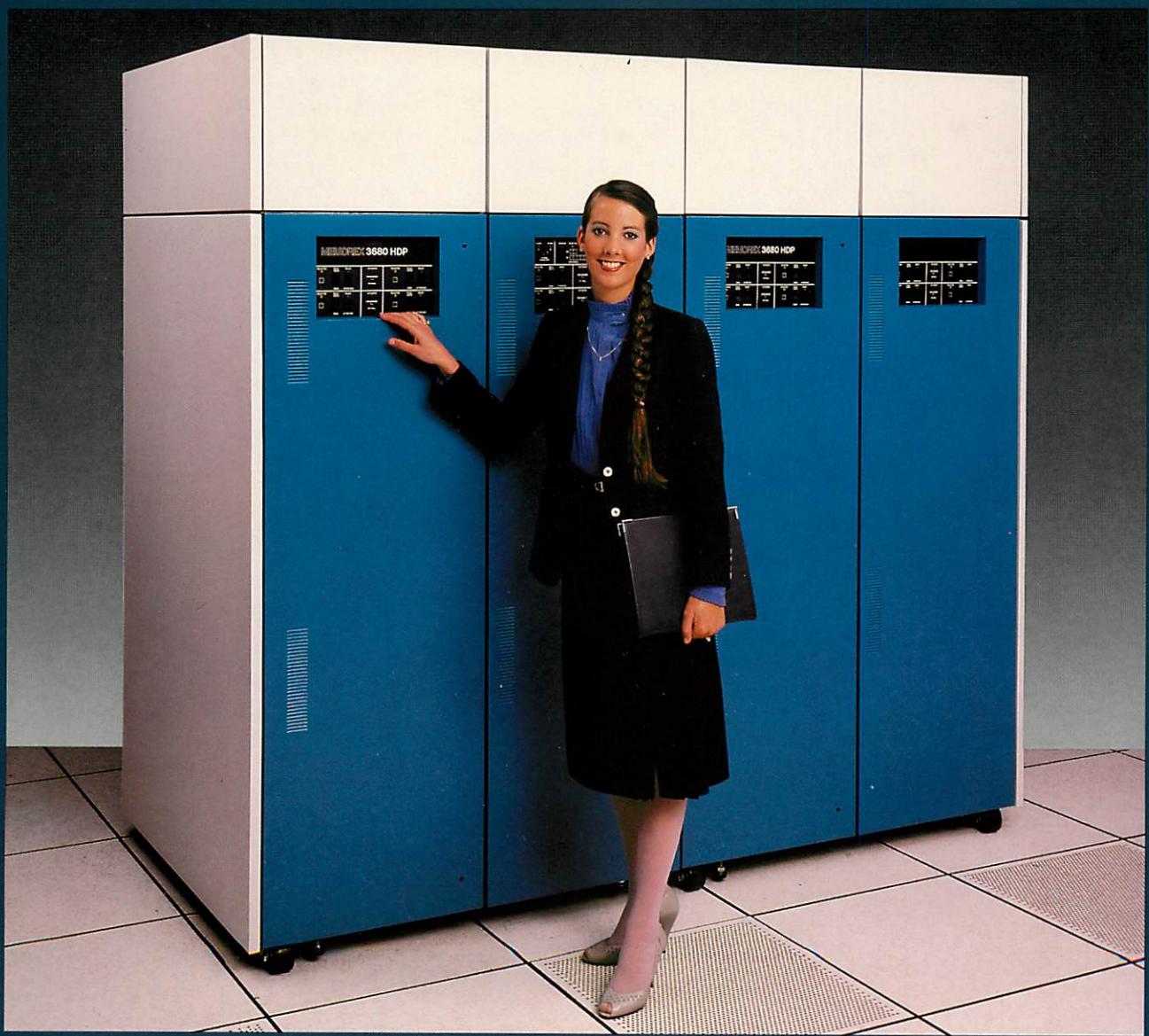


# 3680 HDP

MEMOREX

High Density Packaged  
Disc Storage Device



## Memorex 3680 High Density Packaged Disc Storage Device



The Memorex 3680 High Density Packaged Disc Storage Subsystem solves the problem of rapid DASD growth in a floor space constrained Data Center. Each 3680 HDP Disc Storage Subsystem contains eight 3680 Head Disc Assemblies (HDA) providing 10 gigabytes of storage in a footprint of 26 square feet. All 3680 HDA's have two independently addressable actuators capable of accessing one half of the physical module (630 megabytes). The 3680 HDP has an average access time of 16 ms and a data transfer rate of 3 megabytes per second. The 3680 HDP is functionally equivalent to a full string of the IBM 3380 single density devices or one/half string of the IBM 3380 double capacity devices.

