Western Digital.

Data Sheet

Ultrastar® DC HC680

28TB[1] | 27TB | 26TB | 7200 RPM | 6Gb/s SATA

Highlights

- Industry's first 28TB[1] HDD for data centers
- Integration of leading technologies OptiNAND, EAMR, TSA, UltraSMR, and HelioSeal
- Purpose-built for sequential write applications
- 2.5M hour (projected) MTBF[2] rating
- 5-year limited warranty

Applications/Environments

- Big Data or Bulk Storage
- Cloud Storage
- Social Media
- Content Libraries, Streaming Media, and Digital Media Assets
- Online Back-up and Replication
- Hyperconverged Infrastructure (HCI)
- Hybrid Cloud Architectures
- Compliance, Audits, and Regulatory Records

Shingled Magnetic Recording (SMR) enables data center expansion

The modern data center demands highest capacity HDDs to cost effectively expand storage and lower the total cost of ownership (TCO). SMR HDDs, and more specifically host-managed SMR (HM-SMR), enable higher capacities by overlapping the physical tracks on the media during write operations. An HM-SMR HDD results in higher capacity compared to a conventional magnetic recording (CMR) HDD of the same generation. While this requires software changes to properly exploit the capacity advantage of HM-SMR, the most common TCO metrics can be improved by utilizing SMR HDDs.

UltraSMR enables 28TB HDDs

Ultrastar DC HC680 integrates a suite of technologies on a 10-disk platform to create a new class of HDDs. These drives achieve capacities of 28TB, 27TB, and 26TB, by combining Western Digital's OptiNAND™ technology with UltraSMR, energy-assist magnetic recording (EAMR), a second-generation triple-stage actuator (TSA), and proven HelioSeal® technology.

Combining OptiNAND with proprietary firmware that leverages HDD system-level hardware advancements, Western Digital's new UltraSMR technology introduces large block encoding along with an advanced error correction algorithm that increases tracks-per-inch (TPI) to enable higher capacity. The result is Western Digital's new 28TB Ultrastar DC HC680 UltraSMR HDD that delivers up to 2.8TB per platter, offering higher capacities for cloud customers optimizing their stacks to take advantage of the benefits of SMR.

Data center workloads

The Ultrastar DC HC680 meets modern data center reliability requirements with 2.5M MTBF (projected) and a 5-year limited warranty. It is performance-optimized for heavy application workloads and is designed to handle workloads up to 550TB per year. Trust Western Digital and the Ultrastar DC HC680 hard drive to deliver unbeaten capacity and greater value for your data center.

Ultrastar® DC HC680

Specifications

	SATA Models	SATA Models
Model Number	WSH722880ALN6L1 WSH722880ALN6L4	WSH722870ALN6L1 WSH722870ALN6L4 WSH722860ALN6L1 WSH722860ALN6L4
Configuration		
Interface	SATA 6Gb/s	SATA 6Gb/s
Capacity[1]	28TB	27TB, 26TB
Format: Sector size (bytes)[3]	4Kn	4Kn
Areal Density (Gbits/sq. in, max)	1430	1380, 1325
Performance		
Data buffer[4] (MB)	512	512
Rotational speed (RPM)	7200	7200
Latency average (ms)	4.16	4.16
Interface transfer rate (MB/s, max)	600	600
Sustained transfer rate[5] (MB/s, max) / (MiB/s, max)	265 / 253	263 / 251, 261 / 249
Reliability		
Error rate (non-recoverable bits read)	1 in 10^{15}	1 in 10^{15}
Load/Unload cycles (at 40°C)	600,000	600,000
Availability (hrs/day x days/wk)	24x7	24x7
MTBF[2] (M hours, projected)	2.5	2.5
Annualized Failure Rate[2] (AFR, projected)	0.35%	0.35%
Workloads	up to 550 TB/year	up to 550 TB/year
Limited warranty (yrs)	5	5

[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). Actual user capacity may be less due to operating environment.

[2] Projected values. Final MTBF and AFR specifications will be based on a sample population and are estimated by statistical measurements and acceleration algorithms under typical operating conditions, typical workload and 40°C device-reported temperature. Derating of MTBF and AFR will occur above these parameters, up to 550TB/year and 60°C (device reported temperature). 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] Based on internal testing; performance may vary depending on host environment, drive capacity, logical block address (LBA), and other factors. 1MiB = 1,048,576 bytes (2^{20}), 1MB = 1,000,000 bytes (10^6)

[6] Idle specification is based on use of Idle_A.

[7] 5°C ambient temperature, 60°C device reported temperature.

	SATA Models	SATA Models
Acoustics		
Idle/Operating (Bels, typical)	2.0/3.2	2.0/3.2
Power		
Requirement	+5 VDC, +12VDC	+5 VDC, +12VDC
Random Read 4KB QD=8 @MAX IOPS (W)	9.4	9.4
Idle[6] (W)	5.5	5.5
Power consumption efficiency at idle (W/TB)	0.20	0.20, 0.21
Physical Size		
z-height (mm)	26.1	26.1
Dimensions (width x depth, mm)	101.6 (+/-0.25) x 147	101.6 (+/-0.25) x 147
Weight (g, max)	670	670
Environmental (Operating)		
Temperature[7]	5° to 60°C	5° to 60°C
Shock (half-sine wave, 2ms, G)	40	40
Vibration (G RMS, 5 to 500Hz)	0.7	0.7
Environmental (Non-operating)		
Ambient temperature	-40° to 70°C	-40° to 70°C
Shock (half-sine wave, 2ms, G)	200	200
Vibration (G RMS, 2 to 200Hz)	1.04	1.04

How to Read Model Number

Example: WSH722880ALxxyz

W = Western Digital
S = Ultrastar
H = Helium (vs. S for Standard)
72 = 7200 RPM
28 = Full capacity (28TB)
80 = Last 2 digits of Capacity for this model (28.0TB)
A = Generation code
L = 26.1 z-height
xx = Interface
  N6 = 4Kn SATA 6Gb/s
  E6 = 512e SATA 6GB/s
y = Power Disable Pin 3 status
  0 = Power Disable Pin 3 support
  L = Legacy Pin3 config - No Power Disable support
z = Data Security Mode
  0 = ISE (Instant Secure Erase)
  1 = SED*: Self-Encrypting Drive TCG-Enterprise and Sanitize Crypto Scramble / Erase
  4 = Base (SE)*: No Encryption. Sanitize Overwrite only.
  5 = SED-FIPS*: Self-Encrypting Drive TCG-Enterprise FIPS
* ATA Security Feature Set comes standard on SATA

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