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



IBM Ultrastar Family of Disk Drives

2nd Quarter 1998

Highlights

High capacity

With capacity up to 18.2 GB and an areal density of 1.2 Gbits per square inch, IBM Ultrastar disk drives provide reliable, highperformance storage for today's dataintensive applications.

Industry-leading performance

The IBM Ultrastar family is designed for the most demanding of corporate and enterprise server applications available today. High performance is achieved by combining fast rotational speeds of up to 10,000 RPM and rapid seek times as fast as 6.3 milliseconds. In addition, IBM controllers incorporate command queuing.

Leading drive technology

The Ultrastar family delivers high sustained data rate performance through the combination of Magnetoresistive Extended (MRX) advanced head technology, an embedded digital servo, efficient No-ID[™] sector formatting, and a fifth-generation Partial Response Maximum Likelihood (PRML) data channel with enhanced track ID detection.

Data protection

S.M.A.R.T. (Self-Monitoring Analysis and Reporting Technology)-compliant Predictive Failure Analysis™ (PFA) and Drive Temperature Indicator Processor (DriveTIP™) monitors enable the Ultrastar 9LP, 18XP, and 9ZX to report significant changes or impending failures when pre-programmed thresholds are exceeded.

Warranty

All Ultrastar hard disk drives have a five year warranty.

Wide-ranging applications

The Ultrastar family is specifically designed for servers and high-end workstations running a range of applications—from collaborative workgroup applications to image processing, video editing to data mining, and online transaction processing to online analytical processing.





Ultrastar 18XP 3.5-inch 18.2 GB 7,200 RPM disk drive

Ultrastar 9ZX 3.5-inch 9.1 GB 10,000 RPM disk drive

IBM Ultrastar Family Specifications, 2nd Quarter 1998

			New 3Q 98	
Description (capacity-disks)	Ultrastar ES 2-2	Ultrastar ES 4-3	Ultrastar ES 4-3	Ultrastar XP 4-5
Product Family Name	Ultrastar 2ES	Ultrastar 2ES	Ultrastar 9ES	Ultrastar 2XP
Capacity and Interface				
Capacity (512 Bytes)	2.16 GB	4.22 GB	4.5 GB	4.55 GB
Performance				
Data Buffer	512 KB	512 KB	512 KB	512 KB
Rotational Speed (RPM)	5400	5400	7200	7200
Latency (Average ms)	5.56	5.56	4.17	4.17
Media Transfer Rate (Mbits/sec, inner-outer)	62.5-103.4	62.5-103.4	108.6–171.1	81.6-123.4
Interface Transfer Rate (MB/sec)1	20/40	20/40	20/40/80	20/40/80
Seek Time (Typical)				
Average (ms)	8.5	8.5	7.5	7.5
Track to Track (ms)	1.1	1.1	0.8	0.5
Full Track (ms)	15	15	15	
Configuration				
Sector Size (Bytes)	512	512	512	512
Recording Zones	8	8	8	
User Cylinders	8210	8210	8420	
Data Heads	3	6	5	9
Disks	2	3	3	5
Areal Density	1158 Mbits/sq in	1158 Mbits/sq in	1.56 Gbits/sq in	829 Mbits/sq in
Recording Density (Max. KBPI)	134.6	134.6	156	134.5
Track Density (TPI)	8600	8600	10,000	6160
Reliability				
Warranty (Years)	5	5	5	5
Error Rates (non-recoverable bits read)	<1 in 1.0E 13	<1 in 1.0E 13	<10 in 10E 14	< 10 in 10E 15
Power				
Dissipation (Typical)				
Start-up (Max. Peak) Amps	0.46 (5V), 1.83 (12V)	0.46 (5V), 1.83 (12V)	0.27 (5V), 2.0 (12V)	1.7
Idle (Avg.) Watts	3.42	4.05	5.3	11.2
Power Consumption				
Efficiency Index (Watts/MB)	0.0015	0.0009	0.0012	.0025
Environmental (Operating/Nonoperati	ng)			
Ambient Temperature	5 to 55° C/-40 to 65° C	5 to 55° C/-40 to 65° C	5 to 55° C/0 to 65° C	5 to 55° C/-40 to 65° C
Relative Humidity	8% to 90%/5% to 95%	8% to 90%/5% to 95%	8% to 90%/5% to 95%	5% to 90%/5% to 95%
Shock (half sine wave)	10G (11 ms)/75G (11 ms)	10G (11 ms)/75G (11 ms)	10G (11 ms)/65G (2 ms)	10G/70G
Vibration (random(RMS))	0.67G (5-500 Hz)/	0.67G (5-500 Hz)/	0.67G (5-500 Hz)/	5G/2G
	1.04G (2-200 Hz)	1.04G (2-200 Hz)	1.04G (2-200 Hz)	
Physical Size				
Height	25.4 mm/1 in	25.4 mm/1 in	25.4 mm/1 in	25.4 mm/1 in
Width	101.6 mm/4 in	101.6 mm/4 in	101.6 mm/4 in	101.6 mm/4 in
Depth Weight (Max)	146 mm/5.75 in	146 mm/5.75 in	146 mm/5.75 in	146 mm/5.75 in
0 ()	610 g/21.52 oz	610 g/21.52 oz	630 g/22.22 oz	460 g/16.23 oz
Ordering Information				
Model	DCAS 32160	DCAS 34330	DDRS 34560	DCHS 34550
Part Numbers ²	09J1034	09J1035	00K3980	27H1713
	USCSI 50P/SE	USCSI 50P/SE	SCSI 50P	USCSI 50P/SE
	09J1036	09J1037	00K4000	27H1772
	USCSI 68P/SE	USCSI 68P/SE	SCSI 68P	USCSI 68 P/SE
	03L5652	03L5653	00K4020	93G3024
	USCSI 68P/SE	USCSI 68P/SE	SCSI 80P	USCSI 68P/DIFF
	09J1038	09J1039		93G3026
	USCSI 80P/SE	USCSI 80P/SE		USCSI 80P/SCA
				27H1715
				USCSI 50P/SE 93G3022
				93G3022 USCSI 68P/SE
				0000100F/0L

