Ultrastar® 7K4000

Highlights

- 2.0 million hours MTBF[1]
- Up to 4 terabytes[2] of capacity
- SATA 6Gb/s and SAS 6Gb/s models for configuration flexibility
- Advanced Format* SATA with 512-byte emulation (512e)*
- Dual Stage Actuator (DSA) and Enhanced Rotational Vibration Safeguard (RVS) for robust performance in multi-drive environments
- 24x7 accessibility for enterprise-class, capacity-optimized applications
- 5-year limited warranty

Applications/Environments

- Cloud storage
- Massive Scale Out (MSO)
- Data warehousing & mining
- Disk-to-disk backup & archiving
- RAID arrays
- Network Attached Storage (NAS)



4TB, 3TB and 2TB | 7200 RPM
SATA 6Gb/s and SAS 6Gb/s

Delivering Industry-Leading Quality and Reliability

HGST Ultrastar® 7K4000 is the world's first 4TB 7200 RPM hard drive with a 2.0 million hours MTBF specification and backed by a full 5-year warranty. Ultrastar 7K4000 represents the sixth-generation HGST 5-platter design, which has been field proven by top server and storage OEMs and Internet giants. Engineered for the highest quality, the Ultrastar 7K4000 is put through grueling design tests during development and must pass stringent ongoing reliability testing during manufacturing. Ultrastar 7K4000 delivers by reducing downtime, eliminating service calls and minimizing TCO.

Increasing Capacity Density by One Third

To deal with the explosive petabyte (PB) growth, data centers require large amounts of efficient storage. Reducing W/GB without expanding floor space is vital to lowering operating costs. To meet these demands, Ultrastar 7K4000 delivers 33% more capacity in the same footprint at 24% lower W/GB than its predecessor, Ultrastar 7K3000. Now you can get 2.4PB in the footprint of a standard 19-inch enterprise storage rack by stacking ten 4U, 60-bay enclosures. Ultrastar 7K4000 dual port SAS is available in traditional 512, 520 and 528 byte sector size. Ultrastar 7K4000 SATA is an Advanced Format* drive, using 4096-byte sector size to provide enormous capacity earlier than otherwise possible for environments optimized for this technology. Advanced Format drives are backwards compatible with legacy 512-byte sector size by offering built-in 512-byte emulation through the SATA interface.

Combining 7200 RPM Performance and Granular Power Control

Operating at 7200 RPM, Ultrastar 7K4000 offers better overall performance than slower RPM capacity-oriented drives, and does so at impressively low power-consumption rates. The Ultrastar 7K4000 can help data centers achieve lower AC power and HVAC requirements. With five Advanced Power Management modes, the 7K4000 achieves a 59% reduction in watts during low RPM idle mode, and uses less than 2W during standby/sleep modes, freeing up precious headroom for growing enterprise needs.

Innovating for a More Sustainable Environment

The Ultrastar 7K4000, with its halogen-free design and power-efficient operation, minimizes environmental impact in the areas of product design, manufacturing, operation and disposal.

HGST Quality and Service

HGST's Ultrastar 7K4000 extends the company's long-standing tradition of performance and capacity leadership. The proven drive design enables high reliability and availability to customer data. Ultrastar quality, performance and world class technical support and service provides customers with a lower total cost of ownership over previous generations.

HGST drives are backed by an array of technical support and services, which may include customer and integration assistance. HGST is dedicated to providing a complete portfolio of HDD/SSD solutions to satisfy today's monumental computing needs.

Features & Benefits

	Feature / Function	Benefits
Capacity	4TB, 3TB and 2TB	Highest enterprise capacity available in a single platform
Performance	• 7200 RPM • Rotational Vibration Safeguard (RVS)	• High performance for business critical applications • Maintains drive performance in high rotational vibration environments and multi-drive systems
Reliability	• Thermal Fly-height Control (TFC) with internal thermal sensor • Head load/unload • SMART command transport	• Better soft error rate for improved reliability and performance • Protects disk during non-operation • Adaptive error correction
Power	Improved Watts per gigabyte (W/GB)	24% lower W/GB than predecessor for maximum efficiency
Security	Optional Bulk Data Encryption (SATA) and TCG Enterprise_A (SAS)	Encrypt private data, providing security and easy redeployment

* A legacy 512-byte configuration is also available.

