTS

**Report Management and Distribution System R1 (cont'd)**

**DOCUMENTATION**  
(available from Mechanicsburg)

*Licensed Program Specifications (GC30-9562) ... General Information Manual (GC30-3191).*

Available at time of general availability of the Program Product:

*User's Guide (SC30-3192) ... User's Reference Summary (SC30-3197)  
... Template for 3270 Display Terminals (SX27-3547) ... Archive  
Administrator's Guide (SC30-3196) ... Archive Administrator's  
Reference Summary (SC30-3176) ... Installation and Operations Guide  
(SC30-3193) ... 3290 Information Panel Support (SC30-3195) ... Two  
Inch-Three Ring Binder (SX27-3541).*

**MVS SYSTEM INTEGRITY**

IBM will accept APARs where the installation of the Report Management and Distribution System introduces an exposure to the system integrity of MVS. Refer to Programming Announcement dated October 21, 1981. Certain Components of this system are intended to run authorized.

RPOs ACCEPTED: No

TERMS and CONDITIONS: See PP Index

## PROGRAM PRODUCTS

**NPDA V3 (cont'd)****DOCUMENTATION**

(available from Mechanicsburg)

*Network Problem Determination Application Version 3: Program Summary (GC34-2110) ... Network Problem Determination Application Version 3: General Information Manual (GC34-2111) ... Network Problem Determination Application Version 3: Installation (SC34-2117) ... Network Problem Determination Application Version 3: User's Guide (SC34-2112) ... Network Problem Determination Application Version 3: Recommended Action Guide (SC34-2113) ... Network Problem Determination Application Version 3: Messages (SC34-2115) ... Network Problem Determination Application Version 3: Diagnosis (SC34-2130) ... Network Problem Determination Application Version 3: Licensed Program Specification (GC34-2116) ... Network Problem Determination Application Version 3: User Reference (SC34-2114).*

**MVS SYSTEM INTEGRITY**

IBM will accept APARs where the installation of NPDA Version 3 introduces an exposure to the system integrity of MVS. Refer to Programming Announcement, "Statement of MVS System Integrity", dated October 21, 1981. This program is intended to run authorized during initialization only.

**RPOs ACCEPTED: No**

PROGRAM PRODUCTS

**5666-296 - VSE/SP 1.1.0 PRODUCTION**  
**5666-297 - VSE/SP 1.1.0 GENERATION**  
**VSE/SYSTEM PACKAGE VERSION 1.1.2**  
**5750-AAP - VSE SYSTEM IPO/E 1.4.0**

**PURPOSE**

VSE/System IPO/E 1.4.0 is an important enhancement and extension of the well-accepted VSE System System IPO/E. VSE System IPO/E 1.4.0 is restructured and enhanced to further reduce time and skill level required to install and service VSE.

The primary design emphasis for VSE System IPO/E 1.4.0 is the following:

- Improved system stability and quality by system testing all of the programs as a single package.
- Reduced installation time and complexity through pre-generated and pre-tailored VSE System IPO/E 1.4.0 programs and libraries. In many cases, the process to install the system can be completed in approximately two hours.
- A new and simplified service procedure. Customers can choose the PRODUCTION format, which significantly reduces service time and complexity.
- A new and simplified ordering procedure.

**OVERVIEW**

VSE System IPO/E 1.4.0 consists of SCPs, VSE/SP 1.1.0, Optional and Documented support products which are tested as a system to provide high system quality. Previously, VSE System IPO/E consisted of several bases. These bases have been combined and enhanced into a single base for VSE System IPO/E 1.4.0, called VSE/SYSTEM PACKAGE 1.1.0 (VSE/SP 1.1.0). The VSE Interactive Productivity Facility has been incorporated into the VSE/SP 1.1.0. The performance of Interactive Productivity Facility has been improved by approximately 50% for key dialogs. New programs have been added and release levels of other VSE System IPO/E programs have been upgraded in VSE System IPO/E 1.4.0.

**VSE/SP 1.1.0:** This licensed program, with its prerequisite System Control Programs (SCPs), is an operational, interactive, data communication operating system. The prerequisite SCPs are not a part of the VSE/SP 1.1.0 licensed program, but are merged into the pre-generated VSE/SP 1.1.0. All references to VSE/SP 1.1.0 include both the licensed program and its prerequisite SCPs unless specifically indicated otherwise. VSE/SP 1.1.0 is comparable to the previous VSE System IPO/E Data Communications (DC) base. It is built and tested as a pre-generated package of VSE programs and delivered as a single licensed entity. It is part of VSE System IPO/E 1.4.0 and is ordered via the VSE System IPO/E 1.4.0 order process.

VSE System IPO/E 1.4.0 introduces a new and improved delivery process and a new service process for the PRODUCTION format.

All programs within VSE System IPO/E 1.4.0 are available in PRODUCTION and in GENERATION format. Both formats provide full function, are pre-generated and ready to use. The pre-generated options are selected to meet a very high degree of existing VSE installations. The GENERATION format, which also includes the PRODUCTION libraries, is provided for those users who want to modify the system.

Customers who order the VSE System IPO/E 1.4.0 in PRODUCTION format will benefit from a new service process, which reduces the service time and complexity. For the GENERATION format, service is similar to that of VSE System IPO/E 3.1.

The VSE/SP 1.1.0 PRODUCTION system is offered at a lower price than the GENERATION system.

VSE/SP 1.1.0 is offered with a new One-Time-Charge (OTC) Option as an alternative to the Monthly License Charge (MLC).

VSE/SP 1.1.0, in addition to the above, provides hardware support for the 3430 Tape Unit, the 4245 and 3262-5 Printers, and the 4341 Model Groups 9 - 12 Processors.

**HIGHLIGHTS**

**VSE**

- Is delivered and installed as a pre-generated SYSTEM via VSE System IPO/E 1.4.0 with VSE/SYSTEM PACKAGE 1.1.0 as its base.
- VSE/SP 1.1.0 is offered with a new One-Time-Charge (OTC) Option as an alternative to the Monthly License Charge (MLC).

**VSE/SP 1.1.0**

- Is a pre-generated package of VSE programs.
- Is an operational, interactive, data communications operating system without any other prerequisite software
- Is delivered as one entity under a single license.
- Is ordered as the base for VSE System IPO/E 1.4.0.

**VSE System IPO/E 1.4.0**

- Is available in only one version comparable to the Data Communication (DC) version of the previous VSE System IPO/E.
  - The DB/DC version of the previous VSE System IPO/E can be obtained by installing VSE/SP 1.1.0 plus the Optional Product DL/I DOS/VS.
  - A Batch/Interactive version will not be available as a standard offering with VSE System IPO/E 1.4.0.
- All programs within VSE System IPO/E 1.4.0 are available in:
  - PRODUCTION format to significantly reduce service time and complexity, and in
  - GENERATION format for users who want to modify the system.

**Ordering/Shipping**

- Improved order process and physical packaging for VSE System IPO/E 1.4.0.
- In order to simplify the packaging, only VSE System IPO/E 1.4.0 documentation will be included in the shipment. Documentation for individual VSE System IPO/E products is now only ordered through SLSS.
- VSE/SP 1.1.0 is available as part of the VSE System IPO/E 1.4.0 and is ordered via the VSE System IPO/E 1.4.0 order process. The prerequisite SCPs are shipped together with VSE/SP 1.1.0.
- Optional and Documented Support Products are ordered individually as part of the VSE System IPO/E 1.4.0 order.
- The number of distribution tapes is reduced from 13 to 2 when ordering VSE System IPO/E with Optional Products in PRODUCTION format. Ordering ACF/NCP, VM/VSE feature, or Documented Support Products increases the number of tapes.
- Customized libraries are shipped to VSE System IPO/E 1.4.0 users.

**Installation**

- The installation of VSE System IPO/E 1.4.0 including Optional and Documented Support Products can be done in approximately two hours.
- The installation process for VSE/SP 1.1.0 Optional and Documented Support Products is simplified via pre-tailored library packaging and a simplified customization process.
- The usage of a single DASD type for system files further reduces installation complexity.
- System file sizes have been established to meet the needs of most users, reducing the necessity to expand, regenerate, and reload these files.
- The Interactive Productivity Facility dialogs are easier to understand by using fewer DP terms.
- Performance of Interactive Productivity Facility has been improved by approximately 50% for key dialogs.
- Online information is available in the form of 'Explain facilities' and a 'First Use Tutorial' to improve ease-of-use.
- The number of user responses during installation of VSE System IPO/E 1.4.0 is reduced to about 25% compared with previous System IPO/E releases.
- Recovery and restart procedures have been added for operator errors, system failures or uncontrolled system shutdown during the installation process.

**Quality**

- System quality, stability and availability is improved via more comprehensive tests of VSE System IPO/E 1.4.0.
- Optional and Documented Support Products are system verification-tested within VSE System IPO/E 1.4.0 based on VSE/SP 1.1.0.

**New Service Process**

- Customers who order VSE System IPO/E 1.4.0 products in PRODUCTION format will benefit from a new service process.
- This process will ensure that cross-component module dependencies have been included, resolved and tested on a VSE System IPO/E 1.4.0 level for all VSE/SP 1.1.0 Optional and Documented Support Products.
- The IBM service organization now has the capability of testing and verifying corrections to a greater degree than before, because they

PROGRAM PRODUCTS

VSE System IPO/E V1.4.0 & VSE/SP 1.1.0 (cont'd)

have the same set of modules and executable phases as the customer.

- This new service eliminates the time consuming process of recompilation and/or link-editing.
- Service for executable phases of products ordered in PRODUCTION format are supplied pre-link edited, ready to be merged to production libraries.
- Service for relocatable/source members is applied directly to production libraries.
- Service libraries are not provided for a PRODUCTION system.
- For VSE System IPO/E 1.4.0 products ordered in GENERATION format, the service process is similar to that in the previous VSE System IPO/E 1.3.1.

New Hardware Support

- 3430 Tape
- 4225 Printer
- 3262-5 Printer
- 4351 Processors Model Group 9 - 12
- 3290 Information Panel in 3278 mdl 2-5 compatibility

In S/370 mode

- Support of FBA DASD
- Virtual Storage Address extension to 16MB independent of the real storage size (max. 8MB real memory in S/370 mode)

DESCRIPTION

VSE SYSTEM IPO/E 1.4.0

Product Content

Note: Program numbers listed in the tables that follow denote the individual program numbers outside the VSE System IPO/E 1.4.0.

VSE/SP 1.1.0

VSE/SP 1.1.0 (5666-296 and 5666-297)		
COMPONENT NAME	NUMBER	V. R. M.
VSE/Advanced Functions	5746-XE8	1.3.5
VSE/ICCF	5746-TS1	1.3.5
VSE/POWER	5666-273	2.1.0
VSE/VSAM	5746-AM2	1.3.0
VSE/VSAM Space Management	5746-AM2	---
VSE/VSAM Backup/Restore	5746-AM2	1.2.0
VSE/INTERACTIVE PRODUCTIVITY FACILITY	N/A	N/A
CICS/DOS/VS	5746-XX3	1.6.0
VSE/FAST COPY	5746-AM4	1.2.0
DITTO FOR VSE AND VM	5668-917	1.1.0
BTAM-ES	5746-RC5	1.1.0
ACF/VTAM	5666-280	2.1.0
VSE/POWER SHARED SPOOLING VM/VSE Feature	5666-273	2.1.0
DOS/VSE SCP	5745-030	1.3.5
BTAM SCP	5747-CG1	1.1.0
EREP	5656-093	2.2.0
OLTEP	5656-092	1.1.0
Device Support Facility	5747-DS2	1.6.0

Notes:

1. The ACF/VTAME Communication Adapter support is incorporated into ACF/VTAM 2.1.0.
2. The VM/VSE feature provides support for the VM/VSE environment of Interactive Productivity Facility and needs to be ordered as a separate feature of VSE/SP 1.1.0.  
VM/SP 2.1.0 is required when the VM/VSE feature is used.
3. The VSE Interactive Productivity Facility is included in the VSE/SP 1.1.0, but is separately available upon request.

**Optional Products:** Optional Products are installed and tested within the VSE System IPO/E 1.4.0 environment. Inter-product/component dependencies are resolved for the VSE System IPO/E user. Dialog support for key functions of these products is provided by Interactive Productivity Facility. Support for Optional Products has already been generated in VSE/SP. Library space for Optional Products is pre-assigned. The set of Optional Products available with the VSE System IPO/E 1.4.0 is shown in the following table, which also compares the release levels with the previous VSE System IPO/E Release 3.1 components.

OPTIONAL PRODUCTS			
PRODUCT NAME	LICENSED PROGRAM NUMBER	VSE SYSTEM IPO/E	VSE SYSTEM IPO/E
		R 3.1	1.4.0
VSE/IPCS	5746-SA1	1.3.0	1.3.0
VSE/OCCF	5746-XC5	1.1.0	1.1.0
Sort/Merge II	5746-SM2	2.4.0	2.5.0
DL/I DOS/VS	5746-XX1	1.6.0	1.6.0
EP/VS - DOS/VS	5747-AG1	1.3.0	1.3.0
VSE/Access Control Logging & Reporting	5746-XE7	1.1.0	1.1.0
ACF/NCP/VS (which includes) ACF/NCP/VS	5735-XX1	1.2.1	1.2.1
SSP for ACF/NCP/VS	5735-XX3	1.2.1	1.2.1
NCP/SSP SCP	5747-CH1	1.2.1	1.2.1
NCP/SSP SCP with EP Support feat. #6004	5747-CH1	1.3.0	1.3.0
NCCF	5735-XX6	1.2.0	1.2.0
NPDA	5668-983	1.2.1	2.1.0
DOS/VS COBOL	5746-CB1	1.3.0	1.3.0
DOS/VS RPG II	5746-RG1	1.3.0	1.3.0
PL/I COMP/LIB	5736-PL3	1.6.0	1.6.0
PL/I OPT. COMP	5736-PL1	1.6.0	1.6.0
PL/I RES. LIB	5736-LM4	1.6.0	1.6.0
PL/I TRANS LIB	5736-LM5	1.6.0	1.6.0

Notes:

1. The Optional Products ordered with VSE System IPO/E 1.4.0 are shipped as pre-tailored libraries that are restored within the VSE System IPO/E 1.4.0 install process.
2. The Optional Products are available with the same installation and servicing attributes as VSE/SP 1.1.0.

**Documented Support Products:** Documented Support Products are installed and tested with the VSE System IPO/E 1.4.0. The set of Documented Support Products in the VSE System IPO/E 1.4.0 are listed in the following table.

DOCUMENTED SUPPORT PRODUCTS			
PRODUCT NAME	LICENSED PROGRAM NUMBER	VSE SYSTEM IPO/E	VSE SYSTEM IPO/E
		R 3.1	1.4.0
DMS/CICS/VS-DOS	5746-XC4	1.3.0	1.4.0
DMS/CICS/VS IAG	5746-XC4	1.3.0	1.4.0
DMS/CSP DEFINITION	5668-944	N/A	1.1.0
DMS/CSP EXECUTION	5668-945	N/A	1.1.0
ELIAS-I	5746-XXV	1.2.0	1.2.0
DB/DC Data Dictionary	5746-XXC	1.4.0	1.4.0
ISPF	5668-960	N/A	1.1.0
ISPF/PDF	5666-281	N/A	1.1.0
INFO SYSTEM	5735-OZS	N/A	1.1.2
SQL/DS	5748-XXJ	1.1.0	1.2.0

Notes:

1. The DASD space required to install Documented Support Products is additional to minimum DASD requirements.
2. Documented Support Products are shipped as pre-tailored libraries that are restored using jobs created by Interactive Productivity Facility dialogs.
3. Documented Support Products are available with the same packaging and servicing attributes as VSE/SP 1.1.0.
4. SQL/DS 1.2.0 will be available in 1/84.
5. VSE/Performance Tool (VSE/PT) Release 2 Modification Level 1 has been tested with VSE System IPO/E 1.4.0 and is available at PID for installation as a non-SIPO program. The Technical Newsletter (TNL) (N20-0602) describes the installation and activation tasks.
6. It is IBM's direction to extend the ISPF dialog manager to the future VSE System IPO/E.

**Installation of VSE System IPO/E 1.4.0 products ordered after the initial installation:** VSE System IPO/E 1.4.0 Optional and Documented Support Products that are ordered after the initial order are installed into the pre-allocated libraries using jobs created by Interactive Productivity Facility dialogs.



## VSE System IPO/E V1.4.0 & VSE/SP 1.1.0 (cont'd)

### PRODUCTION and GENERATION Definition of VSE System IPO/E 1.4.0 Products

**PRODUCTION** Definition: PRODUCTION is generally defined as providing full product function but not providing for user modifications of this function. The products are pre-generated and shipped primarily in object code (library restore format) to simplify installation and service and to enhance usability. Flexibility for system environment adjustments is still maintained. Source code required for program development and program execution is included. These pre-generated options are selected to meet the requirements of most existing VSE installations. Service libraries are not provided. A user who orders VSE System IPO/E 1.4.0 products in PRODUCTION format will benefit from the new service process, which significantly reduces time and complexity of service application.

**VSE/SP PRODUCTION** is the pre-generated VSE/SYSTEM PACKAGE 1.1.0. It contains several pre-assembled supervisors to cover various 4300 and S/370 VSE and VM/VSE environments. CICS/DOS/VS 1.6.0 is pre-generated, but allows for environmental adaptations of the Terminal Control Tables, Program Control Tables, Transient Data Table, Basic Mapping Support, etc. These adaptations can either be done at initial installation or at a later time when needed, as described in the CICS/DOS/VS 1.6.0 documentation.

**GENERATION** Definition: VSE System IPO/E 1.4.0 products shipped in GENERATION format include the PRODUCTION format as well as all library members available with the Basic Machine-Readable Material of stand-alone products.

GENERATION allows the user to modify and to re-assemble certain programs. The GENERATION format is provided for users who:

- Require unique system or subsystem generation parameters that are not provided in the PRODUCTION format of VSE/SP 1.1.0 or other VSE System IPO/E 1.4.0 products.
- Modify IBM-provided code/generation options to support additional hardware or software.

The service process for programs ordered in GENERATION format is similar to that of the VSE System IPO/E 3.1.

**Note:** Details about the characteristics and considerations of System IPO/E 1.4.0 products shipped in PRODUCTION format versus GENERATION format can be found in the *VSE System IPO/E 1.4.0 Planning Guide* (GC20-2003). This document will be shipped after the VSE System IPO/E 1.4.0 announcement to all SLSS users with VSE/AF in their SLSS profiles.

**VSE/System Package 1.1.0 Characteristics:** The VSE System IPO/E 1.4.0 with VSE/SP 1.1.0 is a significant step to address VSE as a total system

VSE/SP 1.1.0 is an operational, interactive, and data communication operating system. It is built as a package of VSE programs and delivered as a single licensed entity as the base for VSE System IPO/E 1.4.0. The optional VM/VSE feature of VSE/SP 1.1.0 can be ordered for execution of Interactive Productivity Facility under CMS.

The components within VSE/SP 1.1.0 have been serviced to a service update level concurrent with all VSE System IPO/E 1.4.0 products.

Functions of VSE/SYSTEM PACKAGE 1.1.0 by Program: (Detailed functional descriptions can be found in the documentation associated and available with each program.)

**VSE/Advanced Functions (VSE/AF) 1.3.5:** VSE/AF is extended to provide the following new support:

- **New I/O devices:**
  - 2,000 lpm 4245 Printer attached via channel
  - 5,650 lpm 3262 Printer attached via channel
  - 3430 Tape device with recording densities of 1,600 and 6,250 bpi attached via channel
- **New functions:**
  - Support of FBA DASD in S/370-mode
    - Any supervisor mode now supports FBA Direct Access Storage Device (FBA DASD).
  - More Virtual Storage in S/370-mode
    - With VSE/AF 1.3.5 up to 16MB of virtual storage size can now be specified also in S/370 supervisor mode regardless of the real memory size. However, the 16MB of virtual storage space is reduced by the supervisor size and the sum of the real partition sizes specified.
    - For ease-of-use, VSIZE can be specified in units of M-Bytes in addition to units of K-Bytes.
  - SIOF (START IO FAST) Support
    - The SIOF instruction will be used in the VSE/AF supervisor.

Along with the support of the SIOF instruction, the extended I/O architecture for improved I/O busy handling (SIO Queued) will be supported. The supervisor will process 'delayed I/O interrupts'. This support will be used by processors which can exploit this SIOF instruction. It can improve performance in environments with heavy I/O activity. The use of SIOF allows VM a better guest system dispatching in case of I/O operations.

- **Ease-of-Use, Availability, Reliability**
  - ISPF Support
    - This support allows use of the Documented Support Product ISPF as dialog and panel manager in a VSE system with dialog and panel compatibility of other systems running ISPF. ISPF executes in an ICCF interactive partition.
  - Integrity Improvements
    - The ABEND exit routine has been extended to be invoked for any type of termination (normal and abnormal). Thus, the task which is abended can keep control. This allows the user to program controlled termination actions like invocation of VSAM automatic close, completion of all pending I/O requests, free all locks etc. Using this function will more often leave a functioning system after an ABEND, and thus make recovery/restart much easier or avoid recovery at all.
  - Extended IPL support
    - Allows specification of volume serial number instead of device address in the IPL commands DEF, DLA, DLF and DPD. These enhancements further simplify IPL and give more flexibility in DASD usage.

#### Device Support Facility 1.6.0

- Provides functions like Initialize Disk, Assign Alternate Block etc. for the DASD devices.

#### VSE/ICCF 1.3.5

- **Multilevel Program Function Keys**
  - The extension of the PF-key setting will be used to define and work with four different sets of PF-keys: One individual set for each, Command mode, LIST/SPOOL-mode, EDIT-mode and EXECUTION/READ-mode. Each set can be up to 24 PF-Keys and thus fully utilize the extended PF-Key keyboards. This facility is used to substitute PF-Keys for commands etc., for ease-of-use and productivity purposes.
- **@Exit Macro Order in the ICCF Macro Language**
  - The new macro order will be used to exit a macro without reaching the physical end of a macro. This provides controlled flexibility in macro processing comparable to procedures.
- **Removal of @ Prefix for Macro Invocations**
  - Macros may now be invoked in command mode by specifying the macro name without the @-prefix. Thus, a terminal user can invoke macros like he can invoke procedures. This functional extension improves ease-of-use and simplifies the human machine interface in VSE.
- **VSE/ICCF Notify Support**
  - A communication link will be established between VSE/ICCF and VSE/POWER (via NOTIFY) so that e.g., batch job ending messages can be routed to the terminal user who submitted the job. This function notifies the terminal user about the job events automatically rather than have him query the system to get the information, thus providing a better level of information. This function complements the NOTIFY support in VSE/POWER.
- **/Include Job Entry Statement Resolved by DTSUTIL**
  - The new parameter SDI will be introduced for the DTSUTIL-commands PRINT, PUNCH and PRTPCH to allow printing or punching of included members. This function provides ease-of-use in ICCF library handling. It relieves the user of analyzing library members to create extra punch or print cards for each INCLUDE statement within members. The INCLUDE statement will be automatically resolved by DTSUTIL.
- **Skip Recovery (via DTSANALS) if Library is Correct**
  - DTSANALS will have the capability through the optional parameter OPT on the commands ANALYZE, RECOVER, and REORG, to decide whether the Analyze-, Recover- or Reorg-command should run or not depending on the current status of the ICCF library. This should reduce and improve restart/recovery time because unnecessary recovery runs can be eliminated
- **3290 Information Panel support**
  - The 3290 Information Panel is supported as a 3278 mdl 2 -5 compatible display.

**VSE System IPO/E V1.4.0 & VSE/SP 1.1.0 (cont'd)**

**VSE/POWER 2.1.0**

- **New Device Support**  
VSE/POWER has been extended to support the new hardware devices which are supported in VSE/AF 1.3.5.
- **NOTIFY Support to a VSE/ICCF User**  
This support enables a message to be sent to a VSE/ICCF user when a job has executed locally or remotely, output has been received from another system for that user, or a job or output has been transmitted by the network. This complements the NOTIFY support in VSE/ICCF.
- **Network connectivity to MVS/JES3**  
The VSE/POWER networking function can now be used to connect with an MVS/JES3 Release 1.3.1 node via BSC lines (PTF UZ64973 has to be installed in MVS/JES3 1.3.1).

**VSE/Interactive Productivity Facility**

- **Restructured Menu Hierarchy**  
Interactive Productivity Facility provides a structured menu hierarchy, which is more task-oriented.
- **Additional Hardware Support**  
VSE/Interactive Productivity Facility supports all new hardware devices which are supported in VSE System IPO/E 1.4.0.
- **Support of new Software Products/Components**  
VSE/Interactive Productivity Facility supports all new software components which are included in VSE System IPO/E 1.4.0.
- **Dialog Improvements**  
Performance for key Interactive Productivity Facility dialogs has been improved by approximately 50%.
- **VM/VSE Feature Enhancements**  
The VM/VSE feature will contain its own dialog manager in Interactive Productivity Facility and will no longer be dependent on VM Interactive Productivity Facility. The system interfaces in the Interactive Productivity Facility dialog manager are adapted to the new standard interfaces provided in VM/SP 2.1. Thus, VM/SP 2.1 is a prerequisite if the VM/VSE feature is used in a VM/VSE environment.

**CICS/DOS/VS 1.6.0 (For detailed information, see P-Letter 282-268)**

- Application Programming Enhancements
- Guidance on CICS/VS Master Terminal and User Exits
- Security Enhancements
- Journal Management and Restart Enhancements
- CICS Resource Definition Online
- System Availability Enhancements
- Performance and Tuning Improvements
- Intercommunication Enhancements
- Device Support Enhancements
- Problem Diagnosis/Serviceability Aids
- New User Exit Facilities
- Serviceability Improvements

**VSE/Fast Copy 1.2.0**

- Performance improvements for 8809 via a new Multiple Buffering concept developed in order to guarantee the streaming for the 8809 tape device in most cases of alternate block assignments.

**BTAM-ES 1.1.0:** BTAM-ES provides support for Bisynchronous and Start/Stop communication terminals and also supports local terminal attachment.

**ACF/VTAM/VSE 2.1.0**

- **Full VTAM/NCP Environment**  
ACF/VTAM/VSE 2.1.0 provides the following enhancements over ACF/VTAM 1.3.0 in a VSE environment:
  - Integrated multisystem networking capabilities.
  - ACF/VTAM/VSE 2.1.0 hosts can function as intermediate routing nodes in the network
  - Ability to easily modify, replace, or suppress ACF/VTAM messages to suit installation needs or preferences.

- Enhanced processing of large SNA messages sent from ACF/VTAM application programs to potentially improve network performance and reliability.
- Allows programs to determine, at assembly and at execution time, what particular functions are supported with the given level of ACF/VTAM being used.
- Support for downstream load of devices with the Downstream Load Utility program on VSE.
- Reliability, availability, and serviceability (RAS) enhancements of ACF/VTAM networks.
- Dynamic collection of tuning statistics.

• **Communications Adapter Support**

Integration of communication adapter and communications controller support in ACF/VTAM/VSE 2.1.0 provides VSE users with simplified growth paths for IBM communication products and enhanced data communication capability. ACF/VTAM/VSE 2.1.0 replaces ACF/VTAME in VSE System IPO/E.

With these enhancements, ACF/VTAM 2.1.0 VSE now provides support for:

- Customers installing their first teleprocessing system
- Non-SNA customers desiring to utilize:
  - Economies of SNA line sharing and terminal sharing
  - Communication network management licensed programs for centralized control and problem determination
  - Loop adapter support
- CICS/DOS/VS customers with terminals supported by BTAM who wish to migrate to terminals supported by SNA.
- ACF/VTAME customers wishing to utilize facilities previously available only in ACF/VTAM Release 3.

**VSE/VSAM 1.3.0**

- VSE/VSAM is an access method designed to operate with direct access devices and to support both direct and sequential processing.
- Three types of data sets are provided: Key-sequenced, entry-sequenced and relative record data.
- VSE/VSAM offers multiple levels of password protection.
- Alternate Indexes permit application programs to access records of a VSAM entry or key-sequenced data set on the basis of keys other than the prime key.
- VSE/VSAM SPACE MANAGEMENT FOR SAM provides the capability to define and process a SAM file within VSE/VSAM data space giving automatic space management of the file.
- VSE/VSAM BACKUP/RESTORE of VSE/VSAM provides backup onto tape and restore from tape with high performance and low processor utilization. The VSE/VSAM feature is especially geared to the streaming mode of the 8809 tape drive.
- VSE/VSAM delivered in VSE/SP 1.1.0 can also be used for execution in a VM/CMS/DOS environment.

**VSE/OLTEP 1.1.0**

- **Extended Hardware Support**  
VSE/OLTEP supports all hardware devices supported by VSE. In addition, it now supports FBA only and cardless systems.

**VSE/EREP 2.2.0:** EREP 2.2.0 availability for VSE environments is announced through this announcement. It will be available concurrent with VSE/AF 1.3.5 and VSE/SP 1.1.0.

- **Extended Hardware Support**  
EREP is extended to handle the new hardware devices which are supported in VSE/AF 1.3.5.
- **New Function - System Exception Report**  
This function of EREP 2.2.0 strengthens and extends the analytic/diagnostic capabilities of EREP in VSE environments, enabling a more rapid identification of significant component failures within a system and each of its major hardware subsystems.

**DITTO for VSE and VM 1.1.0:** DITTO for VSE and VM Release 1.1.0 provides the following new functions and improvements to existing functions:

- Full screen display mode for record display and alteration functions.
- A tape-to-tape compare function (TTC) to compare the contents of two different files. If a mismatch is found, the input and output records will be printed out.

**VSE System IPO/E V1.4.0 & VSE/SP 1.1.0 (cont'd)**

- A VSAM Record Load (VRL) function to allow direct alteration of VSAM file records.
- Further SET function extensions are provided to allow the user to specify:
  - Dump formats of UPDOWN or ACROSS (new horizontal format)
  - Print length of 80 or 132. The shorter length is especially useful on VSE/ICCE screens to avoid overlapped output lines.
- Significant ease-of-use improvements, for example:
  - SET function defaults can be changed via a profile.
  - Horizontal Dump format for printouts and full-screen displays.
  - The Display VTOC function (DVT) is extended to provide additional information about the files on the disk and is presented in a more compact format.
  - The Disk Record Scan function is extended to also show the offset of the data found in the record and to provide printouts of each record where a hit is found.
- DITTO for VSE and VM delivered in VSE/SP 1.1.0 can also be used for execution in a VM/CMS/DOS environment.

**Deleting VSE/SP 1.1.0 Components:** The option of taking VSE/SP 1.1.0 without the full complement of components is available. In this case, one of the following PRPQ versions of VSE/SP 1.1.0 has to be ordered, licensed and installed instead of VSE/SP 1.1.0 (5666-296/5666-297):

- VSE/SP 1.1.0 PRPQ - Partial Function PRODUCTION (5799-BNB)
- VSE/SP 1.1.0 PRPQ - Partial Function GENERATION (5799-BNC)

**Licensing Instructions:** To simplify the customers order process, the VSE/SYSTEM PACKAGE may be ordered and licensed as a single licensed program.

Customers who do not wish to use all of the components of the VSE/SYSTEM PACKAGE in their operational VSE system will be given permission via a VSE/SYSTEM PACKAGE memo-to-users, to use all of the components of the VSE/SYSTEM PACKAGE solely for the purpose of installing the VSE System IPO/E 1.4.0. The customer is then required to delete those components which the customer does not plan to use in his operational system. At time of general availability, an ordering check list will be provided on which the customer can select those components of VSE/SP 1.1.0 which the customer wants to use in his operational system.

See the Announcement Letter for Sample Order Checklists to be used for ordering VSE System IPO/E 1.4.0 and VSE/SP 1.1.0. The availability letter for VSE System IPO/E 1.4.0 will include an updated VSE System IPO/E 1.4.0 order checklist.

**CUSTOMER RESPONSIBILITIES**

Customer Management is responsible for the ultimate evaluation of the adequacy of this offering to address individual customer requirements and or the selection, implementation and adequacy of security procedures for their application.

**SPECIFIED OPERATING ENVIRONMENT**

**HARDWARE REQUIREMENTS**

**Systems:** VSE System IPO/E 1.4.0 supports the same IBM 4300, S/370, and 30XX hardware as the VSE System IPO/E 3.1. (Processors: IBM 4321, IBM 4331 - all model groups with a minimum of 1MB of real memory, IBM 4341 Model Groups 9 - 12, IBM 4361 Processor, IBM S/370 mdls 138 - 158 with a minimum of 1MB of real memory, IBM 3031, 3032, 3033. Support for the IBM 3083 requires VM. Hardware feature requirements are the same as for VSE/AF.) New hardware is supported as described under the individual programs (see "Highlights of VSE/SP 1.1.0 by product").

VSE System IPO/E 1.4.0 requires a processor with a minimum of 1MB of real storage. Therefore, S/370 mdl 115 and 125 Processors can not utilize VSE System IPO/E 1.4.0

**Storage Requirements:** The minimum processor storage requirements for the VSE System IPO/E 1.4.0 are shown below.

VSE Environment	VM/VSE Environment
1.0MB	2.0MB

**Note:** Depending on the products used in a customer environment, the minimum processor storage requirement may be higher (e.g., due to SQL/DS, which requires a system containing at least 2.0MB of real memory).

Those customers who have processors with minimum real storage and who are now fully exploiting their memory should consider the increased memory needs of VTAM and CICS.

**DASD Requirements:** The number of Direct Access Storage Device (DASD) volumes required for the installation of VSE System IPO/E is dependent upon the DASD type and the product set being installed.

The minimum addressable DASD volumes required are shown below in Figure 1 for a VSE System IPO/E 1.4.0 system with VSE/SP 1.1.0 and Optional Products shipped only in PRODUCTION format. Figure 2 shows the minimum addressable DASD volumes required for the same system if any product is shipped in GENERATION format (Figure 2).

- All DASD volumes required for VSE System IPO/E installation and service must be of the same device type.
- The minimum volumes listed below do not include space for the Documented Support Product production library sets.
- The VM/VSE feature requires 28,000 1K blocks of VM CMS mini-disk space for all DASD environments.

IBM DASD TYPE	MINIMUM VOLUMES PRODUCTION	NOTES
3310	5	
3330	5	1
3340	5	2, 3
3350	2	
3370	2	
3375	2	

Figure 1: Minimum VSE/System Package and Optional Product DASD Requirements with only PRODUCTION Products

**Notes:**

1. IBM 3330 mdl 1. 3330 mdl 11s are treated as 3330 mdl 1s.
2. IBM 3340 mdl 70 or 70F or 3344 (1-3344 = 4-3340s).
3. One additional 3340 volume is required for ACF/NCP/VS.

IBM DASD TYPE	MINIMUM VOLUMES GENERATION	NOTES
3310	6	4
3330	6	1, 4
3340	6	2, 3, 4
3350	2	4
3370	2	4
3375	2	4

Figure 2: Minimum VSE/System Package and Optional Product DASD Requirements if any GENERATION Products

**Notes:**

1. IBM 3330 mdl 1. 3330 mdl 11s are treated as 3330 mdl 1s.
2. IBM 3340 mdl 70 or 70F or 3344 (1-3344 = 4-3340s).
3. One additional 3340 volume is required for ACF/NCP/VS.
4. No data-secured file may be placed in the DASD space required for a generation library.

**Library/File Size Comparison:** The size of the minimum DASD layout in VSE System IPO/E 1.4.0 is larger than the layout for the VSE System IPO/E 3.1. This is due to two factors:

- All phases, modules, and macros necessary for normal use of each product are included in the production libraries. In the VSE System IPO/E 3.1, some of the parts of products needed for normal use were contained in the service libraries.
- The size of the user's POWER files, ICCF libraries, and ICCF files are increased substantially. This will minimize the need to expand these files during or after the installation of VSE System IPO/E 1.4.0.

**Other Hardware:** The following minimum hardware is required for the VSE System IPO/E 1.4.0. The VM/VSE feature has the same hardware requirements as the VM/SP System IPO/E, plus at least the virtual equivalent of the devices listed below:

- A VSE-supported console.
- A local terminal which supports a 24x80-character screen format. This terminal must be supported by VSE, CICS/VS, VSE/ICCF, and the telecommunications access method selected by the user.

## PROGRAM PRODUCTS

**VSE System IPO/E V1.4.0 & VSE/SP 1.1.0 (cont'd)**

- A VSE-supported tape drive.
- A VSE-supported printer.

**SOFTWARE REQUIREMENTS**

VSE/SP 1.1.0 is a complete operating system with no prerequisite software. VSE System IPO/E 1.4.0 PRODUCTION and GENERATION products are ready for immediate use after installation. Products ordered in GENERATION format can be modified according to customer needs like in VSE System IPO/E 3.1.

VM/SP 2.1 is required if the VM/VSE feature is used in a VM/VSE System IPO/E 1.4.0 environment.

**COMPATIBILITY**

Migration to VSE System IPO/E 1.4.0: (Details are described in the *VSE System IPO/E 1.4.0 Planning Guide*, GC20-2003).

The migration to VSE System IPO/E 1.4.0 is considered as a release transition.

Migration assistance will be provided through Interactive Productivity Facility dialogs to migrate from VSE System IPO/E 2.1, VSE System IPO/E 3.0, and VSE System IPO/E 3.1 to VSE System IPO/E 1.4.0.

Non-VSE System IPO/E products with Interactive Productivity Facility dependent dialogs will run without modification on VSE System IPO/E 1.4.0 with the following exceptions: Explicit references to menu names in Interactive Productivity Facility may cause an error message due to the restructured menu hierarchy. Depressing a function key can be used to recover from this situation.

VSE/POWER provides support to migrate POWER punch, list and reader files via the POWER Offload (Poffload) facility.

Users of VSE/ICCF can migrate their VSE/ICCF user libraries using the facilities provided by the VSE/ICCF DTSUTIL program.

VSE/VSAM 1.3.0 provides compatibility and portability for VSAM data sets of previous releases as documented in chapter 10 of the *VSAM Programmer's Reference* (SC24-5145-2).

VSE System IPO/E 1.4.0 will coexist in networks with VSE/System IPO/E 3.1, 2.1 and other VSE releases and with SSX/VSE 1.2.

Interactive Productivity Facility provides dialog facilities to support the backup and restore of user program libraries.

VSE/Performance Tool (VSE/PT) Release 2 Modification Level 1 has been tested with VSE System IPO/E 1.4.0 and is available at PID for installation as a stand-alone program. The Technical Newsletter (TNL) (N20-0602) describes the installation and activation tasks.

**PERFORMANCE CONSIDERATIONS**

VSE System IPO/E 1.4.0 provides improved performance in the areas of system installation and service.

Response time and system performance is a function of the application and system configuration. Refer to individual product or component documentation for further details on the performance of the individual products.

**DOCUMENTATION**

(available from Mechanicsburg)

VSE System IPO/E:  
*Planning Guide* (GC20-2003) ... *Installation Guide* (GC20-2012) ...  
*Reference Manual* (GC20-2013) ... *VME/VSE Feature Guide* (GC20-2014) ...  
*Communication Guide* (GC20-2004) ... *Licensed Program Specifications for VSE/SP* (GH20-5347).

Interactive Productivity Facility 1.4.5:  
... *Reference Summary Card* (GX20-2383) ... *User's Guide* (SH20-5526) ... *Reference Manual* (SH20-2486).

RPQs ACCEPTED: No

PROGRAM PRODUCTS

**5666-296 - VSE/SP 1.1.2 PRODUCTION**  
**5666-297 - VSE/SP 1.1.2 GENERATION**  
**VSE/SYSTEM PACKAGE VERSION 1.1.2**  
**5750-AAP - VSE/SYSTEM IPO/E 1.4.2**

**PURPOSE**

VSE/System Package 1.1.2 shipped via VSE/System IPO/E 1.4.2 provides support for the 3380 mdls A4, AA4, and B4 and the 3370 mdls A02 and B02.

**Extended RAS Support for the 4361:** VSE/System Package 1.1.2 and VSE System IPO/E 1.4.2 will support the extended machine check and channel check handling of the 4361 System, resulting in fewer system hard wait conditions.

**SPECIAL SALES INFORMATION**

This refresh release will be especially attractive for those customers who want to install the 3380 mdl 4 and/or the 3370 mdl 2.

**HIGHLIGHTS**

VSE/System Package 1.1.2 shipped via VSE/System IPO/E 1.4.2 supports the 3370 mdl 2 for system and data files. The 3370 mdl 1 layout is used on the 3370 mdl 2.

The 3380 is supported for user files. The VSE System IPO/E system files have to reside on a different DASD type (3310, 3330, 3340/44, 3350, 3370 mdl 1 and 2, 3375).

A VSE customer not using VSE/System IPO/E Version 1 Release 4 Modification Level 2 can generate his system using the 3380 for system residence files through VSE/AF 1.3.5 and installation of the required SPE PTFs (see 'PTFs for IBM 3370 - 2 and IBM 3380 -4' in chapter Ordering Instructions), or by installing VSE/AF 1.3.5 at Refresh Level 8401.

Note: SSX/VSE Release 3 will provide support for the 3370 mdls A02/B02 via a PTF as system and data device at availability of these devices.

For system devices, the SSX/VSE predefined DASD space layout will be the same as with the 3370 mdls A01/B01 (remaining space can not be used). For VSAM user files which are on the data devices however, the full capacity of the mdls A02/B02 can be utilized.

**DESCRIPTION**

**Products with Limited Support (3370 mdl 2 support only):**

- ELIAS-I  
ELIAS-I will not be changed to support the 3380.
- IPCS  
IPCS will not be changed to support the 3380.

**Full Support:**

Full support for the 3380 mdl 4\* and 3370 mdl 2 is provided by the following VSE products within VSE/System IPO/E 1.4.2:

COMPONENT NAME	NUMBER	V.R.M.
DOS/VSE SCP (incl. ASSM.)	5745-030	1.3.5
VSE/Advanced Functions	5746-XE8	1.3.5
VSE/ICCF	5746-TS1	1.3.5
VSE/POWER	5666-273	2.1.0
VSE/VSAM	5746-AM2	1.3.0
VSE/VSAM Space Management	5746-AM2	----
VSE/VSAM Backup/Restore	5746-AM2	1.2.0
VSE/Interactive Productivity Facility **	5799-BND	1.1.0
VSE/Access Control Logging and Reporting	5746-XE7	1.1.0
CICS/DOS/VS	5746-XX3	1.6.0
DL/I DOS/VS	5746-XX1	1.6.0
DL/I DOS/VS ***	5746-XX1	1.7.0
VSE/FAST COPY	5746-AM4	1.2.0
DITTO FOR VSE	5668-917	1.1.0
Sort/Merge	5746-SM2	2.5.0
VS/FORTRAN Comp./Lib. ***	5748-FO3	1.3.1
VS/FORTRAN Library ***	5748-LM3	1.3.1
DOS/VS COBOL Comp./Lib.	5746-CB1	1.3.0
DOS/VS COBOL Library	5746-LM4	1.3.0
DOS/VS RPG II	5746-RG1	1.3.0
PL/I Compiler/Library	5736-PL3	1.6.0
PL/I Optimizing Compiler	5736-PL1	1.6.0
PL/I Resident Library	5736-LM4	1.6.0
PL/I Transient Library	5736-LM5	1.6.0
VSE/POWER Shared Spooling	5666-273	2.1.0
VM/VSE Feature	-----	-----
EREP	5665-093	2.3.0
OLTEP	5656-092	1.1.0
Device Support Facility	5747-DS2	1.6.0

**Notes:**

- \* See "Hardware Restrictions" in chapter Ordering Instructions.
- \*\* Restricted PRPQ.
- \*\*\* Not included in VSE System IPO/E.

