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Ultrastar® He¹²

Highlights

- 12TB capacity[1] in a standard 3.5-inch form factor
- PMR technology works with all capacity enterprise applications & environments
- Reliable, field-proven, 4th generation design
- Industry's best power efficiency (Watts/TB)
- Compared to 8TB air drives
    - 50% more capacity
    - 54% more power efficient (Watts/TB)
    - 25% more reliable
- SATA 6Gb/s and SAS 12Gb/s
    - 12Gb/s SAS compatible with next gen data centers; backwards compatible with 6Gb/s SAS
- 2.5M hours MTBF[2] rating & 5-year limited warranty
- Instant Secure Erase (ISE) & Self-Encrypting Drive (TCG SAS) options
- Advanced Format 4Kn and 512e models

Applications/Environments

- Enterprise and data center applications where capacity density, power efficiency and reliability are paramount
- Cloud & Hyperscale storage
- Massive scale-out (MSO), high-density data centers
- Distributed File Systems
- Bulk storage using object storage solutions like CEPH™ and OpenStack Swift
- Primary and secondary storage for Hadoop® to support Big Data Analytics
- Centralized video surveillance
- Ideal for all mainstream enterprise capacity applications

12TB | 7200 RPM
SATA 6Gb/s and SAS 12Gb/s

ADVANCED 4Kn FORMAT   ADVANCED AF FORMAT

* VS. 8TB AIR DRIVES AS OF 12/6/2016

More Value to the Data Center with Maximum Capacity, Power Efficiency and Reliability

Laying the foundation for a worry-free data center, HGST delivers capacity to conquer the data explosion – Ultrastar® He¹² HDD. Designed to handle workloads up to 550TB per year, the Ultrastar He¹² HDD is the industry's first 12TB drive and uses PMR technology to make it drop-in ready for any enterprise-capacity application or environment. The stable internal environment created by fourth-generation HelioSeal® technology enables a new 8-disk design, increasing the capacity by 20% when compared to the 7-disk design of the prior generation. This highest capacity helium drive offers the lowest power profile in the industry to help data center architects meet eco-environmental goals and requirements. Targeted at 2.5M hours MTBF, the Ultrastar He¹² HDD provides the highest reliability rating available of all HDDs on the market today by building on the successful design of its 10TB, 8TB and 6TB predecessors. Trust HGST and the Ultrastar He¹² HDD to deliver more capacity, more efficiency, more reliability and more value to your data center.

HelioSeal Technology Helps Solve Challenges Facing Next Generation Data Centers

Data centers are facing growing pressures. Data volume is expanding, operating costs are rising, yet budgets remain flat. Lowering the total cost of ownership (TCO) has become the focus of data center architects and the Ultrastar He¹² HDD provides the best value proposition and greatest storage efficiency available. Compared to 8TB air-filled drives, this HelioSeal hard drive provides 50% more capacity, uses 54% less power (Watts/TB), and is 25% more reliable, rated at 2.5M hours MTBF. Data-center ready features like a second generation dual-stage actuator — the HGST Micro Actuator — enhance head-positioning accuracy to deliver better performance, data integrity and overall drive reliability, especially in multi-drive environments where operational vibration is present. Refer to our HMA technical brief to learn more. A choice of 6Gb/s SATA and 12Gb/s SAS interface enables easy integration into high performance data centers.

Data Durability and Data Security to Support Compliance and Privacy Requirements

As drive capacity grows beyond single-digit TBs, object storage systems with erasure coding provide better data durability compared to RAID systems, given its tolerance for simultaneous error conditions. The Ultrastar He¹² HDD is a best-fit for object storage implementations with its massive capacity and industry-leading reliability rating. Compliance and privacy requirements drive the need for increased data security. The Ultrastar He¹² HDD offers security and encryption options to help protect data from unauthorized use, including TCG SAS models.

HGST Quality and Service

The Ultrastar He¹² HDD extends HGST's long-standing tradition of reliability leadership with a 2.5M-hour MTBF rating and a 5-year limited warranty. Ultrastar quality, capacity, power efficiency, 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 and systems to help the world harness the power of data.

