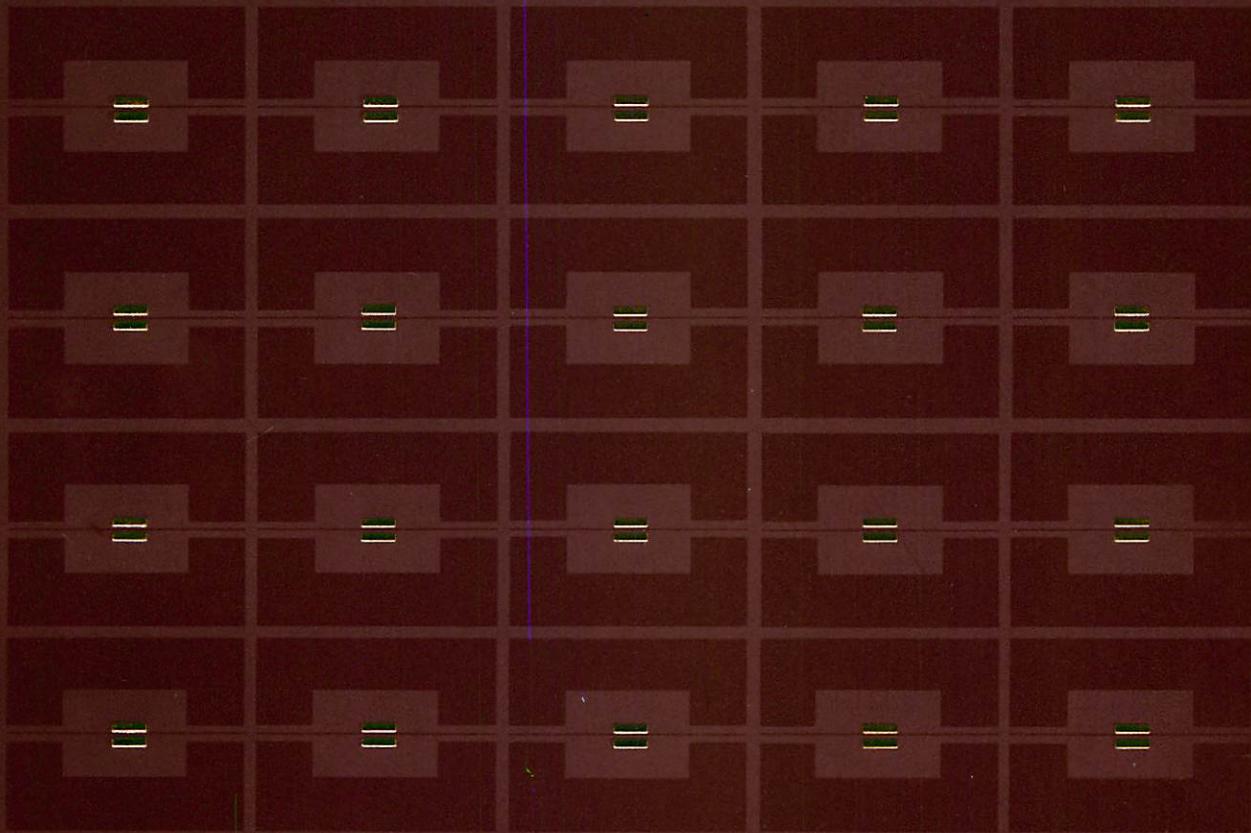


3680

MEMOREX



Thin-Film-Head
Disc Storage Subsystem

the system

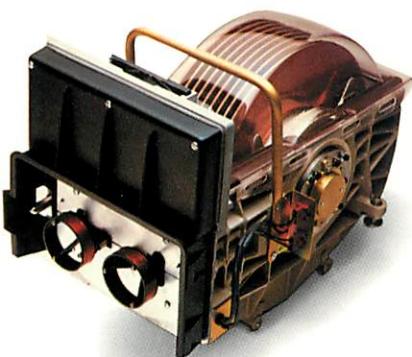
The 3680 disc file's single-spindle architecture—a very flexible and cost-effective means of meeting capacity requirements.