PROGRAM PRODUCTS

**5667-124 - ACF/NCP V3 for 3705 and 3725  
ADVANCED COMMUNICATIONS FUNCTION for  
NETWORK CONTROL PROGRAM VERSION 3  
for the 3705 and 3725 COMMUNICATION CONTROLLERS**

**PURPOSE**

Advanced Communications Function for the Network Control Program (ACF/NCP) Version 3 for the 3705 and the 3725 is a program product for users of MVS/370 and MVS/XA (Compatibility Mode) that offers the capabilities of ACF/NCP Version 2 for the 3705 and the 3725, plus SNA network interconnection capability, enhanced recovery of lost resources, enhanced problem determination tools, error recording, and availability. Additionally, for the 3705, ACF/NCP Version 3 contains improved sysgen times previously incorporated for the 3725 in ACF/NCP Version 2.

Additional enhancements support functional enhancements for the 3725. ACF/NCP Version 3 is designed to operate in the 3705 and 3725 Communication Controllers, whether channel-attached to a host processor, or remotely connected to a host processor by an SDLC link to another controller. ACF/NCP Version 3 is generated using the ACF/System Support Programs (ACF/SSP) Version 2 Release 2 (5735-XXA).

**HIGHLIGHTS**

- Provides the capability for independent SNA networks to communicate via SNA network interconnection in conjunction with ACF/VTAM Version 2 Release 2.
- Allows forced deactivation of SNA resources and non-SNA lines.
- Extends support when applicable for 3863, 3864, 3865, and 3868 modems to reporting of received signal level and execution of LPDA commands on data multiplexed links and tail circuit attached links.
- Provides improved problem determination capabilities via the ability to trace the path of a session and to map physical addresses to logical names, in conjunction with the Network Logical Data Management (NLDM) licensed program, Release 2.
- For the 3705, enhancements are included which were previously supported for the 3725 in Version 2:
  - Reduced sysgen time due to removal of conditional assemblies.
  - Key control blocks may be extended above 64K boundary, which may allow additional devices to be included, if adequate storage is available.
- For the 3725 only, ACF/NCP Version 3 supports functional hardware improvements:
  - Additional storage protect support is implemented.
  - Up to 2 megabytes of storage is supported.
  - Links across an Intermediate Routing Node (IRN) may send up to 127 blocks of data in one direction before requiring a response, resulting in more efficient usage of high-speed links and satellite transmissions.
  - The Port Swapping function of the 3725 is supported.
  - The enhanced start/stop support announced October 4, 1983 for the 3725 is supported.

**DESCRIPTION**

- ACF/NCP Version 3 provides SNA network interconnection, the capability of connecting two or more networks through a gateway NCP node. With ACF/NCP Version 3 operating in conjunction with ACF/VTAM Version 2 Release 2, two end-points (LUs) in different networks can then be logically interconnected through the gateway NCP. Highlights of SNA network interconnection include:
  - Each network still preserves its own character, in terms of network elements, naming, control, evolution, and security.
  - Interconnected networks may have different partitioning of the 16-bit network address. Thus, a network of 16 subareas may be interconnected with a network of 64 subareas, for example.
  - All currently supported cross-domain LU-LU sessions are also supported in cross-network sessions. Ownership is within a network.
  - Addresses in one network are transformed into corresponding addresses of the other network. Through the use of the alias name translation function of the Network Communications Control Facility (NCCF) Version 2, each interconnected network may (optionally) have its own name structure.
  - BSC 3270 terminals may participate in cross-network sessions.
  - Networks may be interconnected by more than one gateway NCP.
  - One gateway NCP may be used for attaching up to 255 networks. The gateway NCP is capable of supporting sessions spanning any pair of networks connected to it.
  - Any number of networks may be connected together via interconnection. A cross-network session may go through a number of networks.
  - In addition to SNI functions, a gateway NCP may perform additional NCP functions consistent with available storage and performance capabilities.

- One gateway NCP may have up to eight SSCP owners at one time, each of which may or may not be gateway SSCPs.

- ACF/NCP V3 also provides end-to-end visibility of the configuration from one end of the session to another within a network in conjunction with NLDM.
- ACF/NCP V3 provides forced deactivation to operationally force the deactivation of a line. For some cases where 'hung' resources would previously require re-IPLing, the NCP to recover, the resources may be recoverable via command. ACF/TCAM supports both SNA and non-SNA forced deactivation of lines via PTF on Version 2 Release 4; ACF/VTAM Version 2 Release 2 supports forced deactivation of SNA links, BSC 3270 lines, and, in conjunction with Network Terminal Option Release 2.1, non-SNA Lines.
- ACF/NCP V3, in conjunction with the Network Problem Determination Application (NPDA) Version 3, provides additional support for 3863, 3864, 3865 and 3868 modems:
  - Extension of Link Problem Determination Aid (LPDA) capability to support 3865 modems with the data multiplexer feature and 3863 and 3864 modems attached by the tail circuit accessory.
  - Inclusion of the received signal-level measurement with LPDA data sent to NPDA V3.
  - Inclusion of support for remote modem self-test, with LPDA data sent to NPDA V3.
- For the 3725, ACF/NCP extends the functional support:
  - Storage Protection enhancements will offer more protection against inadvertent overlays of storage.
  - Storage support will be increased from one megabyte up to two megabytes of allowable storage.
  - Up to 127 blocks of data may be sent across an IRN link before a response is required, which will provide significantly improved performance for NCP-to-NCP traffic on 19.2K bps and higher-speed links. Previous IRN to IRN traffic required a response after only seven blocks.
  - The enhanced start/stop support announced October 4, 1983 for the 3725 is supported.
  - Support is included for Port Swapping. Port Swapping allows an operator to logically swap a defined port to an undefined port, improving recovery capability.

**SPECIFIED OPERATING ENVIRONMENT**

**HARDWARE REQUIREMENTS**

This licensed program is designed to operate on the IBM 3705-II, the IBM 3705-80, and the IBM 3725 Communication Controllers, either channel-attached to a host processor, or remotely connected to a host processor by an SDLC link to another controller.

**SOFTWARE REQUIREMENTS**

ACF/NCP Version 3 for the IBM 3705 and 3725 is generated using the ACF/System Support Program (ACF/SSP) Version 2 Release 2 licensed program (5735-XXA). ACF/NCP Version 3 for the IBM 3705 and IBM 3725 operates with MVS Release 3.8, MVS 3.8 with the System Extension licensed program, MVS 3.8 with the SP Version 1 licensed program, and MVS/SP Version 2 for Extended Architecture (XA) processors (24-bit mode).

Use of the Partitioned Emulation Programming (PEP) extension of ACF/NCP Version 3 for the IBM 3705 requires the Emulation Program for the IBM Communication Controllers.

Use of the Partitioned Emulation Programming (PEP) extension of ACF/NCP Version 3 for the IBM 3725 requires the Emulation Program for the IBM Communication Controllers.

ACF/NCP Version 3 supports the following releases of ACF/TCAM and ACF/VTAM, at the functional level of the access method:

- ACF/TCAM Version 2 Release 4
- ACF/VTAM Version 1 Release 3 (MVS only)
- ACF/VTAM Version 2 Release 1 (MVS only)
- ACF/VTAM Version 2 Release 2

**COMPATIBILITY**

ACF/NCP Version 3 for the 3705 and 3725 Communication Controllers supports and can communicate with:

Host-resident programs	3705	3725
• ACF/SSP V2 R2	X	X
• ACF/TCAM V2 R4	Note 5, 6	
• ACF/VTAM V1 R3	Note 1, 5	
• ACF/VTAM V2 R1	Note 1, 5	
• ACF/VTAM V2 R2 MVS	X	X
• EREP MVS	X	X

PROGRAM PRODUCTS

ACF/NCP V3 for 3705 and 3725 (cont'd)

• NPA-Host FDP (5798-CZR)	X	X
• NPDA V2	Note 2, 5	
• NPDA V3	X	X
• NCCF R2	Note 5	
• NCCF V2	X	X
• NLDM R1	Note 5	
• NLDM R2	X	X

Controller-resident programs: Operation of the following programs is supported with NCP Version 3 in the specified machine:

	3705	3725
• EP for the IBM Communication Controllers	X	X
• NTO Release 2.1	Note 3	
• NRF Release 1.5	Note 3	
• X.25 NPSI	Note 4	
• Non-SNA Interconnection	Note 7	

Notes:

1. MVS only, with appropriate PTF.
2. NPDA Version 2 support for the 3725 is provided via PTF.
3. NTO Release 2.1 and NRF Release 1.5 for ACF/NCP Version 3 will be ordered by new feature numbers for the 3705 and 3725. Feature numbers will be available at general availability.
4. Ability for the X.25 NCP Packet-Switching Interface (5668-981), to operate with ACF/NCP Version 3 is scheduled for 4Q84 for the 3705 and 4Q84 for the 3725.
5. Supported only at the identified product's functional level.
6. A TCAM PTF will be provided 2Q84 to support cross-network sessions and forced deactivation for SNA and non-SNA lines.
7. The Non-SNA Interconnection licensed program (5668-951) will be available for operation with ACF/NCP Version 3 for the 3725 1Q85.

The following levels of ACF/NCP may communicate with ACF/NCP Version 3:

- ACF/NCP V1 R2.1
- ACF/NCP V1 R3
- ACF/NCP V2 (3705 and 3725)
- ACF/NCP V3

In addition, ACF/NCP Version 3 can communicate with ACF/VTAME and ACF/VTAM V2R1 supporting an ICA under VSE.

Stage 1 program generation source decks for ACF/NCP Version 1 Release 3 and ACF/NCP Version 2 for the IBM 3705 or IBM 3725 with no or slight modifications may be used to generate ACF/NCP Version 3 for the corresponding Communication Controller. Modifications, if required, are not extensive and are relatively simple to implement. They include the addition and deletion of certain macros and macro operands. Details for Version 3 for the IBM 3705 are in the *ACF/NCP and SSP Installation and Resource Definition Guide (SC30-3224)*; details for Version 3 for the IBM 3725 are in the *ACF/NCP and SSP Installation and Resource Definition Guide (SC30-3226)*.

PLANNING CONSIDERATIONS:

The Network Control Program user will require ACF/NCP Version 3 for the 3705 and the 3725 (5667-124), ACF/SSP Version 2 Release 2 (5735-XXA), and the required access methods and operating systems to generate and operate ACF/NCP Version 3.

The 3705 or 3725 Partitioned Emulation Programming user will require, in addition, Emulation Program for the IBM Communication Controllers (5735-XXB).

For a SNA network interconnection environment, IBM recommends that NLDM Release 2 and NCCF Version 2 be present at every VTAM host that serves as a gateway node to assist problem determination for cross-network sessions. With these products installed, the network operator will have access to data used for network problem determination and problem source identification.

VM/370 support for BSC or start-stop terminals may coexist with the SNA terminal support provided by the partitioned emulation program (PEP) extension of ACF/NCP Version 3 with the Emulation Program for the IBM Communication Controllers under MVS. The loading and the management of the PEP is controlled by ACF/VTAM, ACF/TCAM, or the independent loader utility program in the guest MVS machine.

When deactivating or reloading the Communication Controller, the guest machine must be aware of the potential impact to users of EP lines if these lines are used by the VM/370 control program. The dynamic dump utility is usable under VM/370 provided the utility is run under a guest machine and the utility was installed using SMP.

**Performance and Storage Considerations:** Path lengths for ACF/NCP Version 3 for the 3705 and the 3725 should closely approximate those for ACF/NCP Version 2 when using the same

functions. Use of the SNA Network Interconnection support will result in increased path lengths for messages traversing the gateway.

For the 3705, storage requirements will increase over previous releases of ACF/NCP due to the elimination of conditional assemblies. The net increase in NCP storage will be less for the user who previously selected more options, than for the user who previously selected fewer options. Customers with 256K or less of storage should carefully review storage requirements before installation.

For the 3725, the elimination of conditional assemblies was included in Version 2.

The actual performance and storage impact (if any) to a customer will vary depending on particular hardware and network configuration and options selected.

DATA SECURITY, AUDITABILITY and CONTROL

ACF/NCP Version 3 enables the installation to establish and maintain the integrity of the data communication network. SNA network interconnection provides additional potential for network separation, which may increase security.

An enterprise may, for security reasons, wish to protect some nodes and their data flows from inadvertent or intentional access by other nodes. SNA network interconnection allows customers to configure nodes sharing similar security requirements into an isolated network, allowing cross-network communications through a defined interface, but preventing network management control from nodes outside that network.

In OS/VS environments, the ACF/VTAM Encrypt/Decrypt feature, and the Encrypt/Decrypt facility of ACF/TCAM can provide increased facilities to safeguard the information transmitted between logical units in the network.

The user is responsible for the selection, application, adequacy, and implementation of these facilities and for appropriate application and administrative controls.

**Education:** ACF/NCP courses will be updated to include ACF/NCP Version 3 for the 3705 and 3725. Also available is an SNA Network Interconnection Planning and Implementation Class, Course Number G3643.

**Ordering Information:** Customers may continue to order ACF/NCP Version 2 for the 3705 and ACF/NCP Version 2 for the 3725 after the availability of ACF/NCP Version 3. ACF/NCP Version 1 Release 3 and Release 2.1 may also be ordered for the 3705.

DOCUMENTATION  
(available from Mechanicsburg)

Available at announcement for both the 3705 and 3725:  
*Network Program Products: General Information (GC27-0657).*

Available January, 1984 for both the 3705 and 3725:  
*Network Program Products: Planning (SC27-0658).*

Available at FCS of Version 3 support for the 3705:  
*Advanced Communications Function for Network Control Program and System Support Programs: Messages and Codes (SC30-3169) ... Advanced Communications Function for System Support Programs: Diagnosis Reference (LY30-3060) ... Advanced Communications Function for Network Control Program Version 3 and System Support Programs Version 2 Release 2 for the IBM 3705: Installation and Resource Definition Guide (SC30-3224) ... Advanced Communications Function for Network Control Program Version 3 and System Support Programs Version 2 Release 2 for the IBM 3705: Resource Definition Reference (SC30-3199) ... Advanced Communications Function for Network Control Program Version 3 and System Support Programs Version 2 Release 2 for the IBM 3705: Diagnosis Guide (SC30-3225) ... Advanced Communications Function for Network Control Program Version 3 for the IBM 3705: Diagnosis Reference (LY30-5554) ... Advanced Communications Function for Network Control Program Version 3 and for System Support Programs Version 2 Release 2 for the IBM 3705: Customization (LY30-5556) ... Advanced Communications Function for Network Control Program Version 3 for the IBM 3705: Reference Summary and Data Areas (LY30-5555).*

Available at FCS of Version 3 support for the IBM 3725:  
*Advanced Communications Function for Network Control Program Version 3 and System Support Programs Version 2 Release 2 for the IBM 3725: Installation and Resource Definition Guide (SC30-3226) ... Advanced Communications Function for Network Control Program Version 3 and System Support Programs Version 2 Release 2 for the IBM 3725: Resource Definition Reference (SC30-3227) ... Advanced Communications Function for Network Control Program Version 3 and System Support Programs Version 2 Release 2 for the IBM 3725: Diagnosis Guide (SC30-3228) ... Advanced Communications Function for Network Control Program Version 3 for the IBM 3725: Diagnosis Reference (LY30-5557) ... Advanced Communications Function for Network Control Program Version 3 for the IBM 3725: Customization (LY30-5559) ... Advanced Communications Function for Network Control Program Version 3 for the IBM 3725: Emulation Program for the IBM 3725: Reference Summary and Data Areas (LY30-5558).*

PROGRAM PRODUCTS

5668-002 - DASD MIGRATION AID RELEASE 1.1

PURPOSE

The Direct Access Storage Device (DASD) Migration Aid program provides support for the new 3380 and 3375 Direct Access Storage, new high-speed, large capacity direct access disk storage devices. The Migration Aid is designed to help reduce the effort required to perform DASD migration.

The Migration Aid is designed to capture all required data set attributes from the devices' Volume Tables of Contents (VTOC). Furthermore, by identifying the amount of space currently allocated and the original secondary space allocation, internal space calculation routines can help project the data sets' space requirements on the new device.

HIGHLIGHTS

- Data Set Characteristics report with target device space calculations.
- Identification of data sets that do not meet user specified space utilization goals on the current and/or target device.
- Independent Space Calculation routines (TSO or batch). A one-step approach provides information to help determine the best data set blocking factors and total space requirements on the target device.
- Creation of customized JCL and utility statements to allocate space, copy data sets to the target device, and update the catalog.
- Mass conversion support:
  - Full volume Data Set Characteristics report.
  - Creation of customized JCL and utility statements for all supported data sets in current volumes.
- Procedure Library tools to:
  - Identify all affected data set JCL statements.
  - Generate a jobstream to update all affected JCL statements.
- All JCL and utility statements generated by the migration aid are placed under user control for review, modification and execution.

New with Release 1.1:

- Preservation of Resource Access Control Facility (RACF) discrete protection for certain types of data sets.
- Reblocking of migrated load modules, in the MVS/XA Data Facility Product (DFP) environment.
- Handling of special data sets (unsupported data set organization, unknown record format or a blocksize of zero).
- User specification of multiple compatible catalogs (virtual storage access method, VSAM, and integrated catalog facility catalogs) for migration selection criteria (filters).
- User specification of multiple output volumes and corresponding space thresholds.

The Migration Aid is composed of four parts:

- Presentation of current data set information and generation of JCL statements to place data on the target devices.
- Independent Space Calculation routines.
- Procedure Library Search and Update functions.
- Procedure Library utilities.

DEVICES SUPPORTED

The Migration Aid provides support for the following device type migrations:

FROM	3350		TO		3340		3385	
	3380	3375	Native	Compat	3330-1	3330-11	3344	3385
3380	Yes	C	C	C	C	C	C	C
3375	Yes	Yes	C	C	C	C	C	C
3350 Native	Yes	Yes	Yes	C	C	C	C	C
3350 Compat	Yes	Yes	Yes	Yes	Yes	Yes	C	Yes
3330 mdl 11	Yes	Yes	Yes	Yes	Yes	Yes	C	Yes
3330 mdl 1	Yes	Yes	Yes	Yes	Yes	Yes	C	Yes
3340/3344	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2314/2319	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2305 mdl 2	Yes	Yes	Yes	C	C	C	C	C

C - Caution: Data sets with blocking factors larger than the target device track size are not supported by the Migration Aid.

CUSTOMER RESPONSIBILITIES

New customers are responsible for ordering and installing DASD Migration Aid Release 1.1 and any prerequisite programs.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

The DASD Migration Aid can be utilized on IBM processors with the minimum configuration required to support the host operating system. Main Storage of 200K bytes is usually required for execution.

SOFTWARE REQUIREMENTS

The DASD Migration Aid is designed to operate with OS/VS1 Release 7.0, OS/VS1 Basic Programming Extensions (BPE, 5662-257), OS/VS2 MVS Release 3.8 and all subsequent releases including System Extensions and System Product, and MVS/XA unless otherwise stated. The 3380 and 3375 require the MVS/System Product-JES3 Release 1 (5740-XYN), or MVS/System Product-JES2 Release 1 (5740-XXS), MVS 3.8 3380/3375 PRPQ (5799-BFF) with Data Facilities Device Support (5740-AM7), MVS/370 Data Facility Product (5665-295), or MVS/XA Data Facility Product (5665-284). OS/VS1 users of the 3375 require Data Facilities Device Support (5740-AM6) with OS/VS1 Basic Programming Extensions (5662-257).

Prerequisites for the 3380 and 3375 need be present in the system only at the time when an actual or test migration of data sets to it is attempted; all other functions may be used without the device and its supporting software being installed. Sort, OS/VS Sort/Merge (5740-SM1) or equivalent, must be installed. The following IBM utility programs, supplied with the host operating system, must be installed on the system.

- IEHMOVE
- IEBUGDTE
- IEHPRGDM
- IEBISAM
- IDCAMS
- IEBPTPCH
- IEBCOPY

The following programs are required to install and maintain the Migration Aid:

- OS/VS Assembler and macro library
- OS/VS Assembler H Version 2 (5668-962) is required in the MVS/XA environment.
- IEBGENER
- System Modification Program Extended (SMP/E, 5668-949) or SMP/4 (with PTF UR03129).

Data sets, that have not been allocated as unmovable, using the following access methods are supported:

- BDAM
- BSAM/QSAM
- ISAM
- QSAM
- PAM
- VSAM

Multi-volume data sets must be cataloged.

COMPATIBILITY

DASD Migration Aid Release 1.1 is a functional update to the current release of the DASD Migration Aid and is upward compatible for all prior functions.

SECURITY

DASD Migration Aid Release 1.1 complies with and conforms to the data security and auditability controls of the systems it supports. The target of source data may be either RACF or password protected, which would require a user to be RACF-authorized or to supply the password. User management is responsible for evaluating, selecting, applying and implementing such features and for the appropriate administrative and application controls.

DOCUMENTATION

(available from Mechanicsburg)

*Licensed Program Specifications (GC26-3974) ... General Information (GC26-3972 ... Use and Diagnosis (SC26-3973).*

MVS SYSTEM INTEGRITY APPLIES: Yes

LICENSED PROGRAM MATERIALS AVAILABILITY

This licensed program will be available without source licensed program materials. It will be available with object code.



## PROGRAM PRODUCTS

**DOCUMENT INTERCHANGE FACILITY/CENTRAL  
VERSION 1 RELEASE 1 (5668-003)  
DOCUMENT INTERCHANGE FACILITY/DISTRIBUTED  
VERSION 1 RELEASE 1 (5668-004)**

**PURPOSE**

IBM offers a variety of products associated with word and text processing activities. Among these are:

- 8100 Information System with the DOSF/8100 (Distributed Office Support Facility) program product
- 3730 Distributed Office Communication System
- Document Library Facility
- Document Composition Facility (SCRIPT/VS)
- Advanced Text Management System-III (ATMS-III)
- Storage and Information Retrieval System (STAIRS/VS)
- Distributed Office Support System.

Individually, these products provide facilities for the creation, storage, revision and production of a wide variety of documentation items.

**DESCRIPTION**

Acting as a functional link, the Document Interchange Facility allows an enterprise to take advantage of these products within the same installation. Using the communications capabilities of the Customer Information Control System/VS (CICS/OS/VS or CICS/DOS/VS), the Document Interchange Facility/Central executes as a CICS/VS application, invoking the Document Library Facility through a supplied batch program. Documents created on an 8100 System with DOSF or a 3730 Distributed Office Communication System can be stored in a library of the Document Library Facility and formatted using the SCRIPT/VS formatter of the Document Composition Facility. Formatted documents may be printed on a system printer, saved in a library or returned to the DOSF/8100 or 3730 for local printing.

The Document Interchange Facility consists of two complementary program products:

Document Interchange Facility/Central - Operates as a transaction-initiated CICS/VS application in a host computer. It processes user requests from 8100 or 3730 controllers to 'IMPORT' documents to the Document Library Facility, to format documents using the SCRIPT/VS formatter of the Document Composition Facility and to retrieve documents from the Document Library Facility.

Document Interchange Facility/Distributed - Operates in the DOSF/8100 or 3730 controller and provides easy to use panels to prompt for information needed to submit requests to the Document Interchange Facility/Central.

**HIGHLIGHTS**

- Documents are created on the 8100 system with DOSF or the 3730 system using the 3732 Text Display Station.
- Documents may be filed in a library of the Document Library Facility.
- Documents sent to the Document Library Facility may optionally be translated into a form suitable for the SCRIPT/VS formatter of the Document Composition Facility.
- A user-provided translate routine can be used in place of the IBM-supplied routine. For example, a user-provided routine could convert controls to a set of Generalized Markup Language tags.
- Documents formatted by SCRIPT/VS can be directed to a system printer, stored in a library of the Document Library Facility or returned to the DOSF/8100 or 3730 for local printing.
- Advanced SCRIPT/VS functions, such as multiple-column formatting or footnote management, can be used by embedding appropriate SCRIPT/VS Generalized Markup Language tags or control words within the text of the documents created on the DOSF/8100 or 3730.
- Documents may be retrieved from a library of the Document Library Facility by document name (with or without translation) and placed in the appropriate DOSF/8100 or 3730 operator's permanent storage.
- Retrieved documents can be those previously transferred by the Document Interchange Facility to the Document Library Facility or those placed there by other applications.
- A list of documents stored in the Document Library Facility may be obtained for local printing.
- Documents may be deleted by name from a library of the Document Library Facility by any authorized text operator.

An added advantage of having documents filed in a library of the Document Library Facility is accessibility by other text-oriented applications, such as the use of ATMS-III for continual revision and production, user-provided data extraction and search routines, and for repetitive batch printing for quantity output.

**CUSTOMER RESPONSIBILITIES**

The customer must provide the proper operating environment by installing the required operating system, CICS/VS program product, Document Library Facility, DOSF/8100, 8100 or 3730 system, and supporting machine configuration.

Customer personnel must be trained and knowledgeable on the above products, as well as on any other products to be used in conjunction with the Document Interchange Facility.

The customer will develop procedures to insure data security, develop backup procedures, determine the overall tasks to be accomplished and install and operate the Document Interchange Facility. If necessary, the customer may wish to add special translate routines for documents being transferred between the DOSF/8100 or 3730 and the Document Library Facility.

**SPECIFIED OPERATING ENVIRONMENT for DOCUMENT INTERCHANGE FACILITY/CENTRAL****HARDWARE REQUIREMENTS**

The minimum requirement to execute the Document Interchange Facility/Central is an IBM S/370 mdl 125 or higher or other IBM processor with a main and external storage capacity and peripheral equipment as required for, and supported by, CICS/OS/VS or CICS/DOS/VS. Floating-point hardware is required for the Document Library Facility. A 3704 or 3705 Communications Controller is also required for a 3730 controller attached using telecommunications facilities rather than a channel. With a 4331 processor, the Integrated Communications Adapter may be used in place of a 3704 or 3705.

**SOFTWARE REQUIREMENTS**

The source code language for the Document Interchange Facility/Central is Assembler. It runs under control of CICS/OS/VS (5740-XX1) or CICS/DOS/VS (5746-XX3) Version 1 Release 5 and subsequent releases unless otherwise indicated.

Operation in an OS/VS environment requires OS/VS1 Release 7.0 or OS/VS2 MVS Release 3.8 together with VSAM and JES2 or JES3. A user SVC is supplied for installation in an OS/VS1 environment. Operation in a DOS/VSE environment requires DOS/VSE with VSE/Advanced Functions Release 2 (5746-XE8), VSE/VSAM (5746-AM2) and VSE/POWER (5746-XE3).

In addition, the release of ACF/VTAM Version 1 or ACF/VTAM Version 2 or ACF/VTAME (5746-RC7), as required by CICS/VS Release 1.5, is required. ACF/NCP/VS (5748-XX1) is required for the 3704 or 3705.

The Document Library Facility (5748-XXE) Release 2 is required. If document formatting at the host is to be done by the SCRIPT/VS formatter, the Document Composition Facility (5748-XX9) Release 2 is also required.

**SPECIFIED OPERATING ENVIRONMENT for DOCUMENT INTERCHANGE FACILITY/DISTRIBUTED****HARDWARE REQUIREMENTS**

- One IBM 8100 Information System as required to support the DOSF/8100 program product, and at least one IBM 3732 Text Display Station with keyboard, and at least one IBM 3736 Printer,

- or -

- One IBM 3730 Distributed Office Communication System with Configuration Support #9171 and feature codes #9275 and #9285 with at least one IBM 3732 Text Display Station with keyboard and at least one print device which can be an IBM 3736 Printer or the IBM 3791 Line Printer Feature. The host attachment is by either the IBM 3791 Local Channel Attachment Feature (#1515) to a byte or block multiplexer channel or the IBM 3791 SDLC Communications Feature (#6301, 6302, or 6303) to an IBM 3704 or 3705 Communications Controller or a 4331 processor Integrated Communications Adapter.

**SOFTWARE REQUIREMENTS**

Document Interchange Facility/Distributed is written in IBM 3790 and IBM 3730 programming statements. If executed on an IBM 8100, the DOSF/8100 (5761-XR1) program product is required. The Program Validation Services (PVS) Release 11 or later, and Subsystem Support Services (SSS) programming support must be available.

**DATA SECURITY**

Control of access to Document Interchange Facility/Central is provided by CICS/VS. Authorized users of the DOSF/8100 or 3730 will have access to Document Interchange Facility/Distributed. Document security is provided by using those facilities already available in the Document Library Facility, the DOSF/8100 program product and the 3730. Access to libraries, or to the documents stored therein, may be protected by passwords. Documents stored in DOSF/8100 or 3730

## PROGRAM PRODUCTS

**Document Interchange Facility (cont'd)**

permanent storage may also be protected by get and/or delete codes. Customer management is responsible for the implementation, application and adequacy of these controls.

In MVS, the Resource Access Control Facility (RACF) program product (5740-XXH) can be utilized to control authorized access to the libraries of the Document Library Facility, as well as to control access to CICS/VS transactions and address space.

**DOCUMENTATION**  
(available from Mechanicsburg)

*Document Interchange Facility: General Information Manual (GH20-2440) ... Document Library Facility: General Information Manual (GH20-9158) ... Program Summary (GH20-9176) ... Document Composition Facility: General Information Manual (GH20-9158) ... Program Summary (GH20-9175) ... DOSF/8100: General Information Manual (GC27-0546) ... 3730 Distributed Office Communication System: System Description (GA33-3022) ... Advanced Text Management System-III: General Information Manual (GH20-2404) ... STAIRS/VS: General Information Manual (GH12-5115) ... Distributed Office Support System: General Information Manual (GH12-5124)*

RPQs ACCEPTED: No

MVS SYSTEM INTEGRITY APPLIES: Yes

## PROGRAM PRODUCTS

**DOWNSTREAM LOAD UTILITY  
RELEASE 1 (5668-006)**
**PURPOSE**

The Downstream Load Utility program product provides the function needed to load data into the 3644 Automatic Data Unit and/or the 8775 Display Terminal and/or equivalent devices such as the 7426 Terminal Interface Unit. The 3644 and the 8775 mdls 1 and 2 can be attached to the 4331 processor via the Loop Adapter Feature. The 8775 mdls 11 and 12 can be attached to the 4331 processor via the Communication Adapter (Feature #1601) or to the 4300 and S/370 processors via the 3704 or 3705 Communications Controller.

These devices require transmission of load data from the processor for the 3644 Automatic Data Unit (not supported by OS/VS1, MVS/370 or MVS/XA) and the downstream loadable function microcode for Enhanced Function, Enhanced Function with Magnetics or Multiple Partitions and Scrolling for the 8775 Display Terminal. They also require a mechanism to install distributed load data in system libraries. Downstream Load Utility supports both the receipt of load data for inclusion into the system or private library, and the transfer of the data to the device via ACF/VTAME with VSE, or via ACF/VTAM Version 1 Release 3 with OS/VS1 or ACF/VTAM Version 2 (VSE, OS/VS1, MVS/370 or MVS/XA) on demand. The use of existing system libraries, procedures and services allows the user to manage his configuration and application in a familiar fashion.

**HIGHLIGHTS**

Downstream Load Utility provides for the following functions to support the load requirements for the 3644 and IBM 8775:

- Two types of load data will be applied by Downstream Load Utility to the system libraries prior to its transmission to the device.
  - Distributed control storage load for the CSL Load (3644) and Enhanced Function Load (8775).
  - User defined data (3644 only) for the PTL load.
- 3644 Control Storage Load (CSL): The purpose of CSL is to provide the 3644 with its required Control Storage microcode. The loading takes place automatically upon unit power-on or after a power line disturbance (PLD).
- 3644 Parameter Table Load (PTL): The purpose of PTL is to provide the 3644 with user defined operational characteristics. After a successful CSL load the 3644 contains a default PTL and is operational. A user-generated PTL is constructed by the 3644 Parameter Table Generation Facility based upon user defined inputs and is required to personalize the 3644.
- 8775 Microcode Load: The 8775 requests the load of the downstream loadable microcode as part of its power on sequence. The load if required occurs at physical unit activation (for example, shortly after power on) of the 8775 display.
- Load Data Distribution: Both 3644 CSL and 8775 downstream loadable microcode are distributed in DTR format. 3644 PTL is created at the host processor through user defined input to the 3644 Parameter Table Generation Facility.

**CUSTOMER RESPONSIBILITIES**

Downstream Load Utility requires the VSE/Advanced Functions or OS/VS1, MVS/370 or MVS/XA release most current at the time of first customer shipment of Downstream Load Utility, and ACF/VTAME or ACF/VTAM as shown in the DSLU Support Summary Table under "Software Requirements". At least one tape unit must be available for program distribution and maintenance. Any system-supported tapes or DASD may be used with Downstream Load Utility. Sufficient I/O devices must be available to support the requirements for system input, system output, system residence and system data sets.

DASD space required for the program product is less than two cylinders of 3340 space in both the core image library and the source statement library. Additional DASD space is required in the program libraries for both IBM distributed device microcode and "Parameter Table Load" data from the IBM 3644 Parameter Table Generation Facility program (GEN3644).

**SPECIFIED OPERATING ENVIRONMENT**
**HARDWARE REQUIREMENTS**

The Downstream Load Utility operates on the IBM 4300 or S/370 processors with either of the following:

- The IBM Loop Adapter feature (4331/21) to support the load requirements of:
  - The IBM 3644 Automatic Data Unit.
  - The IBM 8775 Display Terminal mdls 1 and 2, with the downstream loadable functions.

The IBM 3644 and the IBM 8775, mdls 1 and 2, attach either via the directly attached loop or via the data link attached loop to the IBM 4331 Processor.

- The Communication Adapter (feature #1601) (4331/21) or
- The IBM 3705 Communication Controller (4300 or S/370) to support the load requirements of the IBM 8775 mdls 11 and 12 with downstream loadable functions.
- At least one tape unit supported by VSE/Advanced Functions.
- Sufficient DASD space.

**SOFTWARE REQUIREMENTS**

DSLU requires:

- Either the VSE/Advanced Functions release most current at the time of first customer shipment of DSLU and ACF/VTAME, upgraded by a PTF to support DSLU, or ACF/VTAM Version 2.
- Or the OS/VS1 release most current at the time of first customer shipment of DSLU and ACF/VTAM Version 1 Release 3 or ACF/VTAM Version 2.

For the IBM 3644, the program product IBM 3644 Parameter Table Generation Facility (GEN 3644), 5668-998, is required.

**DOCUMENTATION**

(available from Mechanicsburg)

*Downstream Load Utility Installation Guide and Reference (SC33-6127) ... DSLU Program Summary (GC33-6125) ... DSLU Licensed Program Specifications (GC33-6126) ... DSLU Diagnose Reference (LY33-9099).*

RPQs ACCEPTED: No

TERMS and CONDITIONS: See PP Index

**COMMUNICATION ORIENTED MESSAGE SYSTEM  
OS/V5 (CORMES) REL.1.0  
5668-007****PURPOSE**

The Communication Oriented Message System OS/V5 (CORMES) is designed to build the central "paperless" message exchange system in an organization connecting terminal users and application programs of different functions. It provides communication links:

- For the exchange of information between terminal users (action messages).
- For the interaction between application programs and terminal users (action messages).
- For triggering the execution of online application programs based on the occurrence of prespecified events (trigger messages).

CORMES operates under the Operating Systems OS/V51 Release 6.7/7.0 and OS/V52 MVS Release 3.7 (collectively referred to as OS/V5) or subsequent releases unless otherwise identified.

For data base management, the system uses the data base facilities of the Information Management System/Virtual Storage (IMS/V5) Version 1, Program Number 5740-XX2, Release 1.5 or subsequent releases unless otherwise identified.

For data communication, CORMES uses the facilities of the S/370 Customer Information Control System/Virtual Storage (CICS/V5) Version 1, Program Number 5740-XX1, Release 4 or subsequent releases unless otherwise identified.

**HIGHLIGHTS****Terminal User Services**

- Easy-to-use terminal functions to create, display, modify and distribute action messages.
- Routing of action messages from one user to another.
- Linkage to online application programs to process a user-selected action message.

**Application Program Services:**

- User macros to simplify the creation of action and trigger messages in user-written programs and their transfer to the central message file.
- Triggering of online application program execution according to prespecified events: A point in time, a time interval, a queue length or a combination of these.
- CORMES as a framework for the implementation of interactive application programs.

**System Services**

- Monitoring of the individual message queue of each terminal user by due date or by the number of received messages.

**CUSTOMER RESPONSIBILITIES**

This section briefly discusses the activities the user has to perform to make CORMES operational. It gives a rough guide for assessing the total installation effort. The assumption is that a system running under OS/V5 with IMS/V5 and CICS/V5 has already been installed.

The installation procedure allows an easy installation of CORMES, including the sample, by use of object code facility. The distributed source code will be used for the final adaptation to the existing system environment, if necessary.

The major implementation steps are:

- Installation of CORMES according to the distribution tape and installation description.
- Execution of the supplied sample to verify the installation. This sample can also be used as a tool for training terminal users.
- Optionally, assembly of all CORMES online programs to include customer requirements.
- Modification and reassembly of existing programs for CORMES communication (according to the rules defined by CORMES) by use of macros and examples provided.
- Exchange of the sample data sets and tables by data sets and tables that describe the customer system.

The required changes within existing user programs have been reduced to a minimum. In addition, macros are provided to simplify the program interactions. Support is provided for Assembler, PL/I and COBOL programs.

**SPECIFIED OPERATING ENVIRONMENT****HARDWARE REQUIREMENTS**

For compilation and/or execution of CORMES, an IBM S/370, a 3031, 3032 or 3033 Processor or a 4300 Processor (OS/V51 only) with a main storage capacity large enough to run IMS/V5 and CICS/V5 is required.

For CORMES, additional storage is required: For the first terminal 16,500 bytes and for each additional terminal 3,000 bytes; for the first application program 11,800 bytes and for each additional program 1,200 bytes.

For the data bases and data sets, the same devices are used as supported by the basic software of OS/V5, CICS/V5, and IMS/V5.

One magnetic tape device is required for the installation.

At least one 1920-character or larger 3270 Display Station, attached to the appropriate control unit, must be available.

The online address space requirements for CORMES may vary widely, according to the number of active terminals. A minimum installation might require address space for a combined CICS/V5 and IMS/V5 user-task partition.

**SOFTWARE REQUIREMENTS**

CORMES is written in Assembler language and uses the macro language facility. Application programs that interact with CORMES can also be written in command-level languages.

CORMES is designed for an online OS/V5 environment and requires the following programs:

- OS/V51 Release 6.7/7.0 or OS/V52 MVS Release 3.7
- CICS/V5 Version 1, Program Number 5740-XX1, Release 4
- IMS/V5 Version 1, Program Number 5740-XX2, Release 1.5

Subsequent releases of the above are also supported unless otherwise provided by IBM.

**DOCUMENTATION:** (available from Mechanicsburg)

Title	Order Number
Licensed Program Design Objectives	GH12-5053
General Information Manual	GH12-5127

**RPOs ACCEPTED:** No

**TERMS and CONDITIONS:** See PP Index

**PROGRAM PRODUCTS**
**SYSTEM PRODUCTIVITY FACILITY  
SPF (5668-009)**

*No longer available, effective September 30, 1982.*

**PURPOSE**

The System Productivity Facility (SPF) is a program product which assists in program development. SPF is designed to take advantage of the characteristics of IBM 3270 display terminals and increases productivity in an interactive environment for users of both structured and conventional programming techniques.

The System Productivity Facility replaces the Structured Programming Facility program products (5740-XT8, 5748-XT3). The name has been changed to reflect the expansion of the product capabilities beyond structured programming. SPF includes significant new functions that simplify the development of interactive applications. New services are provided to display predefined screen images, build and maintain permanent tables of user information and generate output files for job submittal or other processing.

**HIGHLIGHTS**

- SPF consists of a comprehensive set of dialog management services and the program development facility.
- The dialog manager includes a new panel display service with enhanced function and improved usability over the previous Structured Programming Facility display capability.
- New functions added to SPF will simplify the development of interactive applications. These applications can execute in online environments. These SPF services provide the ability to:
  - Define and control symbolic variables.
  - Display predefined screen images and messages.
  - Build and maintain permanent tables of user information.
  - Generate output files for job submittal or other processing.
  - Interface to edit and browse, and log hardcopy output.
- Conversion utilities are provided in the program development facility to convert old format selection menus, tutorials and messages to the new panel and message formats.
- SPF consists of two major components: The dialog manager and the program development facility. The dialog manager provides control and services for running interactive applications.
- The dialog manager allows totally new applications to be developed, each with its own primary option menu. Applications may be independent, entered via separate command procedures or linked via menu options that transfer from one application to another.
- The SPF dialog manager provides control facilities to:
  - Traverse a hierarchy of selection menus and invoke the appropriate dialog functions.
  - Transfer in and out of the tutorial and control the sequence of tutorial pages based on user inputs.
  - Manage the physical display image in single screen or split screen mode.
  - Interpret program function (PF) key usage for system defined functions.
- Online tutorial can be entered in either of two ways:
  - As a selectable option from a menu or
  - Indirectly from any non-tutorial panel when the user presses the 'Help' PF key.
- Advantages of the new panel and message formats include:
  - Communication of user inputs (from panels) and substitution of parameters (in messages) via symbolic variables rather than positional calling sequence parameters.
  - Ability to verify user inputs in panel definitions.
  - Ability to test and set variables in panel definitions.
  - Improved control over field attributes, including specification of padding characters and justification.
  - Replacement of LIST/RETURN keywords with TRANS keyword in which the source and translated values are paired.
  - Simplification of selection menu and tutorial panel formats.
- The significant program development facilities include:
  - Support for multi-level programming libraries. Facilities maintenance and tracking of program segments under development at varying version and modification levels.
  - Full screen, context editing. Allows additions and changes to multiple lines in a single interaction. Simple one-character edit

commands are used for inserting, deleting, duplicating or rearranging lines of source data.