50% MORE CAPACITY*

54% LOWER WATTS/TB*

25% MORE RELIABLE*

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Ultrastar® He12

Features & Benefits

Feature / Function	Benefits
Capacity • 12TB	• Provides 50% more capacity than 8TB drives
Power Efficiency • Industry's lowest Watts per terabyte (W/TB)	• 54% lower idle W/TB than 8TB air drives
Performance • HGST Micro-Actuator • Rotational Vibration Safeguard (RVS) • Media Cache Plus architecture • Rebuild Assist mode • SATA 6Gb/s & SAS 12Gb/s • 256MB cache buffer	• More accurate head positioning, especially in multi-drive environments, for better performance, data integrity and reliability • Maintains drive performance in high rotational vibration environments and multi-drive systems • Better random write performance • Dramatically improves RAID recovery time and maintains system performance during recovery • Provides compatibility with high-performance data centers • Improves response time and data management
Reliability • Dual Safe, RSA-signed firmware • 2.5M hours MTBF[2] and 0.35% AFR[2] • 5-year limited warranty	• Retains previous firmware version for safe firmware updates, verified with an RSA signature • Industry's highest reliability rating for Capacity Enterprise HDD for fewer failures/less service needs • Industry's best for enterprise-class hard drives
Data Security • Instant Secure Erase • Encryption options on SAS models	• Enables swift and efficient drive redeployment and retirement • Hardware-based encryption protects data from unauthorized use (TCG SAS options)

How to read the Ultrastar model number

Example: HUH721212AL420y = 7200 RPM, 12TB, 4Kn SAS 12Gb/s

H = HGST	42 = Interface, 4Kn SAS 12Gb/s (52 = 512e SAS 12Gb/s, E6 = 512e SATA 6Gb/s, N6 = 4Kn SATA 6Gb/s)
U = Ultrastar	
H = Helium (vs. S for Standard)	
72 = 7200 RPM	O = Reserved
12 = Full capacity — 12TB (12,000GB)	y = Data Security Mode
12 = Capacity this model 12TB (12,000GB)	0 = Instant Secure Erase 1 = TCG encryption (SAS) 4 = Secure Erase (overwrite only) 5 = TCG encryption with FIPS (SAS)
A = Generation code	
L = 26.1mm z-height	

[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 specifications are based on a sample population and are estimated by statistical measurements and acceleration algorithms under typical operating conditions for this drive model. 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 sectors

[4] Portion of buffer capacity used for drive firmware

[5] MiB/s is 2^{20} bytes, MB/s is 10^6 bytes

[6] Excludes command overhead

[7] SATA models: 8KB Queue Depth = 1 @ 40 IOPS, SAS models: 4KB Queue Depth = 4

[8] Idle specification is based on use of Idle_A

Specifications

	SATA Models	SAS Models
Model No.	HUH721212ALE60y HUH721212ALN60y	HUH721212AL420y HUH721212AL520y
Configuration		
Interface	SATA 6Gb/s	SAS 12Gb/s
Capacity[1] (TB)	12TB	←
Format: Sector size[3] (bytes)	4Kn: 4096 512e: 512	4Kn: 4096, 4112, 4160, 4224 512e: 512, 520, 528
Max. Areal density (Gbits/sq. in.)	864	←
Performance		
Data buffer[4] (MB)	256	←
Rotational speed (RPM)	7200	←
Latency average (ms)	4.16	←
Interface transfer rate (MB/s, max)	600	1200
Sustained transfer rate[5] (MiB/s, typical)	243	←
(MB/s, typical)	255	←
Seek time[6] (read/write, ms, typical)	8.0/8.6	←
Reliability		
Error rate (non-recoverable, bits read)	1 in 10^{15}	←
Load/Unload cycles (at 40ºC)	600,000	←
Availability (hrs/day x days/wk)	24x7	←
MTBF[2] (M hours)	2.5	←
Annualized Failure Rate[2] (AFR)	0.35%	←
Limited Warranty (yrs)	5	←

	SATA Models	SAS Models
Acoustics		
Idle (Bels, typical)	2.0/3.6	←
Power		
Requirement	+5 VDC, +12VDC	←
Operating[7] (W)	7.2	9.8
Idle[8] (W)	5.3	6.1
Power consumption efficiency at Idle (W/TB)		
(Watts/TB)	0.44	0.51
(Watts/GB)	0.00044	0.00051
Physical size		
z-height (mm)	26.1	←
Dimensions (width x depth, mm)	101.6 (+/-0.25) x 147	←
Weight (g, max)	660	←
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, G)	300 (2ms) / 150 (11ms)	←
Random vibration (G RMS 2 to 200 Hz)	1.04 (XYZ)	←

NOTE: See "How to read the Ultrastar model number" at the top of the page for possible values for xx and y. Visit the product page on our website for a list of part numbers.

Information & Technical Support
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