MEMOREX

# Data Mark 70/70F
# Data Module

# Data Mark 70/70F Data Module

## Aligned Oxide Particles
## 100X Surface Shield
## "Armor-tough" Recording Surface

### The Data Mark 70/70F

This successor memory device to conventional disc packs combines disc pack technology with disc drive engineering. The easy-to-handle module houses disc recording surfaces, recording heads, spindle, head carriage, base plate and electronics circuitry, in a completely self-contained unit. Greater data integrity is achieved because the head that writes the data is the same head that reads it into the computer. Mistracking and data checks, formerly caused by minor misalignment of heads, are now eliminated. Data Mark's factory-sealed module has a closed-loop air system which resists potential contamination which was previously a problem with conventional disc packs.

Two Data Mark configurations are available: the Data Mark 70 with 70 million bytes of data storage; and the 70F which provides low cost, fixed head access to 502 thousand bytes of the 70 million byte capacity. In addition to being directly interchangeable with the IBM 3348 Model 70/70F and other IBM 3340 compatible data modules, the Data Mark features many product attributes not found on all modules.

### Advanced Substrate Preparation

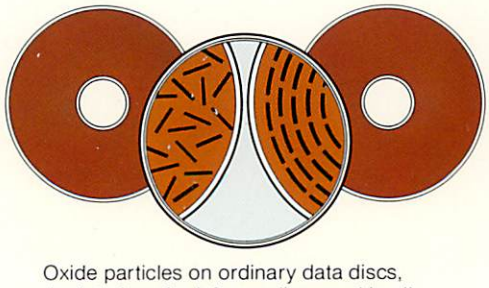
Data Mark disc substrates are lathe turned on air bearings to the strictest of tolerances. They are then polished to a mirror-like smoothness.

Years of experience in manufacturing disc packs of high reliability has resulted in exacting quality control procedures. For example, each substrate used to make a disc is subjected to nine separate quality control checks before final acceptance for coating.

### "Armor-Tough" Coating

Since the Company was founded in 1961, Memorex has pioneered in coating computer tape, video tape and disc packs. This experience has led to a proprietary formulation and advanced processing techniques for the coating of Data Mark discs. This special "armor-tough" surface coating extends disc durability and withstands head loading stress.

All processing of Data Mark discs occurs in environmentally controlled clean rooms to eliminate potential contamination. The special formulation is applied to microinch accuracy using sophisticated spin coating techniques. Coated surfaces are then cured and polished to exacting standards.



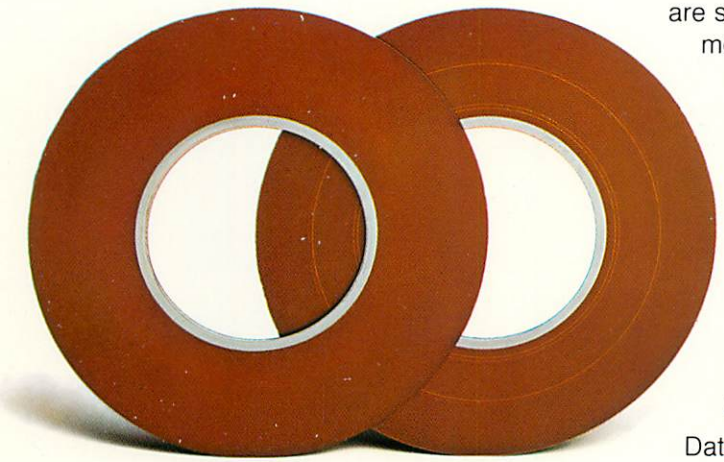
Oxide particles on ordinary data discs, depicted on the left, are dispersed in all directions. The oxide particles on the Data Mark data disc, depicted on the right, are circumferentially aligned around the disc.

### Oxide Particle Alignment

The oxide particles encapsulated within the extremely thin coating are circumferentially aligned on the disc by a proprietary process. Particle alignment provides the high output and data resolution that is essential for reliable performance with high bit packing densities. Data Mark discs have greater resolution and less residual noise than conventionally coated discs. Additionally, particle alignment maximizes head-to-track stability and assures cleaner erasures and rewriting on all tracks.

### Unique "100X" Surface Shield

Because the recording heads are in contact with the discs during start/stop operations, Memorex developed



The disc on the left, protected by Memorex "100X" surface shield, has undergone the equivalent of ten years' normal operation with no damage to the surface. The disc on the right, without Memorex "100X," shows extensive damage after the equivalent of only one year of normal operation.

a special surface shield to complement the "armor-tough" coating. This smooth and durable top shield was called "100X" because it protects the discs and the data on it by extending the useful life of the data disc by *one hundred times* over any normal discs without the coating used in similar applications. This combination of "armor-tough" coating and "100X" surface shield provides greater data integrity and longer lasting operational performance.