- Forward, backward and sideways scrolling of source data or listings, plus the ability to locate information by character string or line number.
- Interface to utilities for specification and maintenance of libraries, files and data sets.
- Interface to standard language processors for execution in the foreground or batch.
- Document preparation support, including text editing features and a menu interface to the SCRIPT/VIS Document Composition Facility.
- Online tutorial for instruction and reference which is especially valuable for the occasional or novice user.
- The program development facility supports both structured and conventional programming techniques. Features which are especially oriented toward structured programming include:
  - Ease of segmentation changes. One segment (member) can easily be split into multiple segments or multiple segments can be merged into one.
  - Ease of indentation changes. Single statements or blocks of statements can easily be shifted left or right by a specified number of column positions.
  - Insert in context. A 'DO-END' pair, for example, may be coded on two consecutive lines and then space can be opened between the two lines to allow insertion of a block of code.
  - Visual verification aids. A block of code may be temporarily excluded from display so that the space which it occupies on the screen is closed up. This facilitates visual verification of the control structure, particularly when the length of a segment exceeds the screen size.

**SPECIFIED OPERATING ENVIRONMENT**
**HARDWARE REQUIREMENTS**

The System Productivity Facility is designed to operate on the following IBM machines: 303X, 4300 and S/370.

**MVS**

The machine requirements are the same as those for MVS with the Time Sharing Option (TSO).

Approximately 512K bytes of the pageable link pack area (PLPA) are required for SPF program occupancy. The virtual storage requirements for each user's region will vary depending upon the application being executed, the size of tables and data sets and the use of "split-screen". The minimum region size is 512K bytes, but a larger region (at least 1024K bytes) is recommended.

Approximately 20 cylinders of direct access storage are required for the panel, message and skeleton libraries distributed with SPF. This number assumes IBM 3330 disk storage. An equivalent amount of space is required for other types of devices.

**VM**

The machine requirements are the same as those for VM/370 with the Conversational Monitor System (CMS).

Approximately 512K bytes (8 segments) of a discontinuous shared segment (DCSS) area are required for SPF program occupancy. The virtual storage requirements for each user's virtual machine will vary depending upon the application being executed, the size of tables and files and the use of "split-screen". The minimum virtual machine size is 512K bytes, but a larger virtual machine (at least 1024K bytes) is recommended.

Approximately 20 cylinders of direct access storage are required for the panel, message and skeleton libraries and EXECs distributed with SPF. This number assumes IBM 3330 disk storage. An equivalent amount of space is required for other types of devices.

Execution of SPF also requires a disconnected virtual machine which communicates with each user's machine via the VM Communication Facility (VMCF).

**TERMINALS**
**MVS**

SPF requires an IBM 3270 type display terminal with at least 24 lines and 12 PF Keys.

SPF supports the following IBM display stations:

- 3275 mdls 2 and 12
- 3276 mdls 2, 3, 4, 12, 13 and 14

PROGRAM PRODUCTS

SPF (cont'd)

- 3277 mdl 2 (local or remote attachment)
- 3278 mdls 2, 3, 4 and 5 (local or remote attachment)
- 3279 All mdls (local or remote attachment), when operated in 4-color compatibility mode

The following IBM keyboards are supported:

For 3275 or 3277 Display Stations:

- 78-Key Operator Console (feature #4632)
- 78-Key EBCDIC Typewriter (feature #4633)
- 78-Key ASCII Typewriter (feature #4635)
- 78-Key EBCDIC Typewriter/APL (feature #4638), when operated with APL switch off.

For 3276, 3278 or 3279 Display Stations:

- 75-Key EBCDIC Typewriter (feature #4621)
- 75-Key ASCII Typewriter (feature #4624)
- 87-Key EBCDIC Typewriter (feature #4627)
- 87-Key ASCII Typewriter (feature #4628)
- 87-Key EBCDIC Typewriter/APL (feature #4626), when operated with APL switch off.
- 87-Key EBCDIC Typewriter/Text (feature #4629), when operated with TEXT switch off.

The standard character set (94 graphics plus blank and null) is supported on 3276, 3278 and 3279 Display Stations.

The following are supported, but not required:

- Audible alarm (feature #1090)
- IBM 3268, 3284, 3286, 3287, 3288 and 3289 printers
- 3277 dual-case character set (RPQ #8K0366)

Installation of the audible alarm feature is strongly recommended to enhance usability. The alarm is sounded whenever a warning or error message is displayed.

The IBM 3268, 3284, 3286, 3287, 3288 and 3289 printers, if used, are supported via the "DSPRINT" TSO command processor, which must be installed if output is directed to one of these printers.

VM

SPF requires an IBM 3270 type display terminal with at least 24 lines and 12 PF Keys.

SPF supports the following IBM display stations:

- 3275 mdl 2
- 3275 mdl 12 (via VM/VCNA)
- 3276 mdls 2, 3, and 4
- 3276 mdls 12, 13 and 14 (via VM/VCNA)
- 3277 mdl 2 (local or remote attachment)
- 3278 mdls 2, 3, 4 and 5 (local or remote attachment)
- 3279 All mdls (local or remote attachment), when operated in 4-color compatibility mode

The following keyboards are supported:

For 3275 or 3277 Display Stations:

- 78-Key Operator Console (feature #4632)
- 78-Key EBCDIC Typewriter (feature #4633)
- 78-Key EBCDIC Typewriter/APL (feature #4638), when operated with APL switch off.

For 3276, 3278 or 3279 Display Stations:

- 75-Key EBCDIC Typewriter (feature #4621)
- 87-Key EBCDIC Typewriter (feature #4627)
- 87-Key EBCDIC Typewriter/APL (feature #4626), when operated with APL switch off.
- 87-Key EBCDIC Typewriter/Text (feature #4629), when operated with TEXT switch off.

The standard character set (94 graphics plus blank and null) is supported on 3276 and 3278 Display Stations.

The following are supported, but not required:

- Audible alarm (feature #1090)
- 3277 dual-case character set (RPQ #8K0366)

Installation of the audible alarm feature is strongly recommended to enhance usability. The alarm is sounded whenever a warning or error message is displayed.

SOFTWARE REQUIREMENTS

The System Productivity Facility is designed for use on the OS/VS2 (MVS) operating system with TSO environment, and on the VM/370 operating system with CMS and VM/SP. The program operates with the current releases of MVS and the VM operating systems.

MVS

SPF operates as a TSO command processor under the Time Sharing Option of VS2 Release 3.8 (MVS). The BPAM and BSAM access methods are required by SPF for reading and writing data sets, and TSO/TCAM or TSO/VTAM are required for terminal communication.

The following teleprocessing access methods are supported:

- TCAM 10 (available with MVS)
- ACF/TCAM Version 2, Releases 2 and 3 5735-RC3
- VTAM 2 (available with MVS)
- ACF/VTAM Version 1 Releases 2 and 3 5735-RC2
- ACF/VTAM Version 2 5665-280

The SPF program development facility provides interfaces to the following IBM processing programs for foreground and background execution:

- VS2 Assembler (available with MVS)
- TSO Assembler Prompter (foreground only) 5734-CP2
- COBOL Compiler and Library 5740-CB1
- TSO COBOL Prompter (foreground only) 5734-CP1
- COBOL Interface Debug (foreground only) 5734-CB4
- FORTTRAN IV G1 Compiler 5734-FO2
- TSO FORTRAN Prompter (foreground only) 5734-CP3
- FORTTRAN Interactive Debug (foreground only) 5734-FO5
- PL/I Checkout Compiler 5734-PL2
- PL/I Optimizing Compiler 5734-PL1
- PASCAL Compiler 5796-PNQ
- Linkage Editor (available with MVS)

The appropriate processing programs and TSO prompters must be installed to use the foreground and background options.

An interface to SCRIPT/VS is also provided to allow formatting, display and printing of text maintained in SPF libraries or other data sets. Use of this feature requires installation of the following IBM program product:

- Document Composition Facility (SCRIPT/VS) with the Foreground Environment Feature 5748-XX9

Internal interfaces are provided to the following IBM programs. These programs are not required to operate SPF. However, if an IBM 3268, 3284, 3286, 3287, 3288 or 3289 printer is used for SPF output, the appropriate DSPRINT command processor must be installed on the system.

- OS/VS2 MVS 3270 Extended Display Support - Session Manager, Release 2 5740-XE2
- TSO/TCAM Command Processor "DSPRINT" 5798-AYF
- TSO/VTAM Data Set Print (DSPRINT) 5798-CPF
- TSO/VS2 Programming Control Facility (PCF) 5798-BBJ
- TSO Programming Control Facility - II (PCF2) 5798-CLW

All the program-numbered products listed above can be ordered separately under IBM licensing agreements.

VM

SPF operates as a CMS command under VM/370 Release 6. It uses the VM Communication Facility for inter-machine communication and uses the full-screen display support of the following program product which must be installed:

- VM/System Product (VM/SP) 5664-167

If SPF is to be used with SNA 3270 Displays, the following program product must be installed:

- VM/VCNA 5735-RC5

VM/VCNA requires a VS1/BPE guest system with ACF/VTAM or a VSE system with VTAME or ACF/VTAM.

The SPF program development facility provides interfaces to the following IBM processing programs for foreground and batch execution:

- VM/370 Assembler (available with VM)
- COBOL Compiler and Library 5740-CB1
- COBOL Interactive Debug (foreground only) 5734-CB4
- FORTTRAN IV G1 Compiler 5734-FO2
- FORTTRAN Interactive Debug (foreground only) 5734-FO5
- PL/I Checkout Compiler 5734-PL2
- PL/I Optimizing Compiler 5734-PL1
- PASCAL Compiler 5796-PNQ

The appropriate processing programs must be installed to use the foreground and batch options.

An interface to SCRIPT/VS is also provided to allow formatting, display and printing of text maintained in SPF libraries or CMS files. Use of this feature requires installation of the following IBM program product:

PROGRAM PRODUCTS

SPF (cont'd)

Document Composition Facility  
(SCRIPT/VS) with the  
Foreground Environment Feature 5748-XX9

Guide	SC34-2036	SC43-2049
Licensed Program		
Specifications	SC34-2035	GC34-2050
Program Logic Manual	LY25-0006	LY25-0010

Internal interfaces are provided to the following IBM program. This program is not required to operate SPF, but must be installed if spool output is to be sent to another node on the network.

RSCS Networking 5748-XP1

All the program-numbered products listed above can be ordered separately under IBM licensing agreements.

MVS SYSTEM INTEGRITY APPLIES: Yes

TERMS and CONDITIONS: See PP Index

COMPATIBILITY

All existing function in the Structured Programming Facility TSO (5740-XT8) and CMS (5748-XT3) will be carried forward in SPF.

INSTALLATION RESPONSIBILITIES

MVS

The installation of SPF requires a properly configured IBM S/370 or 303X, appropriate terminals and other required devices and MVS with the Time Sharing Option (TSO). Also, appropriate processing programs and TSO prompters must be installed to use the SPF foreground and background options, and the Document Composition Facility must be installed to use the SCRIPT/VS utility.

To install SPF, operations personnel must be knowledgeable in OS/VS JCL, TSO and the System Modification Program (SMP). Installation procedures are described in the *SPF Installation and Customization Guide*.

If SPF is to be used with TSO/TCAM, a TCAM MCP generation is required to obtain full-screen support in the TSO/TCAM environment. This MCP generation is required to eliminate interference between the full screen I/O operations used by SPF and the line-oriented I/O operations used by TSO. No other changes are required to TSO or TCAM.

A dialog developer must be familiar with MVS, TSO and appropriate programming languages, and should review the *SPF Dialog Development Guide*. A user of the SPF Program Development Facility must be familiar with MVS and TSO, and should review the *SPF Program Reference Manual*.

Special SPF training or courses are not required for programming personnel familiar with the IBM 3270, the programming and machine systems and the language processors in use.

VM

The installation of SPF requires a properly configured IBM S/370, 303X or 4300 processor, appropriate terminals and other required devices and VM/370 with the Conversational Monitor System (CMS) and the VM/SP program product. Also, appropriate processing programs must be installed to use the SPF foreground and batch functions, and the Document Composition Facility must be installed to use the SCRIPT/VS utility.

To install SPF, operations personnel must be knowledgeable in VM/CMS and the computer system. Installation procedures are described in the *SPF Installation and Customization Guide*.

A dialog developer must be familiar with VM/CMS and appropriate programming languages, and should review the *SPF Program Development Guide*. A user of the SPF Program Development Facility must be familiar with VM/CMS and should review the *SPF Program Reference Manual*.

Special SPF training or courses are not required for programming personnel familiar with the IBM 3270, the programming and machine systems and the language processors in use.

DATA SECURITY

SPF runs in the environments produced by TSO in MVS and by CMS in VM/370 and is subject to the controls provided by these environments. SPF runs as a TSO Command Processor with or without the Resource Access Control Facility (RACF). SPF also provides an interface to the standard MVS TSO Password Protection mechanism. Customer management is responsible for the selection, implementation and adequacy of these facilities.

DOCUMENTATION (available from Mechanicsburg)

At Announcement:

General Information Manual for SPF-MVS	GC34-2039
General Information Manual for SPF-VM	GC34-2046

At FCS:

	MVS	VM
Program Reference Manual	SC34-2038	SC34-2047
Installation and Customization Guide	SC34-2037	SC43-2048
Dialog Development		

## PROGRAM PRODUCTS

**5668-011 - INTERACTIVE INSTRUCTIONAL  
AUTHORING SYSTEM VERSION 1 RELEASE 2.0****PURPOSE**

The Interactive Instructional Authoring System program provides the capability to create (author) and maintain computer-based training courses. These courses will run under Interactive Instructional Presentation System (5668-012), a companion product which is a prerequisite.

**DESCRIPTION**

For the course author, three methods of creating course materials are available:

- Course Structuring Facility
- Simulation Exercise Facility
- Coursewriter Language

The Course Structuring Facility provides simplified course development and course organization facilities for both the new and the experienced author.

Specific fill-in-the-blanks worksheets allow for entering, analyzing, and structuring the following:

- TEXT - Tutorial information.
- QUESTIONS - True/false, matching, multiple choice, single or multiple constructed answers.
- SCREEN FORMATS - Enables author to use special terminal screen displays to simulate other terminal applications as part of a training course.

The Simulation Exercise Facility provides a means of creating a series of computer based training exercises which students can access through topic menus. Facilities to simulate online applications are included.

Using the Coursewriter language, the author is free to decide on the instructional strategies to be implemented. Language codes allow the author to enter lines of text, ask questions, evaluate responses, and provide remedial text for incorrect student responses. Experienced authors may write their own macros (frequently used course statements in skeletal form).

The system also includes commands for author use in storing, moving, and deleting course material as well as inserting new material into already existing text.

The entry of course material can be accomplished in either batch processing mode or at the terminal, interactively.

Computer Based Training courses on advanced authoring support facilities are provided as a part of the Authoring System.

An interactive method of creating full screen formats for subsequent use in courses is provided.

**CUSTOMER RESPONSIBILITIES**

Before installation of the Interactive Instructional Authoring System the customer must install the prerequisite product, Interactive Instructional Presentation System (5668-012). Then the customer must install Interactive Instructional Authoring System and:

- Register authors and courses for development as required.
- Administer course creation and maintenance.

**SPECIFIED OPERATING ENVIRONMENT****HARDWARE REQUIREMENTS**

The Interactive Instructional Authoring System is designed to operate on all processors capable of supporting the prerequisite product - Interactive Instructional Presentation System (5668-012). Machine requirements vary depending on operating environment. The Interactive Instructional Authoring System requires a properly configured IBM S/370, 303X or 4300 processor. Storage requirements given below are estimates for planning purposes. (Note, K = 1024).

**VTAM, TCAM**

The versions of the Interactive Instructional Authoring System that support the VTAM and TCAM environments will be pre-generated for each environment. The pre-generated version will utilize 456K bytes of virtual storage for VS1 and VS2, in addition to the storage requirements of the host system, and will include provision for:

- 20 Course Files
- 200 Courses
- 7 WorkFiles
- 100 Users

These parameters can be changed by the customer at execution time through the use of control cards. Working storage (real storage) for the default system with all 100 users on the system simultaneously (assuming 85% of the users are students) is estimated to be less than 200K bytes in addition to that required by the teleprocessing access method and other components of the host system. Utilization of

system resources, and therefore working storage, will increase as the number of active authors increases.

**IMS/VS, CICS/VS, TSO, CMS**

The Interactive Instructional Authoring System under IMS/VS, TSO or CMS will require the following S/370 virtual storage for the duration of each transaction:

- 280K Administrator
- 280K Author
- 280K Student

Under CICS/VS, a shared program storage area of 300K bytes is required. Each transaction requires an additional 20K bytes for the duration of that transaction.

**Input/Output Devices:** Sufficient direct access storage must be provided to satisfy the requirements of the online data sets. This will be approximately 35 cylinders of 3330 space for all host environments except IMS/VS. Approximately 60 cylinders of 3330 space are required under IMS/VS. Additional space for course materials will be required.

Approximately 45 cylinders of 3330 DASD space will be required for the storage of courses delivered with the Interactive Instructional Authoring System.

DOS based installations of this product do not support 23XX DASD.

**Distribution and Maintenance:** Installation and maintenance of the instructional system requires the availability of one tape drive.

**Terminals Supported:** The Interactive Instructional Authoring System provides support for IBM 3277, IBM 3275, IBM 3276, IBM 3278 and IBM 3279 terminals. Screen sizes of 24x80, 32x80, 43x80 and 27x132 are supported in those environments supporting and identifying the appropriate models. Typewriter, data entry, APL and text keyboards are supported in those environments that permit identification of the keyboard type. SDLC, BSC and local IBM protocols are supported as permitted by each environment. Support for IBM 3279 terminals is for IBM 3278 functions. Color, extended highlights and PSS are supported for course presentation under CMS and TSO using GDDM.

The Interactive Instructional Authoring System provides support for non-3270 type terminals only in line-at-a-time mode. The IBM 2741 mdl 1 is supported in those environments with appropriate support. CPT-TWX (mdl 33/35) Line Control Type is supported in those environments with appropriate support.

It is the user responsibility to assure the equivalence at the software interface of other terminals as well as the suitability of non-hardcopy terminals using hardcopy interfaces.

Since update transactions are employed under IMS, non-checking terminals are not supported.

**SOFTWARE REQUIREMENTS**

The Interactive Instructional Presentation System, a prerequisite product, runs in a variety of teleprocessing environments. That product in turn provides the operating environment for Interactive Instructional Authoring System. See the pages for Interactive Instructional Presentation System for a description of appropriate operating environments.

**COMPATIBILITY**

Courses running under the predecessor product, Interactive Instructional System (5748-XX6), or previous releases of Interactive Instructional Presentation System (5668-012) will run without change.

Users planning simultaneous operation of this product and its predecessor should carefully review the pertinent operations guides for information on special installation and operational restrictions when using this mode of operation.

Courses using 3270 dynamic formatting operation codes are not supported by the instructional system in the IMS/VS environment.

**PERFORMANCE CONSIDERATIONS**

The performance of the instructional system in a virtual storage environment is dependent on the system resources available, the programs that operate concurrently and their relative priorities, system and application data set placement, and system timing. Performance also depends on the paging characteristics and storage reference patterns of the system and its courses, the allocation of data sets to particular devices, and the particular data being processed.

For specific online performance and response time requirements, attention must be given to ensuring that adequate real resources (main storage, processor computing capability, channels, direct access devices, etc.) are available. To verify specific performance (particularly on systems with a large number of concurrent terminal users), benchmarking the instructional system should be planned.



PROGRAM PRODUCTS

**Interactive Instructional Authoring System (cont'd)**

Courses that utilize 3270 native mode facilities (light-pen, PF keys, field definitions, etc.) will not operate under CMS unless necessary extensions to diagnose code 58 function have been added to the VM/370 system.

The necessary extensions are available in each of the following programs:

- VM/System Extensions Program Product, 5748-XE1
- VM/Basic Systems Extensions Program Product, 5748-XX8
- VM/System Product, 5664-167

**DOCUMENTATION**

(available from Mechanicsburg)

The following IBM publications provide further information regarding the characteristics of the Interactive Instructional Presentation System and its companion product, the Interactive Instructional Authoring System:

*Interactive Instructional Presentation System Interactive Instructional Authoring System General Information Manual (GH20-0008) ... Interactive Instructional Presentation System Interactive Instructional Authoring System Administrator's Guide (IMS) (SH20-0010) ... Interactive Instructional Authoring System Course Authoring Guide (SH20-0019) ... Interactive Instructional Presentation System Interactive Instructional Authoring System Administrator's Guide (non-IMS) (SH20-0011) ... Interactive Instructional Presentation System Interactive Instructional Authoring System Problem Diagnosis Guide (SH20-0012) ... Interactive Instructional Authoring System Simulation/Exercise Facility Authoring Guide (SH20-0013) ... Interactive Instructional Authoring System Coursewriter Authoring Guide (SH20-0014) ... Interactive Instructional Presentation System Interactive Instructional Authoring System (VM/370-CMS): Installation/Operations Guide (SH20-0015) ... Interactive Instructional Presentation System Interactive Instructional Authoring System (OS/VS): Installation/Operations Guide (SH20-0016) ... Interactive Instructional Presentation System Interactive Instructional Authoring System (DOS/VS): Installation/Operations Guide (SH20-0017) ... Interactive Instructional Presentation System Interactive Instructional Authoring System (IMS/VS): Installation/Operations Guide (SH20-0018) ... Interactive Instructional Presentation System Course Structuring Facility Authoring Guide (SH20-0020) ... Interactive Instructional Presentation System Interactive Instructional Authoring System Student Reference Card (SX20-0140) ... Interactive Instructional Authoring System Basic Author Training for the Course Structuring Facility Student Materials (GH20-2447) ... Interactive Instructional Authoring System Extended Author Training for the Course Structuring Facility Student Materials (GH20-2448)*

**RPQs ACCEPTED: No**

PROGRAM PRODUCTS

**5668-012 - INTERACTIVE INSTRUCTIONAL PRESENTATION SYSTEM VERSION 1 RELEASE 2.0**

**PURPOSE**

The Interactive Instructional Presentation System program provides terminal-based training and instructional capability by utilizing available Data Base/Data Communication Systems (IMS/VS and CICS/VS), Interactive Systems (CMS and TSO), and Terminal Access Methods (VTAM and TCAM). No modification is necessary to the programs of the host system. Interactive Instructional Presentation System (5668-012) is a prerequisite for its companion product, Interactive Instructional Authoring System (5668-011) which is used to create course material for delivery under Interactive Instructional Presentation System.

**DESCRIPTION**

The Interactive Instructional Presentation System provides an environment in which users can maintain, administer and deliver instructional materials via an online training system. They can use their existing data processing equipment and teleprocessing terminal network for training or instructional applications while at the same time running other programs.

Interactive Instructional Presentation System is a follow-on product to Interactive Instructional System (5748-XX6) and is compatible at the language level with that product (see "Compatibility" section). Courses developed under Interactive Instructional System will run without change under Interactive Instructional Presentation System.

Through the use of specific terminal commands, an administrator can view the record(s) of a particular student, a group of students or all students as they relate to course registrations, performance in a course and course completions.

Depending on the options specified during student registration, printed reports may be obtained to aid authors in improving their courses during and after the course validation cycle.

Students can use any terminal identified for the Interactive Instructional Presentation System; however, they can only take the course(s) for which they are registered. The students' progress through the course is based on their keyed responses and the logic flow of the course as determined by the course author.

Student commands allow the student to:

- Ask for optional help or hint statements which the author may have included in the course.
- Move around the course at will, provided the author agrees with this approach and has supplied the proper keywords to enter.
- Access a glossary for definitions of important words.
- Page backward or forward through previously presented material.
- Send comments directly to the author.

Additional commands permit maintenance of the courses at the Coursewriter language level.

**CUSTOMER RESPONSIBILITIES**

Before installation of the Interactive Instructional Presentation System, the customer must meet the "Hardware Requirements" as specified in this document and ensure that the host telecommunications system is fully operational.

Then, the Interactive Instructional Presentation System must be installed and the customer must:

- Register courses and students as required.
- Load the course materials into the system, and
- Administer course offerings and schedules.

Course materials may be purchased or authored by the customer.

**Note:** Customer authoring of course materials requires the availability of the companion product "Interactive Instructional Authoring System" (5668-011) on the processor(s) used for authoring.

**SPECIFIED OPERATING ENVIRONMENT**

**HARDWARE REQUIREMENTS**

The Interactive Instructional Presentation System is designed to operate on all sufficiently configured IBM Virtual Storage processors capable of supporting the host environments depicted in Figure 1. Machine requirements vary depending on operating environment. The Interactive Instructional Presentation System requires a properly configured IBM S/370, 303X or 4300 processor. Storage requirements given below are estimates for planning purposes. (Note, K = 1024.)

• **VTAM, TCAM**

The versions of the Interactive Instructional Presentation System that support the VTAM and TCAM environments will be pre-generated for each environment. The pre-generated version will utilize 456K bytes of virtual storage for VS1 and VS2, in addition to the storage requirements of the host system, and will include provision for:

- 20 Course Files
- 200 Courses
- 7 Work Files
- 100 Users

These parameters can be changed by the customer at execution time through the use of control cards. Working storage (real storage) for the default system with all 100 users on the system simultaneously (assuming 85% of the users are students) is estimated to be less than 200K bytes in addition to that required by the teleprocessing access method and other components of the host system. Utilization of system resources, and therefore working storage will increase as the number of active authors increases.

• **IMS/VS, CICS/VS, TSO, CMS**

The Interactive Instructional Presentation System under IMS/VS, TSO or CMS will require the following S/370 virtual storage for the duration of each transaction: ]

- 280K Administrator
- 280K Author
- 280K Student

Under CICS/VS, a shared program storage area of 300K bytes is required. Each transaction requires an additional 20K bytes for the duration of that transaction.

**Input/Output Devices:** Sufficient direct access storage must be provided to satisfy the requirements of the online data sets. This will be approximately 35 cylinders of 3330 space for all host environments except IMS/VS. Approximately 60 cylinders of 3330 space are required under IMS/VS. Additional space for course materials will be required. Approximately 10 cylinders of 3330 DASD space will be required for the storage of courses delivered with the Interactive Instructional Presentation System.

DOS based installations of this product do not support 23XX DASD.

**Distribution and Maintenance:** Installation and maintenance of the instructional system requires the availability of one tape drive.

**Terminals Supported:** The Interactive Instructional Presentation System provides support for IBM 3277, IBM 3275, IBM 3276, IBM 3278 and IBM 3279 terminals. Screen sizes of 24x80, 32x80, 43x80 and 27x132 are supported in those environments supporting and identifying the appropriate models. Typewriter, data entry, APL and text keyboards are supported in those environments that permit identification of the keyboard type. SDLC, BSC and local IBM protocols are supported as permitted by each environment. Support for IBM 3279 terminals is for IBM 3278 functions. Color, extended highlighting and PSS are supported for course presentation under CMS and TSO using GDDM.

The Interactive Instructional Presentation System provides support for non-3270 type terminals only in line-at-a-time mode. The IBM 2741 mdl 1 is supported in those environments with appropriate support. CPT-TWX (Model 33/35) Line Control Type is supported in those environments with appropriate support.

It is the user's responsibility to assure the equivalence at the software interface of other terminals as well as the suitability of non-hardcopy terminals using hardcopy interfaces.

Since update transactions are employed under IMS, non-checking terminals are not supported.

**SOFTWARE REQUIREMENTS**

The Interactive Instructional Presentation System permits the user to manage use of transaction processing and the training facilities. It is written in Assembler language and can use any of the following IBM S/370 facilities to present courses to students.

The Interactive Instructional Presentation System will operate with the version, release and/or levels of the host system current at the initial availability of the Interactive Instructional Presentation System Release 2. It will also operate with subsequent host system releases unless otherwise identified.

**Note:** DOS based installations require DOS/VSE Release 2 or later, and do not support 23XX DASD.

- Data Base/Data Communication Systems (DB/DC)
  - Information Management System/Virtual Storage (5740-XX2)
  - Customer Information Control System/OS/VS (5740-XX1)

PROGRAM PRODUCTS

Interactive Instructional Presentation System (cont'd)

- Customer Information Control System/DOS/VS (5746-XX3)

For operating system support refer to IMS/VS and CICS/VS programming systems support in the appropriate IMS/VS and CICS/VS documentation.

- Interactive Systems

- Conversational Monitor System
- Time Sharing Option with TCAM or VTAM (MVS only)

For interactive system support refer to the CMS and TSO programming systems support in the appropriate CMS and TSO documentation.

- Graphics Support (CMS and TSO only)

- GDDM (5748-XXH)

- Terminal Access Methods

- Virtual Telecommunications Access Method
- Telecommunications Access Method

For terminal access method support refer to VTAM and TCAM programming systems support in the appropriate VTAM and TCAM documentation.

The following figure portrays facilities and access methods used during instructional system operation.

S/370 Facility	Teleprocess Facility	Access Method	
		DIRECT	SEQUENTIAL
IMS/VS	IMS	IMS	QSAM
CICS/OS/VS	CICS	CICS	CICS
CICS/DOS/VS	CICS	CICS	CICS
VM/370	CMS Macros*	CMS Macros	CMS Macros
TSO	TSO	BDAM	QSAM
VTAM/OS/VS	VTAM	BDAM	QSAM
VTAM/DOS/VS	VTAM	DTFDA, VSAM**	DTFDI, DTFSD, DTFMT
TCAM	TCAM	BDAM	QSAM
BATCH DOS/VS	DTFDI	DTFDA, VSAM**	DTFDI, DTFSD, DTFMT
BATCH OS/VS	QSAM	BDAM	QSAM

\* = CP Diagnose 57 for 3277 Display Station  
\*\* = VSAM is intended primarily for use on FBA devices

Figure 1. System/370 Facility and Access Methods

COMPATIBILITY

Courses running under the predecessor product, Interactive Instructional System (5748-XX6), or previous releases of Interactive Instructional Presentation System (5668-012) will run without change.

Users planning simultaneous operation of this product and its predecessor should carefully review the pertinent operations guides for information on special installation and operational restrictions when using this mode of operation.

Courses using 3270 dynamic formatting operation codes are not supported by the instructional system in the IMS/VS environment.

Courses that utilize 3270 native mode facilities (light-pen, PF keys, field definitions, etc.) will not operate under CMS unless necessary extensions to diagnose code 58 function have been added to the VM/370 system.

The necessary extensions are available in each of the following programs:

- VM/System Extensions Program Product, 5748-XE1
- VM/Basic Systems Extensions Program Product, 5748-XX8
- VM/System Product, 5664-167

PERFORMANCE CONSIDERATIONS

The performance of the instructional system in a virtual storage environment is dependent on the system resources available, the programs that operate concurrently and their relative priorities, system and application data set placement and system timing. Performance also depends on the paging characteristics and storage reference patterns of the system and its courses, the allocation of data sets to particular devices and the particular data being processed.

For specific online performance and response time requirements, attention must be given to ensuring that adequate real resources (main storage, processor computing capability, channels, direct access devices, etc.) are available. To verify specific performance (particularly on systems with large number of concurrent terminal users), benchmarking the instructional system should be planned.

DOCUMENTATION  
(available from Mechanicsburg)

The following IBM publications provide further information regarding the characteristics of the Interactive Instructional Presentation System and its companion product, the Interactive Instructional Authoring System:

*Interactive Instructional Presentation System Interactive Instructional Authoring System General Information Manual (GH20-0008) ... Interactive Instructional Presentation System Interactive Instructional Authoring System Administrator's Guide (IMS) (SH20-0010) ... Interactive Instructional Authoring System Course Authoring Guide (SH20-0019) ... Interactive Instructional Presentation System Interactive Instructional Authoring System Administrator's Guide (non-IMS) (SH20-0011) ... Interactive Instructional Presentation System Interactive Instructional Authoring System Problem Diagnosis Guide (SH20-0012) ... Interactive Instructional Authoring System Simulation/Exercise Facility Authoring Guide (SH20-0013) ... Interactive Instructional Authoring System Coursewriter Authoring Guide (SH20-0014) ... Interactive Instructional Presentation System Interactive Instructional Authoring System (VM/370-CMS): Installation/Operations Guide (SH20-0015) ... Interactive Instructional Presentation System Interactive Instructional Authoring System (OS/VS): Installation/Operations Guide (SH20-0016) ... Interactive Instructional Presentation System Interactive Instructional Authoring System (DOS/VS): Installation/Operations Guide (SH20-0017) ... Interactive Instructional Presentation System Interactive Instructional Authoring System (IMS/VS): Installation/Operations Guide (SH20-0018) ... Interactive Instructional Presentation System Course Structuring Facility Authoring Guide (SH20-0020) ... Interactive Instructional Presentation System Interactive Instructional Authoring System Student Reference Card (SX20-0140) ... Interactive Instructional Authoring System Basic Author Training for the Course Structuring Facility Student Materials (GH20-2447) ... Interactive Instructional Authoring System Extended Author Training for the Course Structuring Facility Student Materials (GH20-2448)*

RPQs ACCEPTED: No

PROGRAM PRODUCTS

**5668-971 - NLDM R1 and R2  
NETWORK LOGICAL DATA MANAGER  
RELEASES 1 and 2 for OS/VS2 MVS**

**PURPOSE**

Network Logical Data Manager (NLDM), a Network Communications Control Facility (NCCF) application program, develops and maintains an image of the active network configuration. The data describing the active configuration is used directly to aid session-oriented problem determination. NLDM is an interactive network management product which, because it can capture session data prior to an incident, is useful in identifying and isolating hardware and software problems.

NLDM Release 2, because of its interactions with ACF/VTAM Version 2 Release 2 and ACF/NCP Version 3, can present complete configuration data for the active network. NLDM R2 is effective in single and multiple-domain networks or in interconnected SNA networks

**HIGHLIGHTS**

- NLDM is an online, interactive facility which collects selected access method data and Network Control Program data and makes them available for display at an NCCF operator station.
- The collected data include recent path information unit headers from the access methods, PIU sequence numbers from NCP, and configuration information for the session including the primary and secondary logical unit names and addresses and the route description.
- The operator can commence NLDM R2 operations on an active network. With Release 2, synchronizing NLDM activity with network and session initialization is no longer required.
- The collected data is displayed in full-screen mode, utilizing seven-color support for highlighting and user prompting. NLDM also can be used with a monochrome display.
- NLDM provides useful data for doing problem determination when software problems occur, which otherwise may not produce problem-related information.
- The operator can select the session(s) to be traced.
- Data is maintained in virtual storage for active sessions. When the session is terminated, the data is transferred to a data base for later reference.
- NLDM Release 1 provides information for local or remote resources in the same SNA domain or in cross-domain sessions.
- NLDM Release 2 provides information for local or remote resources in the same SNA domain, in cross-domain sessions, or in cross-network sessions (i.e., within an SNA Network Interconnection environment).
- NLDM R2 can, automatically or under operator request, test the connectivity of a session up to the boundary node.
- In Release 2, the NLDMs, at the multiple hosts involved in a session, automatically cooperate in preparing a session description, for example, when presenting the configuration or trace data.

**SPECIFIED OPERATING ENVIRONMENT**

**HARDWARE REQUIREMENTS**

NLDM Release 1 and NLDM Release 2 are designed to run in a virtual storage environment in any IBM system configuration that supports MVS as specified in the "Software Requirements". The estimated amount of virtual storage required by NLDM R1 is 280,000 bytes and by NLDM R2 is 330,000 bytes, plus (for both releases) a variable amount of storage depending upon the number of active sessions being monitored. NLDM executes in the same address space as NCCF. For additional information about storage requirements for NLDM:

- For Release 1, see the *NLDM General Information Manual* (GC30-8081).
- For Release 2, see the *Network Program Products Planning Manual* (SC27-0658).

Any terminal supported by NCCF as a communications network operator station can be used to operate NLDM. NLDM can use seven-color displays when appropriate.

**SOFTWARE REQUIREMENTS**

NLDM Release 1 and NCCF Release 2 (with the required PTF) operate with MVS/370\*, and for reasons of compatibility and coexistence with MVS Extended Architecture (MVS/XA) in 24-bit addressing mode. The access method and NCP levels supported are:

- ACF/VTAM Version 1 Release 3\*\* (with the required PTF)
- ACF/VTAM Version 2 (with the required PTF)
- ACF/TCAM Version 2 Release 4
- ACF/NCP Version 2 (IBM 3705)
- ACF/NCP Version 2 (IBM 3725)

NLDM Release 2 and the prerequisite NCCF Version 2 operate with MVS/370\* and MVS/XA (compatibility mode). The access method and NCP levels necessary for full function of NLDM Release 2 are:

- ACF/VTAM Version 2 Release 2, and
- ACF/NCP Version 3 (for the IBM 3705 and 3725).

Other access methods and NCP levels are:

- ACF/VTAM Version 1 Release 3\*\* (with the appropriate PTF) in single-domain networks
- ACF/VTAM Version 2 Release 1 (with the appropriate PTF)
- ACF/TCAM Version 2 Release 4 - in single-domain networks
- ACF/NCP Version 2 (IBM 3705)
- ACF/NCP Version 2 (IBM 3725)

\* MVS/370 is a generic term used to refer to MVS operating systems which operate with S/370 architecture, i.e.:

- OS/VS2 (MVS) Release 3.8
- OS/VS2 (MVS) Release 3.8 with the MVS/SE program product
- OS/VS2 (MVS) Release 3.8 with the MVS/SP V1 program product

\*\*ACF/VTAM Version 1 Release 3 is supported in MVS/370 mode only.

**DATA SECURITY**

NLDM uses the data security, auditability and control facilities of NCCF.

**DOCUMENTATION**

(available from Mechanicsburg)

**Release 1:**

*NLDM General Information* (GC30-3081) ... *NLDM Licensed Program Specifications* (GT30-9555) ... *NLDM Installation and Operation* (ST30-3165).

**Release 2:**

*NLDM Licensed Program Specification* (GC30-9555) ... *Network Program Products General Information* (GC27-0657) ... *Network Program Products Planning* (SC27-0658) ... *NLDM Installation and Operation* (SC30-3165) ... *NLDM Diagnosis* (SC30-3166).

**MVS SYSTEM INTEGRITY APPLIES:** Yes

**RPQs ACCEPTED:** No

**LICENSED PROGRAM MATERIAL AVAILABILITY**

**Restricted Material:** No. This licensed program will be available without source licensed program materials. It will be available with object code.

**QUERY MANAGEMENT FACILITY (QMF) RELEASE 1  
5668-972**

**PURPOSE**

Query Management Facility (QMF) is a program product designed to provide interactive data base facilities to users with little or no data processing background. It can also be highly useful to the data processing professional as a high productivity programming tool for use in application development and prototyping. Query Management Facility operates against IBM Database 2 (DB2) data in the MVS/XA and MVS/370 environments. Query Management Facility also operates against SQL/DS R2 data in the VM/SP environment. Query Management Facility also utilizes companion IBM program products: Interactive System Productivity Facility (ISPF) Dialog Manager and Graphical Data Display Manager (GDDM).

Query Management Facility provides an interface, designed principally for use by non-programmers, to enable users to access a relational (tabular) data base. The following are some specific characteristics:

- Both structured query language (SQL) style and query-by-example (QBE) style query and data manipulation capabilities.
- Data definition functions through the SQL language.
- An easy-to-specify interactive reports definition and generation capability.
- A simple set of commands that allows handling of queries, report forms, and procedures.

Users of QMF can produce meaningful results utilizing only a portion of the SQL or QBE language facility and/or QMF commands. To facilitate the use of QMF, a set of HELP panels and sample SQL queries are provided.

The functions available within QMF have been designed to support typical user tasks so that the performance of those tasks is easy for the non-data processing professional end user. At the same time, Query Management Facility offers flexibility regarding the order in which the steps of such tasks are performed.

**Early Support Program:** To assist IBM in introducing the significant new Query Management Facility product, QMF is currently being tested in a number of customer and IBM locations. Early experience with a limited number of users will assist IBM in evaluating the product in varied environments and in developing additional support material prior to general availability.

An Early Support Program (ESP) is being planned for QMF. This ESP will be conducted by the NAD Dallas Systems Center; nominations will be through the NAD regions and NMD areas.

**HIGHLIGHTS**

Typical functions which an end user might perform include:

- Ad-hoc query in SQL or QBE languages.
- Report preparation.
- Preparation of data for graphic presentation
- Definition and execution of a procedure consisting of a series of query/report functions.
- Definition of a data extract request in an interactive mode by dialogs which can invoke Data Extract (DXT), a companion IBM program product.

**DESCRIPTION**

**Ad-Hoc Query** - Either SQL or QBE may be used to retrieve selected information that is formatted and displayed at the user's terminal. Scrolling commands may be used to browse through the data. The user may then display the original query and modify it in order to obtain different results. Subsequently, the user may save the data, print it, save the request that produced the data, or simply go on to another task.

**Report Preparation** - The results of executing a query will be displayed to the user as a simple table. A form is generated which describes the default format for presentation of the result. Alternatively, a user-defined, pre-stored form may be specified at the time the query is run. The user can then describe the nature of the report (headings and other text, format and summarization required) by filling and changing the values in the form. With only a few specifications, the user can produce a variety of different report types including listing, summary or across-style reports. Once the form is satisfactory, the user merely requests the selected data be redisplayed. QMF will format and display the report at the user's terminal. Since preparing a report can often be an iterative process, QMF makes it easy for a user to move from one step to another. That is, display the report format, and redisplay the data using the updated form. These commonly performed command functions are available via program function (PF) keys as well. Once the user is satisfied with the report, he or she can print the report and also save the report description form.

**Graphic Presentation Preparation** - A sample program is provided with QMF which can invoke the Interactive Chart Utility (ICU) to present the data prepared using QMF. The ICU is a facility provided with the

Presentation Graphics feature of the licensed program GDDM (5748-XXH).

**Procedures** - For periodic reports, users can create a 'procedure' definition that allows the execution of a series of commands which can be invoked through a single command. The execution of both SQL- and QBE-style queries can be included in a single procedure.

Because QMF takes advantage of features of ISPF and GDDM, the creation and alteration of queries and procedures is easy for the user. As examples, corrections and insertions are simply typed over incorrect information or into blank spaces. Deletions can be made by simply blanking out the unnecessary data. Also, prompts and HELP panels are provided to guide the user as he or she performs a task.

**Interactive DXT Requests** - As a convenience, special ISPF dialogs are available in support of DXT. These dialogs are also part of the DXT program product (5668-973). This facility provides an easy, interactive way to specify extract requests for DXT. The user of these special dialogs is intended to be a technical person with data base knowledge sufficient to formulate an IMS/VS V1 DL/I, virtual storage access method (VSAM), or physical sequential access method (SAM) request. These dialogs are the only part of QMF which requires some DP knowledge. QMF has otherwise been developed for the non-programmer.

The dialogs consist of ISPF menu-driven screen facilities which guide a user through the process of creating an extract request from a terminal. If DXT is not installed on the system where the extract request was constructed, the request can be sent to a system which contains DXT, and the requested data routed to its destination, via the appropriate operating system telecommunications facilities.

**CUSTOMER RESPONSIBILITIES**

A customer installing Query Management Facility must:

- Have installed the prerequisite products.
- Assure that appropriate MVS/XA, MVS/370, VM/SP and S/370 training (including terminal and direct access storage education) be given to system analysts, application programmers, system programmers, and system operators.
- Have MVS/XA, MVS/370 or VM/SP successfully installed.
- Have personnel educated in Query Management Facility.
- Provide adequate protection against the accidental loss or misuse of his data.

