

IBM System/370

NEW PRODUCT ANNOUNCEMENT

3850 MASS STORAGE SYSTEM: On October 14, 1974, IBM unveiled the latest of its mass storage concepts when it announced what is officially designated the Model 3850 Mass Storage System (known informally as "Project Oak" during its years of development). Aimed primarily at large organizations with requirements for storing massive amounts of data, the 3850 combines both magnetic tape and disk storage technologies to provide for economical on-line accessibility to large collections of data.

The 3850 uses a cylindrical data cartridge, approximately 2 inches in diameter and 4 inches long, containing a 771-inch length of 3-inch-wide magnetic tape as the primary storage medium. Each cartridge can contain up to 50 million bytes of data, which is recorded in a format identical with that of the IBM 3336 Model 1 Disk Pack. One data cartridge, thus, can contain the equivalent of up to 202 cylinders, with 19 tracks per cylinder and 13,030 characters per track; and two data cartridges, according to IBM terminology, equal one "mass storage volume" (i.e., one 3336 Model 1 Disk Pack). Purchase price for a 3850 magnetic tape cartridge is \$20, compared to \$775 for one 3336 Model 1 Disk Pack.

The data cartridges are stored in honeycomb-like cells in the 3851 Mass Storage Facility. Also included in the 3851 are from two to eight Data Recording Devices that transcribe the data between the magnetic tape cartridges and a group of dedicated 3333/3330 Disk Storage Drives. The data transfer rate from the magnetic tape cartridge to the Data Recording Device is 874,000 bytes per second, and between the 3830 Model 3 Disk Control and the central processor the transfer rate is 806,000 bytes per second.

Each 3851 Mass Storage Facility contains a Mass Storage Control, which provides interfaces between the System/370 central processor and the disk storage system controller to initiate and control the data transfer operations between the 3851 and the disk pack drives. Two accessor mechanisms are supplied with each 3851 unit for retrieving and replacing the cartridges. The minimum time required to place a cartridge in the Data Recording Device entry position, or to restore the cartridge, is approximately three seconds, and the maximum can range from four to eight seconds depending on the size of the Mass Storage Facility. After the cartridge is placed in the entry position of the Data Recording Device, the approximate positioning time to locate the first physical position and begin data transfer to the 3830 Model 3 Disk Control is five seconds.

The 3851 Mass Storage Facility comes in two versions, Models A and B, with four models of each version. The A Series units have one Mass Storage Control, while the B Series units each contain two Mass Storage Controls. All models have two accessor mechanisms; in Models A1 and B1 the second accessor serves as an alternative to an inoperative first accessor, while in Models A2 and B2 both accessors can operate simultaneously.

The functional characteristics and storage capacities of all models of the 3850 Mass Storage system are as follows:

	<u>A1, B1</u>	<u>A2, B2</u>	<u>A3, B3</u>	<u>A4, B4</u>
Cartridge capacity (no. of cartridges)	706	2044	3382	4720
Byte capacity (billions of bytes)	35.3	102.2	169.1	236.0
Data recording devices	2	4	6	8
Data recording controls	1	2	3	4
Accessors	2	2	2	2

A maximum of two 3851 Mass Storage facilities from the A-series of models or one 3851 Mass Storage Facility from the B-series of models can be included in a 3850 Mass Storage System. The 3851 Mass Storage Facility attaches to a System/370 byte multiplexer or block multiplexer channel and can be shared by up to four System/370 central processors, or by a maximum of two System/370 multiprocessor systems.

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IBM Model 3333/3330 Disk Storage Units serve as intermediary storage between the central processor and the Mass Storage Facility. A new microprogrammed 3830 Model 3 Storage Control for System/370 Models 145, 155-II, 158, 165-II, and 168 and a new Staging Adapter special feature for the Integrated Storage Control on System/370 Models 158 and 168 are required to provide the capability to interact with the Mass Storage Controller. A maximum of sixteen 3330 Model 1 or 2 or eight 3330 Model 11 Disk Pack Drives on either controller can be dedicated as "staging drives" to serve as intermediaries between the central processor and data sets stored in the Mass Storage Facility. Addresses on these drives are associated with a set of virtual drive addresses by logic within the 3830 Model 3 or Integrated Storage Control. The disk controller, working in conjunction with the Mass Storage Controller, converts virtual addresses to actual addresses on the staging drives for use by the Mass Storage Controller. The Mass Storage Facility locates the data set and maps the data into available space on the staging drives in "pages" of eight cylinders for access by the central processor. The 3830 Model 3 and the Integrated Storage Control are connected to a selector channel with the block multiplexer channel feature on the System/370 Model 145, or to a block multiplexer channel on the System/370 Models 155-II, 158, 165-II, and 168.

The 3850 is supported under the IBM OS/VS1 and OS/VS2 operating systems and uses a special Mass Storage System Communicator for control of mass storage volumes. Access methods include the BSAM, QSAM, BPAM, BDAM, VSAM, EXCP, and XDAP access methods for direct-access storage devices, but use of ISAM will incur significant performance degradation. A new CONVERTV utility is available for conversion of 3336 Model 1 Disk Packs to 3850 volumes. Tape data sets and direct-access data sets, including those on the 3336 Model 11 Disk Packs, can be converted to 3850 volumes by Job Control Language parameters directing file output to the 3850 Mass Storage System, or by an OS/VS data set copy utility program.

Models B1 and B2 of the 3851 Mass Storage Facility and the 3830 Model 3 control unit are scheduled for first customer delivery in July 1975. Models A1, A2, A3, A4, B3, and B4 are scheduled for customer delivery in November 1975. Prices of the Model 3850 Mass Storage System components are included in the newly updated price list for the IBM System/370 (Report 70C-491-05). □