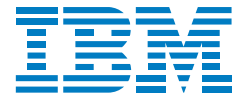*Superior performance, reliability, and capacity for workstation, subsystem, and PC and enterprise server applications*

IBM

IBM Ultrastar 9LZX and 18ZX Hard Disk Drives

Highlights

Rotational speeds of up to 10,020 RPM and average seek times as fast as 5.3 ms provide exceptional performance.

The IBM Drive-Temperature Indicator Processor (Drive-TIP*) feature automatically monitors disk drive temperature and alerts the SCSI drive controller when the recommended temperature is exceeded.

Industry-leading server drive areal densities of 2024 Mbits/sq. in. result in lighter weight drives with improved environmentals.

A buffer size 4.0 MB provides outstanding performance, especially for data-intensive applications that access data sequentially.

Proven drive technology
The newest members of the IBM Ultrastar* family of disk drives provide excellent reliability and performance for servers. Migration to the 9LZX and 18ZX drives is simplified by the use of magnetoresistive extended (MRX) advanced head technology, No-ID* sector formatting, a powerful custom controller with hardware assist functions, a proven PRML data channel, and the field-proven design, electronics, and mechanics of previous generations of the award-winning Ultrastar family.

Featuring 9.1 GB (low profile) and 18.2 GB, the Ultrastar 9LZX and 18ZX provide exceptional performance. These drives combine a rotational speed of 10,020 RPM and seek times as fast as 5.3 ms with the IBM custom controller that incorporates command queuing and a large programmable multisegmented cache up to 4.0 MB. Hardware automation further reduces SCSI command overhead and cache accessing time.

Reliability leadership
The new Ultrastar disk drives support the failure prediction capabilities of S.M.A.R.T. (Self-Monitoring Analysis and Reporting Technology), IBM Predictive Failure Analysis* (PFA), and the IBM-exclusive Drive-TIP. These features help ensure the maximum possible protection for end user data.

Support for advanced applications
Improvements in data throughput are increasingly important in advanced applications. Online transaction and analytical processing (OLTP, OLAP) and other data-intensive applications—along with Internet servers and storage area network servers—can all achieve the maximum benefit from the advanced technology of these Ultrastar disk drives.

Advanced interfaces
IBM offers a comprehensive set of parallel and serial host interfaces, including Ultra2 SCSI LVD (fast, wide,

SCA II), Serial Storage Architecture (SSA), and Fibre Channel-Arbitrated Loop (FCAL).

Ultrastar 9LZX 3.5-inch 9.1 GB high-performance disk drive

Ultrastar 18ZX 3.5-inch 18.2 GB high-performance disk drive

IBM Ultrastar 9LZX and 18ZX 3.5-inch 9.1 GB and 18.2 GB disk drives

Configuration		DRVS Ultra2 SCSI	DRVC	DRVL
	Interface	Fast/Wide, SCA-2	SSA	FCAL
	Formatted capacity (512 bytes)	9.1/18.2 GB[1]		
	Number of disks	5/10		
	Number of heads	10/20		
	Areal density (maximum)	2024 Mbits/sq. in.		
	Recording density (maximum)	219.1 KBPI		
	Track density	9240 TPI		
	Sector size	512 to 732 Bytes		
	Channel	PRML		
	Encoding method	RLL (16/17)		
	Head type	Magnetoresistive Extended (MRX)		
	Dedicated landing zone	Yes		
Performance	Media data rate (banded)	187.2 to 243.7 Mbits/sec		
	Internal formatted transfer rate	17.5 to 23.3 MB/sec		
	Interface transfer rate (max)	80 MB/sec[2]	160 MB/sec[3]	200 MB/sec[4]

	Access times (pop. avg)
	   Average read
	   Track-to-track read
		
		5.3/6.5 ms
		0.7 ms		

	Rotational speed	10,020 RPM		
	Latency (average)	2.99 ms		
	Buffer size	4.0 MB[5]		
Reliability	Recoverable read errors	<10 in 10E13 bits read		
	Non-recoverable read errors	<10 in 10E15 bits read		
	S.M.A.R.T./PFA	Yes		
	Temperature sensor	Yes		
Power	Startup current (max)	2.0/3.2 Amps		
	Idle (average)	11.2/16.3 Watts		
	Read/write (typical)	13.2/19.5 Watts		
	Power consumption efficiency index	.0011/.0009 Watts/MB[6]		
Physical dimensions	Height	25.7/41.5 mm		
	Width	101.6 mm		
	Depth	146.8 mm		
	Weight	0.66/1.03 kg		
	Mounting	Industry standard, all orientations		

Environmental characteristics		Operating	Non-operating
	Temperature	5° to 50° C	-40° to 65° C
	Relative humidity (non-condensing)	5% to 90%	5% to 95%
	Shock	10 G (2, 11 ms)	150/140 G (2 ms)
	Random vibration (RMS)	1.41 G	2.23 G

[1] MB = 1,000,000 Bytes; 1 GB = 1,000,000,000 Bytes
[2] 80 MB/sec represents Ultra2 Fast/Wide
[3] 40 MB/sec per link with four links
[4] 100 MB/sec per loop; dual loops
[5] Up to 337 KB used for firmware
[6] Idle power dissipation/formatted capacity

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)

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