**SPECIFIED OPERATING ENVIRONMENT**

**HARDWARE REQUIREMENTS**

Query Management Facility will operate on any IBM Processor supported by MVS/SP V2 R1 and MVS/SP V1 R3, or VM System Product (VM/SP) Release 3 (5664-167). For the IBM 3033 Processor running MVS, it is recommended that hardware cross-memory extension feature (#6850) be used. The processors must have sufficient real storage to satisfy the combined requirements of IBM Database 2, MVS/XA or MVS/370, or SQL/Data System (SQL/DS) Release 2 and VM/SP, Query Management Facility, appropriate Data Facility Product, appropriate access methods, batch requirements, and other customer-required applications. The configuration must include sufficient I/O devices to support the requirements for system output, system residence, and system data sets. Sufficient direct access storage must be available to satisfy the user information storage requirements, and may consist of any direct access facility supported by the system configuration and the programming system.

**DASD:** Query Management Facility is independent of DASD device type. Any disk devices supported by either MVS/XA Data Facility Product or MVS/370 Data Facility Product in an MVS system, or by VM/SP Release 3 in a VM system, may be used. Query Management Facility uses disk devices for the following data sets:

- Spill file data set which holds the data for the report which a user is viewing (used only when the data does not fit in virtual storage)
- Data base data sets (managed by IBM Database 2 or SQL/Data System (SQL/DS) Release 2)
- Import/export data sets which hold queries, forms, and procedures which can be maintained outside of QMF control or which can be transferred between different QMF users (optionally, tape)

**Tape:** Query Management Facility is also independent of tape device type. Any tape device supported by either MVS/XA Data Facility Product or MVS/370 Data Facility Product in an MVS system, or by VM/SP Release 3 in a VM system, may be used. Query Management Facility uses tape devices for the following data sets:

- The print data set, and the debug (trace) data set

**Data Communications Devices:** Query Management Facility supports terminals supported by TSO, ISPF and GDDM in the MVS/SP environment, and by VM/SP, ISPF and GDDM in the VM/SP

**5719-CB3 - COBOL COMPILER and RESIDENT LIBRARY  
5719-CB4 - COBOL TRANSIENT LIBRARY  
SERIES/1 EVENT DRIVEN EXECUTIVE**

*NO LONGER AVAILABLE, effective April 1984.*

**PURPOSE**

IBM offers COBOL under the Series/1 Event Driven Executive Basic Supervisor and Emulator (5719-XS1). The compiler and library can be diskette- or disk-based as supported by the operating system. The compiler requires as input a COBOL source program and produces object modules which are combined by the Event Driven Executive linkage editor into a Series/1 executable machine language program. The language offers a wide range of commercial features, plus extensive facilities for handling input and output, sorting and merging data files, index capability for faster and simpler access to data files, structuring the source and object programs, and trace facilities for debugging COBOL programs. The Series/1 COBOL product also supports local communication functions, enabling users to accept data from and display data to Series/1 interactive devices.

**SPECIAL SALES INFORMATION**

COBOL programs can be used with the Event Driven Executive Multiple Terminal Manager licensed program (5719-MS1). With these facilities COBOL programs can execute in an interactive environment where one or more applications can run concurrently with more than one terminal. Users can write interactive terminal handling applications and develop screen-oriented programs to accept and display data from predefined fields on screens.

COBOL is suited to an interactive commercial environment where users can develop transaction processing applications such as order entry, data collection, and file update, as well as applications that run in a batch environment.

**DESCRIPTION**

Series/1 Event Driven Executive COBOL is offered as two licensed programs:

- Event Driven Executive COBOL Compiler and Resident Library (5719-CB3) for compilation of user programs.
- Event Driven Executive COBOL Transient Library (5719-CB4) for execution of user programs.

**COBOL Language**

The 1974 American National Standard COBOL processing modules supported include all of Level 1 for the:

Nucleus	Language elements needed for internal processing of data
Table Handling	Define and process fixed-length tables
Sequential I/O	Define and access sequential files*
Relative I/O	Define and access relative files*
Indexed I/O	Access indexed files*
Sort/Merge	Sorting of data files
Segmentation	Specify overlay of the Procedure Division at execution time
Library	Inclusion of pre-defined COBOL text into a COBOL source program
Debug	Convenient access for monitoring program execution
Interprogram Communication	Ability to transfer control from one object program to another

\* RERUN clause is checked for syntactic correctness only.

In addition to the above, the following features are also supported:

- MERGE feature of Sort/Merge Level 2
- NUCLEUS LEVEL 2 features:
  - COMPUTE statement
  - Qualification
  - Arithmetic operators
  - CORRESPONDING phrase
  - ACCEPT and DISPLAY statements
  - Multiple operand support for arithmetic statements
  - Nested IF statements
  - PERFORM UNTIL phrase
  - 01 through 49 level numbers

**HIGHLIGHTS**

- Language
  - Event Driven Executive COBOL is designed according to specifications for American National Standard (ANS) COBOL X3.23-1974 as understood and interpreted by IBM as of March, 1979, with the exception of the RERUN clause.
  - Event Driven Executive COBOL exceeds the Low Intermediate Level COBOL as defined by FIPS 21-1.
- Extensive User Options
  - Source listings
  - Cross reference
  - Storage map of variables
  - Statement offset listing
  - Object listing
  - MAP 370 option
- Program Development and Productivity Aids
  - Symbolic debug, which makes storage maps and snapshots of data areas available in COBOL format
  - Flow trace, which identifies the last statement executed before an abnormal termination
  - Extensive error checking and error messages at five severity levels, ranging from source program fix-up, to warning messages, to serious and fatal errors
  - FIPS flagger enables quick and easy identification of COBOL source statements which exceed the specified FIPS language level
  - Generalized CALL facility allows access to programs written in Assembler language or FORTRAN.

**Resident Library**

The Event Driven Executive COBOL Resident Library consists of commonly used subroutines which are combined with a user's program through the linkage editor to form an executable load module for subsequent execution under the Event Driven Executive Basic Supervisor and Emulator. The Resident Library includes subroutines such as:

- Data conversion
- I/O routines
- ACCEPT/DISPLAY data to/from terminals
- Arithmetic routines
- Sort/Merge interface
- Run-time error routines

**Transient Library**

The Event Driven Executive COBOL Transient Library is used in conjunction with the execution of COBOL user programs. Routines in the transient library are loaded only when needed, thus allowing a more efficient utilization of primary storage. The principal functions in the transient library are:

- OPEN/CLOSE
- Program Termination/Initialization
- ACCEPT - Date/Time
- I/O Error Handling Routines
- Execution time messages

**Compilation**

The Event Driven Executive COBOL Compiler operates in the environment of the Event Driven Executive Basic Supervisor and Emulator (5719-XS1). The COBOL-generated object code is combined with library routines by the Event Driven Executive linkage editor and can run as a program under the control of the Event Driven Executive system. The Event Driven Executive Utilities (5719-UT3) provide powerful program editing and program management capabilities for the COBOL development process.

**Execution**

Object programs are executed under the Event Driven Executive operating system. COBOL data sets can be declared SEQUENTIAL, RELATIVE or INDEXED, and require the operating system data management facilities. The SEGMENTATION feature of COBOL allows users to optimize storage requirements for their application through use of overlays.

**CUSTOMER RESPONSIBILITIES**

The customer is responsible for the installation and use of this licensed program.

**EDX COBOL (cont'd)****SPECIFIED OPERATING ENVIRONMENT**

Support will be provided for these licensed programs when they are operated in the following specified operating environment:

**HARDWARE REQUIREMENTS**

In addition to the minimum requirement for the IBM Series/1 Event Driven Executive Basic Supervisor and Emulator, and the Event Driven Executive Program Preparation Facility, the storage requirements are:

- For compilation, a minimum 32K byte partition for the compiler.
- For execution, a minimum partition size is 8K to 10K bytes for small programs; partition size is a function of the COBOL source program.

For details on system requirements for the IBM Series/1 Event Driven Executive Basic Supervisor and Emulator and the IBM Series/1 Event Driven Executive Program Preparation Facility, see the respective pages.

**SOFTWARE REQUIREMENTS**

Licensed programs required for:

**Compilation**

- IBM Series/1 Event Driven Executive Basic Supervisor and Emulator (5719-XS1)
- IBM Series/1 Event Driven Executive COBOL Compiler and Resident Library (5719-CB3)

**Program Preparation**

- IBM Series/1 Event Driven Executive Basic Supervisor and Emulator (5719-XS1)
- IBM Series/1 Event Driven Executive Program Preparation Facility (5719-XX2)
- IBM Series/1 Event Driven Executive Utilities (5719-UT3)

**Program Execution**

- IBM Series/1 Event Driven Executive Basic Supervisor and Emulator (5719-XS1)
- IBM Series/1 Event Driven Executive COBOL Transient Library (5719-CB4)

**Additional Licensed Programs**

The following licensed programs are required if the associated functions are used:

- IBM Series/1 Event Driven Executive Sort/Merge (5719-SM2): Required support for SORT and MERGE verbs
- IBM Series/1 Event Driven Executive Indexed Access Method (5719-AM3): Required support for indexed file I/O
- IBM Series/1 Event Driven Executive Multiple Terminal Manager (5719-MS1): Required support for interactive terminal I/O and screen support

**COMPATIBILITY**

- Series/1 Event Driven Executive COBOL at the source statement level is a compatible subset of OS/VS COBOL Compiler and Library Release 2. Programmers can develop COBOL programs on larger systems for use on Series/1, provided those programs do not use any language or hardware features the Series/1 product does not support.
- Series/1 COBOL programs are compatible at the Source level between the Realtime Programming System and the Event Driven Executive Basic Supervisor and Emulator (5719-XS1) except for the File Select statement.
- COBOL data files in fixed-block unspanned format are compatible between Event Driven Executive and the Realtime Programming System through the Basic Exchange data format.

**DOCUMENTATION**

(available from Mechanicsburg)

*IBM Series/1 Event Driven Executive COBOL Compiler and Resident Library; Licensed Program Specifications (GL23-0012) ... IBM Series/1 COBOL Language Reference (GC34-0234) ... IBM Series/1 Event Driven Executive COBOL Programmer's Guide (GL23-0014) ... IBM Series/1 Programming System Summary (GC34-0285) ... IBM Series/1 Event Driven Executive COBOL Transient Library Program Specifications (GL23-0013).*

**RPQs ACCEPTED:** Yes

## PROGRAM PRODUCTS

**EVENT DRIVEN EXECUTIVE  
SYSTEM/370 CHANNEL ATTACH (5719-CX1)****PURPOSE**

The IBM Series/1 Event Driven Executive (EDX) System/370 Channel Attach Program is a licensed program that runs under the control of Version 3.0 of the EDX Basic Supervisor and Emulator. This program, when used in conjunction with the 4993 model 1 Series/1-System/370 Termination Enclosure and the Series/1-System/370 Channel Attachment (feature #1200), provides the Series/1 user the ability to communicate with a System/370 over a Selector or Block Multiplexer Channel. (Wherever System/370 is used, it refers to one of the following processors: System/370 (models 135-168), the 3031, 3032 and 3033 Processors, and the 4331 and 4341 Processors.)

**HIGHLIGHTS**

This program provides the Series/1 user the ability of transferring data, under joint consent, between user application programs in a Series/1 and a System/370. The System/370 must be using either DOS/VS, OS/VS1 or OS/VS2 (SVS or MVS) and BTAM, or DOS/VSE with BTAM-ES. The support:

- Establishes, controls and terminates access between Series/1 application programs and the channel attach device.
- Manages input/output transfers between the Series/1 application programs and the channel attach device.
- Communicates with the System/370 over 32 ports (device addresses).
- Performs error logging.
- Handles interrupts from the channel attach device.
- Performs error recovery.

**CUSTOMER RESPONSIBILITIES**

The customer is responsible for the installation and use of this licensed program.

**SPECIFIED OPERATING ENVIRONMENT**

Support will be provided for this licensed program when it is operated in the following specified operating environment:

**HARDWARE REQUIREMENTS**

32K bytes of Series/1 storage is required for execution of the IBM Series/1 EDX System/370 Channel Attach Program in conjunction with the minimum requirements for Version 3.0 of the IBM Series/1 EDX Basic Supervisor and Emulator.

**SOFTWARE REQUIREMENTS**

Basic Supervisor and Emulator Version 3 (5719-XS3) is a prerequisite, and the Supervisor must have EXIO support included at SYSGEN. EDX System/370 Channel Attach application programs require the following licensed programs:

- Event Driven Executive Basic Supervisor and Emulator Version 3 (5719-XS3)
- Event Driven Executive Utilities Version 3 (5719-UT5)
- Event Driven Executive Program Preparation Facility Version 3 (5719-XX4)

The Utilities and Program Preparation Facility are required only for the preparation and installation of EDX System/370 Channel Attach application programs, and are not required for execution.

In addition to the previously listed programs, the following licensed programs are required to assemble EDX System/370 Channel Attach application programs on a host system:

- Series/1 Event Driven Executive Macro Library/Host Version 3 (5740-LM4)
- System/370 Program Preparation Facilities for Series/1 FDP (5798-NNQ)
- System/370 Event Driven Executive Host Communications Facility IUP (5796-PGH) [optional]

**DOCUMENTATION**

(available from Mechanicsburg)

*IBM Series/1 Event Driven Executive System/370 Channel Attach Licensed Program Specification (SC34-1701) ... IBM Series/1 Event Driven Executive Communications and Terminal Application User's Guide (SC34-1705)*

**TERMS and CONDITIONS:** See PP Index



## PROGRAM PRODUCTS

**5719-ED1 - STRUCTURED PROGRAM FACILITY**

*NO LONGER AVAILABLE, effective April 1984.*

**PURPOSE**

The Series/1 Structured Programming Facility provides a resident programming editor in a Series/1, which communicates with a companion application program in a S/370 MVS/VTAM or MVS/TCAM system.

**HIGHLIGHTS**

Series/1 Structured Programming Facility is a programming editor that resides in a Series/1 and communicates with a companion application program on a S/370 MVS/VTAM or MVS/TCAM system. The connection of the Series/1 to the S/370 consists of a binary synchronous communications line using 3271 protocol. Series/1 SPF performs the following functions:

- Initiates request for transfer of data to and from the S/370.
- Initiates request for job submission and job status to S/370.
- Submits background jobs to JES2 or JES3 from the Series/1 or a data set on the S/370 direct access storage.
- Performs local editing of source data.
- Provides 3271 emulation for passthru to TSO or other S/370 subsystems.

The Series/1 SPF editor provides most of the editing functions which are provided by S/370 TSO/SPF in a format and mode of operation consistent with S/370 SPF. Editing functions provided by Series/1 SPF include the following:

- Full screen, context editing which allows multiple lines to be modified in a single interaction.
- Forward, backward and sideways scrolling of data through use of program function keys.
- Inserting and deleting of a line or a block of lines.
- Moving or copying of a line or a block of lines.
- Shifting data on a line or lines.

**LIMITATIONS**

The Series/1 SPF licensed program provides a subset of the editing functions available with the TSO 3270 Display Support and Structured Programming Facility program product (5740-XT8). Although most command formats in the Series/1 SPF program are compatible with the S/370 product, there are a few commands whose format is different and a few commands which are not supported by the Series/1 SPF product.

Should the user require access to the functions of an installed TSO or SPF system on the S/370, this is available from the Series/1 terminal in passthru mode (3271 emulation).

**CUSTOMER RESPONSIBILITIES**

The customer is responsible for the installation and use of this licensed program.

**SPECIFIED OPERATING ENVIRONMENT**

Support will be provided for this licensed program when it is operated in the following specified operating environment:

**HARDWARE REQUIREMENTS**

The use of this licensed program requires the following IBM Series/1 hardware:

- IBM 4955 Processor (model B, D, or E) with 96K bytes of storage
- Storage Address Relocation Translator feature (#6335) required except on IBM 4955 model E and 4952
- Binary Synchronous Communications Single-Line Control feature (#2074)
- Timer feature (#7840)
- Programmer Console (#5650)
- Disk/Diskette
  - One IBM 4962 model 1 Disk Storage Unit and one IBM 4964 model 1 Diskette Unit; or
  - One IBM 4962 model 2 combined Disk/diskette Unit (the fixed heads available with 4962 model 1F and 4962 model 2F are not supported)

**Note:** The diskette is required for installation and maintenance but optional when executing

- Up to ten IBM 4978 Display Stations
- IBM 4973 or 4974 Printer

A printer is not required to run Series/1 Structured Programming Facility. A printer is required for system maintenance (dumps for diagnosis and APAR submissions).

- System Console (one of the following)
  - IBM 4979 Display Station
  - or

– #7850 Teletypewriter Adapter Teletype® Models ASR 33/35 or equivalent device must be provided to complete this configuration if you choose to use #7850

**SOFTWARE REQUIREMENTS**

The use of Series/1 Structured Programming Facility does not require any prerequisite programs. The product is distributed as a completely self-contained load module.

**DOCUMENTATION**

(available from Mechanicsburg)

*IBM Series/1 Structured Programming Facility User's Guide (SC34-1627) ... IBM Series/1 Structured Programming Facility Licensed Program Specification (LPS) 5719-ED1 (GC34-1623)*

PROGRAM PRODUCTS

**5727-CB1 - SYSTEM/36 COBOL COMPILER and LIB.**

PURPOSE

The System/36 1974-level COBOL Compiler and Library operate under control of the System/36 System Support Program (5727-SS1).

HIGHLIGHTS

Enhancements

- Language extensions to support workstations and interactive communications using SSP-ICF.
- The COBOL SORT/MERGE verbs are supported for up to eight input files. Multiple sorts are allowed in the same program.
- Nested IF statements are supported.
- ADD, SUBTRACT, and MOVE CORRESPONDING are now supported. This will reduce the number of instructions required to edit group items for printing or to do data conversion of group items.
- Support for abbreviated combined relations will allow users to code implied subjects and operands such that the following statement will be valid:  
If A = B, OR C...
- Substring capability will allow the user to use the verbs STRING and UNSTRING to combine or take apart fields respectively. These powerful instructions are useful in text processing.
- Table processing will support the ASCENDING/DESCENDING options and the functions:
  - SEARCH
  - SEARCH ALL
- Variable-length tables are also supported by the OCCURS DEPENDING ON option to allow the user to restrict table searches to valid data only and thus save processing time.
- The INSPECT verb replaces the 1968-level EXAMINE. The function has been enhanced to allow use of multiple characters.
- File processing support:
  - Alternate index paths.
  - The record DELETE option is supported.
  - Add to sequential files is supported via the OPEN WITH EXTEND option.
  - The START verb will support NOT LESS THAN as well as EQUAL keys which will allow the user to do generic searches on indexed files.
  - Optional files are supported to allow the user to continue to run even if some of the files do not exist.
  - The DYNAMIC ACCESS option is supported so that a user can now process the same file both sequentially and randomly without having to doubly define the file.
  - The user can specify top and bottom margins for a printer file.
  - The FILE STATUS function is supported so that the user can interrogate the result of a file operation.
  - USE after STANDARD ERROR/EXCEPTION is supported to allow the user to combine error/exception logic in one section of the program.
- The value clause for level 88 supports multiple values. The THROUGH option also allows users to easily do range checking.
- Multiple result fields in arithmetic statements are supported.
- The REMAINDER option of the DIVIDE is supported.
- The RENAMES capability has been extended with:
  - Level 66 items
  - THROUGH option is supported
- The edit character of '/' for data edits is allowed.
- The COPY function supports the REPLACING option. This allows users to replace copied character strings, either entirely or partially, to fit the requirements of the source program.
- The 1974 DEBUG module is supported. This gives the user a special group item called DEBUG-ITEM which can be processed at desired debug points in the program. This support also includes both compile and execution time switches for suppression of the debug function.
- Additional debug support of EXHIBIT and TRACE.
- Additional compiler options include:
  - A cross-reference listing of data names and labels.
  - Flagging of all statements exceeding a specified FIPS (Federal Information Processing Standard) level.
  - Syntax-only compiles to allow users to check syntax prior to generating object code.

- Semi-interactive syntax checking is provided to allow users to compile and correct source programs without requiring a source listing printout.
- Enhanced support for multiple spooled printer files in one program.
- Subroutine support for the 1255 MICR reader/sorter.

DESCRIPTION

The System/36 COBOL Compiler and Library is a licensed program that operates under control of the System/36 System Support Program (5727-SS1). The compiler and library are disk resident. The compiler requires as input a COBOL source language program, and produces as output, by means of the system's Overlay Linage Editor, a System/36 machine language runnable program cataloged in a user library. A source program listing, diagnostic messages, and main storage map can also be requested.

This compiler is designed according to the 1974 standard.

**Industry Standards:** IBM System/36 COBOL is designed according to the following industry standards as understood and interpreted by IBM:

- American National Standards (ANS) COBOL, X3.23-1974 ANS COBOL is identical to ISO 1989-COBOL, approved in February, 1978 by the International Organization for Standardization. The following ANS processing modules are included:

2 NUC	1, 2
2 TBL	1, 2
2 SEQ	1, 2
2 REL	0, 2
1 INX	0, 2
2 SRT	0, 2
1 SEG	0, 2
2 LIB	0, 2
1 DEB	0, 2
1 IPC	0, 2

The first digit above represents the level of the modules included in the compiler. The second digit represents the lowest level specified for American National Standard COBOL (0 implies that the module may be completely missing from a standard compiler). The third digit represents the highest level specified in the standard.

- December 1975 Federal Information Processing Standard, (FIPS PUB 21-1), Low-Intermediate level. However, additional support is provided for many features of higher FIPS level.

The following exceptions apply to the above standards:

- The DELETE function is implemented by marking deleted records with a hexadecimal FF in position 1 of the record. When operating with DELETE mode files, the user is excluded from placing a hexadecimal FF in this position.
- The ALTERNATE RECORD KEY clause is not supported. Comparable function may be utilized by defining additional indexed file access paths outside the COBOL program.
- RERUN is supported for syntax checking only.

**Additions:** In addition to the standard language, the following additional features are provided:

- Extensions to the modules of American National Standard COBOL listed above include certain language elements which are defined in higher levels of the American National Standard COBOL than those listed. The following extensions are supported:
  - Use of apostrophe instead of quotes.
  - Extended data types of computational-3 (packed) and computational-4 (binary).
  - Additional debugging support with EXHIBIT and TRACE.
  - ACCEPT from console.
  - DISPLAY upon console.
  - File definition using the FILE CONTROL entries of SELECT and ASSIGN.
  - Standard error handling using FILE STATUS and the USE procedure in the DECLARATIVES SECTION.
  - Extensions to standard file processing verbs for:
    - OPEN/CLOSE
    - READ/WRITE
  - Support for display format indicators as boolean data types (0,1) and turning them on and off via the SET statement.
  - Acquire and release workstations and SSP-ICF sessions supported through ACQUIRE and DROP.
  - Support for UPSI switches.
  - ACCEPT/DISPLAY statements support reading and writing of the workstation local data area (WSDA).

**Additional Compiler Features:**

System/36 COBOL offers additional compiler features which can be chosen by the programmer:

- Alternative index paths are supported for indexed files. The paths are dynamically maintained. Program coding for an alternate index

## System/36 COBOL Compiler and Library (cont'd)

path is the same as for the indexed file. Alternate index paths must be created by BLDINDEX.

- FIPS Flagger issues messages identifying statements and clauses in a COBOL source program that exceed a user-specified FIPS level.
- Symbol Cross-Reference produces two alphabetic listings of user-specified names. One of the names is defined in the Data Division and one of the names is defined in the Procedure Division.
- Online programming is supported by the diagnosed source member output option of the compiler. Diagnostic messages and summary information are inserted into appropriate places of the source member. The member may then be viewed/changed by SEU (Source Entry Utility).
- Online programming also provides an automatic cycle that enables you to enter a program, compile it, review/correct compile errors (via SEU), and recompile the program without leaving the display or using a printer. The inserted diagnostics are dropped on the next compile or may be optionally dropped by SEU.
- Many compile options such as print/noprint, source/nosource, xref/noxref, and debug/nodebug can be overridden from the online prompts.
- When the performance of accessing a large indexed file can be improved, a storage index will automatically be allocated. Coding of the index size in the program is eliminated.
- Up to 255 display formats may be accessed from a workstation file defined in a program.
- Multiple Requesting Terminal (MRT) programs can continue processing when a permanent I/O error is caused by turning the power off at a display station or by the failure of a communications line to a remote display station.
- Program versions can be tracked with the modification reference number and date/time stamp in the source member directory entry, the compile listing, and the subroutine/load member directory entry.
- Syntax Checking Compilation scans a source program for syntax errors. If errors are found, error messages are generated. No object code is produced.
- Parameter Prompting allows the user to request prompt screens for the specification of parameters needed for entering, updating, compiling, or executing COBOL programs.
- Multiple Printer Files allows the specification of up to 25 different printer files in the same program.
- Standard Program Linkage allows programs written in System/36 COBOL to call or be called by other programs written in System/36 COBOL, System/36 FORTRAN, or System/36 Assembler language.

**Disk File Support:** The access methods supported by System/36 COBOL, based on physical data organization, are as follows:

- Sequential Organization
  - Consecutive processing, including update in place and consecutive add (extend).
  - Random processing, by relative record number, including updating. This requires that the file be described as RELATIVE in the COBOL program.
- Indexed Organization
  - Random processing, by key or relative record number.
  - Sequential processing, by key including file loading.
  - Dynamic processing, combined random and sequential processing.
- Direct Organization
  - Random processing, by relative record number, including updating and file loading.
  - Consecutive processing.
  - Dynamic processing, combined random and sequential processing.

Standard System/36 disk labels are mandatory for all disk files. Nonstandard labels cannot be used except as data records within a file.

Record size can range from 1 byte to 4,096 bytes, and records may be processed as blocked or unblocked. The block size for a given file may be varied between programs up to a maximum block size of 9,999 bytes. Logical records may span physical disk sectors, blocks, tracks, or cylinders.

**Workstation Support:** Low-volume, unformatted, line-at-a-time workstation support is provided with the ACCEPT and DISPLAY verbs. File processing has been extended to support a TRANSACTION organization type. Using this organization type, the user can define one file that supports single or multiple workstations, and single or multiple

SSP-ICF sessions in any combination. Since the support is provided in a COBOL standard file, the user codes standard COBOL verbs, with extensions where necessary, to accomplish the job.

### CUSTOMER RESPONSIBILITIES (not applicable)

### SPECIFIED OPERATING ENVIRONMENT

Support will be provided for this licensed program when it is operated in the following specified operating environment:

#### HARDWARE REQUIREMENTS

The IBM System/36 COBOL Compiler and Library licensed program runs on all models of IBM System/36.

#### SOFTWARE REQUIREMENTS

The current version of the IBM System/36 COBOL Compiler and Library licensed program operates under control of the current version of the IBM System/36 System Support Program (5727-SS1).

#### CONVERSION/COMPATIBILITY

No conversion of source programs from System/34 COBOL '74 compiler is required. There is a high degree of compatibility between the System/36 COBOL compiler and System/38 COBOL, the System/3 subset '68 COBOL, System/32 PRPQ COBOL, and System/34 PRPQ COBOL compilers. Differences do exist and some conversion effort will be required.

#### SECURITY/INTEGRITY (not applicable)

#### PERFORMANCE CONSIDERATIONS

The System/36 COBOL Compiler and Library licensed program runs on all models of IBM System/36. The minimum region size is 24K bytes. Additional main storage may allow faster compilation of a large source program. The Overlay Linkage Editor constructs overlays (if necessary and possible) to fit the object program into the available main storage. The region size required for an object program is a function of source program complexity and its ability to be overlaid.

The System/36 COBOL Compiler accepts source statements from the source member on disk, from a procedure member on disk, or from a display station keyboard. Compiler output can consist of a source listing and diagnostic messages on the printer, messages on the display screen, an object module on disk, and a diagnosed source member.

During execution of the COBOL object program, input is accepted from the keyboard, from a library procedure member (if that procedure is defined as the system input device), or from data files on disk. Output from the executing COBOL program is to the printer, display screen, or to data files on disk.

#### DOCUMENTATION

(available from Mechanicsburg)

*Programming With COBOL (SC21-9007) ... IBM System/36 COBOL Compiler and Library Licensed Program Specifications (GC21-9009) ... COBOL Summary (SC21-9013) ... COBOL Messages (SC21-7941).*

RPQs ACCEPTED: Yes

## PROGRAM PRODUCTS

**5727-OS1 - SYSTEM/36 OFFICE MANAGEMENT SYSTEM****PURPOSE**

The System/36 Office Management System (OMS/36) is a set of related office functions which can be used by principals and secretaries to improve their productivity. OMS/36 complements the text handling functions provided by the System/36 Text Management System.

**HIGHLIGHTS**

- File and find documents (Text Management System licensed program required).
- Process documents (Text Management System licensed program required).
- Local document distribution.
- Open mail.
- Check outgoing mail.
- Maintain name, address and telephone directory.
- A calendar function to create, maintain and print calendars.
- File offline correspondence.
- Maintain user profiles.
- Menu linkage to Text Management System and Advanced Printer Function.
- Label printing.

**DESCRIPTION**

OMS/36 functions are easy to use and are menu driven. They contain extensive help text for users and are designed to be used without the need for special training or hard-copy reference manuals. It runs under the System Support Program (SSP) of the System/36, and requires the Text Management System to be installed. Both system and text printers will be supported for output.

OMS/36 provides menu access to the Text Management System and other related functions such as Advanced Printer Function and problem solving in BASIC.

The major functions provided are:

- File and find documents.
- Local document distribution.  
Document Distribution provides local document distribution services to users of the System/36. A user at any workstation can prepare documents using the Text Management System and distribute them to other office users on the same system. The distribution facilities provide mail services with a private online in-basket and out-basket for each user. Documents may be sent to another user even if the recipient is not currently using the system.  
Related services provided by Document Distribution include:
  - Stored distribution lists (multiple recipients of a document).
  - Message handling (for short, immediate communications).
  - Hard-copy printout of documents sent to nonusers of office services (electronic mail basket does not exist).
  - Tracking of outgoing mail until delivery.
- Open mail.  
All incoming documents are placed in the user's online in-basket file. The Open Mail function allows a user to review the contents of his in-basket. An item may be viewed, filed, printed, kept or deleted.
- Check outgoing mail.  
Office Services maintains a record of documents sent to other users that have not been acknowledged. This function provides the user with a list of documents mailed to OMS/36 users on a single scrollable screen.
- Maintain directory.  
The directory function allows a user to develop a name, address, and telephone directory that may be used for inquiry, document distribution, labels and telephone directories.
- Calendar Function.  
The Office Management System (OMS/36) calendar function allows the user to create, maintain, view and print calendars. Various levels of access can be selected.  
The user can:
  - Schedule appointments on calendars. Add, update, delete, copy, add notes to and reschedule appointments.

- View your calendar and other calendars by day or by week. The user can also view the free time (unscheduled time) on a calendar for a specified date.
- Print calendars for specified days or weeks.
- Select access levels for each calendar. Assign access (no access, read access, or update access) for all users (public access), or for a specific user.
- Select how times will be entered, shown, and printed in either AM/PM or in 24-hour (international) time.
- Select whether a message is given when someone tries to schedule an appointment in a time slot that is already occupied or that is outside the normal scheduling period.

- Filing of offline correspondence.

Document information can be entered and used later to locate a filed document.

- Maintain user profiles.

The user profile allows the user to customize or tailor his operating environment. Entries may be changed at any time. Default values are taken from the user's profile by both the Text Management System and Office Management System functions.

- Menu linkage is also provided to System/36 BASIC. If System/36 BASIC is installed, the user will have a BASIC session started in which BASIC programming can be done.
- Menu linkage to Advanced Printer Function. This provides menu access to APF/36 from the OMS/36 menus.

**CUSTOMER RESPONSIBILITIES (not applicable)****SPECIFIED OPERATING ENVIRONMENT**

Support will be provided for this licensed program when it is operated in the following specified operating environment:

**HARDWARE REQUIREMENTS**

The minimum hardware requirements are:

- IBM System/36, any model.
- One IBM Printer (3262, 5219 mdl D01 or D02, 5224, 5225 or 5256). If an IBM 3262 Printer is used, a print belt with upper and lower characters should be considered.
- One IBM 5251 mdl 11, 5291 or 5292 Display Station.
- The IBM System/36 Office Management System requires a minimum of 2,500 blocks of disk space.

**SOFTWARE REQUIREMENTS**

IBM System/36 System Support Program (5727-SS1), Release 1 or later, and the Text Management System licensed program. The licensed program requires 64K bytes of user memory to execute.

**SECURITY/INTEGRITY**

Same as the System/36 System Support Program (5727-SS1).

**DOCUMENTATION**

(available from Mechanicsburg)

*IBM System/36 Office Management System Licensed Program Specifications (GC21-7980) ... IBM System/36 Office Management System User's Guide (SC21-7983).*

**SYSTEM INTEGRITY**

Same as the IBM System/36 System Support Program (5727-SS1).

RPOs ACCEPTED: Yes

## 5727-RG1 - SYSTEM/36 RPG II

### PURPOSE

The System/36 RPG II Compiler operates under control of the System/36 System Support Program (5727-SS1). It provides the following capabilities: RPG II Language Compiler ... Auto-Report ... Support for System/36 devices including WORKSTN (workstation) device and Interactive Communications feature SSP-ICF ... RPG II support for Binary Synchronous Communications (BSC).

### HIGHLIGHTS

- Full procedural files that combine sequential and random disk access methods into one file definition statement. This can simplify programs by eliminating the need to have two file statements that access the same physical file in order to process randomly, sequentially, and add records.
- Exception output by name enables output statements to be given a name instead of an indicator, and allows that name to appear in Factor 2 of an EXCPT operation. This simplifies programming and debugging by eliminating the use of a unique set of indicators with EXCPT to control the output statements.
- When the performance of accessing and large index file can be improved, a storage index will automatically be allocated. Coding of the index in the program is eliminated.
- Up to 255 display formats can be accessed from a program.
- Alternative index paths are supported for indexed files. The paths are dynamically maintained. Program coding for an alternate index path is the same as for the indexed file. Alternate index paths must be created by BLDINDEX.
- Multiple Requesting Terminal (MRT) programs can continue processing when a permanent I/O error is caused by turning the power off at a display station or by the failure of a communications line to a remote display station.
- Program versions can be tracked with the modification reference number and date/time stamp in the source member directory entry, the compile listings and the subroutine/load member directory entry.
- Online programming is supported by the diagnosed source member output option of the compiler. Diagnostic messages and summary information are inserted into appropriate places of the source member. The member can then be viewed/changed by SEU (Source Entry Utility).
- Online programming also provides an automatic cycle that enables you to enter a program, compile it, review/correct errors (using SEU) and recompile the program without leaving the display or using a printer. The inserted diagnostics are ignored during the next compile or can be removed by SEU.
- Many compile options such as print/noprint source, program size, debug/nodebug can be overridden from the online prompts.
- The RPG II device names are DISK, PRINTER, CRT, CONSOLE, SPECIAL, KEYBOARD, BSCA and WORKSTN.
- Support is provided for SSP-ICF using the WORKSTN file support.
- The external indicators (U1-U8) may be tested and turned on and off in the RPG II program. The status of these indicators may then be tested by OCL. The indicators can also be set on or off using OCL.
- The user program may access a Local Data Area of up to 512 bytes which provides program-to-program or program-to-OCL data interchange.
- Data structures can be defined for the Local Data Area or used to redefine other fields without allocating additional storage.
- A program using a WORKSTN file can support multiple workstations or communication sessions with specified unique data fields and indicators saved and restored automatically for the currently active workstation or communication sessions.
- The TIME operation can be used to obtain time-of-day and date from the system.
- Field end position may be omitted and the compiler will calculate the end position within an output record.
- The user can control spacing and skipping of the compiler listing.
- A subroutine to retrieve message text from a message member is provided.
- RPG uses the System Overlay Linkage Editor (OLE). The flexibility of user-determined overlays may improve performance.
- The compiler defaults to the current user library to improve programmer productivity.
- Subroutine support for the 1255 MICR reader/sorter.

### DESCRIPTION

The System/36 RPG II Compiler is a licensed program that operates under control of the System/36 System Support Program (5727-SS1). It provides the following capabilities:

- RPG II language compiler.
- Auto-report.
- Support for System/36 devices including WORKSTN (workstation) device and Interactive Communications feature SSP-ICF.
- RPG II support for Binary Synchronous Communications (BSC).

### SYSTEM/36 DEVICE SUPPORT

System/36 RPG II supports all the devices available on the System/36 except the diskette drive and 8809 tape (8809 Tape hardware will not be available until May 1984. Disk files can be shared by more than one program. The following expanded device support is provided:

- WORKSTN File Support - System/36 RPG II supports one or more display stations or SSP-ICF communication sessions as a primary or demand file. The WORKSTN device support allows the programmer to treat the display station or communication session as a sequential combined file using the normal RPG II logic. Multiple display stations and/or multiple communications sessions may be attached to the WORKSTN file. The programmer need only be concerned with the single user (display station or communications session) logic. Data fields and indicators that are unique to each user are so indicated by the programmer and RPG II saves and restores those fields and indicators automatically.

Display formats for use with the WORKSTN file must be created using the Screen Design Aid (SDA) which is part of the Utilities licensed program. The system facility for compiling existing source code for screen formats, SSP Screen Format Generator Routine (SFGSR), can also be used.

- CONSOLE File Support - Through the use of normally coded file description and input specifications, the CONSOLE file is supported in a buffered interactive mode. The operator is prompted record-by-record with display formats generated by the compiler. Keying of one record is buffered and overlapped with processing of the previous record. The program is coded to process records as from any other sequential input device.
- KEYBOARD and CRT File Support - The display formats used for these files will use 6 lines of 40 characters each or 24 lines of 79 characters each depending on the maximum record length specified in the program for the file. The KEYBOARD support includes support of 24 command function keys.
- PRINTER File Support - Multiple printer files may be specified in a single program. The System/36 OCL is used to assign an RPG II printer file to the natively attached printer or a workstation printer at run time.

### AUTO-REPORT

Auto-Report is included with the System/36 RPG II compiler and includes the following features:

**Copy** - Specifications may be cataloged in a library and included in any RPG II program via the COPY statement. A copy statement is especially useful for cataloging the file description and input specifications for which overrides may be coded to specify such things as control levels. By using the COPY statement, only one description of the file need be cataloged and maintained for all programs using the file.

**Page Headings** - Page headings can easily be specified on output specifications without the need for output indicators or end positions. The heading is centered over the report complete with page numbers and date.

**Simplified Report Specifications** - A report can be produced by listing on output specifications the fields in the order desired. On one output specification, the field, column heading, and an indication for column totals can be entered. The column headings, fields, and column totals are automatically generated.

### BINARY SYNCHRONOUS COMMUNICATIONS (BSC)

The telecommunications specification is supported in System/36 RPG II. Support of binary synchronous communications will be provided by System/36 to communicate with:

- Another System/36 with RPG II, Assembler or SSP-ICF BSCSEL subsystem
- System/34 with RPG II, Assembler or SSP-ICF BSCSEL subsystem
- System/32 with RPG II or Assembler
- System/3 with (MLMP) CCP, or RPG II
- System/7 with MSP/7
- System/38 (CPF)
- System/360 with BTAM\*

## PROGRAM PRODUCTS

**System/36 RPG II (cont'd)**

- System/370 with any of the following:
    - BTAM\*
    - VTAM/NCP
    - CICS/VS\*
    - IMS/VS\*
  - 3741 mdl 2 or 4
  - 3747
  - 5231 mdl 2 (supported as 3741 mdl 2 or 4 in transmit mode only)
  - 5280 distributed data system
  - Series/1 (supported as a System/3)
  - 5110 or 5120 (as a 3741)
  - 6640 Document Writer
  - Office Systems/6 Information Processor
  - 6240 Magnetic Card Typewriter - Communicating
  - 6670 Information Distributor
  - 6580 Displaywriter System
  - POWER/VS (as a 2780 or 3780)
- \* Note: The 3704/3705 Emulation Program (EP) or the Partitioned Emulation Program (PEP) extension to 3704/3705 NCP can be used to emulate the 2701.

The BSC host support for System/36 is generated on the host system as System/3 BSC.

**System/34 RPG II Considerations:** If any System/34 assembler subroutines are called via EXIT or SPECIAL files, those assembler subroutines must be reviewed and modified as required to execute correctly on System/36.

CUSTOMER RESPONSIBILITIES (not applicable)

**SPECIFIED OPERATING ENVIRONMENT**

Support will be provided for this licensed program when it is operated in the following specified operating environment:

**HARDWARE REQUIREMENTS**

The IBM System/36 RPG II licensed program runs on all models of IBM System/36 and supports the communications adapters (#2500 and #4500) in BSC mode.

**SOFTWARE REQUIREMENTS**

The current release of the IBM System/36 RPG II licensed program operates under control of the current release of the IBM System/36 System Support licensed program (5727-SS1).

**COMPATIBILITY**

The System/36 RPG II source programs are source compatible with System/34 RPG II. System/34 RPG II programs and screen formats must be recompiled to execute on the System/36.

**CONVERSION**

No conversion of source programs from System/34 is required.

SECURITY/INTEGRITY (not applicable)

PERFORMANCE (not applicable)

**DOCUMENTATION**

(available from Mechanicsburg)

*Programming With RPG II (SC21-9006) ... IBM System/36 RPG II Licensed Program Specifications (GC21-9008) ... RPG II Messages (SC21-7940).*

RPGs ACCEPTED: Yes

PROGRAM PRODUCTS

**5727-SS1 - SYSTEM/36 R2 SSP  
SYSTEM/36 SYSTEM SUPPORT PROGRAM**

**PURPOSE**

The System/36 System Support Program provides control programming functions for the System/36. These functions support user application programs and IBM programs and provide a number of independent general system integrity and ease-of-use facilities. System/36 SSP is layered to enhance productivity for all of its users. HELP menus and text, prompted procedures, and Operations Control Language are all available. Procedure Control Expressions allow building additional user procedures with full job stream control using substitution, branching, and some arithmetic functions.

**HIGHLIGHTS**

The System/36 SSP and SSP features provide the following control program capabilities:

- System Guided Operation.
- Over 2,000 Screens of Online HELP Text.
- User Application Help Support.
- Simple Configuration.
- Alternate Index Support on Disk.
- System/34 Source Code Compatibility.
- Multiple Program Mode.
- Input Job Queue
- Main Storage Management
- Operation Control Language (OCL) and Procedure Control Expressions.
- Sort/Merge Facility.
- System Utilities.
- Data Management for Disk and Diskette, plus Local and Remote Displays and Printers.
- Inquiry (Interrupt) Function.
- User/Resource Security.
- System History Facility.
- Spooling.
- Overlay Linkage Editor.
- Online Programming Support.
- Elastic Workload Management.
- Auto Response for System and User Messages.
- System Measurement Facility.
- Support for Diagnostic Operations.
- Support for Batch BSC.
- Remote Workstation Protocol.