¹ Interface transfer rates vary based on the pin configuration. 50 Pin=20 MB/sec; 68 Pin=40 MB/sec; 80 Pin=40 MB/sec
² P=Pin, SE=Single-Ended, T=Terminal, Diff=Differential, SCA=Single Connector, DE=IDE, USCSI=UltraSCSI, SSA=Serial Storage Architecture

Ultrastar XP 9-9 Ultrastar 2XP	Ultrastar LP 9-5 Ultrastar 9LP	Ultrastar ES 9-5 Ultrastar 9ES
9.1 GB	9.1 GB	9.1 GB
512 KB	1 MB	512 KB
7200	7200	7200
4.17	4.17	4.17
81.6-123.4	92.2–179.2	108.6–171.1
20/40	40	20/40
7.5	6.5	7.5
0.5	0.7	0.8
	14	15
 512	512-732	512
	16	8
	8151	8420
18	10	10
9	5	5
829 Mbits/sq in	1253 Mbits/sq in	1.56 Gbits/sq in
134.5	150	156
6160	8356	10,000
5	5	5
<10 in 10E 15	<10 in 10E 15	<10 in 10E 14
2.7	1.6	0.27 (5V), 2.0 (12V)
15.6	9.2	7.1
.0017	0.0009	0.0008
5 to 55° C/-40 to 65° C	5 to 50° C/-40 to 65° C	5 to 55° C/0 to 65° C
5% to 90%/5% to 95%	5% to 90%/5% to 95%	8% to 90%/5% to 95%
10G/70G	10G (2.11 ms)/140G (2 ms)	10G (11 ms)/65G (2 ms)
5G/2G	10G (2.11 ms)/140G (2 ms)	0.67G (5-500 Hz)/1.04G (2-200 Hz)
41.3 mm/1.63 in	25.4 mm/1 in	25.4 mm/1 in
101.6 mm/4 in	101.85 mm/4.01 in	101.6 mm/4 in
46 mm/5.75 in	147 mm/5.77 in	146 mm/5.75 in
850 g/29.98 oz	570 g/20.11 oz	630 g/22.22 oz
DCHS-391000	DGHS	DDRS-39130
DCHS-391000 27H1714	DGHS 59H6588	DDRS-39130 00K3970
27H1714	59H6588	00K3970
27H1714 USCSI 50P/SE	59H6588 USCSI 50P/SE T	00K3970 SCSI 50P
27H1714 USCSI 50P/SE 27H1771	59H6588 USCSI 50P/SET 59H6590	00K3970 SCSI 50P 00K3990
27H1714 USCSI 50P/SE 27H1771 USCSI 68P/SE	59H6588 USCSI 50P/SE T 59H6590 USCSI 68P/SE T	00K3970 SCSI 50P 00K3990 SCSI 68P
27H1714 USCSI 50P/SE 27H1771 USCSI 68P/SE 93G3025	59H6588 USCSI 50P/SE T 59H6590 USCSI 68P/SE T 59H6594	00K3970 SCSI 50P 00K3990 SCSI 68P 00K4010
27H1714 USCSI 50P/SE 27H1771 USCSI 68P/SE 93G3025 USCSI 80P/DIFF	59H6588 USCSI 50P/SE T 59H6590 USCSI 68P/SE T 59H6594	00K3970 SCSI 50P 00K3990 SCSI 68P 00K4010
27H1714 USCSI 50P/SE 27H1771 USCSI 68P/SE 93G3025 USCSI 80P/DIFF 93G3047	59H6588 USCSI 50P/SE T 59H6590 USCSI 68P/SE T 59H6594	00K3970 SCSI 50P 00K3990 SCSI 68P 00K4010

