

## IBM 3081 Product Enhancement

On October 21, 1981, IBM announced a new processor model, the 3081 Model Group K, which offers improved performance over the original 3081 processor, now designated the Model Group D. The announcement also included extensions to the System/370 architecture, two new 3880 Storage Control models, and a number of new or enhanced software products.

**3081 MODEL GROUP K:** The Model Group K represents the top of IBM's large systems product line. According to IBM, the 3081 Model Group K offers 1.3 to 1.4 times the internal performance of the Model Group D. The improved performance has been achieved primarily by increasing the size of the 3081's high-speed buffer to 64K bytes and by providing a more overlapped machine organization. Like the 3081 Model Group D, the 3081 Model Group K supports 16 or 24 integrated channels and is available with 16, 24, or 32 megabytes of main memory. A Model Group D can be field-upgraded to a Model Group K.

The new System/370 Extended Architecture (370-XA) provides extended addressing and additional channel capabilities for large MVS applications. Any 3081 system can operate in either System/370 or 370-XA mode. In 370-XA mode, real and virtual storage addressing are expanded from 24 bits (16 million bytes) to 31 bits (2 billion bytes). Bimodal operation permits the concurrent execution of 24-bit and 31-bit programs. In addition, a new dynamic channel subsystem enables individual I/O channels to operate with any central processor. Either 3081 CPU can initiate I/O requests to, or handle I/O interrupts from, any I/O device. Additional 3081 enhancements include: increasing the number of allowable I/O devices to 4080, performing channel path selection under hardware control, reducing the number of I/O interrupts, and providing 4K-byte storage protect keys on all models except the 3081 Model D16.

A new Preferred Machine Assist feature is designed to improve the performance of an MVS guest machine running under VM/SP. This feature provides the guest operating system with direct control of the processor, dedicated channels, and I/O devices. The preferred guest machine can also utilize more than 16 megabytes of real storage. The Preferred Machine Assist feature is supported by the VM/SP High Performance Option.

In addition, Virtual Machine Assist microcode has been enhanced to allow the segment protection function to be performed by VMA instead of the VM control program. The VM/SP High Performance Option Release 1 is required to support this enhancement.

Initial shipments of the 3081 Model Group K are scheduled for the second quarter of 1982. The 370-XA mode for all 3081 processors is expected to be available in the first quarter of 1983.

**3880 STORAGE CONTROL MODELS 11 AND 13:** The 3880 Model 11 is a paging subsystem designed for use with 3350 Direct Access Storage Devices, while the 3880 Model 13 is a non-paging subsystem used with 3380 Direct Access Storage Devices. The Model 11 consists of two storage directors. The first storage director, called the Paging Storage Director, dynamically manages an eight-megabyte solid-state storage unit for paging and swapping data. The storage unit is divided into a cache and a directory. The cache contains page and swap data, and the directory contains location and identifier information about the cache contents. Recently referenced pages are stored in the cache; other pages are maintained on the 3350 DASD. The cache is accessed at channel speeds (1.5 or 3 megabytes per second) without mechanical delays. The second storage director operates in a conventional manner as a DASD storage director. Up to four 3350 DASDs can be connected to the 3880 Model 11 Paging Storage Director. The second storage director, which functions as a 3880 Model 1 storage director, can be connected to up to 16 IBM 3330/3333 or 3350 DASDs. The 3880 Model 11 is scheduled for delivery in April 1982.

The 3880 Storage Control Model 13 consists of a cache unit that is attached to a 3880 Storage Control Model 3 to form a two-level storage hierarchy with 3380 Direct Access Storage Devices. The 3880 Model 13 includes two Cache Storage Directors with either four (Model B13) or eight (Model D13) megabytes of solid-state storage. Like the 3880 Model 11, the Model 13's cache unit consists of a cache and a directory. Cache contents are dynamically managed by a modified least recently used (LRU) algorithm. The 3880 Model 13 Cache Storage Directors connect to a 3-megabyte-per-second data streaming channel on any 3081 processor. It supports one or two strings of 3380 DASDs, each consisting of one 3380 Model AA4 and up to three 3380 Model B4 units. Initial shipments of the 3880 Model 13 are scheduled for the third quarter of 1982.