**Special Features (optional):**

- Support for Communications Products.
  - Autocall, X.21 and X.25 (#6001)
  - Interactive Communications Feature SSP-ICF (#6002)
  - Multiple Session Remote Job Entry (MSRJE) (#6004)
  - 3270 Device Emulation (#6003)
  - Data Encryption Standard (DES) Subroutine for Banking (#6005)
  - Distributed Disk File Facility (#6006)
  - Communications and System Management feature (#6029)
- Extended SSP Feature (#6000).
  - Diskette I-Format Support
  - Multinational Character Set.
  - Tape Save/Restore and Data Interchange Support (available 2Q84)
  - 1255 Magnetic Character Reader Support (available 2Q84).

**DESCRIPTION**

**System Guided Operation:** The System/36 SSP is built to generally work without the need of publications. After signing on to the system, the operator can see the MAIN HELP menu. Options are chosen based on what the user wants to do. Each menu screen leads to another screen with additional options or to the execution of some command or procedure. There are about 140 Help menus supplied, but the path taken for any specific task uses only a few. Each operator can use a

command key to set any one of these as a sign-on help menu depending on individual experience level.

In addition, the Help menus can be bypassed by displaying a user-defined menu for specific applications. Also, each operator can use a command key to set the default sign-on application menu. The user need only define the menu and the job associated with each menu option. When the operator selects an option from the menu, the system displays it and runs the procedure or command associated with the selected option.

**Over 2,000 Screens of Help Text:** Help text is available to make the execution of system commands and procedures easy for the users, whether they are programmers or operators. This additional support can be removed from disk if/when it is not needed. When available, it gives an explanation of all the Help available on the system, describes the function of each selected procedure, and tells what command keys are active. Thus, the system can be operated without keying any commands.

**User Application Help Support:** Help text support similar to that used by system functions is available for programming use. Each menu and its option can be easily described using the Screen Design Aid (SDA) utility. No other programming is required.

Application help text, describing areas on the screen, can also be defined on screen formats using SDA. Different help text screens can be displayed based on cursor location at the time the help key is pressed. Using this facility, operator instructions can easily be added to existing applications by simply changing screen formats used by the application.

**Simple Configuration:** Configuration of the system involves an interactive process of responding to displayed prompts to tailor hardware and software definitions. Configuration is typically performed immediately following initial installation of the SSP on the system, but may be repeated later to change specified options or values. The system is tailored to the user's definitions by updating the master configuration record and doing an Initial Program Load (IPL) of the system. Careful and complete planning will ease system configuration.

Meaningful configuration defaults are provided for several system variables and system files based on the size of the system (main storage and disk capacity). Local workstations can be automatically configured. Workstation IDs and default values for display station and printer characteristics are assigned for the user.

Each menu and prompt is supported by an extensive set of defaults and automatic functions as well as Help text.

**Alternate Index Support on Disk:** This facility makes it possible to save disk storage and improve performance with applications that require multiple access paths to the same data. Alternate index files can be built for indexed files as necessary. Each alternate index file contains keys and pointers. An alternate index file can also contain duplicate keys. These files are used like any other indexed file and are maintained automatically by the SSP disk data management for all applications.

**System/34 Source Code Compatibility:** Any assembler or high-level language source program or procedure can be saved on diskette at a System/34 and restored to the System/36. RPG, COBOL or FORTRAN programs are simply recompiled to take advantage of System/36 object generation improvements in storage use or run-time performance. Some changes necessary in Assembler macros and procedure statements to take advantage of the System/36 architecture are documented in a Conversion manual, *Converting from IBM System/34 to IBM System/36*.

**Multiple Program Mode:** The SSP is designed to allow the System/36 to operate in the multiple program (multiprogramming) mode. Operators at multiple command-capable display stations may concurrently start control commands, OCL, and procedures. Multiple jobs and programs can execute concurrently.

**Input Job Queue:** The SSP also provides a job queue facility. This queue contains a list of jobs that are to be processed in sequence concurrently with other batch or operator-interactive jobs. The jobs in the queue can be placed there by an operator at any command-capable display station or by a procedure. The display station that places the job on the queue is released from that job and, therefore, becomes available for other work. Job queue priorities can be specified to control a job's position in the job queue.

**Main Storage Management:** The System/36 manages main storage as a pool of separate (noncontiguous) 2,048-byte segments and 'swaps' programs to and from disk as required to fit an active program into main storage (a program that is inactive might, for example, be waiting for data input or a message response from a display station).

System/36 main storage management allows the total main storage required by all active tasks to exceed actual user main storage, allowing the system to support a very elastic workload. Performance considerations will dictate to what extent user main storage may be overcommitted.

## System/36 SSP (cont'd)

The System/36 SSP occupies a minimum of 36K bytes of main storage. This value may be automatically increased in 2K-byte increments to include printer spool support, increase number of active tasks, or optimize system performance. This resident nucleus area contains SSP functions such as data management for disk, printer and display stations; buffers for workstation I/O and printer spooling; and an SSP work area used for task control. When remote workstations are active, an additional area of main storage is dynamically reserved for line buffers and SDLC data management.

**Operation Control Language (OCL) and Procedure Control Expressions:** OCL is the user interface to run jobs and programs. It allows specification of job control information which is easy to use and keyword driven.

Procedures consist of one or more OCL statements. They allow up to 255 levels of nesting, up to 64 variable-length parameters, and control of the inquiry options allowed if the procedure is interrupted with the ATTN key.

Normally, OCL statements are written in procedure form, stored in a user library, and provided to the application operator as options to be selected from a user menu.

Procedures can be very flexible using Procedure Control Expressions which are provided. Functions include conditional processing of statements, simple arithmetic, character string comparisons, parameter substitutions, branching, message display, and disk/diskette file existence tests. Special OCL statements provide debugging assistance to programmers.

**Sort/Merge Facility:** This facility includes the same sort/merge functions available with the System/34 Utilities program product, only it is part of the System/36 base SSP. Support includes multiple record type sort with record selection dependent on field contents. Records may be sorted in any sequence. Addrout, tag along, and summary tag along sort are allowed. All data fields, except binary, are supported. Work file space is automatically allocated and multiple input files are allowed. Up to eight files can be merged together, and both equal control field and alternating sequence by field are allowed.

**Systems Utilities:** System/36 SSP also provides enhanced function to create, copy, save, restore, and rename files; build display formats, build menus and other common functions.

Enhancements to the library support include new directory fields to contain date/time of creation and subtype, easier to use library listings along with new information (such as number of diskettes needed to make a copy), and library extension when required to complete a job.

The SSP provides data management support for the disk, diskette, display stations and printers. The display and printer workstation data management supports multiple direct and remote units of the workstation devices which can be attached. The display station data management manages all input and output to the display stations including the retrieval of display formats from a disk library, and merging program data prior to displaying the format on the display, and displaying associated application help text based on cursor position.

Disk data files on System/36 may be accessed concurrently by multiple programs for input, update, or add operations. Protection of data against concurrent update by two programs is provided by locking disk records until released by the accessing program. An OCL parameter is provided to allow various levels of file sharing for any file. Also, files are optionally allocated by the system to the disk drive currently being used least. Input can be from Data Entry or Typewriter-style keyboards.

Disk files can be designated as extendable at file creation. In addition, immediate access is provided for all records that are added by a user program, regardless of file organization.

The System/36 SSP includes utility programs to support the diskette unit and the diskette magazine drive as a save/restore and data interchange device. The diskette 1 in 128- or 512-byte sector formats are supported. In addition, the diskette 2D (2-sided double-density) is supported in 256- or 1,024-byte sector formats.

The diskette magazine support allows input/output operations to begin on any one of 23 specified diskettes and overflow automatically to the next diskette in the magazine, to the next magazine, or from individual slot to the next.

**Inquiry (Interrupt) Function:** The operator may interrupt a processing program, start another job, such as inquiry into a file, and return to the processing program. Processing of the interrupted program will resume when the operator indicates the completion of interrupting activity. An OCL option will suppress this capability to prevent operators from accidentally changing their job environment.

**User/Resource Security:** Each operator who signs on at a System/36 display station is prompted for a user identification and, optionally, a password. This data is then checked by the SSP before allowing the operator any further access to the system. For each user, there is a profile that can contain a default sign-on HELP menu and a default user menu. This user profile contains additional information, like a password, when security is active.

Also files and program libraries can be restricted to authorized users. These users can be further restricted by type of use. An SSP option allows the creation of audit entries in the system history file for each use of a secured file or library.

Security permits the additional check of operator badge identification at sign-on if the display station has an attached 5250 Magnetic Stripe Reader.

**System History Facility:** System/36 provides a history area on disk which optionally contains all recently executed OCL statements and all messages issued to the logging device. The messages and data may be retrieved and redisplayed on the display station, printed, or copied to a disk file. The system history facility gives an operator flexibility in selecting the segment of the history area to display, print or copy. For example, an individual display operator is able to select entries created at a single workstation. If the history area is displayed, the operator also has the capability of scrolling backward and forward through the history entries.

Entries are time stamped and include the job identification generated by the SSP to assist in determining the sequence of activity on the system. A configuration option allows the user to automatically save the system history area in a disk file when the system history area becomes full. This option can be overridden at IPL time.

**Print Spooling:** Print spooling is supported by the SSP for all printers, whether local or remote. When spooling is active, printer output requests are intercepted and stored on disk. Spool writers are used to retrieve the print records from disk for printing. A print queue is maintained of job names whose printer data is yet to be printed, or specified as 'retained after printing'. System console commands are provided to start/stop, restart (at a page number), cancel, hold/release, change priority of and display jobs in the print queue. Print spooling is supported for any and all printers attached to the system simultaneously. In addition, multiple logical print files from a single program may be directed to one printer or separate printers.

A specified display station can be configured to be the controlling display station for a spooled workstation printer. The spool control commands and spool-issued messages are available to the display station operator to control the output directed to the printers associated with that display station.

The size of the primary spool disk file is specified when the SSP is configured. Defaults vary depending on the disk storage ordered. The spool intercept routine will allocate up to five additional extents if necessary. These specific extents will be the same size as the primary spool file and will be freed up by the spool writer as they become empty.

Spooled data may also be copied to a data file, viewed or printed or transferred to another System/36.

**Overlay Linkage Editor:** The Overlay Linkage Editor facility combines object modules, produced by RPG II, COBOL or FORTRAN and the Assembler program, to create an executable load module. Overlay structures may be created automatically or as designated by the user.

**Online Programming Support:** System/36 provides a procedure which allows automatic chaining from the Source Entry Utility to a compiler and optionally back to the Source Entry Utility for corrections, if necessary. This programming aid allows routing the compiler output to a display.

**Elastic Workload Management:** On System/36, assign/free space can access 2K of storage anywhere in main storage. The allocation algorithm looks for space on a quick-fit basis. The allocation of this space has been designed to provide the most efficient usage.

A user's Local Data Area (LDA) is placed in the system assign/free space during initiation of a job step. Each LDA includes 512 bytes for passing information from one job step to another. The system will never change any of the user's LDA during a job.

**Auto Response for System and User Messages:** The System/36 Auto Response Facility allows users to specify response options to be taken automatically when system messages are displayed. Normally, processing stops until the operator responds to a message with an option value. Auto response allows a user to select a message to which the system will respond with a user-defined option value and then continue processing.

Auto response values are supplied for selected messages and these values may be changed by the user. In addition, responses to other messages can be added to the auto response list.

The use of this facility is particularly valuable when a system must run without an operator in attendance.

A NOHALT facility allows the user to easily manage what severity levels to activate for auto response depending on the types of jobs running.

**System Measurement Facility:** System/36 includes System Measurement Facility (SMF) routines which, in conjunction with control storage routines, maybe started to monitor system activity, system device, and SSP work area utilization, and record this data in a disk file. A report



PROGRAM PRODUCTS

**System/36 SSP (cont'd)**

program is provided so that the file may be listed to provide information useful in analysis of system performance with the current application workload or in anticipation of added application workload.

**Remote Operations and Support Facility:** It is possible to designate a local or remote display station as a system service device. When this is done via a command from an authorized operator, the designated display station can be signed-on and used to run most of the console diagnostic-type programs.

**Support for Batch BSC:** The SSP provides Binary Synchronous Communications (BSC) data management for System/36 RPG II and Assembler and Macro Processor programs. A system utility is also provided to select certain communications characteristics as program processing time such as: Line type, terminal address, line speed, and error retry count. The Assembler licensed program includes BSC macro support.

**Remote Workstations:** The System/36 may be configured to support displays and workstation printers attached to a 5251-012 or a 5294-001 Workstation Controller. Application programs and IBM program products which support directly-attached displays and workstation printers will also support remotely-attached devices. However, the system console function may not be assigned to a remote display station.

**Special Features (Optional):** See individual pages for:

- Extended SSP feature (#6000)
- SSP Communications feature (#6001)
- Interactive Communications feature (#6002)
- 3270 Device Emulation feature (#6003)
- Multiple Session Remote Job Entry feature (#6004)
- Data Encryption Standard Subroutine for Banking feature (#6005)
- Distributed File Facility feature (#6006)
- Communications and System Management feature (#6029)

**CUSTOMER RESPONSIBILITIES** (not applicable)

**SPECIFIED OPERATING ENVIRONMENT**

**HARDWARE REQUIREMENTS**

The IBM System/36 System Support Program runs on all models of System/36 and supports all features.

**SOFTWARE REQUIREMENTS**

All IBM licensed programs for System/36 are designed to operate in an environment that includes the System/36 System Support licensed program (5727-SS1) or its equivalent. The SSP order should be entered via AAS at the same time as the system order. IBM's ability to provide concurrent hardware maintenance is dependent upon functions provided by the SSP or its equivalent.

**COMPATIBILITY**

Due to the broad base acceptance of the System/34, a high degree of compatibility has been maintained. The high-level languages need only be recompiled to run on System/36. Also, most procedures written for the System/34 will run unchanged on System/36. Differences in the SSP are documented in *Converting from System/34 to System/36* (SC21-9053). Also see compatibility statements within the individual System/36 System Support Program "Feature" pages.

**CONVERSION**

Conversion from System/34 is addressed in a conversion manual (SC21-9053) and via a System/34 to System/36 Migration Aid licensed program (5727-MA1). Also see compatibility statements within the individual System/36 System Support Program "Feature" pages.

**SECURITY**

User and resource security are provided as part of the base SSP. Usage is optional. The customer can limit user access with passwords plus menu and badge reader restrictions. He can also limit read/write access for files and libraries. In addition, the keylock on the service panel can be used to restrict its use. The tools are provided but the selection and application of security controls is the customer's responsibility.

**PERFORMANCE CONSIDERATIONS**

Performance depends on many features. A major consideration is the number of users. The System/36 was designed to provide satisfactory response time as the number of display stations increases. Priority is given to interactive jobs by default.

Disk data management considerations are very important and include file organization, the use of in-storage indexes, multiple indexes, and file placement. System/36 keeps usage counters to automatically build files on the least-used disk spindle. The System Measurement Facility is designed to help a customer identify potential areas for improving job throughput and response time. There are also many other factors

discussed in the *System/36 Concepts and Programmer's Guide* if performance is a critical factor and tailoring for performance is necessary.

**DOCUMENTATION**  
(available from Mechanicsburg)

*What to Do Before Your Computer Arrives* (SBOF-4773) includes:

*One 2-inch Horizontal Binder* (SC21-7988) ... *Binder Insert* (SX21-9447) ... *Contents Insert* (SX21-9448) ... *Your Guide to Planning* (SA21-9438) ... *Planning to Set Up Your Computer* (SA21-9439) ... *Planning for System Configuration* (SA21-9440) ... *Planning for Data Communications* (SA21-9441) ... *Preparing to Receive Your Computer* (SA21-9442) ... *General Planning Activities* (SA21-9443) ... *Preparing a Place for Your Computer* (SA21-9444) ... *Planning for System Security* (SA21-9445) ... *Forms for Planning* (SA21-9446).

*Guide to Publications* (GC21-9015) ... *Presenting System/36* (GC21-9016) ... *System Support Licensed Program Specifications* (GC21-9021) ... *SORT Guide* (SC21-7903) ... *System Messages* (SC21-7938) ... *Learning about Your Computer* (SC21-9018) ... *Using the 1255 on System/36* (SC09-1046) ... *Concepts and Programmer's Guide* (SC21-9019) ... *System Reference* (SC21-9020) ... *Performing the First System Configuration for Your System* (SC21-9022) ... *Procedures and Commands Summary* (SC21-9024) ... *System Measurement Facility Guide* (SC21-9025) ... *Operating Your Computer* (SC21-9026) ... *Overlay Linkage Editor Guide* (SC21-9041) ... *System Security Guide* (SC21-9042) ... *Changing Your System Configuration* (SC21-9052) ... *Converting from System/34 to System/36* (SC21-9053) ... *System Problem Determination* (SC21-7919) ... *Creating Displays: Screen Design Aid and System Support Program* (SC21-7902).

**SYSTEM INTEGRITY**

IBM will accept APARs describing any situation where the installation of the System/36 System Support program product (5727-SS1) causes an exposure to the system integrity of the SSP. System integrity, in this context, is defined to mean control of user authorization to the system or its files and libraries.

RPQs ACCEPTED: Yes

PROGRAM PRODUCTS

**5727-SS1 - SYSTEM/36 SSP R2 FEATURE #6000  
SYSTEM/36 EXTENDED SYSTEM SUPPORT PROGRAM  
FEATURE #6000**

**PURPOSE**

The System/36 Extended System Support feature provides support for: Diskette I Format ... Multinational Character Set ... Tape Save/Restore and Data Interchange ... 1255 Magnetic Character Reader Attachment.

**DESCRIPTION**

This feature supports I-Format diskette recording and multinational character sets. Use of the I-Format feature allows reading and writing of information on a System/36 diskette in a blocked and spanned format for better utilization of diskette space. This format allows a common exchange format for the System/34, System/38 and 5280 systems.

The second function of Extended SSP is Multinational Character Set support. This means the ability to display the 188 characters not supported in the specified base SSP 96-character code set. The keyboards do not include the additional characters, but they may be entered with single or multiple key sequences.

Another function of the Extended SSP is subroutines (SUBR08 and SUBR25) to interface to the 1255 Attachment feature. These subroutines allow RPG II, COBOL or the Assembler to read data from documents (checks). They can also return to the program the stacker selection that was made and indicators that tell field validity and document type (available 2Q84).

Also the 8809 Magnetic Tape Attachment hardware feature will be supported by an Extended SSP feature enhancement (available 2Q84).

System/36 will support 1/2-inch magnetic tape in addition to diskette as a save/restore or data interchange device. Tape provides a larger capacity media for backing up applications and data files, in addition to providing a high capacity data interchange media. Programming support is at the system utility level and has the following characteristics:

- Save/Restore
  - Files
  - Libraries (except #LIBRARY)
- Data Interchange Utility Support
  - EBCDIC data format
  - Label support
    - 1) IBM standard labeled tapes
    - 2) Nonstandard labeled tapes
    - 3) Nonlabeled tapes
  - Logical record lengths of 18 to 4,096 bytes
  - Read/write fixed-length blocked records with block length of 18 to 32,767 bytes
  - Read only of variable-length unblocked records
  - Multivolume files
  - Multifile volumes
- Additional Utility Support
  - Catalog files/libraries of a selected tape
  - Initialize tape labels and/or CLEAR a selected tape
  - List contents of a selected tape file

Save/Restore operations may be done in 'streaming' mode at normal 100-inches per second. In this mode, the user is capable of backing up files of up to 43 megabytes of data on a standard 2400-foot reel of tape (equivalent to 36 2D diskettes). The actual performance depends on factors such as system activity, task priority and media condition.

Data Interchange support provides the user with support to interchange data between systems on 1/2-inch magnetic tape with either IBM standard labels or as unlabeled tapes (nonstandard labels are bypassed). Nonstandard label support allows only the reading of a tape's first file. Interchange processing is done in a 'start/stop' mode at normal 12.5 inches per second.

**CUSTOMER RESPONSIBILITIES** (not applicable)

**SPECIFIED OPERATING ENVIRONMENT**

**HARDWARE REQUIREMENTS**

The IBM System/36 Extended System Support Program runs on all models of IBM System/36 and supports all features.

**SOFTWARE REQUIREMENTS**

All IBM licensed programs for System/36 are designed to operate in an environment that includes the IBM System/36 System Support licensed program (5727-SS1) or its equivalent. The SSP order should be entered via AAS at the same time as the system order. IBM's ability to provide concurrent hardware maintenance is dependent upon functions provided by the SSP or its equivalent.

Prerequisite for the IBM System/36 Extended SSP is IBM System/36 System Support Program (5727-SS1).

**COMPATIBILITY** (not applicable)

**CONVERSION** (not applicable)

**SECURITY**

User and resource security are provided as part of the base SSP. Usage is optional. The customer can limit user access with passwords plus menu and badge reader restrictions. He can also limit read/write access for files and libraries. The tools are provided but the selection and application of security controls is the customer's responsibility.

**PERFORMANCE CONSIDERATIONS**

Performance depends on many features. A major consideration is the number of users. The System/36 was designed to provide satisfactory response time as the number of display stations increases. Priority is given to interactive tasks by default.

Disk data management considerations are very important and include file organization, the use of in-storage indexes, multiple indexes, and file placement. System/36 keeps usage counters to automatically build files on the disk spindle being used the least. The System Measurement Facility is designed to help the customer identify potential areas for improving job throughput and response time. There are many other factors discussed in the *System/36 Concepts and Programmer's Guide* if performance is a critical factor and tailoring for performance is necessary.

**DOCUMENTATION**

(available from Mechanicsburg)

See pages for System Support Program (5727-SS1).!

**SYSTEM INTEGRITY**

IBM will accept APARs describing any situation where the installation of the System/36 System Support Program (5727-SS1) causes an exposure to the system integrity of the SSP. System integrity, in this context, is defined to mean control of user authorization to the system or its files and libraries.

RPQs ACCEPTED: Yes

**5727-SS1 - SYSTEM/36 SSP R2 FEATURE #6001  
SYSTEM/36 SYSTEM SUPPORT PROGRAM  
COMMUNICATIONS FEATURE #6001**

**PURPOSE**

The Communications feature supports the autocal adapter and the X.21 line adapter in the MLCA. The logic base for Multiple Session Remote Job Entry (MSRJE), 3270 Device Emulation (3270 DE) and Interactive Communications feature (SSP-ICF) is contained in the Communications feature; this includes CNFIGICF, ENABLE/DISABLE and data management.

**HIGHLIGHTS**

- Autocall Support.
- X.21 Support.
- X.25 Support.
- Base support for MSRJE, 3270 DE, SSP-ICF and C&SM features.

**DESCRIPTION**

**Autocall**

The support for the System/36 autocall feature of the Multiple Line Communications Adapter (MLCA) allows the user to have the system automatically attempt phone calls on a switched line to another device or system. This support is provided external to the user programs such that no change to user source code is necessary. Phone numbers are referenced through OCL parameters and configuration records.

The following functions are available:

- Ability to call multiple locations from a single batch BSC program by looping through the OCL without operator intervention
- Ability to define lists of phone numbers.
- Ability to specify a wait time between calls and a retry count for incomplete calls.
- Up to 22 characters per phone number (international calls), including separator (SEP) characters for dialing delays and an end of number (EON) character.
- Autocall is supported in MSRJE, batch BSC, 3270 DE (SNA) and SSP-ICF (BSCEL, CICS, CCP, SNUF, SNA Peer).

**X.21**

This feature provides an interface for attachment to either an X.21 switched or X.21 nonswitched network. Both BSC and SDLC communications are supported. Refer to Facilities L3 to L6 (switched) or N3 to N6 (nonswitched) in the M2700 pages for the networks and data circuit-terminating equipment (DCE) that are supported. The network establishes the data rate and supplies the clock. The System/36 can communicate via the X.21 Adapter with devices that do not have native X.21 Adapters. These devices must be attached to the network via an X.21bis DCE. This method of attachment uses the CCITT V.24/28 interface. Refer to facilities K3 to K5 (switched) and M3 to M5 (nonswitched) in the M2700 pages for the list of devices that can be attached via an X.21bis DCE.

Switched Networks: Communications at 2400, 4800, 9600 and 48,000 bps are supported. Autocall function is provided for switched lines.

Note: X.21 switched requires the MLCA Expansion feature (#4501).

Nonswitched Networks: Transmission may be at speeds of 2400, 4800, 9600 bps for multipoint operations. Some X.21 networks may not support multipoint operations. The installation of these features is dependent on the availability of an X.21 network that is compatible with IBM's implementation of an X.21 as described in the *IBM Implementation of X.21 Interface General Information Manual (GA27-3287)*. The no-charge codes that specify the type of network attachment must be accurately entered with the order. Limitations: Cannot be installed with an integrated modem, CCITT Interface, DDS Adapter, or Analog Wideband Adapter on the same Line Base Adapter. Note: The X.21 Adapter cannot be configured to support switched lines on a System/36 that has an Autocall Adapter installed. When an X.21 Adapter is operating at 48,000 bps, the other lines cannot exceed an aggregate rate of 9600 bps. Maximum: One per Line Base Adapter, four total for nonswitched, three total for switched. Field Installation: Yes. Prerequisites: Line Base corresponding to the line using the X.21 Adapter. See *Multiline Communications Adapter Configurator* for possible combinations of features.

**Base support for MSRJE, 3270 DE, C&SM and SSP-ICF**

CNFIGICF: The configuration and definition process for MSRJE, 3270 DE, C&SM and SSP-ICF is provided. This procedure allows the user to define the specific communications environment for each subsystem and line. This procedure is similar to the one on the System/34; however, it has been simplified and made easier to use by asking fewer questions about an environment and by having help text with each screen.

ENABLE/DISABLE: The ENABLE/DISABLE commands control the starting and stopping of MSRJE, 3270 DE and the subsystems of SSP-ICF.

Data Management: ICFDM, ICFCTL, and a common SNA for MSRJE (SNA), 3270 DE (SNA), C&SM and SSP-ICF (SNUF) is provided.

**X.25 Support:**

The X.25 feature #6580 for the System/36 will provide the capability to attach to data transmission services having interfaces complying with Recommendation X.25 (Geneva 1980) of the International Telegraph and Telephone Consultative Committee (CCITT). This interface support will be in conformance with the functional description contained in IBM's *General Information Manual (GA27-3345) The X.25 Interface for Attaching IBM SNA Nodes to Packet-Switched Data Networks*. If network suppliers require certification of this feature, it is the responsibility of the customer or the network supplier to obtain the certification.

This feature provides an interface for attachment to an X.25 Packet-Switched Network through either an X.21 (#5655) or an X.21bis (#3701) point-to-point, nonswitched facility. Transmission may be at speeds of 2400, 4800 or 9600 bps. Refer to Charts P and Q of the M2700 pages for the facilities supported. SNA communications are supported with this feature. Refer to Chart 3 of the M2700 pages for the possible intercommunications.

The following functions are available:

- Three versions of Logical Link Control:
  - Physical Services Header (PSH)
  - Qualified Logical Link Control (QLLC)
  - Enhanced Logical Link Control (ELLC)
- An improved level of error recovery for certain network conditions when communicating with another System/36 or 5294-001 through the use of the ELLC protocol.
- Both Permanent Virtual Circuit and Virtual Call support.
- Up to 16 concurrent logical channels which may be a mixture of SNA Primary and Secondary.
- Packet Sequence Numbering by modulo 8 and 128.
- Packet sizes of 64, 128, 256 and 512 bytes.
- Window sizes of from 2 to 15 packets.
- Optional user facilities are:
  - Reverse Charging.
  - Closed User Group.
  - Connection Password.
  - Unique Network Facilities (Priority Service, Throughput Class).
- Address List capability for Autocall/Autoanswer-type support.
- Virtual Circuit status and configuration maintenance capability.
- Tariff-related statistics with display capability.

Limitations: Cannot be installed with an integrated modem, Digital Data Service Adapter, V.35 Adapter, or an Autocall Adapter on the X.25 is mutually exclusive with X.21 switched. Maximum: One X.25 feature per system. Field Installation: Yes

Prerequisites: MLCA (#4500), MLCA Expansion feature (#4501), Line Base Adapter (#5301) on lines 1 and 2 or lines 3 and 4 EIA (#3701) or X.21 (#5655) on line 1 or 3 and 256K of main storage. See *Multiline Communications Adapter Configurator*. Specify: Network type (#910X), line speed, line position, and remote station type. For Public Packet-Switched Networks providing a CCITT X.21bis interface (Chart P of the M2700 pages), the #92XX specify code designates the second line used for X.25. The #5680 X.25 feature may be installed on lines 1 and 2 or on lines 3 and 4. When X.25 is installed on lines 1 and 2, line 1 must have #3701 installed, lines 1 and 2 must have #5301 installed, and line 2 must specify #92X2. When X.25 is installed on lines 3 and 4, line 3 must have #3701 installed, lines 3 and 4 must have #5301 installed, and line 4 must specify #92X4.

For Public Packet-Switched Networks providing a CCITT X.21 interface (Chart Q of the M2700 pages), the #92XX specify code designates the line on which X.25 is installed. The #5680 X.25 feature may be installed on line 2 or line 4. When X.25 is installed on line 2, line 1 must have #5655 installed. When X.25 is installed on line 4, line 3 must have #5655 installed. See *Mandatory Specify Codes for Communications*.

**CUSTOMER RESPONSIBILITIES (not applicable)**

**SPECIFIED OPERATING ENVIRONMENT**

Support will be provided for this licensed program when it is operated in the following specified operating environment.

**HARDWARE REQUIREMENTS**

The IBM System/36 Communications feature runs on all models of IBM System/36. Communications to another system or device

## PROGRAM PRODUCTS

**SSP Communications Feature #6001 (cont'd)**

requires a communications adapter on the System/36, either the Single-Line Communications Adapter (#2500) or the Multiple-Line Communications Adapter (#4500).

**SOFTWARE REQUIREMENTS**

The IBM System/36 Communications feature will operate under control of the current release of the IBM System/36 System Support Program (5727-SS1).

**COMPATIBILITY**

The Communications feature provides the base support for MSRJE, 3270 DE, SSP-ICF, C&SM feature, autocal, X.21 and X.25. It can coexist with the remote workstation support and batch BSC.

**CONVERSION**

Autocal phone lists must be reentered into the system when converting from a System/34. X.21 lists must also be reentered. SSP-ICF configurations must be reentered and are divided into two areas: Line environment and subsystem environment.

**SECURITY/INTEGRITY** (not applicable)

**PERFORMANCE CONSIDERATIONS** (not applicable)

**DOCUMENTATION**

(available from Mechanicsburg)

*Interactive Communications Feature: Reference (SC21-7910) ... Interactive Communications Feature: Guide and Examples (SC21-7911) ... Multiple Session Remote Job Entry Guide (SC21-7909) ... Multiple Session Remote Job Entry Messages (SC21-7944) ... 3270 Device Emulation Guide (SC21-7912) ... 3270 Device Emulation Messages (SC21-7945) ... Communications and System Management Support Guide (SC21-8010).*

**SYSTEM INTEGRITY** (not applicable)

RPOs ACCEPTED: Yes

PROGRAM PRODUCTS

**5727-SS1 - SYSTEM/36 SSP-ICF FEATURE #6002**  
**SYSTEM/36 SYSTEM SUPPORT PROGRAM**  
**INTERACTIVE COMMUNICATIONS FEATURE**  
**FEATURE #6002**

**PURPOSE**

System/36 SSP Interactive Communications feature provides support for: Interactive communications between application programs ... Multiple concurrent communication sessions over the same data link ... Multiple concurrent user application programs which use communications ... An application program interface which is substantially independent of the link and logical protocols (BSC and SNA/SDLC).

**HIGHLIGHTS**

System/36 SSP-ICF consists of:

- A common user interface for application programs.
- Several subsystems.
  - INTRA - allows application program-to-program communications within the same System/36.
- BSC Subsystems.
  - CCP - System/3 mdl 15D CCP
  - CICS - CICS/OS/VS and CICS/DOS/VS
  - IMS - IMS/VS IRSS (BTAM)
  - BSCSEL - System/3 Batch BSC, 3740 BSC, Office Systems BSC, System/34 and System/36 BSC.
- SNA Subsystems.
  - SNA Upline Facility (SNUF) - CICS/VS (LU-0) and IMS/VS (LU-P).
  - SNA Peer - System/34 and System/36 (LU-6.0).
  - SNA Finance Subsystems - 4701 and 3601, 3694 (LU-0).

Note: The SNA Upline and Finance Subsystems use different LU-0 command sets.

**DESCRIPTION**

Interactive communications differs conceptually from batch communications in that the sequence of messages is not necessarily predetermined or scheduled. Either party in the communications session can logically start, alter or terminate the conversation. The logical communication path connecting two programs which are exchanging messages is called a session. SSP-ICF allows for multiple concurrent sessions to be used by one or more application programs in the System/36.

The application program access to SSP-ICF is available at two levels. Both are logical extensions of the System/36 workstation interface. The first is through special predefined 'screen format' names that serve as operation codes to control evoking programs, sending data, and issuing special commands to SSP-ICF. The second is through assembler programming and supports all of the functions in the first level plus the added flexibility of supporting situations that may occur when communicating to systems which are not part of the standard SSP-ICF support.

The application program interface allows the user program to be shielded from most of the uniqueness of the communications protocols (BSC or SNA/SDLC) and the communications support for the remote systems (e.g., IMS/VS, CICS/VS, or CCP). With proper design, users can develop programs for their current BSC network and then easily move to an SNA network without significant change to the communications interface within existing application programs.

An SRT program started by an EVOKE operation can send or receive on the first operation. This capability applies only to SRT programs; system restrictions for MRT processing require the first operation to be input.

Included with SSP-ICF is support for languages, devices, and communications systems as listed below:

Note: System/36 data link connections are either point-to-point or multipoint tributary only (except for connection to 5250 devices, System/36, System/34 or Finance terminal products using the Finance Subsystem.

- BSC protocols:
  - IMS/VS (Version 1.1.6) via IRSS (BTAM) (System/36 as a System/3).
  - CICS/OS/VS (Version 1.6.0 and subsequent releases) using BTAM or CICS/DOS/VSE (Version 1.6.0 and subsequent releases) with BTAM-ES (System/36 as a System/3).
  - System/36 with SSP-ICF, RPG II, COBOL, BASIC, or Assembler\*
  - System/34 with SSP-ICF, RPG II, COBOL, BASIC or Assembler\*
  - System/3 mdl 15D CCP
  - System/3 mdl 15D RPG II\*
  - System/38 (as a System/3)
  - System/32 (as a System/3)\*

- 3741 mdl 2 or 4 (point-to-point only)\*
- 3747 (point-to-point only)\*
- 5110 (as a 3741)\*
- 3780 (as a System/34)\*
- 5120 (as a 3741)\*
- 5231 mdl 2 (as a 3741)\*
- 5260 (as a 3741)\*
- 5280 (as a 3741)\*
- System/23 Datamaster (as a 3741)\*
- 6580 Displaywriter\*
- 5520\*
- Office Systems/6, 6640, 6670\*
- Series/1 (as a System/3)\*
- System/7 (as a System/3)\*
- S/370 with System/36 (as a System/3)
- OS/VS, DOS/VSE BTAM\*

\* These devices are only supported for a single session over a data link.

- SNA/SDLC
  - System/36 using SSP-ICF
  - System/34 using SSP-ICF
  - ACF/NCP/VS (Version 1 Release 3) and ACF/VTAM (Version 2)
  - ACF/VTAME on VSE
  - IMS/VS (Version 1.1.6) (as a 3790) using ACF/NCP/VS, ACF/VTAM
  - CICS/OS/VS (Version 1 Release 6.0 and subsequent releases) (as a 3790) using ACF/NCP/VS, ACF/VTAM
  - CICS/DOS/VS (Version 1 Release 6.0 and subsequent releases) (as a 3790) using ACF/VTAME on VSE
  - 4701, 3601, 3694
- Internal Protocol
  - System/36 using SSP-ICF (INTRA) for application program-to-program communications within the same system.

**CUSTOMER RESPONSIBILITIES (not applicable)**

**SPECIFIED OPERATING ENVIRONMENT**

Support will be provided for this licensed program when it is operated in the following specified operating environment.

**HARDWARE REQUIREMENTS**

The IBM System/36 Interactive Communications feature (SSP-ICF) runs on all models of IBM System/36. SSP-ICF support for communications between programs residing in the same System/36 does not require a communications adapter. Communications to another system or device requires a communications adapter on the System/36, either the Single-Line Communications Adapter (#2500) or the Multiple-Line Communications Adapter (#4500).

**SOFTWARE REQUIREMENTS**

The IBM System/36 Interactive Communications feature (SSP-ICF) will operate under control of the current release of the IBM System/36 System Support Program (5727-SS1) and the Communications feature (#6001).

**COMPATIBILITY**

SSP-ICF communication support can coexist with other communication support (that is, programs using remote 5250s, batch BSC or 3270 Device Emulation or Multiple Session Remote Job Entry.

**CONVERSION**

Programs written for the System/34 using SSP-ICF need to be recompiled. Some of the error return codes have been dropped under some of the subsystems. Review *Converting from the System/34 to the System/36* for details. System/34 configuration members for the subsystems must be re-entered. On the System/34, there is one configuration member per subsystem definition. For System/36, there are two members: 1) a line member describing the link attributes; and 2) a subsystem member defining the subsystem attributes. This allows sharing of common link definitions.

**SECURITY (not applicable)**

**PERFORMANCE CONSIDERATIONS (not applicable)**

**DOCUMENTATION**

(available from Mechanicsburg)

*Interactive Communications Feature: Reference* (SC21-7910) ...  
*Interactive Communications Feature: Guide and Examples* (SC21-7911)

**SYSTEM INTEGRITY (not applicable)**

RPQs ACCEPTED: Yes

## PROGRAM PRODUCTS

**5727-SS1 - SYSTEM/36 SSP R2 FEATURE #6003  
 SYSTEM/36 SYSTEM SUPPORT PROGRAM  
 3270 DEVICE EMULATION FEATURE #6003**
**PURPOSE**

The 3270 Device Emulation feature is a utility program that supports both BSC and SNA/SDLC 3270 line protocols. No user code is required.

**HIGHLIGHTS**

- System/36 appears as a 3271 mdl 2 under BSC or as a 3274 mdl 1C under SNA.
- A locally- or remotely-attached display (5251 mdl 11, 5291, 5292) appears as a 3277 mdl 2 Display.
- Any attached printer (3262, 5219, 5224, 5225, 5256) appears as a 3288 mdl 2 Printer, including spooled remote printers.
- One BSC line and/or up to four SNA lines are supported.

**DESCRIPTION**

The 3270 Device Emulation feature allows the System/36 to appear to a host system as a 3271 mdl 2 (BSC) or a 3274 mdl 1C (SNA) Control Unit. It allows a display which is locally or remotely attached to a System/36, to appear to a host system as a 3277 mdl 2 Display Station. The Keyboard Numeric Lock (#4690) on 3277 Displays is optionally supported. Workstation printers attached locally or remotely to a System/36 will appear to the host system as a 3288 mdl 2 Printer. Spooled remote printers are also supported.

Only the EBCDIC typewriter keyboards and EBCDIC transmission code are supported. Certain keys are in different locations on the 3277 and System/36 Display keyboards. Function keys on the 3277 are mapped onto the System/36 Display keyboards to provide the same functions. These keys are Field Mark, Erase Input, PA and PF keys. The copy command is not supported. However, the System/36 Display Print Key can provide an equivalent function in many cases. The light-pen and magnetic stripe reader are not supported.

Emulation of the 3270 devices allows the System/36 to reside on a multipoint communications link that supports a 3270. Since this program translates the data stream, host application programs will, generally, require no changes to support the System/36 running under this device emulation. 'Screen wrap' is not supported. If the last position (24,80) on the screen is a field attribute character, it will be repeated in the first position (1,1).

A maximum of 127 input fields per screen is supported. If a 3270 screen has more than 127 input-capable fields, it will be rejected by 3270 Device Emulation. When using BSC, the 5250 character set is translated into the 3277 BSC standard character set. The 3278 SNA standard character set is used when the host link is SNA. SNA 3270 DE, SNA MSRJE, C&SM (DSNX) and SSP-ICF (SNUF) can share one communications port on the System/36.

The following host subsystems are supported: VM/370 (ACF/VTAM, BSC only), IMS/VS (ACF/VTAM), CICS/VS (OS, ACF/VTAM and VSE, ACF/VTAME), TSO (ACF/VTAM), and System/3 mdl 15D CCP. The 3270 Keyboard Numeric Lock feature is supported. This provides the capability of locking out all characters in a numeric field except 0-9, decimal sign, minus sign, plus sign, comma, space and the Dup key. The Data Entry keyboard is not supported.

**BSC Considerations:** For BSC, the 3270 Device Emulation feature emulates the 3271 mdl 2 Control Unit, the 1920-character 3277 mdl 2 Display Station, and the 3288 mdl 2 Printer. The System/36 acts as the 3271 mdl 2 Control Unit; any System/36 display station, local or remote, can emulate a 3277 mdl 2. Any System/36 workstation printer can emulate a 3288 mdl 2 Printer.

Automatic calling is not supported. Only one multipoint line is supported.

The maximum receive buffer size supported is 4,096 bytes. This includes all line control characters. The 3270 Device Emulation feature may generate BSC error status to the host under somewhat different conditions than the 3271. Customer host programs dependent on such specific link level 3270 BSC error status may require modification. The reference manual describes these conditions.

**SNA Considerations:** For SNA, the 3270 Device Emulation feature emulates the 3274 mdl 1C Control Unit, the 1,920-character 3277 mdl 2 Display Station, and the 3288 mdl 2 Printer. The System/36 acts as the 3274 control unit; the 5251 mdl 11, 5291, 5292 and 5150 PC Displays serve as the 3277; and the 5256, 3262, 5224, 5225 and 5219 Printers serve as the 3288 (or 3287 in SNA Character String (SCS) mode only). Up to 16 devices (logical units) are supported per line. Up to four lines can be used concurrently. Point-to-point, switched or nonswitched, and multipoint (nonswitched) lines are supported.

**CUSTOMER RESPONSIBILITIES (not applicable)**

**SPECIFIED OPERATING ENVIRONMENT**

Support will be provided for this program when it is operated in the following specified operating environment.

**HARDWARE REQUIREMENTS**

The IBM System/36 Device Emulation feature (3270 DE) runs on all models of the System/36. Communications to another system requires a communications adapter on the System/36, either the Single-Line Adapter (#2500) or the Multiple-Line Communications Adapter (#4500) and Workstation Controller Expansion (#4900).

**SOFTWARE REQUIREMENTS**

The IBM System/36 Device Emulation feature (3270 DE) will operate under control of the current release of the System/36 System Support Program (5727-SS1) and its Communications feature (#6001).

**COMPATIBILITY**

The 3270 Device Emulation can coexist in a System/36 with other communications support (that is, programs using remote 5250s, batch BSC, MSRJE or SSP-ICF).

