

Great performance and reliability provide high value for a wide range of performance desktops, workstations, and PC servers



IBM Ultrastar 9ES Hard Disk Drive

Highlights

Enhanced performance

Average seek times of 7.5 ms and minimum sustained data rates of 8.3 MB/sec provide high performance for a variety of PC, workstation, and server applications.

Industry-standard capacities

At 4.5 and 9.1 GB, the Ultrastar 9ES provides the storage required by a broad range of data-intensive applications.*

Extremely low power dissipation

Through efficient electronic design and a new integrated LSI chip, the Ultrastar 9ES provides the industry's lowest 7200 RPM idle power, helping to improve reliability and ease of integration.

Proven IBM reliability

With a reputation for quality and reliability, IBM SCSI drives provide excellent cost-of-ownership benefits to system integrators.

Low acoustics

With acoustics matching IBM's previous-generation 5400 RPM drives, the Ultrastar 9ES provides excellent human factors qualities for workstation and desktop PCs.

Exceptional data protection

S.M.A.R.T. (Self-Monitoring Analysis and Reporting Technology) protocol support alerts systems of impending drive failure and helps ensure data availability.

Leading drive technology

As a member of the IBM Ultrastar family of disk drives, the Ultrastar 9ES is designed to provide a reliable, cost-effective storage solution for a wide range of workstations, high-performance desktop systems, and LAN servers running Internet/intranet, CAD/CAM, and multimedia applications.

The Ultrastar 9ES achieves its high level of reliability, performance, and affordability by leveraging IBM's development and implementation experience in advanced disk drive technologies. These include Magnetoresistive Extended (MRX) advanced head technology, No-ID* sector formatting, the Partial Response Maximum Likelihood (PRML) digital data channel, and a new integrated LSI chip.

MRX advanced head technology increases areal density and reduces the number of disks and heads required for a given capacity. No-ID sector formatting increases storage capacity by eliminating overhead caused by the duplicate storage of each data sector's ID field onto the disk, which thereby creates more available disk space for data. PRML enables higher areal densities and significantly enhances the drive's overall performance by increasing media-to-buffer and buffer transfer rates.

IBM and Mitsubishi have developed an integrated LSI chip that incorporates a microcomputer, hard disk controller, and flash memory in a single chip. This design helps to increase performance, reduce power usage, and enhance reliability.

SCAM-2 (SCSI Configured Automatically)-compliant

Ultrastar 9ES drives support the implementation of SCAM-2. This support may increase user productivity by simplifying and improving the installation and configuration of SCSI disk drives.

Flexible interfaces

To accommodate a wide range of system requirements, Ultrastar 9ES drives are available with an Ultra-SCSI interface in multiple configurations: 50-pin Single-ended, 68-pin Single-ended Wide, and 80-pin SCA-2 Single-ended Wide.



Ultrastar 9ES 3.5-inch 4.5/9.1 GB low-profile SCSI high-performance disk drive

IBM Ultrastar 9ES 3.5-inch 9 GB disk drive		DDRS-34560/39130	DDRS-34560/39130
Configuration	Interface	Fast, Fast & Wide, SCA-2, SCSI-3 (ULTRA)	Fast & Wide, SCA-2, ULTRA-2 SCSI
	Formatted capacity (512 bytes)	4.5/9.1 GB ¹	
	Number of disks	3/5	
	Number of heads	5/10	
	Areal density (maximum)	1.56 Gbits/sq. in.	
	Recording density (maximum)	156 KBPI	
	Recording zones	8	
	User cylinders	8420	
	Track density	10,000 TPI	
	Sector size	512 Bytes	
	Channel	PRML	
	Encoding method	RLL (16/17)	
	Head type	Magnetoresistive Extended (MRX)	
Performance	Data buffer (read, look ahead buffer, write cache)	512 KB ²	
	Rotational speed	7200 RPM	
	Latency (average)	4.17 ms	
	Media transfer rate	108.6 to 171.1 Mbits/sec	
	Interface transfer rate (SCSI max)	20/40 MB/sec ³	80 MB/sec ³
	Minimum sustained data rate	8.3 to 13.3/8.4 to 13.4 MB/sec	
	Seek time (typical read)		
	Average	75 ms	
	Track-to-track	0.8 ms	
	Full track	15.0 ms	
Reliability	Non-recoverable read errors	< 10 in 10E 14 bits read	
	PFA/S.M.A.R.T.	Yes	
Power	Startup current (average)	0.27 Amps (5V), 2.00 Amps (12V)	
	Idle (average)	5.3/7.1 Watts	
	Power consumption efficiency index	0.0012/0.0008 Watts/MB ⁴	
Physical dimensions	Height	25.4 mm	
	Width	101.6 mm	
	Depth	146.0 mm	
	Weight (max)	630 g	
Environmental characteristics		Operating	Non-Operating
	Temperature	5° to 55° C	-40° to 65° C
	Relative humidity (non-condensing)	8% to 90%	5% to 95%
	Shock (half-sine wave)	10 G (11 ms), 65 G (2 ms)	75 G (11 ms), 175 G (2 ms)
	Vibration (random) horizontal	0.67 G (5 to 500 Hz)	1.04 G (2 to 200 Hz)
	Vibration (random) vertical	0.56 G (5 to 500 Hz)	1.04 G (2 to 200 Hz)

¹ MB = 1,000,000 Bytes; 1 GB = 1,000,000,000 Bytes ² Upper 128 KB used for firmware

³ 40 MB/sec represents SCSI-3 Fast-20 & Wide ⁴ Idle power dissipation/formatted capacity

General product information for other IBM hard disk drive products is available by calling 1 800 IBM-7777 and asking for Dept. Star 30 (outside of North America, call 1 416 383-5161 or fax 1 905 316-4733). Information is also available via the Internet (www.ibm.com/harddrive) or fax. You can contact IBM's TECHFAX system by dialing 1 408 256-5418 from a touch tone phone. (International callers must call from a phone connected to a fax machine.) Follow the voice prompts to receive a TECHFAX directory.

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