

Superior performance, reliability, and capacity for advanced enterprise server applications



# IBM Ultrastar 36XP Hard Disk Drive

## Highlights

**With the highest capacity (36.4 GB) in the Ultrastar\* family and an areal density of 2.7 Gbits/square inch, the Ultrastar 36XP provides superior storage capabilities.**

**Average seek times of 7.5 ms, maximum sustained data rates of up to 19.7 MB/sec, and a rotational speed of 7200 RPM provide rapid data transfer.**

**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.**

**Large multisegmented 4.0 MB cache helps increase performance to support a variety of data-intensive applications.**

## Leading drive technology

The Ultrastar 36XP provides reliable, high-performance storage for high-end and PC LAN server systems that must deliver outstanding throughput for demanding database, Internet/intranet, decision support, data mining, and online transaction and analytical processing (OLTP/OLAP) applications.

Featuring 36.4 GB in a 3.5-inch form factor, the Ultrastar 36XP provides the highest capacity in the Ultrastar family. To provide exceptional performance, this drive combines a rotational speed of 7200 RPM and a seek time as fast as 7.5 ms with an IBM custom controller that incorporates command queuing and a programmable large multi-segmented 4.0 MB cache. Hardware automation further reduces SCSI command overhead and cache accessing time.

## Leadership reliability

IBM continues its leadership tradition of providing drive failure protection through S.M.A.R.T. (Self-Monitoring Analysis and Reporting Technology), IBM Predictive Failure Analysis\* (PFA), and the exclusive IBM Drive-TIP.

These features monitor key device performance indicators and temperature, reporting significant changes, warnings, or impending failures when predetermined thresholds are exceeded. The Ultrastar 36XP drives also employ advanced error correction code (ECC) technology throughout the recording process.

## Support for advanced applications

Improvements in data throughput are increasingly important in advanced applications, such as video editing, multimedia, and data mining. The Ultrastar 36XP provides the necessary high sustained data rates by combining magnetoresistive extended (MRX) advanced head technology, an embedded digital servo with efficient No-ID\* sector formatting, a powerful ECC on-the-fly implementation, and the IBM advanced Partial Response Maximum Likelihood (PRML) digital data channel.

## Advanced interfaces

IBM offers a comprehensive set of SCSI and serial host interface solutions for the server industry, including Ultra2 SCSI, Serial Storage Architecture (SSA), and Fibre Channel-Arbitrated Loop (FCAL).



Ultrastar 36XP 3.5-inch 36.4 GB high-performance hard disk drive

## IBM Ultrastar 36XP 3.5-inch 36.4 GB hard disk drive

Configuration	DRHS Ultra2 SCSI	DRHC	DRHL
Interface	Fast/Wide, SCA-2	SSA	FCAL
Formatted capacity (520 bytes)	36.4 GB <sup>1</sup>		
Number of disks	10		
Number of heads	20		
Areal density (maximum)	2758 Mbits/sq. in.		
Recording density (maximum)	238.8 KBPI		
Track density	11,550 TPI		
Sector size	512 to 732 Bytes		
Channel	PRML		
Encoding method	RLL (16/17)		
Head type	Advanced magnetoresistive (AMR)		
Dedicated landing zone	Yes		
<b>Performance</b>			
Media data rate (banded)	143.2 to 231.2 Mbits/sec		
Interface transfer rate (max)	80 MB/sec <sup>2</sup>	160 MB/sec <sup>3</sup>	200 MB/sec <sup>4</sup>
Access times (pop. avg)			
Average read	7.5 ms		
Track-to-track read	0.3 ms		
Rotational speed	7200 RPM		
Latency (average)	4.17 ms		
Buffer size	4 MB <sup>5</sup>		
<b>Reliability</b>			
Recoverable read errors	< 10 in 10E13 bits read		
Nonrecoverable read errors	< 10 in 10E15 bits read		
S.M.A.R.T./PFA	Yes		
Temperature sensor	Yes		
<b>Power</b>			
Startup current (max)	2.7 Amps		
Idle (average)	13.1 Watts <sup>6</sup>		
Read/write (typical)	15.4 Watts <sup>6</sup>		
Power consumption efficiency index	.0007 Watts/MB <sup>7</sup>		
<b>Physical dimensions</b>			
Height	41.0 mm		
Width	101.85 mm		
Depth	147.0 mm		
Weight	930 g		
Mounting	Industry standard, all orientations		
<b>Environmental characteristics</b>	<b>Operating</b>	<b>Nonoperating</b>	
Temperature	5° to 50° C	-40° to 65° C	
Relative humidity (noncondensing)	5% to 90%	5% to 95%	
Shock	10 G (2, 11 ms)	140 G (2 ms)	
Vibration 0.5 G (RMS)	2.0 G		

<sup>1</sup> MB = 1,000,000 Bytes; 1 GB = 1,000,000,000 Bytes

<sup>2</sup> 80 MB/sec represents Ultra2 Fast/Wide

<sup>3</sup> 40 MB/sec per link with four links

<sup>4</sup> 100 MB/sec per loop; dual loops

<sup>5</sup> Up to 417 KB used for firmware

<sup>6</sup> Add four watts for FCAL interface

<sup>7</sup> Idle power dissipation/formatted capacity

## Contact IBM

Internet and e-mail:

- [www.ibm.com/harddrive](http://www.ibm.com/harddrive)
- [drive@us.ibm.com](mailto:drive@us.ibm.com)

IBMTECHFAX 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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