**CONVERSION**

System/36 3270 Device Emulation is compatible with the System/34 3270 Device Emulation (3270 DE) program product (5726-EM1). The 3270 DE is a utility program which means that the System/36 version should be loaded onto a System/36 and not the System/34 version. System/34 configuration members for the subsystem must be reentered. For the System/34, there is one configuration member per subsystem definition. For System/36, there are two members: 1) a line member describing the link attributes, and 2) a subsystem member defining the subsystem attributes. This allows sharing of common link definitions.

**SECURITY (not applicable)**
**PERFORMANCE CONSIDERATIONS (not applicable)**
**DOCUMENTATION**  
 (available from Mechanicsburg)

*3270 Device Emulation Guide (SC21-7912) ... 3270 Device Emulation Messages (SC21-7945).*

RPOs ACCEPTED: Yes

## PROGRAM PRODUCTS

**5727-SS1 - SSP R2 FEATURE #6004  
SYSTEM/36 SYSTEM SUPPORT PROGRAM  
MULTIPLE SESSION REMOTE JOB ENTRY  
FEATURE #6004**

**PURPOSE**

System/36 Multiple Session Remote Job Entry (MSRJE) provides a common user interface for performing the RJE function to a host system running RES, JES2, JES3, RSCS and VSE/POWER. Multiple readers, writers, punches (disk files), and a console are supported. The maximum number of devices are supported.

**HIGHLIGHTS**

- Multiple sessions supported:
    - Up to 15 Readers\*
    - Up to 15 Printers\*
    - Up to 15 Punches\*
  - For SNA protocols, one line can be shared with SNA 3270 DE, C&SM (DSNX) and SSP-ICF (SNUF subsystem).
  - Consistent and common user interface regardless of the line protocols.
- \* Note: 7 sessions when using BSC protocols, 15 for SNA.

**DESCRIPTION**

The MSRJE feature provides functional support as a remote job entry workstation. Both BSC (multileaving) and SNA line protocols are supported. RES, JES2, JES3, RSCS (BSC only), and VSE/POWER (SNA only) are the host subsystems supported. Multiple lines can be operated concurrently.

Multiple devices are supported and can run concurrently. The maximum number of devices is (Note: Some host subsystems support fewer devices than the maximum shown):

For Hosts Connected:	SNA	BSC
Readers	15	7
Printers	15	7
Punches	15	7
Console	1	1

In addition, the Reader is supported with an input queue of up to 32 requests. The first 15 (7 BSC) entries will be assigned to a Reader. The remaining entries will be queued until a Reader becomes available. A user may request a reader, submit some work to it, and then ask to be released from the Reader.

Printers and Punches are supported with an extensive and powerful Forms Control Table. All of the System/36 printer functions are supported. Disk files can be built directly from the RJE Punch data stream. All file types are supported. At the conclusion of building a file, a System/36 user procedure may be started. The NAME and DATE of a PUNCH file is passed to evoke procedure.

Both Printer and Punch data streams can be received as compressed data without further processing at time of receipt. Another utility is provided to allow processing of the compressed data streams.

Autocall is supported in both BSC and SNA. MSRJE uses the multileaving BSC protocols and can be defined as either a System/3 or a System/360. In SNA, MSRJE is defined as an 'SNA Terminal' with Multiple Logical Units (MLU).

**CUSTOMER RESPONSIBILITIES** (not applicable)

**SPECIFIED OPERATING ENVIRONMENT**

Support will be provided for this licensed program when it is operated in the following specified operating environment.

**HARDWARE REQUIREMENTS**

The IBM System/36 Multiple Session Remote Job Entry (MSRJE) feature runs on all models of IBM System/36. Communications to a host system requires a communications adapter on the System/36, either the Single-Line Communications Adapter (#2500) or the Multiple-Line Communications Adapter (#4500).

**SOFTWARE REQUIREMENTS**

The IBM System/36 Multiple Session Remote Job Entry (MSRJE) feature will operate under control of the current release of the IBM System/36 System Support Program (5727-SS1) and the Communications feature (#6001).

**COMPATIBILITY**

MSRJE communication support can coexist in a System/36 with other communication support (that is, programs using remote 5250s, batch BSC, or 3270 Device Emulation or SSP-ICF).

**CONVERSION**

MSRJE is not compatible with either MRJE or SRJE on the System/34 and must be converted by performing the following:

- Use CNFIGICF to define the operating environment.
- Reenter the forms control table (FCT). (The System/34 FCT can be used as a starting point, but not all printer functions were supported. There also was not any definition for building disk files; this is a new function).
- Convert any data files or library members which contain the RJE utility control statement.
- Educate the System/36 end users on the operation of both the System/36 MSRJE and SSP and the Host subsystem.

**SECURITY/INTEGRITY** (not applicable)

**PERFORMANCE CONSIDERATIONS** (not applicable)

**DOCUMENTATION**

(available from Mechanicsburg)

*Multiple Session Remote Job Entry Guide (SC21-7909) ... Multiple Session Remote Job Entry Messages (SC21-7944).*

**SYSTEM INTEGRITY:** (not applicable)

**RPOs ACCEPTED:** Yes

## PROGRAM PRODUCTS

**5727-SS1 - SSP DES FEATURE #6005  
SYSTEM/36 SYSTEM SUPPORT PROGRAM  
DATA ENCRYPTION STANDARD  
SUBROUTINE FOR BANKING FEATURE #6005****PURPOSE**

The DES subroutine can be used to encrypt or decrypt sensitive data or to generate personal identification numbers (PINs). Typically, DES is used to generate PINs for use with the 3624 Consumer Transaction Facility.

**HIGHLIGHTS**

The DES subroutine can be used in an RPG II, COBOL or Assembler application program. It cannot be used in a BASIC program.

**DESCRIPTION**

The encryption/decryption subroutine complies with the United States Federal Information Processing Data Encryption Standard (DES) algorithm (National Bureau of Standards FIPS 46). It also complies with the American National Standards Institute Data Encryption Algorithm (ANSI X3.92-1981).

**CUSTOMER RESPONSIBILITIES**

The DES algorithm is implemented in software. Security of the key that is used by the algorithm is a user responsibility. For more information about data security and cryptography, see the *IBM Data Security Through Cryptography Manual* (GC22-9062).

**SPECIFIED OPERATING ENVIRONMENT**

Support will be provided for this licensed program when it is operated in the following specified operating environment.

**HARDWARE REQUIREMENTS**

The IBM System/36 Data Encryption Standard (DES) Subroutine for Banking can be used on all models of IBM System/36.

**SOFTWARE REQUIREMENTS**

The IBM System/36 Data Encryption Standard (DES) Subroutine for Banking requires the current release of the IBM System/36 System Support Program (5727-SS1). Other prerequisites include the following SSP features: Communications feature (#6001) and Interactive Communications feature (#6002).

**COMPATIBILITY**

This feature is compatible with the DES subroutine that is included in the System/34 Finance Subsystem (5726-SS1, feature #6010/#6011).

**CONVERSION** (not applicable)**SECURITY/INTEGRITY**

Security of the key that is used by the algorithm is a user responsibility. For more information about key security and cryptography, see the *IBM Data Security Through Cryptography Manual* (GC22-9062).

**PERFORMANCE CONSIDERATIONS** (not applicable)**DOCUMENTATION**  
(available from Mechanicsburg)

The Data Encryption Standard (DES) Subroutine for Banking is covered in the Finance Subsystem chapter of the *IBM Interactive Communications Feature Reference Manual* (SC21-7910).

**SYSTEM INTEGRITY:** (not applicable)

**RPQs ACCEPTED:** Yes



## PROGRAM PRODUCTS

**5727-SS1 - SYSTEM/36 SSP R2 DDFF FEATURE #6006  
SYSTEM/36 SYSTEM SUPPORT PROGRAM RELEASE 2  
DISTRIBUTED DISK FILE FACILITY FEATURE #6006****PURPOSE**

DDFF target data manager allows System/34 application programs to access System/36 data files without changing any user code. The user programs use standard data management in RPG II, Assembler and COBOL to access a disk file. Just as the physical location on the disk is not contained in the user programs, neither is the physical system location. Programs running on a System/34 may access data files on that System/34, another System/34, a System/36 or a System/3 md1 15D.

**HIGHLIGHTS**

- DDFF target data manager.
- Uses SNA peer (PEER) subsystem of SSP-ICF.
- Allows a System/34 running a user program to access System/36 disk data files.

**DESCRIPTION**

The Distributed Disk File Facility (DDFF) target data manager allows a System/34 RPG II or COBOL program to access a disk file located on a System/36. A System/34 Assembler program can access remote files if the program conforms to standard coding techniques (that is, if no special data management techniques are used).

The DDFF program is designed to be a companion program to another DDFF program running on a System/34 (5799-BCP). The System/36 DDFF target supports all of the System/34 access methods for remote file access except:

- Consecutive Output (CO)
- Direct Output (DO)
- Indexed Sequential/Random Input (ISRI)
- Indexed Output (IO/IOU)
- Dummy Open
- Sector Mode Data Management (ZPAM)

**CUSTOMER RESPONSIBILITIES** (not applicable)

**SPECIFIED OPERATING ENVIRONMENT**

Support will be provided for this licensed program when it is operated in the following specified operating environment.

**HARDWARE REQUIREMENTS**

The IBM System/36 Distributed Data File Facility (DDFF) runs on all models of IBM System/36. Communications to a System/34 requires a communications adapter on the System/36, either the Single-Line Communications Adapter (#2500) or the Multiple-Line Communications Adapter (#4500).

**SOFTWARE REQUIREMENTS**

The IBM System/36 Distributed Disk File Facility (#6006) will operate under control of the current release of the IBM System/36 System Support licensed program (5727-SS1), the Communications feature (#6001), and the Interactive Communications feature (#6002).

**COMPATIBILITY**

DDFF uses the SNA Peer subsystem of SSP-ICF and does not restrict the use of any of the System/36 communications support.

**CONVERSION** (not applicable)

**SECURITY** (not applicable)

**PERFORMANCE CONSIDERATIONS** (not applicable)

**DOCUMENTATION**  
(available from Mechanicsburg)

*Distributed Disk File Facility Reference Manual (SC21-7869).*

**SYSTEM INTEGRITY** (not applicable)

**RPQs ACCEPTED:** Yes



PROGRAM PRODUCTS

**5727-SS1 - SYSTEM/36 SYSTEM SUPPORT PROGRAM  
RELEASE 2  
COMMUNICATIONS and SYSTEM MANAGEMENT  
FEATURE #6006**

**PURPOSE**

This SSP optional feature contains Change Distribution and Change Management.

**HIGHLIGHTS**

- Change Management and Distribution - Change Management.
- Distributed System Node Executive (DSNX).

**DESCRIPTION**

This SSP optional feature contains Change Distribution and Change Management. This support is compatible with program product Distributed Systems Executive (5668-986) Version 2 Release 2. DSX Host runs on the central S/370 (4321 to 3084); it distributes (and retrieves) programs, screen formats, procedures, and data files to distributed systems. The System/36 SSP DSNX supports the DSX command protocols for receiving (and sending) programs, screen formats, procedures and data files. Procedures can be sent to a System/36, executed and the results returned to the DSX Host while the SSP DSNX is in session with the DSX Host. The DSX Host treats the System/36 as if it were emulating a Series/1 with Control Program Support (CPS).

**CUSTOMER RESPONSIBILITIES** (not applicable)

**SPECIFIED OPERATING ENVIRONMENT**

**HARDWARE REQUIREMENTS**

The Communications and System Management feature will run on all models of the IBM System/36. Communication with the host system requires a communications adapter on the System/36, either the Single-Line Communications Adapter (#2500) or the Multiline Communications Adapter (#4500).

**SOFTWARE REQUIREMENTS**

The Communications and System Management feature will operate under the control of the current release of the IBM System/36 System Support licensed program (5727-SS1) and the Communications feature (5727-SS1, feature #6001). Distributed Systems Executive (DSX) program product (5668-986, Version 2 Release 2) is required on the central S/370.

**COMPATIBILITY**

The System/36 DSNX is compatible with the S/370 DSX host protocols for change distribution. The System/36 with SSP appears as a Series/1 with CPS.

**CONVERSION** (not applicable)

**SECURITY**

Normal System/36 Security Management (if active) applies.

**PERFORMANCE CONSIDERATIONS** (not applicable)

**SYSTEM INTEGRITY** (not applicable)

**RPQs ACCEPTED**

RPQs will not be accepted until 90 days after the announced first customer ship (FCS).

PROGRAM PRODUCTS

5740-XYS - MVS/SYSTEM PRODUCT-JES2 R1

PURPOSE

MVS/System Product-JES2 Release 1 provides all the performance and functional benefits of MVS/System Extensions (5740-XE1) and significant new enhancements. MVS/SP-JES2 Release 1 is available for the 4341, 4361-5 and 4381 with ECPS:MVS installed, for the 3031, 3032, 3033 Processors and on the S/370 mdl 158 and 168 Processors with the S/370 Extended Feature installed.

DESCRIPTION

**Note:** MVS/System Product (MVS/SP) is a generic term referring to announced releases of MVS/System Product-JES2 (5740-XYS) and MVS/System Product-JES3 (5740-XYN) or topics common to both.

The significant new Base Control Program facilities are:

- Support for the 3380 Direct Access Storage with the 3880 Storage Control mdls 2 and 3 with the Data Streaming feature (#4850) on the 3031, 3032 and 3033 Processors or attached to a 3MB channel on the 4341, 4361-5 and 4381, when installed with the MVS Data Facility/Device Support (5740-AM7) program product.  
Data Streaming feature and on 4341 Processors.
- Support for the 3278, 3278 mdl 2A and 3279 Display Stations as operator MCS consoles.
- Support for the 4341, 4361-5 and 4381 Processors with ECPS:MVS.

HIGHLIGHTS

MVS/SP-JES2 Release 1 installed on MVS 3.8 offers new support for the following:

- The 3380 Direct Access Storage with the 3880 Storage Control mdls 2 and 3 using either:
  - the Data Streaming feature (#4850) on 3031, 3032 and 3033 Processors, or
  - the 3MB channel on the 4341, 4361-5 or 4381.

Device support is provided by MVS/SP-JES2 Release 1 installed with the MVS Data Facility/Device Support Release 1 program product (5740-AM7). This support also permits the 3380 device to be used for paging and for system residence. The 3380 Direct Access Storage provides reduced access times and an increased data transfer rate when compared to previous IBM DASD units. The 3380 Direct Access Storage with the 3880 Storage Control mdls 2 and 3 introduces dynamic path selection facility. Dynamic path selection facility allows the operating system to access a reserved device via any of the available paths.

- The 3279 Color Display Station, all mdls, and the 3278 Display Station, mdls 1, 2, 3 and 4 attached via a 3274 mdl 1D control unit are supported as MCS consoles through device independent display operator console support (DIDOCs). The greater capacity screens are supported on the 3278 mdls 3 and 4 and on the 3279 mdls 3A and 3B. In addition, the color defaults are supported on all mdls of the 3279. These color defaults are blue for all normal traffic, white for all action messages and green for operator commands. Full program function key support is available for the 3278 and 3279 Display Stations.

In addition, the following MVS/System Extensions (5740-XE1) Performance and Functional Benefits are included as part of the MVS/SP-JES2 Release 1.

**Performance Improvements:** MVS/System Extensions test measurements completed on the S/370 158, 168 and 3031, 3032 and 3033 Processors have shown the following results:

A 20 to 27% reduction in control program supervisor state execution time, providing throughput improvements ranging from 14 to 18% for BATCH, TSO/BATCH and IMS/BATCH test environments on uniprocessors and 17 to 20% improvements on multiprocessor configurations as compared to MVS Release 3.7 with SUs 4, 5 and 7 installed.

Actual performance will vary depending upon customer environment, storage and I/O configuration. No assurance can be given that an individual user will achieve the test results.

**SMF Enhancements:** A major revision to SMF provides more data with increased installation control over the amount of data collected and allows a non-disruptive migration to full utilization of the new function.

**SRM Enhancements:** Control of system resources to meet installation-defined goals is necessary for effective usage of the system. The SRM is enhanced to centralize and improve system control, to improve the RMF reporting of certain transactions, and to ease the use of certain SRM facilities.

**Action Message Retention Facility:** Proper and timely handling of operator messages is important. Messages requiring operator action are given particular message descriptor codes. Prior to MVS/System Extensions Release 2, these messages could roll off

the operator's screen with no easy way for the operator to reconstruct the set of unsatisfied action messages. The action message retention facility allows the operator to retrieve all unsatisfied action messages.

See the *General Information Manual* (GC28-1025-0) for more detailed information.

CUSTOMER RESPONSIBILITIES

MVS Release 3.8 and the MVS Processor Support 2 must be installed prior to installing MVS/SP-JES2 Release 1.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

MVS/SP-JES2 Release 1 requires the appropriate S/370 Extended Feature on IBM S/370 mdls 158 (#7730 or #7731) and 168 (#7730) or ECPS:MVS on the 4341, 4361-5 or 4381. MVS/SP-JES2 Release 1 supports the following processors:

IBM mdl 158-1	UP/MP/AP
IBM mdl 158-3	UP/MP/AP
IBM mdl 168-1 with RPQ S20579	UP/MP
IBM mdl 168-1 with RPQ S20580	AP
IBM mdl 168-3	UP/MP/AP
IBM 4341 Processor Mdl Group 1	UP
IBM 4341 Processor Mdl Group 2	UP
IBM 4361-5 Processor	UP
IBM 4381 Processor	UP
IBM 3031 Processor	UP/AP
IBM 3032 Processor	UP
IBM 3033 Processor	UP/MP/AP
IBM 3033 Processor Mdl Group N	UP
IBM 3033 Processor Mdl Group S	UP

The minimum total storage required by MVS/SP-JES2 Release 1 depends on many factors. These include an installation's configuration, the subsystems, program products and problem programs in use. However, the following information will assist in approximating additional bytes of virtual storage required for the MVS/System Extensions and for MVS/SP-JES2 Release 1. The actual bytes of real storage needed will be less because PLPA and CSA are only partially backed by real storage.

To estimate the additional virtual storage required for MVS/SP-JES2 Release 1, use Chart 1 in the following manner:

- If the installation is running MVS 3.8 with the OS/VS2 MVS Processor Support 2 installed, the additional storage is the combined total of columns 1, 2 and 3.
- If the installation has MVS/System Extensions Release 1 installed, the additional storage is the combined total of columns 2 and 3.
- If the installation has MVS/System Extensions Release 2 installed, the additional storage is the amount in column 3.

CHART 1

	MVS/System Extensions Release 1 (Column 1)	MVS/System Extensions Release 2 (Column 2)	MVS/SP-JES2 Release 1 (Column 3)
Nucleus	30,000	6,200	10,500
PLPA	10,000	66,300	- 101,500 (Note 4)
CSA	---	Variable (Note 1)	---
SQA	500	Variable (Note 2)	4,000
LSQA	---	Variable (Note 3)	---

Notes:

1. Assuming four SMF buffers - requires an additional 8,000 bytes.
2. The amount of additional storage required in SQA depends on several variables:
  - Assuming 50 address spaces with interval accounting, two recording data sets and three subsystems defined to SMF, requires an additional 8,000 bytes.
  - Subsystem transaction reporting requires a minimum of 4,096 bytes.
  - The installation control specification requires for each subsystem name, an additional 28 bytes ... for each userid, transaction name and transaction class, an additional 20 bytes.
3. Each initiator requires an additional 40 bytes.
4. This reflects a reduction in PLPA of 101,500 bytes. It is achieved by an optional installation step. This step moves infrequently referenced modules from LPALIB to LINKLIB.

For more information, see the *General Information Manual* (GC28-1025-2).

SOFTWARE REQUIREMENTS

MVS/SP-JES2 Release 1 requires MVS Release 3.8 with MVS Processor Support 2 installed. MVS/SP-JES2 Release 1 completely

## PROGRAM PRODUCTS

**MVS/SP-JES2 R1 (cont'd)**

replaces MVS/System Extensions (5740-XE1).

In order to support the IBM 3380 or the IBM 3375 Direct Access Storage, the MVS Data Facility/Device Support program product (5740-AM7) is required.

RMF users must install RMF Version 2 Release 3.

RMF users of the MVS/SP-JES2 Release 1 Enhancement must install the RMF Version 2 Release 3 Enhancement supporting the MVS/SP-JES2 Release 1 Enhancement.

The specified operating environment may change and will be restated at time of product availability.

**INSTALLATION CONSIDERATIONS**

MVS/SP-JES2 Release 1 requires a stage 1 SYSGEN assembly together with a normal SMP Release 4 application. Alternatively, a full SYSGEN can be used for installation. The program directory will contain additional installation information.

To use the functions provided by RMF, the OS/VS2 MVS Resource Measurement Facility Version 2 Release 3 is required.

**MVS/SP-JES2 RELEASE 1 - JES COMPATIBILITY**

MVS/SP-JES2 Release 1 operates with the following JES2 products:

- |        |                                 |
|--------|---------------------------------|
| Either | JES2 Release 4.1                |
|        | Optionally with:                |
|        | JES2 3800 Enhancements.         |
| or     | NJE for JES2 (5740-XR8)         |
|        | Optionally with:                |
|        | NJE for JES2 3800 Enhancements. |

User-written programs that use standard external interfaces should continue to execute on an MVS system with the MVS/SP-JES2 Release 1 installed. Programs that interrogate MVS system control blocks may require modifications. Licensees will receive documentation on changes in control blocks at the time of availability.

When migrating from an MVS Release 3.8 or an MVS/System Extensions Release 1 environment, changes in an installation's accounting procedures may be required because of enhancements to SMF. (See the *General Information Manual*, GC28-1025-0, for details.) IBM devices currently supported by MVS Release 3.8 will continue to be supported by MVS with MVS/SP-JES2 Release 1 installed.

Any Installation Performance Specification (IPS) that is compatible with MVS Release 3.8 or MVS/System Extensions can be used unchanged with MVS/SP-JES2 Release 1.

IBM program products currently supported on MVS Release 3.8 or MVS Release 3.8 with the MVS/System Extensions program product should continue to run with MVS/SP-JES2 Release 1 installed (although for RMF users, the appropriate RMF release must also be installed). APARs will be accepted for MVS/SP-JES2 Release 1 when any such IBM program product does not run successfully after MVS/SP-JES2 Release 1 is installed.

**MVS/SYSTEM PRODUCT-JES2 RELEASE 1 ENHANCEMENT**

The enhancement for MVS/System Product-JES 2 Release 1 provides the following functions:

- Support of the 3081, 3083 or 3084 Processor Complex.
- Support of the 3375 Direct Access Storage with the 3880 Storage Control mdls 1 and 2 is provided on the 3031, 3032 and 3033 Processors using the Data Streaming Feature. The 3375 Direct Access Storage is also supported on the 4341, 4361-5 and 4381 Processors.
- Support of the 3880 Speed Matching Buffer Feature (#6550) with the 3031, 3032 and 3033 Processors and S/370 Mdl's 158 and 168.

RPQs ACCEPTED: No.

**DOCUMENTATION**

(available from Mechanicsburg)

OS/VS2 MVS/System Product-JES3 and OS/VS2 MVS/System Product-JES2 General Information Manual (GC28-1025-2).

## 5740-XYS - MVS/SYSTEM PRODUCT-JES2 R2

### PURPOSE

MVS/System Product-JES2 Release 2 incorporates all of the functional benefits of MVS/System Product-JES2 Release 1 and, in addition, provides functional and device support enhancements to the MVS Base Control Program and JES2. These enhancements offer an installation opportunities to reduce the system virtual storage requirements of major subsystem and system components, provide new facilities in the areas of multi-system support and operations management, as well as providing general functional and device support enhancements.

### DESCRIPTION of RELEASE 2

MVS/SP-JES2 R2 consists of enhancements to two MVS components: The MVS Base Control Program (BCP) and JES2. The BCP component incorporates all of the functions of the BCP of MVS/SP-JES2 R1 and requires MVS Release 3.8 with the MVS Processor Support 2 function as prerequisites.

The BCP component of MVS/SP-JES2 R2 will operate with the JES2 component of MVS/SP-JES2 R2 or with the JES2 products that operate with MVS/SP-JES2 R1. The JES2 products supported in the latter case are:

JES2 R4.1

NJE for JES2 R3 (program product 5740-XR8)

This flexibility will enable an installation to stage its migration to MVS/SP-JES2 R2. When installed, the JES2 component of MVS/SP-JES2 R2 replaces JES2 R4.1 and NJE for JES2 R3.

### BASE CONTROL PROGRAM (BCP) COMPONENT HIGHLIGHTS

The BCP component of MVS/SP-JES2 R2 incorporates all of the functions of the BCP of MVS/SP-JES2 R1 and, in addition, provides the following facilities:

- Cross Memory Services
- Global Resource Serialization
- Operational Interface enhancements
- Directed VIO
- Subsystem Definition facility

**CROSS MEMORY:** Cross Memory is an architectural extension supported by MVS. This extension facilitates communication among address spaces in an MVS/System Product-JES2 Release 2 environment. By providing a means to transfer data or program control directly between the private areas of address spaces, many benefits result. Because the prime users of Cross Memory services are intended to be MVS system components and subsystems, these benefits can be realized by an installation without any additional user programming. The benefits include:

- **Reduced System Virtual Storage Requirements:** The Cross Memory services of MVS/System Product-JES2 Release 2 enable the system virtual storage (Nucleus, PLPA, SQA, CSA) requirements for specific environments to be reduced. Certain data formerly found in the system virtual storage area can now be stored in new auxiliary address spaces and accessed via Cross Memory services. Such reduction can enable more system or private area virtual storage usage by other subsystems, new applications or current applications growth.
- **Enhanced Isolation:** The multiple address space structure of current MVS provides a considerable amount of data and program isolation. There are instances, however, when two address spaces must communicate with each other. This is generally accomplished through the scheduling of a Service Request Block (SRB) and involves the use of common virtual storage area (CSA/SQA). MVS/SP-JES2 R2 now provides the means by which inter-address space communication can occur without using common virtual storage, thereby isolating the program/data concerned from accidental modification or destruction by system components or authorized programs. Thus, the protection afforded to programs and data by the private area of an address space is extended to include instances of inter-address space communication.
- **Improved System Structure:** Currently, control block information residing in the common virtual storage area (CSA/SQA) is directly addressed by system components and other programs. Cross Memory services enables such control block information to be assigned to the private area of a system or subsystem auxiliary address space and accessed without the overhead of the current Service Request Block (SRB) mechanism. The isolation afforded by the private area of an address space allows controlled access to such data. The information required by system components, subsystems and their users can now be provided via an interface which is independent of the control block structures in the auxiliary address space. Reducing control block dependencies both enhances system reliability and facilitates migration to new function.
- **Enhanced Authority Mechanism:** Cross Memory services provide the capability for authorized subsystems to define groups

of address spaces having different levels of authorization for inter-address space communication. This represents a significant enhancement over existing facilities (for example, SRBs) which provide a single level of authorization to all address spaces (Key 0). Once such groups have been defined, a program may use Cross Memory services for inter-address space communication, but will be prohibited from accessing address space groups for which it has not been authorized.

**Cross Memory Usage:** Examples of system components/subsystems utilizing Cross Memory services in the MVS/SP-JES2 R2 environment.

- Global Resource Serialization
- Operations Interface
- Display Units (DU) command
- IMS/VS

### GLOBAL RESOURCE SERIALIZATION

- Global Resource Serialization, which extends the current ENQ/DEQ facility, provides additional function and improved RAS.
- Global Resource Serialization extends the ENQ function of resource serialization across system boundaries. Multiple MVS systems, interconnected through Channel-to-channel Adapters (CTCs), will now be able to serialize resource usage across systems.
- Additionally, Global Resource Serialization will run in its own address space utilizing the new Cross Memory architecture. Unlike the current ENQ facility, the Global Resource Serialization control blocks will reside in their own address space, thereby reducing the amount of system virtual storage required and, at the same time, improving the system RAS characteristics. By running in its own address space and by preventing addressability to its control blocks, Global Resource Serialization is isolating itself from accidental modification or destruction by other system components or authorized applications.
- Global Resource Serialization also addresses the need to provide information about resources without requiring that an application look at internal ENQ control blocks. MVS/SP-JES2 R2 eliminates dependencies on the structure of ENQ control blocks by providing a new macro service that allows applications to obtain resource status. Access to these control blocks is available only through this new macro service.
- Current ENQ/DEQ/RESERVE services provide three resource serialization scopes: STEP, SYSTEM and SYSTEMS. In a Global Resource Serialization environment, ENQ/DEQ requests specifying STEP or SYSTEM will be treated as requests for local resources and not communicated to other systems in the defined complex. ENQ/DEQ requests specifying SYSTEMS are requests for global resources and are communicated to all systems within the defined complex.

Global Resource Serialization provides the capability to override the default serialization from local to global, and vice versa, in instances where the SYSTEM and SYSTEMS scopes are used. This override is achieved by the invocation of exits that scan installation-specified 'inclusion' and 'exclusion' resource name lists. Global Resource Serialization invokes the 'inclusion' exit for each ENQ/DEQ request specifying a scope of SYSTEM (local serialization) to determine whether the installation requires that resource to be included in global serialization. For each ENQ/DEQ/RESERVE request specifying a scope of SYSTEMS (global serialization), the 'exclusion' exit is invoked to determine whether the installation requires that resource to be excluded from global serialization.

An exit that scans a RESERVE conversion list is also provided to allow device RESERVE requests to be overridden and converted to SYSTEMS (global serialization) requests, thereby allowing other systems in the defined complex to concurrently access the device.

Default exits and resource name lists are provided by IBM. An installation may modify these lists to meet the specific requirements of its operating environment.

- Thus, in the context of multi-system data set integrity, the conversion capabilities provided by Global Resource Serialization can be used to provide a data set level of serialization for MVS/JES2 installations.
- In order for an installation to achieve resource serialization across systems, the MVS systems must be interconnected via Channel-to-channel Adapters (CTCs). Global Resource Serialization requires dedicated CTCs, and, in order for an installation to obtain maximum configurability with Global Resource Serialization, each MVS system should have a CTC connection with every other system with which it serializes resource usage. To meet the additional CTC requirements of large installations, further CTC capability is provided for the 3033 Processor. For details, see RPO 8P0882.

**OPERATIONAL INTERFACE ENHANCEMENTS:** A new facility, in conjunction with two enhanced commands, provides significant improvements in the operability of MVS Systems, particularly in large

**MVS/SP-JES2 R2 (cont'd)**

system installations. These enhancements allow the installation to reduce non-essential message traffic on the operator's console and also provide the operator with new system status information which will allow better control of job traffic and the I/O configuration.

- **Message Processing Facility (MPF):** The Message Processing Facility provides a means of reducing the number of messages to be displayed on the operator's console. The installation can determine the messages which it considers to be important and, through the use of this facility, suppress many non-essential ones.

The messages an installation wishes to suppress are listed by identifiers in a member of SYS1.PARMLIB. The SYS1.PARMLIB member selection may be changed at any time via the SET command and the message identifiers in use can be displayed by use of the DISPLAY MPF command. Suppressed messages are included in the hardcopy log with an indicator denoting the message has been suppressed.

**Note:** Action messages, command responses, responses from the Monitor (MN) command and Write to Operator with Reply (WTOR) messages (message codes 1, 2, 3, 5 and 11) will not be suppressed, even if they had been so specified by the installation.

- **Display Active (DA) Enhancements:** The DISPLAY A command is changed to provide additional information. It allows for improved operator awareness and displays information relevant to other operator commands. Included in this display are address space status, type of user, ASID, PER indicator, step must complete count, performance group number, domain number, CPU affinity, elapsed time, and CPU time for each address space.

The organization of the display is changed to better utilize the screen of the operator's console. The DISPLAY A command can also be restricted to one particular user (job, TSO user, etc.) or group of users with similar names so that it is easier to obtain the required pertinent information for specific users.

- **Display Units (DU) Enhancements:** Determining which jobs are using a device is important to a system operator or programmer trying to resolve why a device cannot be varied offline. With the enhancement to DISPLAY U, the operator can display the job names and ASIDs of device users, in order to decide what action should be taken. Improved recovery is also added to the allocation end of memory resource manager for sharable DASD devices. The additional system status information required for this extension is collected in a separate address space and accessed via Cross Memory services.

**DIRECTED VIO:** Directed VIO enables an installation to more effectively utilize high speed paging volumes for paging of critical response-oriented applications by separating VIO pages from these volumes. In addition, this facility will allow installations to utilize VIO more extensively and experience its benefits in environments where the limitation on high speed paging space was previously a concern.

A new keyword (NONVIO) is being provided as a system parameter, or as a PAGEADD option, to allow installations to specify local page data sets which are not to receive VIO pages. If enough other local page data set space is available, VIO pages will be directed to those local page data sets that were not on the directed VIO data set list. Only in the case of constrained VIO paging space can VIO pages potentially spill to the NONVIO local page data sets.

**OTHER ENHANCEMENTS**

- A Subsystem Definition Facility is provided to give an installation the capability of defining subsystems at IPL via one or more members of SYS1.PARMLIB, thereby eliminating the need to modify the Subsystem Name Table (IEFJSSNT).
- Several other enhancements have been made to the Base Control Program of MVS/System Product-JES2 Release 2 to facilitate the use of subsystems. Details of these enhancements will be documented in the *General Information Manual*, GC28-1025-0.

**JES2 COMPONENT**

The JES2 component of MVS/System Product-JES2 Release 2 (MVS/SP-JES2 R2) provides a generally compatible replacement of both JES2 R4.1 and the NJE for JES2 program product (5740-XR8), together with the functions of the JES2 3800 Enhancements.

The JES2 component is designed to improve the operational environment for the JES2 user through the extension of existing functions and the provision of new facilities. Enhancements include improvements to the reliability and recovery aspects of the spooling subsystem, output processing, RJE and NJE, and extensions to RAS facilities. New facilities include the provision of user exit capabilities to assist the installation in tailoring JES2 to its operational environment, a spool offload program to help mitigate the effects of any future JES2 cold starts, and support of the 3375 and 3380 Direct Access storage devices as a JES2 spool and checkpoint device.

**JES2 HIGHLIGHTS of MVS/SP-JES2 R2**
**Spool Device and RAS Support**

- The new 3375 and 3380 Direct Access Storage devices are supported as spool and checkpoint devices.
- The means of defining a track group has been changed to more efficiently use the capacity of current devices and the 3380 and/or 3375 Direct Access Storage in a mixed spool environment.
- A new facility called Spool Partitioning provides a means of reducing the impact of the failure of a single storage device on the total spool space. The total number of volumes eligible for spool space allocation for each job can be limited. Through the use of this facility, the probability of a job's data becoming inaccessible due to a device failure can be reduced. Exit points are provided to enable the installation to control the allocation of spool space. The installation will also have the option of doing a warm start without all previously mounted volumes available.
- Bad Track Group Isolation attempts to prevent transient and/or limited failures of the media or device from affecting large numbers of jobs by propagation. Track groups in which an I/O error has occurred will be isolated in order to prevent them from being reassigned. Information about the error will be displayed on the operator's console.
- The JES2 User Exit facilities will enable installations to individually tailor the JES2 component of MVS/System Product-JES2 R2 to the requirements of their own operating environment.
- Specific IBM-defined exit points are provided at strategic points in JES2 code. The installation-supplied exit routines are 'logical extensions' of the JES2 environment. The exit code is assumed to be authorized.
- The installation is also provided with the general facility to specify its own exit points by coding the exit macros in the source code of JES2.
- Individual exit points can be controlled by initialization parameters and by system operator commands.

**Improvements to the Operational Characteristics of Output Processing**

- Released 'held' data sets (primarily those held by interactive system users) will be, when possible, gathered and printed with other non-held or released data sets, thereby minimizing the scattering of data sets across printers and reducing the amount of paper used for separator pages.
- Output devices, including both local and remote printers and punches, will now be allowed to select work based upon several route codes. An installation can, therefore, use a local printer to print work originally destined for a currently unavailable RJE station while still permitting that printer to continue selecting locally routed output.
- The line/card count displayed at the time an output group is selected for processing will be updated as the output is processed, thereby enabling a running count to be kept. Various operator commands will provide the updated count. In contrast, the current JES2 environment only provides an initial count.
- New operator commands and system messages give system operators the capability to specify output processing characteristics for groups of SYSOUT data sets, thus providing the installation with greater control of output groups.
- For printers with a forms flashing feature, a standard page format can now be defined as an installation default. JES2 will use the default when no forms flashing is specified via a job's JCL.
- JOB LOG, JCL Images, and System Messages data sets are now addressable using the JES2 JECL Output statement.
- Logical page size (LINECT) support of JES2 JECL JOBPARM statement is extended to the data set level via JES2 JECL output statement.

**Improvements to RJE and NJE Facilities**

- Support for RJE and NJE networks is expanded to 1,000 remotes and 1,000 nodes.
- Verification of successful signon is provided at remote workstations.
- The "JES2 JOB STATISTICS" will now be a part of the Job Log data set and will be transmitted to an RJE workstation or NJE node as part of the job, thus providing more complete job statistics.
- A transparent "STORE and FORWARD" facility is provided to allow jobs and data to be transmitted through a JES2 node.
- Data compression may now be specified on a line basis in addition to the currently supported workstation basis.

**MVS/SP-JES2 R2 (cont'd)**
**Spool Offload Facility**

- A new facility is provided to give the installation the capability to dump and later restore the data from the JES2 spool. This facility will function using either tape, DASD or MSS virtual volumes as the offload media.
- Release and spool device-independent data formats allow customers to use the spool offload facility as a future JES2 cold start circumvention mechanism when migrating from release to release or changing spool devices. At present, a cold start can cause loss of jobs and sysout data; this facility would permit a cold start to be performed without such losses or the need to drain the system.

**RAS Improvements**

- **Command Default Improvements:** Several commands have been changed to reduce their wide ranging effects if issued inadvertently by an operator. An 'ALL' subparameter will now have to be explicitly specified with commands having the potential to adversely impact the system operation.
- **Event Trace Extensions:** This facility has been enhanced to allow for the tracing of internal JES2 "processors" which do not have devices associated with them. This enhancement will assist in diagnosing problems in the areas of the command processor, conversion processor, line manager processor, etc.
- **Error Recovery Facility:** This new facility, similar in structure to the operating system's ESTAE/FRR recovery scheme, has been implemented to allow internal JES2 "processors" to deal with programming errors which previously caused JES2 termination. SYS1.LOGREC recording of all JES2 errors, regardless of whether recovery is successful, is also provided.

**Other JES2 Enhancements**

- **Resource Utilization Thresholds:** The installation will now be able to specify the threshold at which warning messages will be issued when the supply of key JES2 resources is about to become exhausted. The resources for which utilization thresholds will be monitored are: Console message buffers, local buffers, TP buffers, SMF buffers, JQEs, JOEs and track groups.

**Operator Control of Pre-Execution Jobs:** The system operator is now able to change the class and priority of a job at any time through the use of the \$T command.

- **JES2 Message Identification:** The JES2 command responses now carry unique identifiers instead of the commonly used HASP000. This will expedite operator access to explanatory text in the system messages manual. In general, command response texts will remain unaltered. The HASP000 identifier will still be used but merely for the simple affirmative response 'OK'.
- **Extended \$Z Control:** The \$Z command is extended to enable operators at remote locations to control printers and punches at those locations.
- **Unlike Data Set Concatenation of SYS1.PARMLIB:** Installations will now be able to specify data sets of unlike attributes to be concatenated to the initialization parameter library, thereby providing greater flexibility for testing environments.
- **HASPRTAM Restructure:** To improve serviceability, the HASPRTAM module has been split into smaller modules by subfunctions.

**MVS/SP-JES2 R2: JES2 COMPONENT DESCRIPTION**

JES2 is a specialized component of MVS/SP-JES2 R2 which operates in the same Processor with MVS to perform the peripheral functions associated with batch job processing. JES2 is started as a job entry subsystem. Control of designated unit-record devices is taken, the specified intermediate storage direct access device(s) are initialized, and job processing begins. JES2 has four major processing stages which relate to its four major external functions. These are:

1. **INPUT STAGE** - This stage reads jobs simultaneously from a variable number of various types of online card readers and remote terminals. These jobs are then entered into a priority queue to await processing by the next stage.
2. **CONVERTER STAGE** - This stage passes the Job Control Language (JCL) to the MVS Converter which merges the specified procedures from the appropriate Procedure Library, performs a basic syntactical scan, and converts the JCL statements into an "internal text" format which JES2 SPOOLS for later use by the MVS Interpreter. The jobs are then queued by job class to await processing by the next stage.
3. **EXECUTION STAGE** - This stage removes jobs based upon priority and class from the queue established by the Converter Stage and passes those jobs to MVS for processing. Input cards are supplied as required to the executing program and print and punch records are received and written onto JES2 intermediate

storage. At the completion of a job, it is placed in a queue to await processing by the next stage.

4. **OUTPUT STAGE** - This stage transcribes the print and punch output generated by jobs in the previous stage to printers and punches. A variable number of various types of printers, punches and remote terminals can be operated simultaneously.

**JES2 Standard Features:** The standard features of JES2 include:

- **Job input service** provides for low-overhead reading of job streams and storing of data on SPOOLING volumes for later high-speed retrieval for up to 99 concurrently active local card readers in any combination of devices as follows: 2540 reader ... 2501 reader ... 2520 punch (with read feature) ... 3505 reader (80-column punched cards only) ... 3525 punch (with read feature).
- **Converter service** provides for the merging of the submitted JCL with user- or installation-selected procedure libraries and for an early scan of this combined JCL for syntactical errors.
- **Execution service** provides for selection of jobs and execution monitoring for up to 99 concurrently executing jobs as follows: Selection of jobs based upon job class and initiator priority class list of up to 36 classes for each initiator ... automatic delaying of jobs with duplicate OS jobnames ... automatic deblocking and blocking of user SYSIN/SYSOUT data ... counting of lines, cards, and execution duration with optional operator notification and/or cancellation ... interface for SMF counting of SYSIN data.
- **Multiple SPOOLING volume support** provides for balanced utilization of up to 36 volumes for any combination of any mdls of the following devices (one required): 2314 ... 3330 ... 2305 ... 3340 ... 3350 ... 3375 ... 3380.
- **Warm start capability** provides for checkpointing critical JES2 information sufficient for: Optionally restarting jobs which were executing ... restarting print and punch at the last checkpoint.
- **Job output print service** provides for low overhead printing of job streams, system message, and user data print output for up to 99 concurrently active local printers in any combination of devices as follows: 1403 Printer ... 3211 Printer ... 3262-5 Printer (supported as a 4248) ... 3800 Printing Subsystem ... 3203 mdl 4 and 5 ... 4245 Printer.
- **Special forms support** provides for the routing of print (on a job or data set basis) and punch data (on a data set basis) to special forms output queued for output as directed by the operator.
- **Internal Reader facility** provides the ability for any task within the system to submit jobs to JES2 for batch execution as though entered from a JES2 card reader.
- **Console Support** provides for direct entry for JES2 commands and JES2 abbreviated replies to WTORS through MVS operator consoles.
- JES2 interfaces directly with the MVS SMF writer to produce seven SMF records (types 6, 26, 43, 45, 47, 48 and 49). JES2 also provides two user SMF exits (IEFUSO and IEFUJP).
- **Job output punch service** provides for low overhead punching of job stream user punch output for up to 99 concurrently active local punches in any combination of devices as follows: 2520 punch ... 2540 punch ... 3525 punch.
- **Execution Batching** provides the facility for passing jobs directly to a processing program such as a "one-step" monitor, reducing the overhead of OS scheduling and allocation for short running jobs requiring limited system facilities.
- **Priority Aging** provides for automatically increasing the JES2 scheduling priority of jobs which have been in the system for extended periods of time.
- **Remote Job Entry** provides for high speed communications with binary synchronous and SDLC batch workstations which may be used for job stream input and output as well as operator control of the devices and jobs associated with the remote (see "JES2 RJE Features").