IBM Ultrastar Family Specifications, 2nd Quarter 1998

Description (capacity-disks)	Ultrastar ZX 9-6	Ultrastar XP 18-10 Ultrastar 18XP	
roduct Family Name	Ultrastar 9ZX		
apacity and Interface			
Capacity (512 Bytes)	9.1 GB	18.2 GB	
Performance			
Data Buffer	1 MB	1 MB	
Rotational Speed (RPM)	10020	7200	
Latency (Average ms)	2.99	4.17	
Media Transfer Rate (Mbits/sec)	129.3–204.8	92.2-179.2	
Interface Transfer Rate (MB/sec)1	40/80/160/200	40/80/160/200	
Seek Time (Typical)			
Average (ms)	6.3	7.5	
Track to Track (ms)	0.7	0.7	
Full Track (ms)	17	17	
Configuration			
Sector Size (Bytes)	512-732	512-732	
Recording Zones	16	16	
User Cylinders	7400	8151	
Data Heads	12	20	
Disks	6	10	
Areal Density	1136 Mbits/sq in	1253 Mbits/sq in	
Recording Density (Max. KBPI)	151	1253 Mibits/sq in 150	
Track Density (TPI)	7258	8356	
	1200	0000	
Reliability		_	
Warranty (Years)	5	5	
Error Rates (non-recoverable bits read)	< 10 in 10E 15	< 10 in 10E 15	
ower			
Dissipation (Typical)			
Start-up (Max. Peak) Amps	3.5	2.7	
Idle (Avg.) Watts	16.5	13.1	
Power Consumption	0.0019	0.0007	
Efficiency Index (Watts/MB)			
nvironmental (Operating/Nonopera	ting)		
Ambient Temperature (° C)	5 to 50° C/-40 to 65	5 to 50° C/-40 to 65	
Relative Humidity	5% to 90%/5% to 95%	5% to 90%/5% to 95%	
Shock (half sine wave)	10G (2.11 ms)/140G (2 ms)	10G (2.11 ms)/140G (2 ms)	
Vibration (random(RMS))	10G (2.11 ms)/140G (2 ms)	10G (2.11 ms)/140G (2 ms)	
Physical Size	· · ·	,	
Height	42 mm/ 1.65 in	42 mm/1.65 in	
Width	101.85 mm/4.01 in	101.85 mm/4.01 in	
Depth	147 mm/5.77 in	147 mm/5.77 in	
Weight (Max)	870 g/30.69 oz	930 g/32.80 oz	
Ordering Information			
Model	DGVS	DGHS	
Part Numbers ²			
Fait numbers	05J7618	59H6589	
	USCSI 68P/SET	USCSI 50P/SET	
	05J7625	59H6591	
	USCSI 80P/SCAT	USCSI 68P/SET	
	05J7627	59H6595	
	USCSI 68P/SET	USCSI 80P/SCAT	
	05J7623 USCSI 68P/SET		

¹ Interface transfer rates vary based on the pin configuration. 50 Pin=20 MB/sec; 68 Pin=40 MB/sec; 80 Pin=40 MB/sec ² P=Pin, SE=Single-Ended, T=Terminal, Diff=Differential, SCA=Single Connector, DE=IDE, USCSI=UltraSCSI, SSA=Serial

Storage Architecture

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