### Improved Head Technology

Two recording heads per surface are sealed within the data module and are both lighter and closer flying than any previous heads. This provides greater bit density capabilities, faster data access and improved performance characteristics.

### Final Testing and Assembly

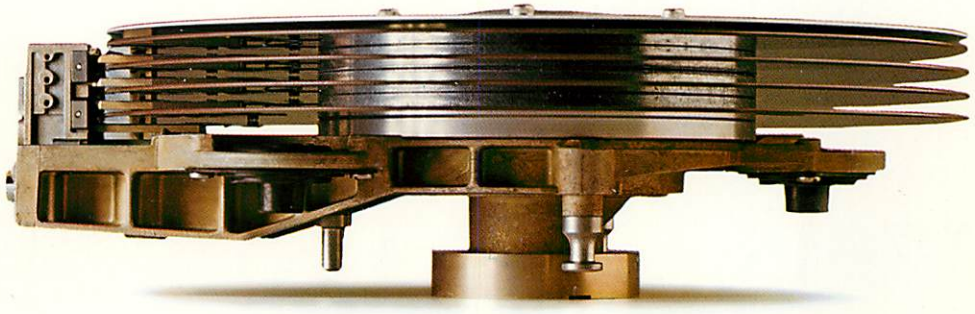
Data Mark discs undergo complete surface testing by using special test heads in overlapping paths. Any potential irregularity or minute flaw is detected on specially designed test equipment. The modules are then hand assembled and sealed in clean rooms that adhere to the industry's most rigid standards (Class 100). After final assembly and exhaustive testing, the Data Marks are subjected to final testing utilizing a system designed to assure 100% performance at less than ideal operating conditions.

### Servo Track Writing

Recording tracks on the Data Mark Disc are so narrow and close together that two of them could be contained on the edge of a data processing card. To control the head alignment accuracy, a specially written servo surface is used. This servo is pre-recorded at the factory using a special servo writer operated under strict environmental control. This assures true track-to-head alignment and precise cylinder location. After final formatting and testing, the Data Marks are specially packaged for storage and shipment.

### Experience Improves Performance

The production of Data Mark modules spans a broad spectrum of scientific and engineering disciplines that have been a part of Memorex for many years. These areas in which Memorex has proven expertise include disc pack production, coating of discs and tape, manufacture of disc drives and recording heads. This unique background enables Memorex to design and produce Data Marks of unsurpassed performance and reliability. Each unit is designed for a life of over five years with no maintenance.



100X

## Data Mark 70/70F Summary Data

### General Specifications
The Data Mark will meet or exceed the specifications detailed in the IBM Document ZA26-1629-1

### Physical Dimensions

| | 70 | 70F |
|---|---|---|
| Height | 8″ | 8″ |
| Width | 16″ | 16″ |
| Length | 18″ | 18″ |
| Shipping weight | 23 lbs. | 24 lbs. |

### Disc Information
Total disc per module
4 each
Top protective disc
1 each
Disc thickness - nominal
0.075 inches
Coating thickness - nominal
I.D. to O.D.
35-50 microinches
Surface smoothness
Less than 1.0 microinches
Surface shield
"100X" wear coating

### Recording Surfaces
Data surfaces
6 each
Servo surface
1 each
Fixed head storage:
Servo surface of Model 70F only

### Recording Heads
Data Head
12 each (2 per data surface)
Servo head
1 each
Fixed heads (Model 70F only)
10 each (three data elements per fixed head)

### Servo Tracks
Pre-recorded

### Initialization
Standard home address and record zero are written prior to shipment

### Maintenance Requirements
None

### Module Data Capacity
Data Mark 70
69, 889, 536 bytes per module
Data Mark 70F
69, 889, 536 bytes per module; 502,080 of the above accessible by fixed heads (cylinders 1-5)
Bytes per track
8368
Tracks per cylinder
12
Cylinders per module
696
Bytes per cylinder
100,416
Bit per inch
5636 nominal
Tracks per inch
300
Alternate cylinders
2
C. E. Cylinders
2

### Transfer Rate
885,000 Bytes per second

### Read Only
Lock out on Data Mark handle

### Environmental Conditions
60°F to 90°F
20% to 80% relative humidity

### Access Time

| Model | 70 | 70F | |
|---|---|---|---|
| Cylinders | 0-695 | 1-5 | 0,6-695 |
| Maximum | 50 ms | 0 ms | 50 ms |
| Minimum | 10 ms | 0 ms | 10 ms |
| Average | 25 ms | 0 ms | 25ms |
| Latency - Average | 10.1 ms | 10.1 ms | 10.1 ms |
| Latency - Maximum | 20.2 ms | 20.2 ms | 20.2 ms |
| Rotational speed | 2964 rpm | 2964 rpm | 2964 rpm |

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