

Greater performance and reliability providing high value for a wide range of performance desktops, workstations, and servers



IBM Ultrastar 18ES Hard Disk Drive

Highlights

Capacities of 18.2 GB and 9.1 GB and an areal density of 3.03 Gbits/square inch provide superior data storage for a one-inch high low-profile drive.

Average seek times as fast as 7.0 ms and sustained data rates of up to 20.2 MB/sec enable rapid data transfer.

The first implementation of giant magnetoresistive (GMR) head technology in server-class drives provides an unprecedented areal density of 3.67 GB per disk.

An efficient electronic design and a new integrated LSI chip enable the industry's lowest power dissipation at 7200 RPM—improving reliability and easing integration.

Low-idle acoustics provide excellent environmental qualities.

Self-Monitoring Analysis and Reporting Technology (S.M.A.R.T.) and the exclusive IBM Drive Temperature Indicator Processor (Drive-TIP*) feature enhance data protection.

Leading drive technology

The Ultrastar 18ES is designed to provide a reliable, cost-effective storage solution for a wide range of workstations, high-performance desktop systems, and LAN and enterprise servers running Internet, intranet, CAD/CAM, multimedia, transaction processing, and data mining applications.

The Ultrastar 18ES achieves its high level of reliability, performance, and affordability by leveraging the experience of IBM in the development and implementation of advanced disk drive technologies. These include giant magnetoresistive (GMR) head technology, No-ID* sector formatting, the Partial Response Maximum Likelihood (PRML) digital data channel, and a new integrated LSI chip.

GMR head technology dramatically 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 has 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.

Advanced interfaces

Ultrastar 18ES drives support Ultra2 SCSI and Fibre Channel-Arbitrated Loop (FCAL) interfaces.



Ultrastar 18ES 3.5-inch 18.2 GB low-profile SCSI hard disk drive

IBM Ultrastar 18ES 3.5-inch 18.2 GB and 9.1 GB hard disk drives**DNES**
318350/309170**DNES**
318350/309170**DNEF**
318350/309170

Configuration				
Interface	Ultra SCSI	Ultra SCSI	Ultra SCSI	FCAL
	Fast, Fast & Wide	Fast & Wide, SCA-2		
Formatted capacity (512 bytes)	18.2/9.1 GB			
Number of disks	5/3			
Number of heads	10/5			
Areal density (maximum)	3.03 Gbits/sq. in.			
Recording density (maximum)	220 KBPI			
Recording zones	11			
Track density	13,700 TPI			
Sector size	512 bytes (fixed), 512 to 524 bytes (variable 2-byte increment)			
Channel	PRML			
Encoding method	RLL (16/17)			
Head type	Giant magnetoresistive (GMR)			
Performance				
Data buffer	2MB ¹			
Rotational speed	7200 RPM			
Latency (average)	4.17 ms			
Media transfer rate	159 to 244 Mbts/sec			
Interface transfer rate (SCSI max)	40 MB/sec ²	80 MB/sec ³	200 MB/sec ⁴	
Sustained data rate	12.7 to 20.2 MB/sec			
Seek time (typical read)				
Average	70 ms			
Track-to-track	0.8 ms			
Full track	13.0 ms			
Reliability				
Nonrecoverable read errors	<1 in 10E13 bits read			
S.M.A.R.T., Drive-TIP	Yes			
Power				
Startup current (max.) in Amps	0.75 (5V), 2.00 (12V)	0.75 (5V), 2.00 (12V)	1.35 (5V), 2.00 (12V)	
Idle (average)	6.9/5.3 Watts	6.9/5.3 Watts	9.9/8.3 Watts	
Power consumption efficiency index	0.0004/0.0006 Watts/MB	0.0004/0.0006 W/MB	0.0006/0.0009 W/MB	
Physical dimensions				
Height	25.4 mm			
Width	101.6 mm			
Depth	146.0 mm			
Weight (max)	630 g			
Environmental characteristics		Operating	Nonoperating	
Temperature	5° to 55° C		-40° to 65° C	
Relative humidity (noncondensing)	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)	0.67 G (5 to 500 Hz) ⁵		1.04 G (2 to 200 Hz)	
	0.56 G (5 to 500 Hz) ⁶			

¹ Upper 256 KB used for firmware
⁴ 100 MB/sec per loop; dual loops

² 40 MB/sec represents Ultra Fast/Wide
⁵ Horizontal

³ 80 MB/sec represents Ultra2 Fast/Wide
⁶ Vertical

Contact IBM

Internet and e-mail:

- www.ibm.com/harddrive
- drive@us.ibm.com

IBM TECHFAX document server:

- 408-256-5418 (requires touch-tone phone)
- International callers must call from a fax machine

IBM hard disk drive product information:

- 1 888 IBM-5214 (United States)
- 507-253-4110 (outside of the United States)

Product description data represents design objectives and is provided for comparative purposes; actual results may vary depending on a variety of factors. Product claims are true as of the date of the first printing. This product data does not constitute a

warranty. Questions regarding IBM warranty terms or the methodology used to derive this data should be referred to an IBM representative. Data subject to change without notice.

© International Business Machines Corporation 1998
 Printed in the United States
 10-98
 All Rights Reserved

* IBM, Drive-TIP, No-ID, and Ultrastar are trademarks or registered trademarks of International Business Machines Corporation. Other product names are trademarks or registered trademarks of their respective companies.

References in this publication to IBM products, programs, or services do not imply that IBM intends to make them available in all countries in which IBM operates.

**www.ibm.com/harddrive**

IBM Storage Systems Division
 5600 Cottle Road
 San Jose, CA 95193

TECHFAX # 7101