Ultrastar® 7K4000

Specifications

Model / Part No		
	HUS724040ALE640 / 0F14683 HUS724040ALE641 / 0F18425 HUS724030ALE640 / 0F14684 HUS724030ALE641 / N/A HUS724020ALE640 / 0F14685 HUS724020ALE641 / N/A HUS724040ALA640 / 0F14688 HUS724030ALA640 / 0F14689 HUS724020ALA640 / 0F14690	HUS724040ALS640 / 0B26885 HUS724040ALS641 / 0B26927 HUS724030ALS640 / 0B26886 HUS724030ALS641 / 0B26926 HUS724020ALS-640 / 0B26887 HUS724020ALS641 / 0B26925

Configuration		
Interface	SATA 6Gb/s	SAS 6Gb/s
Capacity (GB)[2] at 512 bytes/sector	4TB / 3TB / 2TB	←
Form factor	3.5-inch	←
Sector size (bytes)[3]	512e , 512n	512 / 520 / 528
Max. areal density (Gbits/sq. in)	446 (512e) , 475 (512n)	475

Performance		
Data buffer (MB)[4]	64	←
Rotational speed (RPM)	7200	←
Interface transfer rate (MB/s, max)	600	←
Sustained transfer rate (MB/s, typical)[5]	171 (512e), 181 (512n)	183
Seek time (read, ms, typical)[6]	8.0	←

Reliability		
Error rate (non-recoverable, bits read)	1 in 10^{15}	←
Load/Unload cycles (at 40° C)	600,000	←
Availability (hrs/day x days/wk)	24x7	←
MTBF1 (M hours)	2.0	←
Annualized Failure Rate1 (AFR)	0.44%	←
Warranty (yrs)	5	←

Acoustics		
Idle (Bels, typical)	2.9	←

Power		
Requirement	+5 VDC (+/-5%) +12VDC (+10%/-8%)	←
Startup current (A, max)	1.2 (+5V), 2.0 (+12V)	←
Read/write (W)	11.4	10.9
Idle (W, avg)	6.9	7.6
Unload idle (W)	5.7	6.2

Physical size		
z-height (mm, max)	26.1	←
Dimensions (width x depth, mm)	101.6 (+/-0.25) x 147	←
Weight (g, typical)	690	←

Environmental (operating)		
Ambient temperature	5° to 60° C	←
Shock (half-sine wave 2 ms, G)	70	←
Vibration (G RMS, 5 to 500 Hz)	0.67 (XYZ)	←

Environmental (non-operating)		
Ambient temperature	-40° to 70° C	←
Shock (half-sine wave, 1ms, G)	300	←
Vibration (G RMS, 5 to 500 Hz)	1.04 (XYZ)	←

[1] One MB is equal to one million bytes, one GB is equal to one billion bytes and one TB equals 1,000GB (one trillion bytes) when referring to hard drive capacity. Accessible capacity will vary from the stated capacity due to formatting and partitioning of the hard drive, the computer's operating system, and other factors.

[2] MTBF and AFR targets are based on a sample population and are estimated by statistical measurements and acceleration algorithms under median operating conditions. MTBF and AFR ratings do not predict an individual drive's reliability and do not constitute a warranty.

[3] Advanced Format drive: 4K (4096-byte) physical sec

[4] Portion of buffer capacity used for drive firmware

[5] MiB/s is 220 bytes, MB/s is 106 bytes

[6] Excludes command overhead

[7] SATA models: 8K Queue Depth = 1, SAS models: 4K Queue Depth = 4

[8] Idle specification is based on use of Idle_A

How to read the Ultrastar model number

HUS724040ALE640 = 4TB, SATA 6Gb/s, 64MB buffer
H = HGST
U = Ultrastar
S = Standard
72 = 7200 RPM
40 = Full capacity — 4TB
40 = Capacity this model, 40 = 4TB
(30 = 3TB, 20 = 2TB)
A = Generation code
L = 26.1mm z-height
E6 = Interface, SATA 6Gb/s, 512e
(A6 = SATA 512n, S6 = SAS 512n)
4 = 64MB buffer
0 = No encryption (1 = encryption)

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Product specifications provided are sample specifications and do not constitute a warranty. Information is true as of the date of publication and is subject to change. Actual specifications for unique part numbers may vary.

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