Western Digital.

Data Sheet

24TB / 22TB[1] | 7200 RPM | 6Gb/s SATA | 12Gb/s SAS

Ultrastar® DC HC580 Data Center HDD

24TB / 22TB to Fuel Data Center Expansion

Relentless growth of data means organizations must find ways to efficiently store more data. That's where higher areal density comes into play, with its ability to boost capacities while not increasing the storage footprint. The Ultrastar DC HC580 24TB / 22TB[1] HDD with OptiNAND™ technology is the next step in data density, allowing data centers to maximize their storage, especially in footprint- and power-constrained environments.

The 24TB / 22TB drive combines several innovative technologies including energy-assist magnetic recording (EAMR), HelioSeal®, triple-stage actuator (TSA) that improves TPI capability with greater control over the actuator arm, improved OptiNAND Technology and ArmorCache™. This innovation is incorporated into a 10-disk CMR drive, delivering the performance, quality, and reliability that data center customers require.

Highlights

- The Ultrastar DC HC580 data center HDD uses new, improved OptiNAND technology to store 24TB / 22TB[1] on a 10-disk CMR drive, enabling a more efficient storage footprint.
- Innovative technologies such as OptiNAND, energy-assisted magnetic recording (EAMR), triple-stage actuator (TSA) and HelioSeal enable high capacity with low power.
- ArmorCache improves performance and provides enterprise power loss protection.
- The Ultrastar DC HC580 is performance-optimized to handle heavy application workloads up to 550TB per year.
- The robust drive delivers dependability and reliability with up to 2.5M hours (projected) MTBF.
- Provides additional peace of mind with a 5-year limited warranty.

Applications/Environments

- Cloud and hyperscale storage
- Massive scale-out (MSO), high-density data centers
- Distributed File Systems
- Primary and secondary storage for Apache Hadoop® for Big Data Analytics
- Hybrid cloud environments
- Hyperconverged infrastructure servers

Low Power for Lower Operating Costs

Innovative technologies such as OptiNAND energy-assisted magnetic recording (EAMR), triple-stage actuator (TSA), and HelioSeal enable high capacity with low power.

OptiNAND Technology Benefits

The Ultrastar DC HC580 is the newest-generation platform with OptiNAND technology, which integrates an iNAND® Universal Flash Storage (UFS) Embedded Flash Drive (EFD), with traditional spinning disk media. Western Digital's new 2.4TB/disk CMR areal density is used with its proven 10-disk platform, delivering up to 24TB[1] capacity with a CMR recording format. More disks and high areal density work together to maximize data storage efficiency.

OptiNAND improves drive resiliency in the event of an emergency power off (EPO) by increasing the amount of non-volatile memory (NVM) available to flush critical metadata to the iNAND.

ArmorCache enabled by OptiNAND technology ensures that all the data in the DRAM cache is safely written to the onboard NVM device, should a sudden power loss event occur. Power to a host system may be lost without warning; operating HDD's with write cache disabled (WCD) reduced the risk of data loss. With ArmorCache technology, host flush cache commands are no longer necessary to protect data, allowing for maximum performance in either WCD or write cache enabled (WCE) mode. This innovative feature provides enterprise power loss protection of data in WCE while increasing performance in WCD mode.

Trusted Reliability and Quality for Data at Scale

The Ultrastar DC HC580 meets modern data center reliability requirements with 2.5M MTBF[2] (projected) and a 5-year limited warranty. It is performance-optimized for heavy application workloads and designed to handle workloads of up to 550TB per year. IT professionals and executives trust Western Digital and the Ultrastar DC HC580 hard drive to deliver unbeaten CM capacity and great value for their data center.

Ultrastar® DC HC580 Data Center HDD

Specifications

	24TB, 22TB SATA Models	24TB, 22TB SAS Models
Model Numbers	WUH722424ALE6L1 WUH722424ALE6L4 WUH722422ALE6L1 WUH722422ALE6L4	WUH722424AL5201 WUH722424AL5204 WUH722422AL5201 WUH722422AL5204
Part Numbers	0F62795 (SED) 0F62796 (Base SE) 0F62784 (SED) 0F62785 (Base SE)	0F62801 (SED) 0F62802 (Base SE) 0F62790 (SED) 0F62791 (Base SE)
Configuration		
Interface	SATA 6Gb/s	SAS 12Gb/s
Capacity[1] (TB)	24TB 22TB	24TB 22TB
Format: Sector size (bytes)[2]	4Kn: 4096 512e: 512	4Kn: 4096 512e: 512
Areal density (Gbits/sq. in.)	1210 1109	1210 1109
ArmorCache	Supported	Supported
Performance		
Data buffer[3] (MB)	512	512
Rotational speed (RPM)	7200	7200
Latency average (ms)	4.16	4.16
Interface transfer rate (MB/s, max)	600	1200
Sustained transfer rate[4] (MB/s, max) / (MiB/s, max)	298 / 284 291 / 277	298 / 284 291 / 277
Random Read[4] 4KB QD=32 (IOPS)	212	212
Random Write[4] 4KB QD=32, WCE/ WCD (IOPS)	565/565	565/565
Random[4] 50/50 Read/Write 4KB QD=4 (IOPS)	220	220
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

[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] Advanced Format drive: 4K (4096-byte) physical sectors.

[3] Portion of buffer capacity used for drive firmware.

[4] Based on internal testing; performance may vary depending on host environment, drive capacity, logical block address (LBA), and other factors. The location of the max rate is at approximately 10% into the capacity of the HDD. 1MiB = 1,048,576 bytes (2^20), 1MB = 1,000,000 bytes (10^6).

[5] 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.

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

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

	24TB, 22TB SATA Models	24TB, 22TB SAS Models
Availability (hrs/day x days/wk)	24x7	24x7
MTBF[5] (M hours, projected)	2.5	2.5
Annualized Failure Rate[5] (AFR, projected)	0.35%	0.35%
Limited warranty (yrs)	5	5
Acoustics		
Idle/Operating (Bels, typical)	2.0/3.2	2.0/3.2
Power		
Requirement	+5 VDC, +12VDC	+5 VDC, +12VDC
Random 50/50 Read/Write, 4KB QD=4 @MAX IOPS (W)	8.4	8.7
Idle[6] (W)	5.5	5.8
Power consumption efficiency at idle (W/TB)	0.23 0.25	0.24 0.26
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° C to 60° C	5° C to 60° C
Shock (half-sine wave 2 ms, G)	40	40
Vibration (G RMS 5 to 500 Hz)	0.7	0.7
Environmental (Non-Operating)		
Ambient Temperature	-40° to 70° C	-40° to 70° C
Shock (half-sine wave, G)	200	200
Vibration (G RMS 2 to 200 Hz)	1.04	1.04

How to Read the Ultrastar Model Number

WUH722424ALxxyz

W = Western Digital
U = Ultrastar
H = Helium (vs. S for Standard)
72 = 7200 RPM
24 = Full capacity (24TB)
24 = Capacity this model (24TB)
A = Generation code
L = 26.1 z-height

xx = Interface
- E6 = 512e SATA 6 Gb/s
- 52 = 512e SAS 12Gb/s

y = Power Disable Pin 3 status
- 0 = Power Disable Pin 3 support
- L = Legacy Pin 3 config - no Power Disable support

z = Data Security Mode
- 1 = SED*: Self Encrypting Drive TCG-Enterprise and Sanitize Crypto Scramble / Erase
- 4 = Base (SE)*: No Encryption. Sanitize Overwrite only.

* ATA Security Feature Set comes standard on SATA

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