### Drive Features

#### • Configuration Efficiency

The 3680 HDP Disc Storage Subsystem provides the user with the utmost efficiency of floor space utilization for a 10 gigabyte configuration. Using only a 26 square feet footprint, the 3680 HDP is designed to require no side access and can be placed immediately adjacent to other 3680 HDP subsystems. Each 3680 HDP subsystem provides a minimum service clearance requirement of 15 inches for front and rear access thereby bringing the total system with minimum service clearance requirements to a mere 44.5 square feet.

#### • Superior Throughput

Each 3680 HDP actuator has a dual port, which in conjunction with MAPS (Maximum Availability Path Selection) provides superior subsystem performance. This capability allows access to all 15 remaining actuators in a string on the second access to the string. It also allows both actuators on a single spindle to be accessed simultaneously.

To reduce latency and increase performance the 3680 HDP has incorporated a unique method of offsetting index marks on the adjacent cylinders of the disc.

The performance improvements contained in MAPS, the offsetting index marks, and the enhanced communications protocols incorporated in the string controllers provide a disc subsystem with unmatched throughput capability.

#### • Outstanding Reliability

The 3680 HDP contains a number of design features which supply superior reliability.

The 3680 HDP disc storage subsystem incorporates advanced technology by utilizing Memorex developed second generation thin-film read/write heads, advanced 4mm thick-substrate media, LSI circuitry, independent microprocessors for each of the actuators and one microprocessor for maintenance diagnostics and environmental monitoring.

The 3680 HDP not only incorporates reliability into its design and technology, but it is also incorporated into its manufacture. The 3680 HDP is built by utilizing an advanced automated assembly process using only fully burned-in components and with the entire procedure being continually monitored by a statistical quality control system.

#### • Maximum Availability

The 3680 HDP incorporates design enhancements which will improve the data availability of the disc subsystem. All 3680 HDA's have 2 addressable actuators which operate independently of each other. The 3680 HDP incorporates microprocessors at the actuator level which can run diagnostic routines. This allows the Memorex Customer Engineer to diagnose a possible malfunction on an individual actuator without impacting the availability of data to the system by the other actuators.



The 3680 HDP provides an actuator electronics switch which allows the read/write logic associated with one actuator in a spindle to be switched to the other actuator in the event of a malfunction in the logic. This switch allows the address of the failed actuator to remain the same which enables the use of checkpoint restart procedures. This switch allows a Memorex Customer Engineer to repair the failed actuator's electronics while the data is available via the switched actuator.

#### • Improved Maintainability

The 3680 HDP subsystem uses dedicated microprocessors for maintenance diagnostics and environmental monitoring. These microprocessors can execute self diagnostics which can be interpreted by the Portable Maintenance Terminal utilized by the Memorex Customer Engineer.

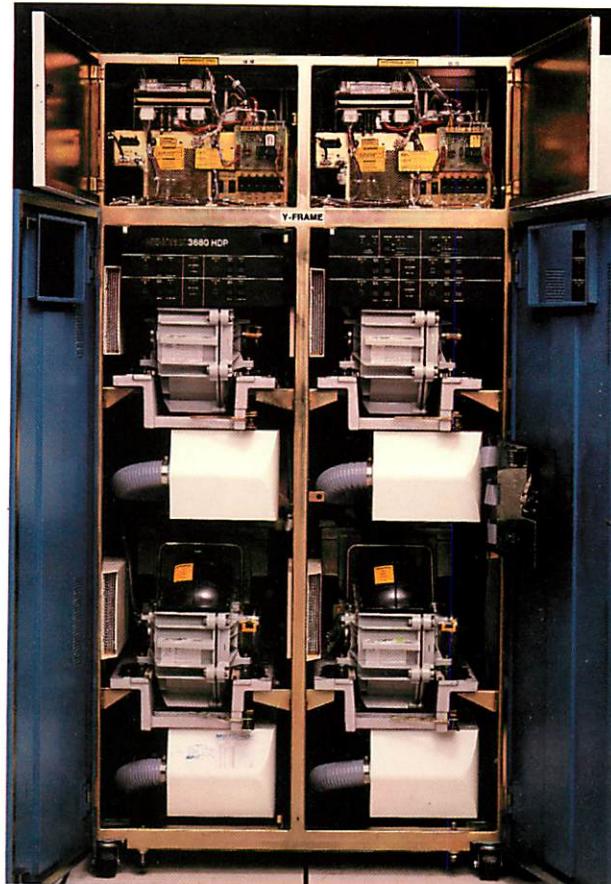
In addition to self diagnostics inherent in the subsystem, the Memorex Customer Engineer has subsystem diagnostics which can be run on the 3888 control unit or on the central processing unit (in a dedicated running mode).