**Use Exit Facilities**

- The JES2 User Exit facilities enable installations to individually tailor the JES2 component of MVS/System Product-JES2 Release 2 to the requirements of their own operating environment.
- Specific IBM-defined exit points are provided at strategic points in JES2 code. The installation-supplied exit routines are "logical extensions" of the JES2 environment. The exit code is assumed to be authorized.
- The installation is also provided with the general facility to specify its own exit points by coding the exit macros in the source code of JES2.

## MVS/SP-JES2 R2 (cont'd)

- Individual exit points can be controlled by initialization parameters and by system operator commands:

### Spool Offload Facility

- A facility is provided to give the installation the capability to dump and later restore the data from the JES2 spool. This facility will function using either tape, DASD or MSS virtual volumes as the offload media.
- Release and spool device-independent data formats allow customers to use the spool offload facility as a future JES2 cold start circumvention mechanism when migrating from release to release or changing spool devices. At present, a cold start can cause loss of jobs and sysout data; this facility would permit a cold start to be performed without such losses or the need to drain the system.

### Spool Partitioning Facility

- Spool Partitioning provides a means of reducing the impact of the failure of a single storage device on the total spool space. The total number of volumes eligible for spool space allocation for each job can be limited. Through the use of this facility, the probability of a job's data becoming inaccessible due to a device failure can be reduced. Exit points are provided to enable the installation to control the allocation of spool space: The installation will also have the option of doing a warm start without all previously mounted volumes available.

### Error Recovery Facility

- This facility, similar in structure to the operating system's ESTAE/FRR recovery scheme, has been implemented to allow internal JES2 "processors" to deal with programming errors which previously caused JES2 termination. SYS1.LOGREC recording of all JES2 errors, regardless of whether recovery is successful, is also provided.

**JES2 Multi-Access Spool Feature (MAS):** JES2 in R3 MVS/SP-JES2 R2 allows from two to seven MVS Systems to share the JES2 input, job and output queues through the use of Shared DASD. This feature may be used to share the workload or a pool of JES2-controlled devices among processors. Jobs may be routed to any specific system or all systems in this multi-access spool complex. Furthermore, JES2-controlled unit record and remote devices need not, but may, be attached to each processor.

Each processor operates asynchronously within the multi-access spool complex, i.e., there is no master-slave relationship. Because of this operating design, any system in the complex can recover the workload accepted into the complex by any other system. Another system in the complex can have the RJE, TSO and unique unit record devices of the failing system physically switched to it and continue processing those jobs previously entered into the spool queue.

Another function supplied by the JES2 multi-access spool feature is the ability to isolate a processor for testing purposes. A processor may be designated as operating in independent mode, and in so doing, will only process jobs that are both routed to it and are themselves designated to be executed on that processor in independent mode.

**JES2 RJE Features:** Those features common to all JES2 RJE configurations are as follows:

- JES2 RJE supports up to 1,000 remote workstations communicating over nonswitched (point-to-point) or switched lines.
- JES2 RJE provides for concurrent operations over up to 1,000 lines assigned to unique communication line adapter addresses of the following types: SDA Type II on a 2701 for Binary Synchronous ... Synchronous Base on a 2703 for Binary Synchronous ... 3704 providing 270X emulation ... 3705 providing 270X emulation ... 3704/3705 SDLC.
- Output routing control provides for print and punch output to be directed to the devices attached to the remote, to the central system, or to other remotes as designated by JES2 initialization parameters, by control cards submitted with the job, or by operator command.
- Remote operator control provides a subset of the JES2 operator commands for display of information and control of jobs and devices associated with the remote.
- Operator message output provides for transmission of messages and responses to remote operators with online MULTI-LEAVING workstations with consoles immediately and optional saving of messages for all other remotes until the remote is online and has a printer available.
- Workstation programs, when required, are supplied as extensions of JES2 and are contained on the MVS distribution libraries in source form.
- Terminal support on the central system provides for communication with: 2772 (Binary Synchronous) ... 2780 (Binary Synchronous) ... 3780 (Binary Synchronous) ... 5110 Computer (as a 2772

BSC) ... S/360 mdls 20, 25, 30, 40, 50, 65, 65MP, 67 (in 65 mode), 75, 85, and 195 (MULTI-LEAVING) ... All virtual storage S/370 processors (MULTI-LEAVING) ... 1131 (MULTI-LEAVING) ... System/3 (MULTI-LEAVING) ... System/32 or System/34 (MULTI-LEAVING as a System/3) and System/32 or System/34 (SDLC as a 3770) (MULTI-LEAVING) ... 8100/DPPX or 8100/DPPX/SP (multiple logical unit SDLC).

To achieve this flexibility of terminal-sharing, JES2 uses the VTAM application program interface for the support of the SDLC terminals which are attached to a 3704/3705 in network control mode.

SDLC terminals supported by JES2 in MVS are the non-programmable mdls of the 3771, 3773, 3774, 3775, 3776 and 3777 Communication Terminals, the S/32 (as a 3770), the S/34 (as a 3770), the 6670 Information Distributor (through the program product MVS/Information Distribution Workstation Support, 5740-AMA), the 3790 Communication System and the 8100/DPCX Information System. Support for the 3770 family of devices includes the the 3262 Line Printer mdls 2 and 12, the 3784 Line Printer, the 3521 Card Punch, the 3501 Card Reader and the 2502 Card Reader.

- The signon feature provides for remote identification and line security through remote and line passwords.
- Remote characteristics support utilizes the unique features on each remote as follows: Full text transparency (required for object decks) ... text compression ... print line width truncation ... outer size and blocking capabilities. **Note:** Multipoint or multidrop line features are prohibited.
- Remote job priority adjustment provides for favoring or limiting the JES2 scheduling priority of jobs submitted from each remote workstation.
- Line restart feature provides for warm starting of print output after remote workstation or line failures.

**NJE Features:** The Network Job Entry (NJE) facility provides for the transmission of selected jobs and in-stream data sets, system output (SYSOUT) data sets, operator commands and messages, and job accounting information from one computer system to another across a communication link.

A job entry network consists of one or more interconnected computer systems (called nodes), running under OS/VS2 MVS. These nodes have the capability of communicating with one another and passing the information indicated above from one node to the next. The number of nodes which can exist within a job entry network ranges from one to 1,000.

The nodes can be single processors (UP/AP), tightly coupled multiprocessors or multi-access spool systems.

A job may enter the network via any JES2 local or remote input device and will be queued for transmission to another node if the node of entry is not the execution mode. A job designated for execution at another node is either transmitted directly to that node or is transmitted through intermediate nodes located along a path to the execution node. Transmission of jobs along BSC communications links is handled on a store-and-forward basis; that is, a job must be completely received by a node before any action will be taken to either execute the job or transmit the job to another node. Once a job has been completely received by a node, the transmitting node frees the resources that were allocated to the transmitted job. Transmission of jobs through ACF/VTAM links is logically direct to the execution node.

At each stage of processing, appropriate accounting information is collected and produced on the processing node for local accounting. In addition, network accounting number support is included. This permits accounting numbers to be assigned across the network and provides initialization parameters, conversion tables and routines and user exits to convert local accounting numbers to network accounting numbers and vice versa. All accounting information is produced through standard System Management Facilities (SMF).

**Network Path Manager:** A network path manager running in each processor in the job network interfaces with JES2 and the multi-access spool facility to communicate with all other network path managers. The network path managers control the routing of data through the network by providing best-path and alternate-path information to other NJE components. No single node is designated as a network manager; any subset of an NJE network can function entirely on its own.

### CUSTOMER RESPONSIBILITIES

A customer using the Network Job Entry Facility for JES2 should be a prior user of JES2 with appropriate personnel trained and experienced in OS/VS2 MVS. When planning NJE, every effort should be made to keep the initial configuration to a minimum number of nodes. After experience is obtained, additional nodes may be planned and added individually. Large network configurations require careful planning by experienced IBM and customer personnel to help ensure that maximum benefits are achieved through the proper use of the system.



**PROGRAM PRODUCTS**
**MVS/SP-JES2 R2 (cont'd)**

**Prerequisites:** The Network Job Entry Facility for JES2 requires the installation of Selectable Unit 10 as a prerequisite to the use of the 3800 Printing Subsystem. Use of SNA devices for RJE workstations will require either VTAM2, or the SCP for ACF/VTAM and ACF/VTAM Version 1 or ACF/VTAM Version 2 as well as the appropriate level of MVS. Use of SDLC communicating links in the NJE network will require installation of ACF/VTAM Version 1 with Multisystem Networking Facility for ACF/VTAM or ACF/VTAM Version 2.

**Channel-to-channel Adapter:** NJE supports the CTC adapter as a communication link when it is attached to a block multiplexer channel. The use of the CTC adapter by NJE for JES2 must be separate from any other use of the CTC adapter.

**SPECIFIED OPERATING ENVIRONMENT**
**HARDWARE REQUIREMENTS**

MVS/System Product-JES2 Release 2 requires the appropriate S/370 Extended Feature on IBM S/370 mdls 158 (#7730 or #7731) and 168 (#7730). MVS/System Product-JES2 Release 2 supports the following processors:

IBM mdl 158-1	UP/MP/AP
IBM mdl 158-3	UP/MP/AP
IBM mdl 168-1 with RPQ S20579	UP/MP
IBM mdl 168-1 with RPQ S20580	AP
IBM mdl 168-3	UP/MP/AP
IBM 4341 Processor Mdl Group 1	UP
IBM 4341 Processor Mdl Group 2	UP
IBM 4361 Processor Mdl Group 5	UP
IBM 4381 Processor	UP
IBM 3031 Processor	UP/AP
IBM 3032 Processor	UP
IBM 3033 Processor	UP/MP/AP
IBM 3033 Processor Mdl Group N	UP
IBM 3033 Processor Mdl Group S	UP
IBM 3081 Processor Complex	Dyadic
IBM 3083 Processor Complex	UP
IBM 3084 Processor Complex	Dyadic

Details concerning optional 3033 Extension feature for 3033 processors may be found in the Machines section.

**SOFTWARE REQUIREMENTS**

MVS/System Product-JES2 Release 2 requires MVS Release 3.8 with MVS Processor Support 2 installed.

In order to support the following function and devices in MVS/SP-JES2 Release 2, the MVS Data Facility/Device Support program product (5740-AM7) is required:

- Checkpoint/Restart facilities
- 3375 Direct Access Storage
- 3380 Direct Access Storage

Details of the MVS Data Facility/Device Support program product may be found in the announcement letter.

RMF users must install RMF Version 2 Release 4.

MVS/System Product-JES2 Release 2 consists of enhancements to two MVS components: The MVS Base Control Program (BCP) and JES2. The BCP component of MVS/System Product-JES2 Release 2 replaces the BCP component of MVS/System Product-JES2 Release 1. The JES2 component of MVS/System Product-JES2 Release 2 replaces both JES2 Release 4.1 and the NJE for JES2 R3 program product (5740-XR8). In addition, the 3800 Enhancements provided for JES2 R4.1 and NJE for JES2 program product are incorporated into the JES2 component of MVS/SP-JES2 R2. Installation details for MVS/SP-JES2 R2 will be provided at availability.

**MVS/SYSTEM PRODUCT-JES2 RELEASE 2 COMPATIBILITY**

User-written programs that use standard external interfaces should continue to execute on MVS Release 3.8 with the MVS/System Product-JES2 Release 2 installed. Programs that interrogate MVS system control blocks may require modifications. Documentation on MVS/System Product-JES2 Release 2 control blocks will be available March, 1981.

When migrating from an MVS Release 3.8 or an MVS/System Extensions R1 environment, changes in an installation's accounting procedures may be required because of enhancements to SMF (see the *General Information Manual*, GC28-1025-0).

IBM devices currently supported by MVS Release 3.8 will continue to be supported by MVS with the MVS/System Product-JES2 Release 2 installed.

Any Installation Performance Specification (IPS) that is compatible with MVS Release 3.8, the MVS/System Extensions program product or MVS/System Product-JES2 Release 1 can be used unchanged with MVS/System Product-JES2 Release 2.

IBM program products currently supported on MVS Release 3.8, or MVS 3.8 with the MVS/System Extensions program product, or MVS

3.8 with MVS/System Product-JES2 Release 1 should continue to run with MVS/System Product-JES2 Release 2 installed (although for RMF users, the appropriate RMF release, RMF V2 R4, must also be installed). APARs will be accepted for MVS/System Product-JES2 Release 2 when any such IBM program product does not run successfully after MVS/System Product-JES2 Release 2 is installed.

**DOCUMENTATION**

(available from Mechanicsburg)

*MVS/System Product-JES2 General Information Manual* (GC28-1025-2).

**RPQs ACCEPTED:** No.

**5740-XYS - MVS/SYSTEM PRODUCT-JES2 R3**

**PURPOSE**

MVS/System Product-JES2 Release 3 provides all of the functions of MVS/System Product-JES2 Release 2 together with: The ability to achieve new levels of capacity and responsiveness on 3033 processors via performance improvements implemented in conjunction with the 3033 Extension feature; support for the Extended Addressing feature, permitting up to 32 megabytes of addressable storage on 3033, 3081, 3083 and 3084 processors, thereby providing potential for further capacity and responsiveness; significant improvements in System RAS; extensions to the reconfiguration and recovery aspects of Global Resource Serialization; and the potential further savings in the system virtual storage requirements. RMF support for MVS/System Product-JES2 Release 3 is provided by an enhancement for RMF Version 2 Release 4.

**BASE CONTROL PROGRAM HIGHLIGHTS**

**Performance:** The performance improvements are achieved through:

- Reduction in processor execution time for high frequency control program functions.  
Usage of the 3033 Extension Feature by many MVS components in combination with code optimization have resulted in shorter path lengths and reduced processor execution time for several highly used system functions. In particular, several system functions have been restructured to perform more effectively on IBM's large processors (3033 UP and above).
- Reduction in I/O wait time.  
Restructure of the MVS paging subsystem and use of new slot allocation algorithms results in reduced I/O wait time for paging and swapping.
- Reduction in I/O through use of extended real storage. MVS/SP R3 will utilize extended real storage to eliminate demand paging and swapping I/O operations, thereby freeing processor capacity for additional productive work and reducing I/O wait time.  
These improvements yield increased system throughput and responsiveness:
- Measurement and projection of test environments indicate that the MVS/System Product Release 3, in conjunction with the associated enhancement of the Data Facility Device Support (DF DS) Release 1 program product, will provide the following performance benefits to 3033 users with the 3033 Extension Feature installed in comparison to MVS/System Extensions Release 2:
  - Throughput improvements generally of the order of 10% (UP) and 12% (AP/MP) for TSO/Batch environments.
  - Throughput improvements generally of the order of 6% for intensive Batch and online IMS/Batch environments, with 3033 AP/MP environments experiencing additional throughput. The IMS/VS projections utilized the then most current level of IMS/VS Version 1 Release 2 available in the fourth quarter of 1981.
  - Further throughput gains of up to 5% are expected for large multi-system establishments. Some of the performance improvements within MVS/SP R3 are sensitive to user I/O configuration and workload, the performance benefit increasing as the size of I/O configuration and I/O rates increase, with the largest benefit accruing to processors configured for multi-system environments.
  - New paging algorithms allow TSO environments to improve response time with increased capacity.

**Extended Addressing:** For customers who install the Extended Addressing Feature and additional storage, potential throughput improvements greater than those described above may be realized. MVS's efficient use of additional real storage to eliminate paging I/O operations allows interactive environments such as TSO and IMS/VS to experience improved response time.

The actual performance benefit that an installation will experience will vary depending upon such considerations as customer environment and customer usage of the product improvements. The working sets of new system address spaces created in MVS/SP R2 and R3 may result in an increased real storage requirement and increased paging rates for some installations. No assurance can be given that an individual user will achieve the projected results.

**New Levels of System RAS:** The RAS enhancements provided by MVS/System Product Release 3 are a result of detailed studies of large MVS installations in 1978. They seek to avoid unscheduled IPLs caused by problems in the areas of I/O equipment, the MVS control program and operations.

Estimates indicate that over 20% of the unscheduled IPLs resulting from problems in these areas in the 1978 study have already been addressed by the general solutions in currently available products such as MVS Processor Support 2. MVS/System Product Release 3 now

provides additional general solutions to detect and recover from such problems.

Projections for a 3033 environment indicate that MVS/System Product Release 3 addresses a further 19% of the unscheduled IPLs that resulted from problems in these areas in the 1978 study.

In addition, extensions have also been made to the recovery aspects of the Global Resource Serialization facility introduced in MVS/SP R2.

**Other Enhancements**

- The potential for additional savings in Common Service Area virtual storage.  
Utilization of Cross Memory Services by the Console Communications task provides the potential for further savings in Common Service Area virtual storage requirements.

**JES2 Considerations:** The JES2 component of MVS/SP-JES2 Release 3 provides a service update to the JES2 component of MVS/SP-JES2 Release 2.

**SPECIFIED OPERATING ENVIRONMENT**

**HARDWARE REQUIREMENTS**

MVS/SP-JES2 Release 3 is designed to operate with the Extended Control Program Support Facility for MVS (ECPS:MVS) on 4341, 4361-5 and 4381 Processors and the appropriate S/370 Extended Feature on S/370 mdls 158 (feature #7730 or #7731) and 168 (feature #7730). MVS/SP JES2 Release 3 is designed to operate on the following IBM processors:

Mdl 158-1	UP/MP/AP
Mdl 158-3	UP/MP/AP
Mdl 168-1 with RPQ S20579	UP/MP
Mdl 168-1 with RPQ S20580	AP
Mdl 168-3	UP/MP/AP
4341 Processor Model Group 1	UP
4341 Processor Model Group 2	UP
4361 Processor Model Group 5	UP
4381 Processor	UP
3031 Processor	UP/AP
3032 Processor	UP
3033 Processor	UP/MP/AP
3033 Processor Model Group S	UP
3033 Processor Model Group N	UP
3081 Processor Complex	Dyadic
3083 Processor Complex	UP
3084 Processor Complex	Dyadic

**SOFTWARE REQUIREMENTS**

MVS/SP-JES2 Release 3 is designed to operate with MVS 3.8 with the MVS Processor Support 2 installed. The functions provided by either Data Facility Device Support Release 1 (5740-AM7) program product or the MVS/370 Data Facility Product (5665-295) program product are required by the users of one or more of the following:

- IBM 3375 Direct Access Storage
- IBM 3380 Direct Access Storage
- Checkpoint/restart
- Extended Addressing feature and additional main storage beyond 16 megabytes

RMF users must install the RMF Version 2 Release 4 Enhancement that supports MVS/SP R3.

MVS/SP-JES2 Release 2 consists of enhancements to the MVS Base Control Program (BCP). The BCP component of MVS/SP-JES2 Release 3 replaces and enhances the BCP component of MVS/SP-JES2 Release 2. The JES2 component of MVS/SP-JES2 Release 3 is a service update to the JES2 component of MVS/SP-JES2 Release 2. Release 2 users who have the JES2 component of Release 2 installed will not be required to re-install this component when migrating to Release 3.

**DOCUMENTATION**

(available from Mechanicsburg)

*MVS/System Product General Information Manual (GC28-1025-2)*

**RPQs ACCEPTED:** No

## PROGRAM PRODUCTS

**5740-XYS - MVS/SYSTEM PRODUCT-JES2 R3.2, 3.3****PURPOSE****RELEASE 3.2**

MVS/System Product-JES2 Release 3.2 provides support for the MVS/Operator Communication Control Facility (MVS/OCCF).

**BCP HIGHLIGHTS**

- Support for the MVS/Operator Communication Control Facility (MVS/OCCF) in a JES2 environment. MVS/OCCF is a Program Product that allows one or more remote MVS systems to be operated from a user-designated, controlling MVS system. MVS/SP Version 1 Release 3.2 provides the following function in support of MVS/OCCF.
  - MVS/OCCF can acquire or alter the use of a console. This support allows MVS/OCCF to obtain and release a console, change the routing codes of a console, or request that messages be broadcast to all subsystems.
- Multiple Console Support (MCS) console specifications can be initialized at IPL using the COMMAND member(s) of PARMLIB. After IPL, the master console operator or an operator at an MVS/OCCF console may direct commands to other consoles to correct system problems related to MCS consoles.

**SPECIFIED OPERATING ENVIRONMENT****HARDWARE REQUIREMENTS**

The hardware configurations specified for MVS/SP Release 3 are unchanged with the installation of MVS/SP Release 3.2.

**SOFTWARE REQUIREMENTS**

MVS/SP-JES2 Release 3.2 will support the JES2 component in MVS/SP-JES2 Release 3 as well as SU23 and SU25.

The functions provided by either Data Facility Device Support Release 1 (5740-AM7) program product or the MVS/370 Data Facility Product (5665-295) program product are required by the users of one or more of the following:

- IBM 3375 Direct Access Storage
- IBM 3380 Direct Access Storage
- IBM 3880 Storage Control mdl 11 or 13
- Checkpoint/restart
- Extended Addressing feature and additional main storage beyond 16 megabytes

The functions of MVS/370 Data Facility Product (5665-295) are required by the users of the following:

- Tape labels and tape file structure support for ISO 1001-1979, ANSI X3.27-1978 and FIPS-1979

**DOCUMENTATION**

(available from Mechanicsburg)

An update to the *OS/VS2 MVS/System Product General Information Manual* (GC28-1025) is available.

**RPOs ACCEPTED:** No

**RELEASE 3.3**

MVS/System Product - JES2 (MVS/SP-JES2) Release 3.3 provides ten new JES2 User Exits, improvements to the usability and operational characteristics of JES2 output processing and a new capability to dynamically add and delete spool data sets without warm starts.

**JES2 HIGHLIGHTS****TEN NEW USER EXITS**

- Job Queue Work Select Exit
- Output Data Set/Copy Select Exit
- Notify Exit
- BSC RJE Sign on/Sign off
- SNA RJE Logon/Logoff
- Initialization Statement Exit
- SMF Record Exit
- Cancel/Status Exit
- End of Job Input
- Post Initialization Exit

**User Control of Sysout Data Set Grouping**

- New Output JCL statements which allow the user to specify which data sets are to be contained in an output work unit. The user can also specify the setup characteristics and the priority for the output group.
- Operational enhancements provide improved procedures for limiting the formation of demand setup groups, limiting which

output device will process demand setup groups, limiting the use of user specified priorities for output and reducing operator intervention. Overall these enhancements will assure that the efficient processing of user's output will not be disrupted by the increase in the amount of demand setup work.

**Dynamic Add/Delete of Spool Data Sets**

- Capability for the operator to dynamically add or delete spool data sets eliminating the need to resort to a warm start which impacts the normal processing of work.
- A number of operator commands will be enhanced to display the jobs on a volume or the volumes used by a job.

**SPECIFIED OPERATING ENVIRONMENT****HARDWARE REQUIREMENTS**

The hardware configurations specified for MVS/SP Release 3 are unchanged with the installation of MVS/SP JES2 Release 3.3.

**SOFTWARE REQUIREMENTS**

MVS/SP-JES2 Release 3.3 requires the most current MVS/SP-JES2 Release 3 BCP component in March 1983 as a prerequisite. The JES2 component in MVS/SP-JES2 Release 3.3 contains all of the functional and device support enhancements as in the JES2 component of MVS/SP - Release 3 and is a complete replacement for the JES2 component in MVS/SP Release 3.

The functions provided by either Data Facility Device Support Release 1 (5740-AM7) program product or the MVS/370 Data Facility Product (5665-295) program product are required by the users of one or more of the following:

- IBM 3375 Direct Access Storage
- IBM 3380 Direct Access Storage
- IBM 3880 Storage Control mdl 11 or 13
- Checkpoint/restart
- Extended Addressing feature and additional main storage beyond 16 megabytes

The functions of MVS/370 Data Facility Product (5665-295) are required by the users of the following:

- Tape labels and tape file structure support for ISO 1001-1979, ANSI X3.27-1978 and FIPS-1979

**Planning Information:** MVS/SP-JES2 Release 3.3 requires a JES2 cold start.

**RPOs ACCEPTED:** No

**DOCUMENTATION**

(available from Mechanicsburg)

An update to the *OS/VS2 MVS/System Product General Information Manual* (GC28-1025) is available.

## TREND ANALYSIS (CICS/OS/VIS) 5740-XYT

### PURPOSE

Trend Analysis is a business graphics and data base system which provides a computer-based linkage between an organization's operating and planning information files and the data presentation needs of decision makers. Trend Analysis integrates the color graphics capabilities of the 3279 Color Display Station and the 3287 Color Printer with the data management capabilities of IMS/VIS-DB and the modeling and projection capabilities of PLANCODE, IBM's primary business planning product. Trend Analysis functions are invoked from a display station through easy-to-use menus which can be customized to meet special organizational requirements. Reports can be displayed or printed in a variety of tabular data or graphic report formats.

### HIGHLIGHTS

- **Color Graphics:** Trend Analysis provides capabilities for creating color graphic displays and printouts of time series data. Color graphic displays can be produced in several different forms: Line graphs, surface and bar charts, histograms and pie charts. Combinations of up to 8 colors and 16 shading patterns can be used for the graphic charts.
- **PLANCODE-Trend Analysis Data Base Bridge:** Trend Analysis provides a bridge from PLANCODE to the Trend Analysis time series data base. Users can apply the data manipulation, projection and modeling capabilities of PLANCODE to the time series data which is subsequently used for data selection, formatting and presentation.
- **Terminal User Interaction:** Trend Analysis provides the display station user with the ability to view predefined reports or graphic charts, with preselected data elements, or to have the user interactively select, display and report on only items of of immediate interest.
- **Menu-oriented Selections:** Trend Analysis provides a series of menus from which the display station user may choose the options best suited to the information of interest. The easy-to-use menu selection approach permits users, with minimal training, to customize the information content and format of a desired report or graphic chart.
- **Data Organization:** Information stored for use by Trend Analysis is logically organized by selectable time periods (daily, weekly, monthly, quarterly, semi-annually and annually), organizations (such as companies, divisions, departments, subsidiaries), and by data elements (such as assets, expenses, sales, production, utilization).
- **Standard Report Types:** The Trend Analysis report writer formats data in one of three report types. These are the single period comparison (cross section) report, the historical comparison report and the historical analysis report. These three report types and their options are designed to correspond to the most common ways of examining time series information.
- **Calculator Facilities:** Trend Analysis permits the user to add, subtract, multiply and divide report data (for example, to create ratios). Some common statistical functions such as compound growth rate and standard deviation are also provided. The results of these calculations may be displayed and reported with other information from the data base.
- **Flexibility:** Trend Analysis is designed to provide generalized application customization capabilities. The supplied sample problem may be used as a basis for applications or the user can define specific screen layouts, processing sequences and data elements. Each Trend Analysis application may be tailored to meet specific organizational requirements.
- **User Exits:** To allow an organization to meet further processing requirements, user exits are provided for the addition of installation-written programming to supplement the data entry calculation and report writer facilities of Trend Analysis.
- **Data Maintainability:** Time series data may be maintained using either online or batch mode capabilities. Planning data in the Trend Analysis time series data base can be directly updated using the PLANCODE-Trend Analysis data base bridge or from an installation-written maintenance program using supplied time series data base interface modules.

### CUSTOMER RESPONSIBILITIES

The customer must provide the proper operating environment by installing the required operating system, CICS/OS/VIS and IMS/VIS-DB program products, PL/1 and Sort/Merge program products, and the Graphical Data Display Manager with the Presentation Graphics Feature. If PLANCODE is to be used with the PLANCODE/Trend Analysis data base bridge, then either PLANCODE/I or PLANCODE/S must be installed.

Customer technical personnel must be trained and knowledgeable on the above products, as well as on any other products to be used in conjunction with Trend Analysis. Appropriate customer personnel must

be trained and knowledgeable in Trend Analysis functions and in the design and preparation of Trend Analysis applications.

The customer is responsible for developing procedures to ensure data security, for developing operating and backup procedures, and determining the overall tasks to be accomplished to install and operate Trend Analysis for his organization.

### SPECIFIED OPERATING ENVIRONMENT

#### HARDWARE REQUIREMENTS

Trend Analysis (CICS/OS/VIS) will run on an IBM S/370 or 4300 processor supported by CICS/OS/VIS and IMS/VIS-DB, equipped with floating point feature, and with sufficient storage to meet the combined requirements of the following software components:

- Host operating system.
- Terminal management subsystem.
- Data base management subsystem.
- Graphical Data Display Manager.
- Trend Analysis.
- PLANCODE/I or PLANCODE/S (if used with Trend Analysis).

Trend Analysis online uses 300K unoverlaid, and can be real or virtual depending on the customer's installation requirements.

Trend Analysis will provide graphic and alphanumeric support, as indicated, for the following display terminals and printers:

- Multiple IBM 3270 Information Display System components of the following types:
  - 3279 mdl 2B or 3B (extended color) Color Display Station with Program Symbols (#5781 and 5782) attached to an appropriate control unit (alphanumeric/color graphics).
  - 3279 mdl 2A or 3A (base color) Color Display Station attached to an appropriate control unit (alphanumeric only).
  - 3278 mdl 2, 3 or 4 Display Station with Program Symbols (#5781 and 5782) attached to an appropriately configured control unit (alphanumeric/monochrome graphics).
  - 3278 mdl 2, 3, 4 or 5 Display Station attached to an appropriate control unit (alphanumeric only).
 

Note: If a 3278 mdl 5 is to be used, alphanumeric output should be directed to a terminal printer having at least a 132-character print line.
  - 3277 mdl 2 Display Station attached to an appropriate control unit (alphanumeric only).
  - 3276 mdl 2, 3, 4, 12, 13 or 14 Control Unit Display Station with appropriate control unit features (alphanumeric only).
  - 3275 mdl 2 or 12 standalone Display Station (alphanumeric only).
 

Note: 32XX display stations are only supported with EBCDIC keyboard configuration.
  - 3289 mdl 1 or 2 Line Printer attached to an appropriate control unit (alphanumeric only).
  - 3288 mdl 2 Line Printer attached to an appropriate control unit (alphanumeric only).
  - 3287 mdl 1 or 2 Printer, acting as a 3284/3286 mdl 2, with 3271/3272 Attachment (#8330) and 1920-Character print operation (#9522) (alphanumeric only).
  - 3262 mdl 3 or 13 Line Printer attached to an appropriate control unit (alphanumeric only).
  - 3268 mdl 2 Printer attached to an appropriate control unit (alphanumeric only).
  - 3287 mdl 1 or 2 Printer, with 3274/3276 Attachment (#8331) (alphanumeric only).
  - 3284 or 3286 mdl 2 Printer attached to an appropriate control unit with Data Analysis-APL Feature (#1066) installed if optional text feature character printing is desired (alphanumeric only).
  - 3284 mdl 3 Printer attached to the standalone 3275 Display Station (alphanumeric only).
  - 3287 mdl 1 or 2 Printer, with Program Symbols (#5781 and 5782) attached to an appropriate control unit (alphanumeric/monochrome graphics).
  - 3287 mdl 1C or 2C Printer (extended color), with Program Symbols-4A (#5783) attached to an appropriate control unit (alphanumeric and extended color graphics).

- The 8775 Display Terminal Component of the 8100 Information System, running in 3270 compatibility mode.

## PROGRAM PRODUCTS

**COMMUNICATION ORIENTED MESSAGE SYSTEM  
CORMES Release 1 Modification Level 0 (5746-XXM)****PURPOSE**

The Communication Oriented Message System (CORMES) is designed to build the central "paperless" message exchange system in an organization connecting terminal users and application programs of different functions. It provides communication links:

- For the exchange of information between terminal users (action messages).
- For the interaction between online application programs and terminal users (action messages).
- For triggering the execution of application programs based on the occurrence of prespecified events (trigger messages).

**DESCRIPTION**

CORMES operates under the IBM Disk Operating System/Virtual Storage (DOS/VS) Release 33 or subsequent releases unless otherwise identified.

For data base management, the system uses the data base facilities of the IBM S/370 Data Language/I Disk Operating System/Virtual Storage (DL/I DOS/VS) Version 1, program number 5746-XX1, Release 1, or subsequent releases unless otherwise identified.

For data communication, CORMES uses the facilities of the IBM S/370 Customer Information Control System/Virtual Storage (CICS/DOS/VS) Version 1, program number 5746-XX3, Release 2, or subsequent releases unless otherwise identified.

**HIGHLIGHTS****Terminal user services:**

- Easy to use terminal functions to create, display, modify, and distribute action messages.
- Routing of action messages from one user to another.
- Linkage to online application programs to process a user-selected action message.

**Application program services:**

- User macros to simplify the creation of action and trigger messages in user-written programs and their transfer to the central message files.
- Triggering of application program execution according to prespecified events: A point in time, a time interval or a queue length.
- CORMES as a frame for the implementation of interactive application programs.

**System services:**

- Monitoring of the individual message queue of each terminal user by due date and priority of the received messages.

**CUSTOMER RESPONSIBILITIES**

This section briefly discusses the activities the user has to perform to make CORMES operational. It gives a rough guide for assessing the total installation effort. The assumption is that a system running under DOS/VS with DL/I DOS/VS and CICS/DOS/VS has already been installed.

The installation procedure allows an easy installation of the CORMES system including the sample by use of object code facility. The distributed source code will be used for the final adaptation to the existing system environment.

The major implementation steps are:

- Installation of the CORMES system according to the distribution tape and installation description.
- Execution of the supplied sample to verify the installation. This sample can also be used as a tool for training terminal users.
- Optionally, assembly of all CORMES online programs to include customer requirements.
- Modification and reassembly of existing programs for CORMES communication (according to the rules defined by CORMES) by use of macros and examples provided.
- Exchange of the sample files and tables by files and tables that describe the customer system.

The required changes within existing customer programs have been reduced to a minimum. In addition, macros are provided to simplify the program interactions. Support is provided for Assembler, PL/I and COBOL programs.

**SPECIFIED OPERATING ENVIRONMENT****HARDWARE REQUIREMENTS**

For compilation and/or execution of CORMES, an IBM S/370 with the minimum main storage capacity for CICS/DOS/VS operation is required.

For CORMES, additional storage is required. For the first terminal 16,500 bytes and for each additional terminal 3,000 bytes; for the first application program 11,800 bytes and for each additional program 1,200 bytes.

For the data bases, and files the same devices are used as for the basic software of DOS/VS, CICS/DOS/VS and DL/I DOS/VS.

At least an IBM 3277 Display Station mdl 2 with a 66-key keyboard must be available. The Selector Light-pen (#6530) and program function keys are supported optionally. The IBM 3274 and 3276 are supported in compatibility mode.

The online address space requirements for CORMES may vary widely, according to the number of active terminals. A minimum installation might require address space of about 384K bytes for the combined CICS/VS and DL/I DOS/VS user task partition.

**SOFTWARE REQUIREMENTS**

CORMES is written in Assembler language and uses the macro language facility.

CORMES is designed for an online DOS/VS environment and requires the following programs:

- DOS/VS Release 33 and subsequent releases). \*
- CICS/DOS/VS Version 1, program number 5746-XX3, Release 2 and subsequent releases). \*
- DL/I DOS/VS Version 1, Program Number 5746-XX1, Release 1 and subsequent releases). \*
- \* Unless otherwise identified in a future revision of this document.

Note: CORMES executes, and is supported by IBM, on S/370 virtual storage configurations running under DOS/VS in virtual mode, and DOS/VS under VM/370 in virtual machine mode.

**DOCUMENTATION:** (available only from the European Publications Center)

*Licensed Program Specifications (GH12-5238) ... General Information Manual (GH12-5127).*

PROGRAM PRODUCTS

**ENTRY LEVEL INTERACTIVE APPLICATION SYSTEM-ONE  
VERSION 1 - RELEASE 1 (ELIAS-I)  
5746-XXV**

**PURPOSE**

ELIAS-I is an interactive program which uses the facilities of the Interactive Productivity Facility (Program Number 5748-MS1). When correctly installed in its Specified Operating Environment (SOE) ELIAS-I is designed to provide a system which will facilitate the design, development and implementation of DB and or DB/DC programs with CICS/DOS/VSE and/or DL/I DOS/VSE using COBOL or PL/I and, optionally, DMS/CICS/VSE-DOS.

**DESCRIPTION**

ELIAS-I presents, via its optional documentation and with supporting education, a design methodology for DB/DC applications which has been specially tailored to the user who is not experienced in DB/DC implementation and who has limited in-house skill. Hints and tips are provided to help facilitate the use of Improved Programming Techniques in the smaller system environment.

ELIAS-I interactive procedures are designed to provide assistance with DB/DC program implementation by providing a dialogue capability for the programmer. ELIAS-I bricks are also included in the product. These bricks are designed to be included in DB/DC application programs and to provide assistance in utilizing standard CICS/DOS/VSE and DL/I facilities.

Procedures and bricks are provided for the following main functional areas:

- Assistance with DL/I data base definition. Procedures to generate DL/I nucleus, DBDs, PSBs, SSAs and the associated VSAM files, together with the associated COBOL or PL/I maps, and error recovery code.
- Assistance with DL/I data base maintenance. A procedure for loading, reorganization and backup/recovery of DL/I data bases.
- Assistance with CICS/DOS/VSE screen map generation using Basic Mapping Support. Interactive definition of application screens to ELIAS-I design standards, together with maps in COBOL or PL/I and error recovery code.
- Assistance with program creation in COBOL or PL/I. Provision of skeleton programs with DL/I and CICS/DOS/VSE maps, data areas and linkages, and error recovery code. "Fetch a brick" capability for CICS/DOS/VSE and DL/I calls. Simple use of full screen editor to enter user source statements and test the resulting program.
- Assistance with writing COBOL or PL/I user exits for DMS/CICS/VSE-DOS (Program Number 5746-XC4). For those customers who have DMS installed, a user exit capability similar to the above described program creation routines is available.

ELIAS-I, when installed in conjunction with the DOS/VSE System IPO-E, is designed to provide a comprehensive system for the design, development, programming, debugging, testing and operation of a DB/DC system using, in the main, interactive tools to accomplish the above tasks. Sample programs - working models of various DB/DC functions - are designed to illustrate, "how to do it", for the user new to DB/DC implementation. ELIAS-I also provides assistance for the experienced programmer whose productivity can be improved via the interactive program generation procedures.

ELIAS-I can be used in the following ways:

- Use with any DOS/VSE System IPO/E base to generate source code in COBOL or PL/I for:
  - Batch data base programs.
  - Online programs using CICS/DOS/VSE or DMS/CICS/VSE-DOS.
  - DB/DC programs using DL/I, CICS/DOS/VSE and/or DMS/CICS/VSE-DOS.

These source code programs can be tested and run on other DOS/VSE systems which contain the appropriate compilers and DC or DB components.

- Use with the DC version of any DOS/VSE System IPO/E base, together with COBOL or PL/I, to generate, test and put into production batch or DC programs which use CICS/DOS/VSE and, optionally, DMS/CICS/VSE-DOS.
- Use with the DB/DC version of any DOS/VSE System IPO/E base to generate, test and put into production batch, DB, DC or DB/DC programs which use CICS and/or DL/I, either COBOL or PL/I and, optionally, DMS/CICS/VSE-DOS.

ELIAS-I has been designed to provide the maximum productivity benefits in the last case above; that is, when used in a full DB/DC environment together with CICS and DL/I, either COBOL or PL/I and, optionally, DMS/CICS/VSE-DOS.

**HIGHLIGHTS**

- Interactive interface for definition of DL/I DOS/VSE Data Bases.

- Interactive interface for definition of CICS/DOS/VSE screens (using Basic Mapping Support or DMS/CICS/VSE-DOS).
- Interactive program build facility for batch or online programs in COBOL or PL/I.
- Interactive facilities to enhance DMS/CICS/VSE-DOS user exit programming.
- Comprehensive Data Base recovery and reorganization routines.
- Task oriented documentation.
- Sample programs to illustrate how DB/DC programs should be built.
- Designed to provide ease of use to DB/DC programming.
- Explain and Help facilities.
- Standard program design and error recovery routines designed to provide easier and reduced maintenance.

**CUSTOMER RESPONSIBILITIES**

See above. The customer should ensure that the functions of ELIAS-I match their application requirements and that they have sufficient terminals to realize the benefits of an online programming environment.

**SPECIFIED OPERATING ENVIRONMENT**

**HARDWARE REQUIREMENTS**

ELIAS-I (5746-XXV) is designed to operate on the IBM S/370, 4300 and 303X processors supported by the DOS/VSE operating system.

- A typical DOS/VSE environment to support ELIAS-I might be:
  - IBM 4331 Processor - 1.0 megabyte storage; DASD - 5 Spindles 3310\*; Console - 1 3278-2A; Printer - 1 3205-5\*; 1 Card or Diskette Reader; Tape Drive - 1 8809\*; Terminal - 1 3278-2 or 3277-2.
  - IBM S/370 - 1.0 megabytes storage; DASD - 5 Spindles 3340\*; 1 Line Printer; 1 Tape Drive; Terminals - 1 3277-2 or 3278-2; 1 Card or Diskette Reader.

\* = or equivalent devices supported by the Operating System.

**SOFTWARE REQUIREMENTS**

ELIAS-I is designed to operate with the specified releases of the following programs. The Interactive Productivity Facility (5748-MS1) is a prerequisite for using ELIAS-I.

	Release	
DOS/VSE	5475-030	-
VSE/Advanced Functions	5746-XE8	2
VSE/ICCF	5746-TS1	2
VSE/POWER	5746-XE3	2
VSE/VSAM	5746-AM2	2
Interactive Productivity Facility	5748-MS1	2
CICS/DOS/VSE	5746-XX3	1.4.1
DL/I DOS/VSE	5746-XX1	1.5
DMS/CICS/VSE-DOS	5746-XC4	2
COBOL/VSE	5746-CB1	2.5
PL/I OPT. LIBS	5736-PL3	5.1
PL/I OPT.	5736-PL1	5.1
PL/I RES. LIB	5736-LM4	5.1
PL/I TRANS. LIB	5736-LM5	5.1
SORT/VSE	5746-SM2	3
DB/DC Data Dictionary		
DOS/VSE	5746-XXC	3

- \* ELIAS-I is transparent to the teleprocessing access method. Release 1 of the DOS/VSE System IPO/E supports only BTAM-ES.