Data storage requirements are growing at a rate averaging 45 percent per year. Your data processing facilities are not. The continued need for additional data processing capacity has resulted in the development of advanced central processor units. This, then, has created a parallel need for disc subsystems that provide greater storage capacities and performance. These new subsystems must offer recording densities higher than those which have been achieved with ferrite recording heads of the 3650 class of disc devices.

Memorex's solution: a series of new-generation disc subsystems utilizing the company's advanced thin-film read/write heads. This series, including the 3680 subsystem, uses state-of-the-art technology to give users the benefits of high capacity, improved throughput and unsurpassed reliability.

Memorex's 3680 subsystem fulfills users' needs by providing a capacity of 10.08 gigabytes (billions of bytes) per string, an average access time of 16 milliseconds and a data transfer rate of 3 megabytes per second. With a



recording density of 12 million bits per square inch, the 3680 Dual Actuator Disc File gives users four times the capacity of the Memorex 3650, and twice the capacity of the double-density 3652—all within the same floorspace.

The 3680 disc file's single-spindle architecture allows users to add data storage capacity in increments of 1.26 gigabytes—a very flexible and cost-effective means of meeting capacity requirements.

A horizontal-axis head/disc assembly permits the 3680's spindle to be supported at both ends, further enhancing

the HDA's stability and protecting data integrity over the conventional, vertical spindle supported at one end. The 3680 HDA also incorporates Memorex's advanced, thick-substrate particulate media, contributing additional stability and data integrity.

In addition to 3680 disc files, the new Memorex subsystem includes the 3888 Dual Director Storage Control Unit and the 3683 Dual Path String Controller.