The Memorex 3888 Dual Storage director Control Units employ power system redundancy at the DC power supply level. Throughput of one storage director continues even when power is terminated to an affected storage director within the 3888.

All 3680 HDP subsystems are shipped with a maintenance tool to provide the Customer Engineer with safety and ease when replacement of any heavy component is required.

#### • Advanced Technology and Architecture

The Memorex 3680 HDP subsystem meets and exceeds technological standards by using Memorex thin film heads and Memorex advanced particulate media. All Memorex 3680 Head Disc Assemblies contain only nine disc platters and two independent actuators to provide maximum throughput for both sequential and random data requests.



# 3680 High Density Packaging Specifications

## Dimensions

Height: 2080 mm (82 inches)  
Front: 2260 mm (89 inches)  
Side: 1065 mm (42 inches)

## Service Clearances

Front: Max. 760 mm (30 inches)  
Min. 380 mm (15 inches)  
Rear: Max. 760 mm (30 inches)  
Min. 380 mm (15 inches)  
Right: None Required  
Left: None Required

**Weight:** 2110 kg (4644 lb)

**Maximum Heat Dissipation:** 7761 W (26500 BTU/hr)

**Airflow:** 18.1 m<sup>3</sup>/min (640 cfm)

## Power Requirements

kVa: 10.6  
Phases: 3  
Plug: R&S SC7328-78  
Receptacle: R&S SC7324-78  
Connector: R&S SC7428-78  
Frequency: 60 + .5 Hz  
Voltage: 208/240  
Branch Service: 60 Amperes maximum

## Cable Lengths

AC Power 4.57 m (15 ft)  
EPO 44.7 m (150 ft) maximum  
CTLI 61.0 m (200 ft) maximum  
Remote Switch 45.7 m (150 ft) maximum

## Environmental Conditions

Operating:	Temperature	16°C-32°C (60°F-90°F)
	Relative Humidity	20%-80%
	Max. Wet Bulb	26°C (78°F)
	Temperature Variation	2.7°C/hr (5°F/hr)
Non-Operating:	Temperature	10°C-49°C (50°F-120°F)
	Relative Humidity	10%-90%
	Max. Wet Bulb	26°C (78°F)
	Temperature Variation	No Condensation

## Access Time:

Seek: 3 ms minimum  
16 ms average  
30 ms maximum

**Latency:** 8.3 ms

## Capacity:

Capacity per actuator: 630 megabytes  
Actuator per spindle: 2  
Capacity per spindle: 1.26 gigabytes  
Spindles per 3680 HDP: 8  
Total capacity: 10.08 gigabytes

**Data Transfer Rate:** 3.0 megabytes/second

**RPM:** 3600

**TPI:** 806

**BPI:** 15,294

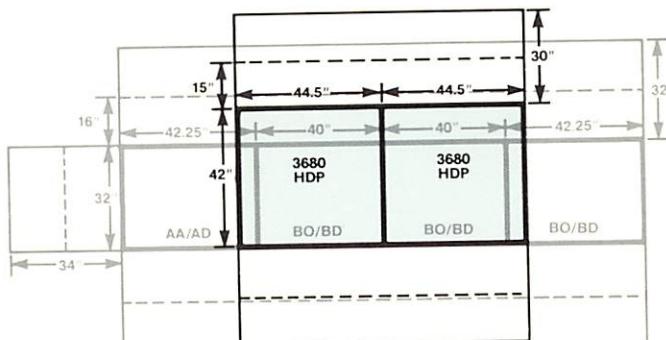
## Bytes per Track:

47,476 (Formatted, single record, without keys)

**Tracks per Cylinder:** 15

**Cylinders per Actuator:** 885

## Memorex 10 Gigabyte Configuration



IBM 10 Gigabyte Single Capacity Configuration

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