**COMPATIBILITY**

Programs written using ELIAS-I in conjunction with CICS/DOS/VSE, DL/I DOS/VSE, DMS/CICS/VSE-DOS, COBOL or PL/I are designed to be able to run on any DOS/VSE System IPO/E which has installed the appropriate selection of the above mentioned component programs.

**Ordering Instructions:** ELIAS-I can be ordered separately from the System IPO/E. The customer will receive all necessary instructions for installing ELIAS-I on top of an installed system which contains the Interactive Productivity Facility and the other prerequisite programs described under "Programming Requirements".

A separate license is required under the terms and conditions of the Agreement for IBM Licensed Program.

PROGRAM PRODUCTS

**ENTRY LEVEL INTERACTIVE APPLICATION SYSTEM-ONE  
RELEASE 2  
ELIAS-I (5746-XXV)**

**PURPOSE**

ELIAS-I is an interactive program which runs under the control of the Interactive Productivity Facility, Program Number 5748-MS1. When correctly installed in its Specified Operating Environment (SOE), ELIAS-I is designed to provide a system which will facilitate the design, development and implementation of VSAM, DB, DC and/or DB/DC programs with CICS/DOS/VSE, DL/I DOS/VSE, and/or VSE/VSAM using COBOL or PL/I and, optionally, DMS/CICS/VSE DOS.

ELIAS-I presents, via its optional documentation and with supporting education, a design methodology, especially oriented towards DB/DC applications, tailored to the user who is not experienced in DB/DC implementation and who has limited in-house skill. Hints and tips are provided to help facilitate the use of improved programming techniques in the smaller system environment.

ELIAS-I interactive procedures are designed to provide assistance with VSAM, DB, DC, and/or DB/DC program implementation by providing a dialog capability for the programmer. ELIAS-I bricks are also included in the product. These bricks are designed to be included in VSAM, DB, DC, and/or DB/DC application programs and to provide assistance in utilizing standard CICS/DOS/VSE, DL/I DOS/VSE and VSE/VSAM facilities.

**DESCRIPTION**

Procedures and bricks are provided for the following main functional areas:

- Assistance with DL/I data base definition. Procedures to generate DL/I nucleus, DBDs, PSBs, SSAs and the associated VSAM files, together with the associated COBOL or PL/I structures. A procedure to transport ELIAS-I defined DL/I control blocks and COBOL or PL/I structures into the DB/DC Data Dictionary DOS, Program Number 5746-XYC, is provided.
- Assistance with PSE import. A procedure to make available to ELIAS-I program generation procedure PSBs which have been defined without making use of ELIAS-I facilities.
- Assistance with DL/I data base maintenance. A procedure for loading, reorganization and backup/recovery of DL/I data bases.
- Assistance with CICS/DOS/VSE screen map generation using Basic Mapping Support. Interactive definition of application screens to ELIAS-I design standards. These maps can be defined for use either with COBOL or PL/I application programs.
- Assistance with batch and online program creation and maintenance in COBOL or PL/I. Provision of skeleton programs with data areas, screen maps, linkage and error recovery code for DL/I (CALL or High Level Programming Interface), VSE/VSAM and CICS/DOS/VSE.
- "Fetch a brick" capability for service requests related to DL/I (CALL or HLP interfaces), VSE/VSAM and CICS/DOS/VSE either in batch or online programs written in COBOL or PL/I. Simple use of full screen editor to enter user source statements and test the resulting program.
- Assistance for writing COBOL or PL/I user exits for DMS/CICS/VSE DOS, Program Number 5746-XC4. For those customers who have DMS installed, ELIAS-I provides support for writing user exits in either COBOL or PL/I, offering productivity improvements made available to the developers of traditional COBOL or PL/I programs.
- Assistance with "compile and link" jobstream creation. A procedure to generate a fully tailored jobstream in order to submit to batch for compiling and linking batch and/or online programs, as well as CICS/DOS/VSE screen maps.

ELIAS-I, especially when installed in conjunction with the VSE System IPO-E DB/DC, Program Number 5750-AAA, is designed to provide a comprehensive system for the design, development, programming, debugging, testing and operation of a DB/DC system using, in the main, interactive tools to accomplish the above tasks. Sample programs - working models of various DB/DC functions - are designed to illustrate "how to do it" for the user new to DB/DC implementation. ELIAS-I also provides assistance for the experienced programmer whose productivity can be improved via the interactive program generation procedures.

**HIGHLIGHTS**

ELIAS-I provides:

- Interactive interface for definition of DL/I DOS/VSE Data Bases.
- Interactive interface for definition of CICS/DOS/VSE screens (using Basic Mapping Support or DMS/CICS/VSE DOS).
- Interactive program build facility for batch or online programs in COBOL or PL/I.

- Interactive facilities to enhance DMS/CICS/VSE DOS user exit programming.
- Data Base recovery and reorganization routines.
- Task-oriented documentation.
- Sample programs to illustrate how DB/DC programs may be structured.
- Ease of use for DB/DC programming.
- Dialogs and help functions available in the following languages: French, German, Italian, Katakana, Portuguese and Spanish in addition to English.
- Standard program design and error recovery routines designed to provide easier and reduced maintenance.

**CUSTOMER RESPONSIBILITIES**

See above. The customer should ensure that the functions of ELIAS-I match their application requirements and that they have sufficient terminals and machine power to realize the benefits of an online programming environment.

**SPECIFIED OPERATING ENVIRONMENT**

**HARDWARE REQUIREMENTS**

ELIAS-I is designed to operate on any IBM S/370, 303X and 4300 processors supported by the VSE/Advanced Functions.

ELIAS-I runs under control of Interactive Productivity Facility, in a VSE/ICCF pseudo-partition with at least 768K bytes of virtual storage allocated.

The following space is required in the VSE libraries:

	CIL	BL	SSL
Installation/ Servicing	1051 (31)	4030 (61)	31620 (2022)
Execution	1051 (31)		

A typical minimum VSE DB/DC where ELIAS-I can be installed to support application programming development might be:

- IBM 4331 Processor - 1 megabyte of storage ... 3 spindles 3370 DASD ... 1 Console 3278-2A ... 1 Printer 3211, 4245 or 3203-5\* ... 1 Card or Diskette Reader ... 1 Tape Drive ... 1 Terminal 3277-2 or 3278-2.
- IBM S/370: 1 megabyte of storage ... 8 Spindles of 3340 DASD\* ... 1 Line Printer ... 1 Card or Diskette Reader ... 1 Tape Drive ... 1 Terminal 3277-2 or 3278-2.

\* = or equivalent devices supported by the Operating System.

**SOFTWARE REQUIREMENTS**

This licensed program requires the functions provided by the Interactive Productivity Facility Release 3, Program Number 5748-MS1, running in conjunction with the following programs:

	Release
DOS/VSE	5745-030 -
VSE/Advanced Functions	5746-XE8 2.0
VSE/ICCF	5746-TS1 2.0
VSE/POWER	5746-XE3 2.0

The set of macros and application programs generated by ELIAS-I may interface with the following programs:

	Release
CICS/VSE	5746-XX3 1.5
DL/I DOS/VSE	5746-XX1 1.5 ICR 2
DOS/VSE	
VSE/VSAM	5746-AM2 2.0
DMS/CICS/VSE DOS	5746-XC4 2.0
DOS/VSE COBOL	5746-CB1 2.5
PL/I Optimizing Compiler and Libraries	5736-PL3 5.1
DB/DC Data Dictionary	5746-XXC 3.0

and any teleprocessing access method supported by VSE/AF Release 2.0, Program Number 5746-XE8.

**MIGRATION from ELIAS-I RELEASE 1:** ELIAS-I Release 1 is upward compatible with ELIAS-I Release 2:

- Tables created by ELIAS-I Release 1 can be used directly by ELIAS-I Release 2 dialogs.
- Program skeletons generated using ELIAS-I Release 1 facilities can be accessed by ELIAS-I Release 2 editors.

## PROGRAM PRODUCTS

**ELIAS-I R2 (cont'd)**

- ELIAS-I Release 2 bricks providing functions already existing in ELIAS-I Release 1 can be included in any ELIAS-I, Release 1 generated programs, without regeneration of the framework.

**Restriction:**

- ELIAS-I Release 2 editors can only use ELIAS-I, Release 2 bricks.

**DOCUMENTATION**  
(available from Mechanicsburg)

The following documents will be available at ELIAS-I availability time:

**Entry Level Interactive System One**

Licensed Program Specifications	GH19-6219
Licensed Program Design Objectives	GH19-6204
General Information Manual *	GH19-6218
Application Design Guide	SH19-6220
COBOL Application Programmer's Guide	SH19-6222
PL/I Application Programmer's Guide	SH19-6223
System Administrator's Guide	SH19-6221
COBOL Samples Handbook	SH19-6224
PL/I Samples Handbook	SH19-6225
Program Logic Manual	LY19-6214
Reference Card	

- \* will be available at announcement time.

**Ordering Instructions:** ELIAS-I is ordered separately from the VSE System IPO/E Release 2.1. The customer will receive all necessary instructions for installing ELIAS-I on top of an installed system which contains the Interactive Productivity Facility Release 3.0 and the other prerequisite programs described under "Programming Requirements".

A separate license is required under the terms and conditions of the Agreement for IBM Licensed Program.

**RPQs ACCEPTED:** No



## DISPLAY MANAGEMENT SYSTEM/3770 (DMS/3770), RELEASE 1 5748-XC3

### PURPOSE

This program product is a productivity aid for users of the 3770 Communication System that simplifies the design, coding, testing and maintenance of the 3770 application programs. The DMS/3770 program product consists of an interactive or forms driven panel definition program, a screen handler program generator, a local data set access manager, a host communication access manager and an application function manager.

The 3770 programmable system is an operator oriented communication system that consists of an IBM 3774 or 3775 Programmable Communication Terminal and its attached devices. The operator terminal consists of the console keyboard, the 480 character gas panel display, the console printer and the 3278 Display Station mdl 2 RPQ #EJ2657 (3774 only). Support for the RPQ will be available in a later release. Records may be stored on one fixed diskette drive, and/or two additional diskette drives that are optional. Other devices supported are the 3501 Card Reader, the 2502 Card Reader and the 3521 Card Read/Punch.

Programs prepared on the host system are transmitted to the 3770 where they may be executed. These programs can operate in a stand-alone manner or with host communication.

The S/370 host system supports the 3770 under DOS/VS, OS/VS1, OS/VS2 and VM/370 (CMS). 3770 programs are created and tested at the host system and are transmitted by the user to the 3770.

DMS/3770 generates a 3770 application program which supports data collection and maintenance from the 3770 console. Local data sets may be either indexed or relative in organization. Host data sets may have any form of organization which the user-written host program will support.

### HIGHLIGHTS

- Improved programmer productivity.
- The cost of maintaining 3770 application programs should be reduced because of system modularity and standardized documentation.
- Tedious aspects of 3770 programming are removed without prohibiting unique implementation via user exits.
- Distribution of function or data from the host system to the 3770 or vice versa.
- Application may be described on the Interactive Forms Preparation facility or by using the DMS/3770 forms.
- Full Screen Processing facility.

### DESCRIPTION

- Field by field support.

The Interactive Forms Preparation Facility (IFP) is a productivity tool that aids the application designer in describing the interface with the display operator. This facility operates under TSO, CICS/VS and CMS. The IFP provides for online entry of the information necessary to generate screen handler programs by using a 3271 or 3272 and one 3277 mdl 2 Display Station or one 3275 Display Station (or equivalent 3274/3276/3278 combination). This facility provides the capability to improve productivity with functions such as:

- Full screen entry of display and print layouts.
- Left-right and up-down scrolling capability.
- Automatic prompting for field definitions.
- Restart capability.
- Help panels.

DMS/3770 forms allow an application programmer to describe the 3770 interface with the display operator. In order to use the screen handler function of DMS/3770 for specifying operator communications, certain forms must be filled out, keyed and input to the DMS/3770 screen handler generator. The forms are divided into two groups: (1) data definition and (2) screen handler definition. Data definition consists of the buffer definition form. This form allows the user to specify the formats of buffers or records. A DMS/3770 data definition processor edits this form and then generates, in card form, the appropriate 3770 code for the definitions. These definitions can then be added to a MACLIB or source statement library for reference at assembly time for the application.

There are two forms which provide for the screen handler definition. Contents of these forms allow input of basic program information of field editing characteristics.

The host communication function supports the BSC mode of line use. SDLC support is also available.

Five operational functions may be selected by the application programmer to be provided in the generated functional program:

- Add** --- Selected input data fields from the panel described by the application programmer are collected and arranged in the order specified by the buffer description and are stored in the local/host data sets selected by the operator.
- Display** --- Previously entered data is retrieved and merged with the panel described by the application programmer, and is displayed on the operator console of the 3770. A record may be retrieved by the operator by entering the key of the record, by entering the relative record number of the record, or by entering a null key which signifies "next record".
- Verify** --- Previously entered data is retrieved by key or by entering a null key ("next record"). The operator is supplied with the prompts from the application programmer specified panel and is required to rekey the entry values. If the existing data and the newly keyed data match, the next field is processed. Three attempts at each field are allowed before the new value is accepted in the case of mismatch. The original data is not shown to the verify operator to maintain keying independence. Indexed data sets include a verification indicator. The indicator will be changed to a "V" if the record was verified correct as is, and will be changed to a "C" if the record was altered during the verify operation.
- Update** --- Previously entered data is retrieved by key or by entering a null key ("next record"). The data is then merged with the panel described by the application programmer, and is displayed on the operator console one field at a time. After each input value is displayed, the operator is given the opportunity to alter it. After the last field, the record is rewritten to the source data set. If an indexed data set is being processed, the verification indicator will be changed to a "U" if a field is updated.
- Delete** --- The record is selected by the operator by key only, is merged with the application programmer specified panel and is displayed on the operator console. The operator is then prompted to continue or to abort the delete request. "No" implies abort, "yes" implies continue. The record is then removed from the data set by altering the key so that it is no longer selectable. (The deleted record may be returned to active status by the operator.)

Continuous running routines -- the operator has the option of performing a selected function in a continuous mode.

DMS/3770 requires at the host a number of input, output and work files to retain information as it is processing the various screen handler forms. These files are:

1. Input file.
2. Layout & field processing file (work).
3. Mapping file (work).
4. Generated output file.

### CUSTOMER RESPONSIBILITIES

To install and use the DMS/3770 program product the user must:

1. Acquire a knowledge of the functions provided by the different facilities.
2. Learn the new macros provided for implementing these facilities.
3. Learn how to use the IFP facility or the forms provided for the screen handler generation.
4. Provide the necessary data set and program ID's to be used.
5. Provide the necessary host application programs and install CICS/VS or IMS/VS if host communications is used.
6. Provide any necessary user programming to perform functions not provided by DMS/3770. This may be done via user exits.
7. Provide the NCP/VS and Access Method Generations if online diskette transmission or DMS/3770 Host Communications is used.

### SPECIFIED OPERATING ENVIRONMENT

#### HARDWARE REQUIREMENTS

DMS/3770 requires the following system configuration:

- An IBM S/370 mdl 115 or larger for DOS/VS, an IBM mdl 135 or larger for OS/VS1 or an IBM mdl 145 or larger for OS/VS2 and comparable mdls of the IBM 3031, 3032, and 3033. The machine configuration for DMS/3770 varies according to the user's application needs. The requirement for operation under CICS/VS or IMS/VS is any S/370 with enough real storage to meet the combined operating requirements of CICS/VS or IMS/VS, the host operating system, the appropriate access methods and other

PROGRAM PRODUCTS

DMS/3770 (cont'd)

user-required applications. The DMS/3770 IFP facility requires 112K (code requirement) of virtual storage. The DMS/3770 editor and generator requires 48K (code requirement) of virtual storage. Depending upon the operating system used, any direct access storage device supported by the virtual storage access method (VSAM) and OS/VS1, OS/VS2, or DOS/VS is supported.

- Any card read/punch and printer supported by OS/VS1, OS/VS2 or DOS/VS.
- Any magnetic tape drive supported by OS/VS1, OS/VS2 or DOS/VS (required for installation only).
- A minimum of one 3271 or 3272 and one 3277 Display Station mdl 2 or one 3275 Display Station (or equivalent 3274/3276/3278 combination) is required if the Interactive Forms Preparation Facility is used.
- An IBM 3704/3705 Controller or ICA for online operations or an IBM 3747 Data Converter for offline diskette creation.
- An IBM 3770 Programmable Communications Terminal (3774 or 3775).
- DMS/3770 will support the following devices attached to a 3770:
  - Gas Panel Display.
  - Console Printer.
  - 3501 or 2502 Card Reader.
  - 3521 Card Read/Punch.
  - 3278 Display Station mdl 2 RPQ #EJ2657 (3774 only).
  - Diskette Drives (0, 1 and 2).

DMS/3770 supports all models of the 2314, 3330 or 3340 Direct Access Storage devices for its input and output files. In addition to a single disk, this program product also requires a Card Reader/Punch and a printer. A tape drive is required only for installation.

SOFTWARE REQUIREMENTS

3770 operates under OS/VS (SVS 1.7\*) (MVS 3.0\*), VS/1 (6\*) DOS/VS (33\*) and VM/370 (Release 5)/CMS. (\* - and subsequent releases and modification levels unless otherwise stated.) The Sequential Access Method (SAM) and Virtual Storage Access Method (VSAM) are used for the input and output files. DMS/3770 is written in S/370 Assembler language, PL/S\*, and 3770 programming statements as follows:

- Interactive Forms Preparation -- PL/S\* and Assembler
- Screen Handler Generator -- PL/S\* and Assembler
- DSURPRL1, 2, 3 Macros -- 3770 Programming Statements
- DMS/3770 supplied utilities -- 3770 Programming Statements

\* Programming Language/Systems (PL/S) is an IBM proprietary language.

Assembler language and 3770 programming statements source code is provided with the DMS/3770 program product.

Depending upon the Host Operating System used, the following programs are required:

	OS/VS1	OS/VS2	
OS/VS Assembler XF	5741-SC1-03	5752-SC1-03	(MVS)
Linkage Editor	5741-SC1-04	5752-SC1-04	(MVS)
Virtual Storage Access Method (VSAM)	5741-SC1-DE	5752-SC1-DE	(MVS)
IDCAMS (Access Method Services)	5741-SC1-DK	5752-SC1-DK	(MVS)
Sequential Access Method (SAM)	5741-SC1-DO	5752-SC1-DO	(MVS)
Virtual Telecommunication Access Method (VTAM)	5741-SC1-23	5752-SC1-23	(MVS)
VTAM (ACF/VTAM) and Prerequisite SCP		5742-SC1-23	(SVS)
3704/3705 Network Control Program (NCP/VS)	5744-BA2	5744-BA2	
3705 Advanced Communications Function for Network Control Program (ACF/NCP) and Prerequisite SSP and SCP.	5735-XX1	5735-XX1	
3790 Host Support Release 7 and subsequent releases and modification levels unless otherwise stated.	5744-BZ3	5744-BZ3	
Customer Information Control System (CICS/VS), Version 1 Release 3.0 and subsequent releases and modification levels unless otherwise stated.	5740-XX1	5740-XX1	

- or -

Information Management System (IMS/VS) Version 1, Release 1.4 and subsequent releases and modification levels unless otherwise stated.	5740-XX2	5740-XX2	
Basic Telecommunications Access Method (BTAM) (on System Distribution Tape)	-----	-----	
Telecommunication Access Method (TCAM)	5741-SC1-21	5752-SC1-21	(MVS)
Advanced Communications Function for TCAM (ACF/TCAM)	5735-RC1	5735-RC1	(MVS)
TSO subroutines for TCAM	-----	5735-RC1	(SVS)
TSO		5752-SC1-T8	(MVS)
Data Management	-----	5742-SC1-T8	(SVS)
Scheduler	-----	5752-SC1-T3	(MVS)
Supervisor	-----	5742-SC1-T3	(SVS)
		5752-SC1-T4	(MVS)
		5742-SC1-T4	(SVS)
		5742-SC1-T7	(SVS)

Note 1: For the Interactive Forms Preparation Facility CICS/VS, CMS or TSO is required.

Note 2: CICS/VS or IMS/VS is required if the Programmable Communications Feature is used.

Note 3: If the 3278 RPQ #EJ2657 for the 3774 is installed, the appropriate levels of 3790 host support and engineering changes must be installed.

Note 4: IMS/VS supports 3770 as a 2770 in BSC Line Control, and as SLU-P under SNA SDLC.

	DOS/VS
DOS/VS Assembler	5745-SC-ASM
Linkage Editor	5745-SC-LNK
Virtual Storage Access Method (VSAM)	5745-SC-VSM
Access Method Services	5745-SC-AMS
Sequential Disk IOCS	5745-SC-DSK
Virtual Telecommunication Access Method (VTAM)	5745-SC-VTM
Advanced Communications Function VTAM (ACF/VTAM)	5746-RC3
Extended Telecommunications Modules (EXTM) with CICS/VS Version 1, Release 3.0	5746-XXB
3704/3705 Network Control Program/VS (NCP/VS)	5747-AJ2
3705 Advanced Communications Function for Network Control Program (ACF/NCP) and Prerequisite SSP and SCP.	5735-XX1
3790 Host Support Release 7 and subsequent releases and modification levels unless otherwise stated.	5747-BQ1
Customer Information Control System (CICS/VS) Version 1, Release 3.0 and subsequent releases and modification levels unless otherwise stated.	5746-XX3

Note 1: CICS/VS or CMS is required if the Interactive Forms Preparation Facility is used. CICS/VS is required if the programmable communication feature is used.

Note 2: If the 3278 RPQ #EJ2657 for the 3774 is installed, the appropriate levels of 3790 host support and engineering changes must be installed.

VM/370: CMS can be used for execution of the Screen Handler Generator and assembly of programs if a 3770 Macro Library is available. For validation and transmission of programs to the 3770 and for host communication, a DOS/VS or OS/VS system is required. Under VM/370 Release 5, the PA1 key function is not available for DMS/3770. PA1 is reserved for VM/370 usage. All IFP users under this release must use a 3270 display station having at least 12 PF keys.

COMPATIBILITY

DMS/3770, DMS/3790 and DMS/VS are similar in concept; however, because of the unique requirements of the individual systems, they are not compatible. The code generated by DMS/3770 contains 3770 unique macros. Therefore, the functional programs are not compatible with the IBM 3790 Communication System.

## PROGRAM PRODUCTS

**DMS/3770 (cont'd)****PERFORMANCE CONSIDERATIONS**

Because of the variations possible with a communication terminal, it is difficult to predict performance. The performance of a DMS/3770 Generated Application Program executing on a 3770 terminal is highly dependent on the terminal resources available, data file placement and user written routines. Use of DMS/3770 generated programs should have a positive effect on the 3770 Programmable Communication Terminal performance. This is a result of the use of 3770 unique macro code as well as the structure of DMS/3770.

**DOCUMENTATION:** (available from Mechanicsburg)

Title	Order Number
DMS/3770 Licensed Program Specifications	GH20-4547
DMS/3770 Licensed Program Design Objectives	GH20-4593
DMS/3770 General Information Manual	GH20-2020
DMS/3770 Program Reference and Information Manual	SH20-2021

The DMS/3770 Buffer/Storage Form (GX20-2029), DMS/3770 Layout Form (GX20-2030) and DMS/3770 Field Processing Form (GX20-2031) are not supplied with the distribution tape and must be ordered separately. There are approximately 50 sheets per pad. The DMS/3770 additional editing form is on the reverse side of Form GX20-2031.

**TERMS and CONDITIONS:** See PP Index

PROGRAM PRODUCTS

**DEVELOPMENT MANAGEMENT SYSTEM/  
DISTRIBUTED PROCESSING CONTROL EXECUTIVE  
DMS/DPCX (5748-XC4)**

**PURPOSE**

Development Management System/Distributed Processing Control Executive is a licensed program which offers productivity gains in the development of applications for the IBM 8100/DPCX Information System. Running a host S/370, 4300 or 3000 Series Processor, DMS/DPCX assists the user in complete application definition and subsequent maintenance.

The DMS/DPCX generated applications execute on 8100/DPCX systems. DMS/DPCX minimizes the data processing experience and aptitude required to generate new application programs. Programmers can use DMS/DPCX to develop application programs with a minimum learning period. Complete applications are generated into source code for the 8100/DPCX system. As application complexity increases, so does the requirement for DP expertise. DMS/DPCX is a member of the Cross System Generator Set of program products which also contains DMS/DPPX and DMS/CSP. Each of these program products share a common, proven architecture and all are highly compatible in their implementation. They are all intended to simplify application development and increase programmer productivity.

**HIGHLIGHTS**

- Provides a S/370, 4300 or 3000 Series online interactive preparation facility, which operates under VM/CMS, TSO or CICS/VS.
- Complete application programs are defined. Primary capabilities provided include display formatting, field editing, arithmetic operations, conditional processing, data definition and file read, write and update.
- Supports distributed data processing using the 8100/DPCX and the host system.
  - Enhanced Instructions.
  - Distributed indexed access method.
  - 32K task virtual storage and other symbolic machine enhancements.
  - Advanced function device support (large display screens and color).
- Resultant application programs that execute on the 8100/DPCX system may be either interactive or batch.
- Application programmers are shielded from SNA protocol and sequences.
- Manages communications between the DMS/DPCX user application programs and IMS/VS or CICS/VS. DMS/DPCX includes the DMS/3790 Communications Interface Monitor (CIM) feature, which assists the application programmer in the initiation and termination of host sessions.
- Self-teaching.
  - TUTOR mode for new users.
  - PROMPT mode for experienced users.
  - HELP facility.
- Application models may be defined, stored and subsequently customized to meet new requirements.
- Application definitions may be tested on the host before they are generated for the 8100/DPCX system.
- A utility is provided to assist in converting DMS/3790 screens to DMS/DPCX format.
- Utilities are provided which allow map, data and application definitions to be copied, renamed, deleted, printed and imported or exported between member specification libraries.
- A DMS/DPCX application may invoke user-written applications written in DPCX programming statements.
- DMS/DPCX supports all currently announced displays and display printers attached to the 8100/DPCX.

**DESCRIPTION**

The user at a display terminal is guided through the definition and generation of a complete application. The definition includes:

- Data formats.
- Screen formats (Maps).
- Editing.
- Use of program function and attention keys.
- Selector pen-detectable fields.
- File read, write, update.
- Table definition.
- Application logic and flow.
- Data manipulation.
- Inclusion of user code.
- Linkage to other programs.

The user can operate in either of two modes, TUTOR or PROMPT. A HELP facility is provided for use in both modes.

The user may test his application's logic on the host through the DMS/DPCX Interactive Test Facility. The Test Facility will support access to user-defined files of test data.

DMS/DPCX converts these specifications into source application programs that are assembled and validated on the IBM S/370 or IBM 4300 Processor with PVS. Resultant programs are distributed to the 8100/DPCX program library and execute in full screen processing mode or as a batch program.

DMS/DPCX also provides the DMS/3790 execution-time services on the 8100/DPCX system, which assist in the task of host communications and allow existing DMS/3790 applications to be run.

Use of DMS/DPCX can result in application programs that:

- Can be invoked by other programs.
- Execute interactively with an operator.
- Execute in batch mode.
- Can use a spooled printer.

This interactive facility runs under TSO/TCAM, TSO/VTAM, VM/CMS, or CICS/VS.

**APPLICATION DEFINITION STEPS**

**Overview**

- DMS/DPCX allows the user to perform application definition as independent steps. The user selects the application development facility (data definition, map definition or application definition) to be performed. The facility selected may be terminated at any time, and defined information will be stored for future reference.
- The information collected by each process is stored in the Member Specification Library (MSL). The user may then use the application generation facility to combine all the information about a given application from the MSL and generate the necessary DPCX programming statements to perform the given application. Since all definitions are stored on the MSL, they may be referenced or used by several applications without re-definition.

**Step by Step**

- **Data Definition** - Allows the definition of data format and characteristics including the length, data type and relationships with other data items in a record. Once the data is defined for a given file, the attributes of the data items will be automatically retrieved by DMS/DPCX if they are referenced during user program definition. This promotes consistent use of data items for all applications using DMS/DPCX.
- **Map Definition** - Allows the user to define the display format for the terminal or printer. Maps are defined interactively with the capability to specify editing criteria for each field.
- **Application Definition** - Allows the user to define the logic flow of an application. Arithmetic operations, process logic, data retrieval, and the flow of terminal displays and printers are defined during this step.
- **Application Test** - Allows the user to exercise an application under DMS/DPCX on the host. This interactive Test Facility will support access to test data files on the host. It allows the user to trace the execution of his program and thus follow and validate its logic before it is generated and transmitted to the 8100/DPCX system. The Test Facility also provides a pre-processor capability which checks the syntax and usage of DMS statements.

**Application Generation** - The data from the application, map, and data definitions are stored in the MSL. The generation step uses the data to generate a source program. During generation, the user is prompted to specify any unique 8100/DPCX information. The program is then compiled and stored in the S/370 and subsequently sent to the 8100/DPCX program library.

- DMS/DPCX operates in either of two modes, TUTOR or PROMPT. TUTOR mode is an instructional or teaching mode for users who have no previous experience using DMS/DPCX. PROMPT mode is an input assistance mode for an experienced DMS/DPCX user. A HELP facility is provided for use in both of these modes to assist the user in becoming more self-sufficient without referring to a manual.

The user may change between TUTOR and PROMPT mode any time during processing. This allows the user to receive either explicit instruction (TUTOR mode) or minimal instruction (PROMPT mode) on the information required to define and generate application programs.

- DMS/DPCX provides the facilities to create and maintain application models. An application model is a DMS/DPCX

PROGRAM PRODUCTS

DMS/DPCX R1 (cont'd)

definition of a program stored in the MSL. Models can be used directly or can be customized by an end-user to fit specific requirements. This technique offers the customer programming staff the ability to define an application program as a model and subsequently permit end-user departments to customize the models to suit their needs. Once a model has been customized, the user will execute the generation step of DMS/DPCX to obtain the source for the DPCX application program.

A data entry application model to aid in design, implementation, and maintenance, is provided with the DMS/DPCX program product.

- **MSL Utilities** - Allows the user to maintain interactively data, maps, and application definitions by listing, copying, re-naming, deleting, or printing. It also allows library members to be imported or exported between MSL.

**EXECUTION TIME SERVICES**

DMS/DPPX includes the execution-time services of DMS/3790. These are:

- **Communications Interface Monitor (CIM)** which manages communications between user application programs and IMS/VS or CICS/VS.
- **Work Area Manager (WAM).**
- **Get Collection.**
- **Linkage Services.**

CIM and Linkage Services functions are invoked in DMS/DPCX generated applications for the purpose of host communications.

When applications are defined using DMS/DPCX, some of the DPCX services and facilities that will be invoked at execution time are:

**Data Set Services:** Read, write and update access to indexed and relative data sets. This support will include DPCX/DXAM as well as existing 3790 data sets.

**Transaction Services:** Transaction services will allow for creation of transactions for subsequent batch transfer to the host system.

**Queued Printer Services:** Queued printer service to produce printer output. The printer output is spooled to disk. DPCX print facilities are used to print the output on any attached printer. Directly attached, tertiary printers may also be specified.

**Panel Services:** Panel services are used to retrieve full screen processing (FSP) panels to be used in mapping data to the display printer. These panels will be used with the DPCX presentation services.

**Presentation Service:** The DMS/DPCX screen handler will use full screen processing (FSP) to manage the user display screen. This will allow DMS/DPCX to take advantage of all of the functional capabilities of a display device.

**Virtual Storage:** DMS/DPCX applications take advantage of 32K task virtual storage to hold records from DXAM data sets and a working storage area.

**CUSTOMER RESPONSIBILITIES**

**Installation**

The installation process for DMS/DPCX is designed to require minimal system programming or system operator time.

DMS/DPCX installation is the process of building libraries received from PID on a magnetic tape. The installation must be accomplished using standard DOS or OS facilities before DMS/DPCX is initialized and made operational.

To install and use the DMS/DPCX program product the user must:

- Acquire a knowledge of the functions provided by the different facilities.
- Provide the necessary data set and program IDs to be used.
- Provide the necessary host application programs for the host communications function.

**SPECIFIED OPERATING ENVIRONMENT**

**HARDWARE REQUIREMENTS**

DMS/DPCX requires the following systems configuration:

- An IBM S/370 model 115 or larger with a minimum of 192K or an IBM 4300 or 3000 Series Processor with enough real storage to meet the combined operating requirements of CICS/VS, the operating system and the appropriate access method.
- Depending upon the operating system used, any direct access storage device supported by the Virtual Storage Access Method (VSAM) and OS/VS1, OS/VS2 or DOS/VSE.
- Any IBM magnetic tape drive supported by OS/VS, DOS/VSE or VM/CMS.

- A minimum of one display terminal with 1,920-character screen and twelve program function keys.
- An IBM 8100/DPCX with feature #6001.

DMS/DPCX has no unique requirements for the 8100/DPCX systems.

**SOFTWARE REQUIREMENTS**

Depending on the host operating system used, the following programs are required:

**8100**

DPCX (with feature #6001) 5761-DS1

**OS/VS1 or OS/VS2**

Host Prep Licensed Program 5735-XR3

In addition, there must be an operational TSO or CICS 1.4.1 (or greater) system to execute DMS/DPCX. Further, there must be some system in place for transporting the DPCX programs from the host system to the 8100. This can include host transmission through DSX, SSS or a user-written program or it can be by using BDES.

**DOS/VSE**

Host Prep Licensed Program 5735-XR3  
VSE/Virtual Storage Access Method (VSAM) 5746-AM2

In addition, there must be an operational 1.4.1 (or greater) system to execute DMS/DPCX. Further, there must be some system in place for transporting the DPCX programs from the host systems to the 8100. This can include host transmission through DSX, SSS, a user-written program, or BDE diskettes.

**VM/CMS**

VM/CMS can be used for execution of DMS/DPCX and for assembly of generated programs if an 8100/DPCX macro library has been set up. For validation and transmission of programs to the 8100/DPCX and for use of the Communications Interface Monitor of DMS/DPCX, a DOS/VSE or OS/VS system is required.

In order to execute DMS/DPCX under VM/CMS, one of the full screen interfaces is required. These are:

VM/System Product 5669-167  
VM/System Extensions Program Product 5748-XE1  
VM/Basic System Extensions Program Product 5748-XX8  
Full Screen Console Interface PRPQ 5799-AWP

**COMPATIBILITY and PORTABILITY**

**COMPATIBILITY with DMS/DPPX and DMS CROSS-SYSTEM PRODUCT:** DMS/DPCX, DMS/DPPX and DMS/CSP are conceptually the same in the definition phase. However, DMS/DPPX and DMS/CSP offer functions that are not available with DMS/DPCX. Applications developed on DMS/DPPX or DMS/CSP which use these unique capabilities may require redesign or redefinition if the application is also to be generated for a DPCX system.

Applications defined using DMS/DPCX are portable to DMS/DPPX or DMS/CSP environments within previously published restrictions. For more information about DMS portability, see the *General Information Manual* (GH20-5555).

**COMPATIBILITY with DMS/3790:** A conversion aid is provided to assist in conversion of DMS/3790 maps and data definitions to DMS/DPCX MSL format.

DMS/DPCX will not affect the execution of existing DMS/3790-developed applications. DMS/DPCX will include the execution-time services now provided by DMS/3790.

**DATA SECURITY, AUDITABILITY AND CONTROL**

DMS/DPCX will support features that assist in preventing unauthorized use of the 8100/DPCX including the following:

- Operator ID codes and password checking in application codes.
- Application program access level assignments.
- Isolation of program definition and execution.
- Supports use of predefined symbols for program auditability.
- Host environment security controls are available to the application programmer.
- Supports use of 8100/DPCX to control access to application programs.

The user is responsible for the selection, use and adequacy of these controls.

**DOCUMENTATION**

(available from Mechanicsburg)

*DMS/DPCX General Information Manual* (GH20-2423) ... *DMS/DPCX Program Reference and Operations Manual* (SH20-2530) ... *DMS/DPCX Program Logic Manual* (LY20-2542) ... *DMS/DPCX Licensed Program Specifications* (GH20-5312) ... *Messages Manual* (SH20-2491) ... *Reference Summary* (GX20-2379).



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PROGRAM PRODUCTS

**DMS/DPCX R1 (cont'd)**

**MVS SYSTEM INTEGRITY APPLIES:** Yes

**RPQs ACCEPTED:** No

**TERMS and CONDITIONS:** See PR Index

**5771-ABA ... Sonoran Serif<sup>1</sup>  
5771-ABB ... Sonoran Sans Serif<sup>1</sup>  
5771-ABC ... Pi and Specials<sup>1</sup>  
TYPOGRAPHIC FONTS for the 3800  
PRINTING SUBSYSTEM MDL 3**

**PURPOSE**

These licensed font programs provide digitized, proportionally spaced, alphabetic and other character forms for use with the 3800 Printing Subsystem mdl 3 with Print Services Facility (5665-275), Print Management Facility (5665-307), Overlay Generation Language (5665-308) and Document Composition Facility Release 3 (5748-XX9). Sonoran Serif<sup>1</sup> is a functional equivalent of Monotype Times New Roman<sup>2</sup>. Sonoran Sans Serif<sup>1</sup> is a functional equivalent of Monotype Arial<sup>2</sup>. Pi and Specials<sup>1</sup> contains special-purpose symbols; Sonoran Petite<sup>1</sup>, a functional equivalent of Monotype Elfin<sup>2</sup>, and Sonoran Display<sup>1</sup>, a functional equivalent of Monotype Old English<sup>2</sup>. These font programs provide, in source form, a total of 131 type fonts from six typeface family designs.

<sup>1</sup> Data derived under license from The Monotype Corporation, Limited.  
<sup>2</sup> Trademarks of The Monotype Corporation, Limited.

**HIGHLIGHTS**

(See "Terminology" below for a definition of terms).

- Print quality. Letter forms were digitized, by The Monotype Corporation, Ltd. from original artwork. The digitization was done at 240x240 dots (pels) per square inch expressly for the 3800 Printing Subsystem mdl 3.
  - General-Purpose Proportional Typeface Families:  
Two complete typeface families are provided - the Sonoran Serif family, a functional equivalent of Monotype Times New Roman<sup>2</sup>, and the Sonoran Sans Serif family, a functional equivalent of Monotype Arial<sup>2</sup>. Both are available in 14 different point sizes, ranging from 6- to 36-points (approximately 1/12" to 1/2"), and in four style/weight combinations, resulting in a total of 56 fonts per family. Each font contains 238 characters\*, providing support for eleven national languages: Danish, Dutch, English, Finnish, French, German, Italian, Norwegian, Portuguese, Spanish, and Swedish.
  - Special-Purpose Proportional Fonts:
    - Pi Serif - typographic, scientific and mathematical, and special symbols, including the uppercase and lowercase Greek alphabet. These are available in a serif roman style in two weights (medium and bold) and four point sizes (6, 8, 10, 12). There are 189 characters\* in each font.
    - Pi Sans Serif - typographic, scientific and mathematical, and special symbols, including the uppercase and lowercase Greek alphabet. These are available in a sans serif roman style in two weights (medium and bold) and four point sizes (6, 8, 10, 12). There are 189 characters\* in each font.
    - Sonoran Petite - a small 4-point font containing 133 characters\*. This font is a functional equivalent of Monotype Elfin.
    - Sonoran Display - a display font available in two point sizes - 20 and 36; each size has 81 characters\*. This font is a functional equivalent of Monotype Old English.<sup>2</sup>
- \* This count does not include blanks or the 'undefined codepoint' character.

**DESCRIPTION**

Document processing/publishing applications require a large variety of proportional typefaces in order to satisfy demands for aesthetics, variety of style, emphasis, and readability. To assist in these needs, IBM makes available, in source form, these three licensed programs containing a total of 131 type fonts in six typeface families.

The fonts designed for use with the 3800 Printing Subsystem mdl 3, consist of digitized alphabetic and other character forms in sizes ranging from 4 to 36 points (approximately 1/18" to 1/2") in height. Each character pattern is printed at a density of 240x240 dots (pels) per square inch.

The typefaces included in each product are:

Proportional typeface families	Style and Weight
Sonoran Serif	Roman and Italic - medium, bold
Sonoran Sans Serif	Roman and Italic - medium, bold
Pi and Specials	
Pi Serif	Roman - medium, bold
Pi Sans Serif	Roman - medium, bold
Sonoran Petite	Roman - medium
Sonoran Display	Roman - medium

**TERMINOLOGY**

- Baseline:** The line on which type appears to stand/align.
- Pitch:** Characters-per-inch.
- Point:** A typographer's measure, approximately equal to 1/72 inch.
- Size:** The distance, specified in points, between baselines when type is set solid; that is, with no additional inter-line spacing.
- Font:** A set of characters in one typeface, one style, one weight, and one point size typeface; for example, Sonoran Serif, italic, bold, 12-point.
- Typeface:** One variation of a character design style, independent of character size; for example, Sonoran Serif, italic, bold.
- Typeface family:** All typefaces of a single design style; for example, Sonoran Serif.

**CUSTOMER RESPONSIBILITIES**

- Adequate DASD storage capacity.
  - Use of system utilities to load fonts to disk.
- Installation:** Standard system file-load utilities are used to load the fonts to disk.

Additional storage is required for the fonts when object format is created. The amount depends on the number of orientations created.

Document Composition Facility Release 3 users must create a font index using the Font Library Index Program supplied with that product.

**SPECIFIED OPERATING ENVIRONMENT**

**HARDWARE REQUIREMENTS**

- An IBM 3800 Printing Subsystem mdl 3 and its prerequisites for printing in all-points-addressable mode.
- Sufficient DASD storage for the desired typeface families. The amount of required storage per typeface family varies with the number of characters in the character set, the point size, the typeface design, and the number of typefaces in the families selected.

DASD storage required for each product, in source form, is shown below in megabytes. The amount of Raster Pattern Storage required for each typeface in object form is provided in *IBM Printing Subsystem Models 3 and 8: Preparing Fonts for Printing* (SH35-0082).

Program Number	Name	MB
5771-ABA	Sonoran Serif	9.6
5771-ABB	Sonoran Sans Serif	8.7
5771-ABC	Pi and Specials	1.6

**SOFTWARE REQUIREMENTS**

The Print Services Facility (5665-275) is a prerequisite when these fonts are printed on the 3800 mdl 3. The Print Management Facility (5665-307) is a prerequisite to convert these fonts from source form to object form. Details for the use of these fonts with other licensed programs, e.g., Overlay Generation Language (5665-308), and Document Composition Facility (5748-XX9), are provided in *IBM Printing Subsystem Models 3 and 8: Preparing Fonts for Printing* (SH35-0082).

**MVS SYSTEM INTEGRITY**

IBM will accept APARS where the installation of these licensed programs introduces an exposure to the system integrity of MVS/370 or MVS/XA. Refer to Programming Announcement dated October 21, 1981. This program is intended to run unauthorized.

RPQs ACCEPTED: No.

**RESTRICTED PROGRAM MATERIALS AVAILABILITY**

Restricted Materials: No. Available in source code only.