

Model DFMS-351AV	*1994 Winner - PC Magazine Award for Technical Excellence
3.5-Inch Ultrastar AV 5.1 GB Disk Drive	Components - IBM's Mangetoresistive and PRML hard disk technology IBM Storage Systems Division

The 5.1 GB Ultrastar AV drive is an innovative solution designed to deliver the sustained data throughput rates for high-end audio/visual applications. Running a video editing software package in full-frame (640 by 480), 60-field video capture at 30 frames per second, for example, requires a storage solution that can stream data without dropped frames. The Ultrastar AV is capable of delivering the data transfer times necessary to support real-time full professional quality video while providing high capacity and high throughput.

The 3.5-inch Ultrastar AV drive incorporates a sector servo implementation rather than dedicated servo surfaces. This eliminates repetitive thermal calibration routines that can dramatically impact high-speed data streams in multimedia and video applications. The intelligent microcode features of the drive, such as Predictive Failure Analysis (trademark), are only evoked after 5 seconds of idle activity. This allows the drive to maintain the high data streams needed without sacrificing disk maintenance functions and drive reliability.

Adaptive minimum pre-fetch increases performance by reducing the number of seeks needed to support multiple, randomly-accessed streams of data. Typically, video editing combines multiple video streams, audio and graphics simultaneously. Adaptive minimum pre-fetch provides better drive performance and a higher level of image quality.

The 5400 RPM drive provides a balanced blend of price and performance and achieves data rates as high as 7.6 MB/sec. with a minimum uninterrupted data rate of 5 MB/sec. 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.

The simple design of the Ultrastar AV device produces a drive with few components and enhanced reliability. This combined with an enhanced manufacturing process helps the Ultrastar AV drive set a new reliability standard with a projected 1,000,000 hours MTBF

HIGHLIGHTS

- 5 MB/sec minimum uninterrupted data rate
- Low command overhead
- Hardware-based ECC on-the-fly
- Adaptive minimum pre-fetch
- Multi-segment, read-ahead caching
- Write and adaptive caching
- Back-to-back writes
- Command reordering
- Embedded sector servo
- Predictive Failure Analysis

PRODUCT DESCRIPTION

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3.5-Inch Ultrastar AV 5.1 GB Disk Drive      DFMS-351AV
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Configuration

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Interface		SCSI-2 F & F/W
Formatted Capacity (512 bytes)		5106 MB(1)
Number of Disks		8
Number of Heads		16
Areal Density	Maximum	578 Mbits/sq.in.
Recording Density	Maximum	133,000 BPI
Track Density		4352 TPI
Bytes per Sector		256 - 744
Disk Type		Thin Film
Channel		PRDF (PRML with digital filter)
Actuator Type		Rotary VCM
Head Type		Magneto-Resistive (MR)

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**Performance**

Uninterrupted Data Rate	Minimum	5 MB/sec.
	Maximum	7.6 MB/sec.
Interface Transfer Rate	Maximum	10.0 or 20.0 MB/sec. (sync)
Access times (Pop.Avg.)	Avg Read	8.0 ms
	Avg Write	9.5 ms
	Track/track	0.5 ms
	Full Stroke	16.5 ms
Rotational Speed		5400 RPM
Command Overhead (Read)	Random	<0.28 ms
	Seq w/read-ahead	<.41 ms
Buffer Size		512 KB

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**Reliability**

MTBF	POH	1,000,000
CDF(2)		3.0% at 500 poh
Recoverable Read Errors	QPE Enabled	<10 in 10E 13 Bits Read
Non-Recoverable Read Err	Pop. Avg	<10 per 10E 15 Bits Read
Seek Errors		<10 per 10E 8 Seeks
Predictive Failure Analysis		Yes

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**Power Requirements**

Start-up Current	Average	1.8 Amps
Idle	Average	8.7 Watts
Read/Write	Average	11.2 Watts

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**Physical Size**

Height	41.3 mm
Width	101.6 mm
Depth	146 mm
Weight	0.82 kg
Mounting	Industry standard, all orientations

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**Environmental Characteristics**

	Operating	Non-Operating
Temperature	5 to 55 C	-40 to 65 C
Relative Humidity		
non-condensing	5% to 90%	5% to 95%
Shock (11 ms)	10 G	70 G
Vibration	0.5 G	2 G

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(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.

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