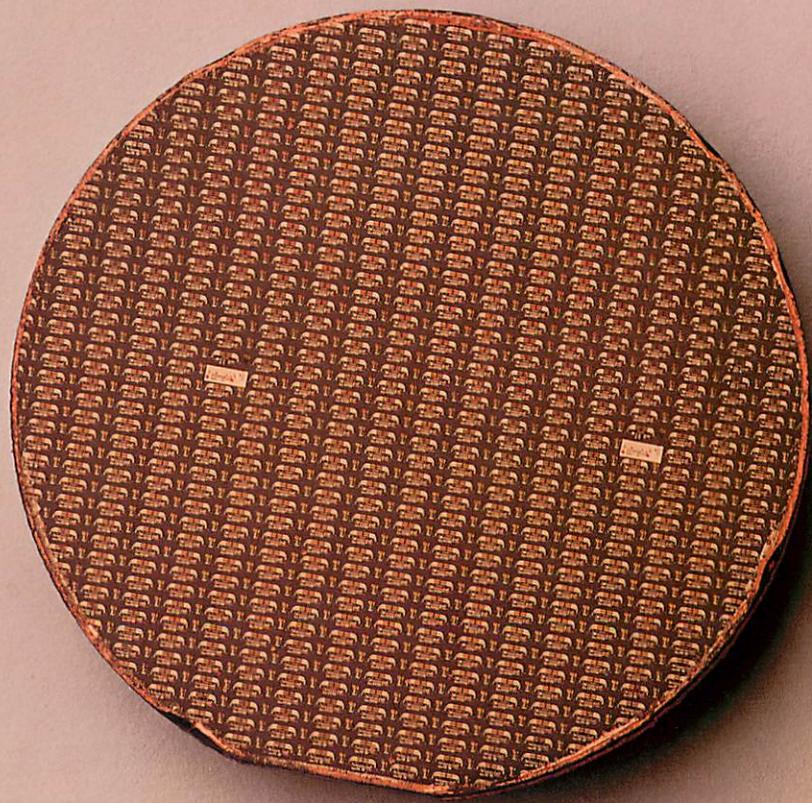
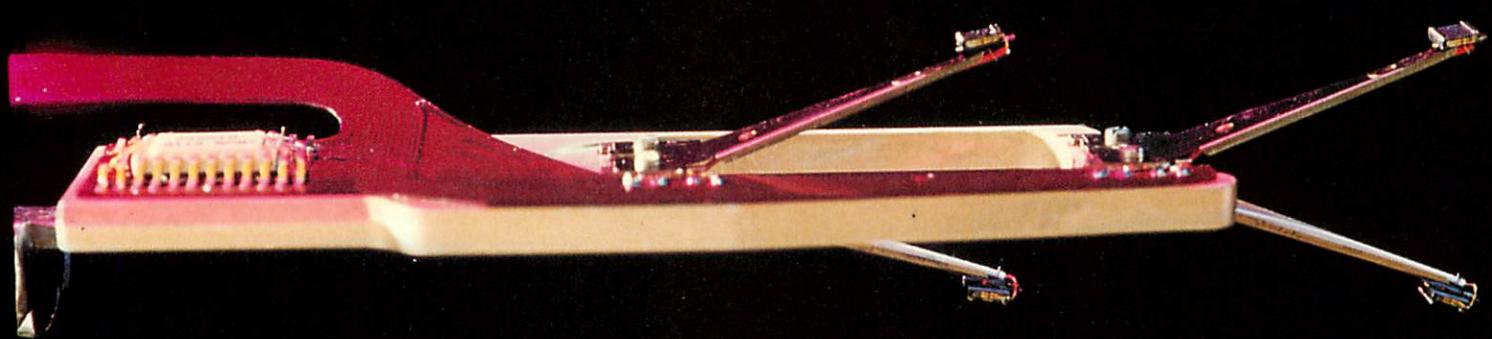
The 3888 storage controller contains two storage directors. The unit has an enhanced control interface to the 3683 string controller, providing single-model architecture compatible with, and equivalent to the 3880 Models 1, 2 and 3—with no hardware changes required. In addition to supporting attachment of 3680s, the 3888 will support earlier Memorex disc storage products, such as the 3650 disc file, with simple micro-program diskette changes.

Memorex's 3683 string controller has two independent data paths which attach to the 3888's directors. Each data path can control any actuator in the string, by means of the Maximum Availability Path Selection (MAPS) feature, which improves data availability by allowing two simultaneous reads or writes per string at the actuator level. Each 3680 within a string attaches directly to both data paths of the controller. This dual-pathing feature improves the availability of the data stored on the subsystem, ultimately enhancing overall system performance.



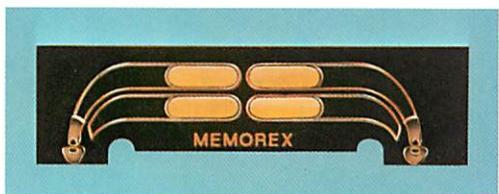
the new technology

The 3680 disc file's advanced thin-film read/write heads, horizontal-axis spindle and thick-substrate media contribute to a new standard of sub-system performance and reliability.



Current-generation disc drives employ ferrite read/write heads manufactured in a process involving machining of an air-bearing slider, and requiring hand-winding of a transducer coil. These processes, and the physical characteristics of the ferrite head, limit the recording density which the heads can achieve reliably—to a maximum of approximately six million bits per square inch. The controlling factor is the size of the gap between the magnetic pole tips on the transducer. To achieve far greater densities, a new technique of manufacturing read/write heads was required.

Memorex made an early and strong commitment to the development of thin-film heads that would provide the 3680 with highly reliable read/write performance, and a recording density of 12 million bits per square inch.



