

3 1/2-INCH ULTRASTAR
1, 2, 2.6, 4 and 5.2 GB HIGH CAPACITY DISK DRIVES
MODELS DFMS-31080, -32160, -32600, -34320 and -35250

AN OEM OFFERING FROM IBM

IBM Ultrastar 3.5-inch disk drives meet the speed and storage requirements demanded by high-end technical and scientific workstations, minicomputers, mainframes, arrays and network servers. Ideal for digital video and multimedia applications, these drives promote high, sustained data rates and optimized cost and throughput. An areal density of 578 Mbits per square inch enables up to 2.6 GB of storage to be packaged in a 1-inch high form factor and 5.2 GB in a drive only 1.6-inches high.

With five offerings from 1 GB to 5.2 GB, the Ultrastar series provides a wide array of capacity options. When combined with the complementary performance-optimized Ultrastar XP series, customers can choose from eight or more different combinations of performance and capacity in a single drive family. The common specifications of these drives can simplify qualification processes when performance and capacity demands vary.

To accommodate different system requirements, these drives are available with a SCSI-2 interface in multiple models; 50-pin Fast Single-ended, 68-pin Fast/Wide Single-ended or Differential, and 80-pin Single-ended.

Ultrastar 3.5-inch drives use a sector servo implementation, eliminating the need for dedicated servo surfaces and the repetitive thermal calibration routines that can dramatically impact high-speed data streams in multimedia and video applications. For further levels of data integrity, Predictive Failure Analysis* (PFA) routines monitor the drive at 32 points, correcting soft errors and providing advanced warning of impending drive problems.

The application of IBM's proven Magneto-Resistive (MR) head technology and PRDF data channels (PRML with digital filter) produces a simple design with few components and enhanced reliability. This combined with an automated manufacturing process helps the Ultrastar series of drives set a new standard with a projected 1,000,000 power-on hours MTBF.

Providing a balanced blend of price and performance. Ultrastar drives spin at 5400 RPM and achieve data rates as high as 12.58 MB/sec, making this family a compelling alternative for data-intensive applications.

HIGHLIGHTS

- 1, 2, 2.6, 4, 5.2 GB capacities
- 5400 RPM
- 7.65-12.58 MB/sec data rate
- PRDF Channel (PRML with digital filter)

- Predictive Failure Analysis (PFA)
- MR head technology
- 512 KB multisegmented data buffer
- Low command overhead
- Sector servo
- Command reordering
- Back-to-back writes (merged writes)
- Self-optimizing buffer ratios
- Read-ahead, write (volatile) and adaptive caching
- Automatic sector reallocation
- Automatic power management
- Built-in error logs
- 1,000,000 hours projected MTBF

PRODUCT DESCRIPTION

3 1/2" Ultrastar	DFMS-31080/32160/32600/34320/35250
1, 2, 2.6, 4, 5.2 GB Disk Drives	

Configuration

Interface	SCSI-2 F & F/W
Formatted Capacity (512 bytes)	1327/2325/2657/4320/5318 (1)
Number of Disks	2/4/2/7/8
Number of Heads	4/8/8/13/16
Areal Density	578 Mb/sq in
Maximum	
Recording Density	133,000 BPI
Maximum	
Track Density	4352 TPI
Tracks Per Surface	4416
Bytes per Sector	256-744
Disk Type	Thin Film
Channel	PRDF (PRML with digital filter)
Actuator Type	Rotary VCM
Head Type	Magneto-Resistive (MR)

Performance

Media Data Rate	7.65-12.58 MB/sec
Banded	
Interface Transfer Rate	10.0 or 20.0 MB/sec (sync)
Maximum	
Access Times (Pop Avg)	
Average Read	6.9/7.5/7.5/8.0/8.0 ms
Average Write	8.5/9.0/9.0/9.5/9.5 ms
Track to Track Read	0.5 ms
Full Stroke Read	14.0/15.0/15.0/16.5/16.5 ms
Rotational Speed	5400 RPM
Command Overhead (Read)	
Random	<0.28 ms
Sequential w/Read-Ahead	<0.41 ms
Buffer Size	512 KB

Reliability

MTBF	1,000,000
Projected power-on hours	
CDF (2)	3.0% at 500 poh
Recoverable Read Errors	<10 in 10E13 Bits Read
QPE Enabled	
Non-Recoverable Read Errors	<10 per 10E15 Bits Read
Population Average	
Seek Errors	<10 per 10E8 Seeks
Predictive Failure Analysis	Yes

Buffer Memory Parity	Yes	
<hr/>		
Power Requirements		
Start-up Current	1.3/1.3/1.3/1.8/1.8 Watts	
Idle	5.6/6.8/6.8/8.5/8.7 Watts	
Seek	7.7/9.0/9.0/11.0/11.2 Watts	
<hr/>		
Physical Size		
Height	25.4/25.4/25.4/41.3/41.3 mm	
Width	101.6 mm	
Depth	146 mm	
Weight	0.46/0.46/0.46/0.82/0.82 kg	
Mounting	Industry standard, all orientations	
<hr/>		
Environmental Characteristics	Operating	Non-Operating
Temperature	5 to 55 degrees C	-40 to 65 degrees C
Relative Humidity	5% to 90%	5% to 95%
Non-Condensing		
Shock (2 ms)	10 G	125 G
Shock (11 ms)	10 G	70 G
Vibration	1 G	2 G
<hr/>		

- (1) 1 MB=1,000,000 Bytes
(2) Cumulative Distribution Failure rate. At 1,000,000 hours MTBF, less than 3.0% of the files are projected to fail in 5 years running at 500 power-on hours per month.

Product Description data represents IBM's design objectives and is provided for comparative purposes; actual results may vary depending on a variety of factors. This product data does not constitute a warranty. Questions regarding IBM's warranty terms or methodology used to derive this data should be referred to your IBM representative. Data subject to change without notice.

Copyright International Business Machines Corporation 1994

* Predictive Failure Analysis is a trademark and IBM is a registered trademark of International Business Machines Corporation.