**MVS ENHANCEMENTS:** The System/370 Extended Architecture will be supported by the new MVS/Extended Architecture (MVS/XA), which consists of two elements: the MVS/System Product Version 2 (MVS/SP V2) and the Data Facility Product (DFP). The two versions of MVS/SP V2, MVS/SP-JES2 V2 and MVS/SP-JES3 V2, include all of the functions of MVS/SP Version 1 Release 3 plus the following enhancements: support for 31-bit virtual and real storage addresses, support for larger and ➤

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▷ more flexible I/O configurations, additional Reliability, Availability, and Serviceability (RAS) features, and enhanced operator commands. Under MVS/XA, some of the I/O processing previously performed by the operating system is done by the 3081 dynamic channel subsystem. All paths to a device are available to either processor in the 3081 Processor Complex. New RAS features included in MVS/SP V2 include the capability of loading the nucleus in non-contiguous real storage, page protection for significant system areas, improved recovery routines for key system components, a new system trace facility that can operate concurrently with the generalized trace facility (GTF), enhancements to GTF, and improved dumping and formatting options.

MVS/SP V2 is designed to be installed on an MVS Release 3.8-based 3081 system with the Data Facility Product as a prerequisite. Also required are Assembler H Version 2 and SMP Release 4. The JES2 and JES3 components of MVS/SP V2 are functionally equivalent to the JES2 and JES3 components of MVS/SP Version 1 Release 3. MVS/SP-JES2 V2 and MVS/SP-JES3 V2 are scheduled for delivery in the first quarter of 1983. Future releases are planned to provide support for the 3880 Storage Control Models 11 and 13.

The Data Facility Product (DFP) provides data management, device support, program library management, and utility functions for the MVS/XA environment. The functions provided by DFP were previously available in MVS Release 3.8 and the following program products: Data Facility/Device Support Release 1 Modification 4, Sequential Access Method-Extended Release 1, Data Facility/Extended Function Release 1, Off-Line IBM 3800 Utility, and Access Method Services Cryptographic Option. IBM states that these programs should not be used individually with an MVS/XA system. Initial delivery of DFP is scheduled for the first quarter of 1983.

Assembler H Version 2, which is required for MVS/XA installation, is a functional replacement for OS Assembler H Release 5. It includes the same functions as the older product plus support for the new machine instructions for 3081 processors operating in 370-XA mode, bimodal addressing in an MVS/XA environment, new channel command word instructions, and operation in the CMS environment of the VM/System Product and the new VM/XA Migration Aid. Assembler H Version 2 is scheduled for delivery in the third quarter of 1982. Additional language support for MVS/XA will be provided by future releases of APL, COBOL, FORTRAN, and PL/1.

A number of optional software products require modification to run in an MVS/XA environment. Among the products for which IBM plans new versions or releases are the following: ACF/TCAM Version 2 Release 4—March 1982; ACF/VTAM Version 2—December 1981; BTAM/SP—May 1982; Data Facility/Data Set Services—third quarter 1982; Device Support Facilities—third quarter 1982; IMS/VS Version 1—fourth quarter 1982; Resource Management Facility Version 3—first quarter 1983; and TSO Extensions—first quarter 1983.

IBM also announced new releases of MVS/SP-JES2 and -JES3 Version 1. MVS/SP-JES2 Version 1 Release 3.1 provides support for the 3880 Storage Control Models 11 and 13 and support for concurrently running multiple copies of ACF/TCAM Version 2 Release 4 in the same processor. Release 3.2 provides new user exits, additional operational characteristics, and support for the MVS/Operator Communications Control Facility, a new program product that allows one or more remote MVS systems to be operated from a user-designated MVS system. Release 3.3 provides 10 new user exits, improved operational characteristics, and the capability to dynamically add and delete spool data sets without warm starts. IBM plans to deliver MVS/SP-JES2 V1 Release 3.1 in March 1982, Release 3.2 in September 1982, and Release 3.3 in March 1983.

MVS/SP-JES3 Version 1 Release 3.1 supports the 3880 Storage Control Models 11 and 13, multiple copies of ACF/TCAM Version 2 Release 4, and the Interactive Data Transmission Facility of TSO Extensions. Enhancements have been made to the output writer to permit a JES3 global to utilize tightly coupled processors more effectively. MVS/SP-JES3 V1 Release 3.1 is scheduled for March 1982 delivery.

**VM ENHANCEMENTS:** The VM/XA Migration Aid is a new program product designed to ease the conversion from MVS/SP Version 1 to MVS/XA. The VM/XA Migration Aid supports, concurrently, one MVS/SP Version 1 preferred virtual machine and one or more MVS/XA test machines with test and debugging facilities. The VM/XA Migration aid is planned for delivery in the fourth quarter of 1983.