Semiconductor-type photolithographic processes were adapted to the manufacture of these heads. Various deposition techniques, including sputtering, are used to batch-produce hundreds of heads at a time on semiconductor-type wafers. The wafers are batch-tested before the wafer is sliced into individual heads, to prevent further processing of any imperfect

heads. The thin-film manufacturing process eliminates most of the mechanical and manual techniques associated with ferrite head production, increasing yields, reducing manufacturing costs and producing heads with high performance and reliability characteristics on a consistent basis.

The second-generation Memorex thin-film recording heads used in the 3680 disc file HDA have a larger number of copper-deposition transducer "windings" than employed in earlier thin-film heads. This enhances the magnetic recording properties of the 3680's heads—providing greater pick-up of signal than did the first generation. In combination, the 3680 disc file's advanced thin-film read/write heads, horizontal-axis spindle and thick-substrate media contribute to a new standard of subsystem performance and reliability.

the support

The distribution of microprocessors allows maintenance functions to be performed at the unit level—even down to the actuator.

Serviceability and reliability in the 3680 have been improved through the use of distributed microprocessor architecture and large-scale, integrated circuitry.

Each unit within the 3680 subsystem utilizes a microprocessor to facilitate diagnostics. Memorex customer engineers use a hand-held monitor that may plug into either a storage controller, a string controller or a disc file, to monitor performance and diagnose any operational problems. This utilization of microprocessors allows maintenance functions to be performed at the unit level—even down to the actuator,

if required—while the remainder of the subsystem operation continues uninterrupted and unimpaired. By limiting the impact of diagnostics and maintenance on the overall system, data availability is enhanced and system performance is maintained.

In addition to maintenance at the unit level, the 3680 subsystem has remote diagnostic capability. An RS-232 interface, incorporated in the 3888 storage controller, enables the subsystem to be linked to a telephone circuit for remote diagnostic assistance from a centralized site.

The 3680 disc file's horizontal-axis HDA allows a single motor to be used to drive both the spindle and the efficient air-flow system, resulting in low heat

generation and power consumption—as well as fewer mechanical components. The use of LSI circuitry also reduces energy consumption and enhances reliability of the 3680 subsystem.

Dual flexible disc drives are incorporated in the 3888 storage controller for loading programs, recording trace activities and logging maintenance history and other data. In the event of a failure in the flexible disc drive used for microprogram loading, the flexible disc drive used for maintenance logging can be switched into program-loading service.

Easy-access design packaging of each unit simplifies servicing the 3680 subsystem. Components in each unit are grouped functionally and are configured to improve the internal operating environments of the devices. For example, heat-generating components in the disc file are located above the HDA, rather than below it—to reduce the potential effect of heat on the HDA components.

Should assistance be required, 3680 users have the full support of Memorex's extensive network of highly experienced customer engineers. Their expertise in the field is backed by the availability of immediate diagnostic assistance from Memorex's Remote Assistance Center.

Memorex's 3680 subsystem meets the data processing community's need for a disc storage system which offers high capacity within your space constraints, single-spindle configuration flexibility and economy, and enhancements which provide improved throughput, reliability and serviceability and, consequently, availability.



Memorex Corporation

San Tomas at Central Expressway
Santa Clara, California 95052

Memorex Corporation

Memorex, founded in 1961, is an international company which manufactures and markets information storage equipment, magnetic recording media, and data communications equipment for the IBM-plug-compatible, OEM and Burroughs markets. Memorex operates 18 engineering and manufacturing facilities in the United States, Canada, Mexico, Ireland, Belgium and Japan. The company's major engineering and development facilities are located in Santa Clara, California. Memorex markets its products, and services its customers, through nearly 70 sales and service offices in the United States and an additional 60 locations in 19 other countries. Distributors market Memorex products in 60 additional countries. A subsidiary of the Burroughs Corporation, Memorex employs 12,000 persons worldwide.



MEMOREX

A Burroughs Company

THE COMPUTER HISTORY MUSEUM
1 027 4503 9