The new VM/System Product Release 2 (VM/SP Release 2) contains all of the functions of Release 1 plus a number of enhancements, including: programmable operator support, new CMS end-user functions, new CMS productivity aids, DIAL command support for remote BSC 3270 users, restructuring of the CMS ▷

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➤ nucleus, removal of the CMS tokenization eight-byte restriction, an enhanced query command, enhanced ASCII support, and a trace table recording facility. VM/SP Release 2 is scheduled for delivery in June 1982.

The new VM/System Product High Performance Option (VM/SP HPO) will be issued in three releases. Release 1, which will be available in January 1982, provides performance enhancements for the CMS environment by supporting the segment protection extension to VMA on the 3081 Model D16. Release 2, which will be available in June 1982, supports the new Preferred Machine Assist feature on 3081 processors, supports all 3081 models operating in System/370 mode, and provides enhancements to facilitate transition to and from a single-processor mode. Support for 3081 processors with more than 16 megabytes of main memory is accomplished by invoking the 4K-byte storage protect key. VM/SP HPO Release 3, scheduled for first quarter 1983 delivery, enables VM to utilize up to 32 megabytes of real memory and supports the 3880 Storage Control Model 11. VM/SP Release 1.1 is a prerequisite for VM/SP HPO Release 1 and 2, while VM/SP Release 2 is a prerequisite for VM/SP HPO Release 3.

### EQUIPMENT PRICES

		Purchase Price	Monthly Maint.	Monthly Rental Charge	Monthly Lease Charge (4-Year Lease)
3081	Processor Complex; includes two CPUs, two 64K-byte buffer storage units, 16 integrated channels, and main memory as specified:				
	Model K16; 16,777,216 bytes of main memory	\$4,320,000	\$8,050.00	\$155,000	\$124,000
	Model K24; 25,165,824 bytes of main memory	4,520,000	8,375.00	161,950	129,560
	Model K32; 33,554,432 bytes of main memory	4,720,000	8,700.00	168,900	135,120
	3081 Model D to Model K upgrade (no change in storage size)	600,000	—	—	—
3880	Storage Control:				
	Model 11	251,520	676.00	7,145	6,080*
	Model B13	202,640	576.00	5,765	4,905*
	Model D13	260,880	711.00	7,410	6,305*
6148	Remote Switch Attachment for 3880-11 or -13	NC	NC	NC	NC
6149	Remote Switch Attachment, Additional	NC	NC	NC	NC
8170	Two-Channel Switch Pair for 3880-11 or -13	7,460	11.00	210	179*
8171	Two-Channel Switch Pair, Additional	19,900	38.50	562	478*

### SOFTWARE PRICES

		Initial Charge		Monthly Charges		Monthly Licensed Program Support	Monthly Additional Licensed Program Support
		Basic License	DSLO	Basic License	DSLO		
5740-XC6	MVS/SP-JES2 Version 2	\$12,000	\$9,000	\$4,000	\$3,000	\$ 500	\$300
5665-291	MVS/SP-JES3 Version 2	13,500	10,125	4,500	3,375	1,000	600
5665-284	Data Facility Product	1,350	1,010	450	337	60	36
5668-962	Assembler H Version 2 Release 1	435	326	145	108	5	3
5740-XYS	MVS/SP-JES2 Version 1 Releases 3.1, 3.2, and 3.3 (as of 1/1/82)	—	—	1,495	1,120	175	105
5740-XYN	MVS/SP-JES3 Version 1 Release 3.1 (as of 1/1/82)	—	—	1,635	1,225	375	225
5664-169	VM/XA Migration Aid	10,500	7,875	3,500	2,625	500	300
5664-167	VM/SP Release 2	—	—	287	215	50	30
5664-173	VM/SP High Performance Option	4,200	3,150	1,400	1,050	100	60
5665-285	TSO Extensions for MVS/370	1,305	978	435	326	65	39
5665-293	TSO Extensions for MVS/XA	1,560	1,170	520	390	80	48
5665-279	BTAM/SP	4,920	3,690	—	—	10	6
5735-RC3	ACF/TCAM Version 2 Release 4	—	—	535	401	71	43
5665-280	ACF/VTAM Version 2 for MVS	2,745	2,058	915	686	175	105
5662-280	ACF/VTAM Version 2 for OS/VS1	1,560	1,170	520	390	80	48
5666-280	ACF/VTAM Version 2 for DOS/VSE	660	495	220	165	50	30
5665-270	Resource Management Facility Version 3	2,100	1,575	700	525	50	30□

\*Monthly charge on a two-year lease.■