22TB to Fuel Data Center Expansion

The explosive growth of data from AI/ML, 5G networks, IoT, connected vehicles, and more is fueling growth in data centers. HDD innovation drives the ability to capture, store, analyze, and protect much of this data. Higher-capacity HDDs deliver higher data density, enabling data center expansion and efficiency.

The Ultrastar® DC HC570 22TB data center HDD with OptiNAND™ technology is the next leap in data density. This 22TB data center HDD enables an incredible 22.44PB of raw storage in a typical rack*. This higher volumetric density allows data centers to maximize their storage, especially in footprint- and power-constrained environments.

The Ultrastar DC HC570 combines several industry-first technologies on a 10-disk CMR drive, delivering the performance, quality, and reliability that data center customers require.

Low Power for Lower Operating Costs

Ultrastar HDDs are designed for optimal power over a variety of workloads. The DC HC570 features low power sequential read/write and mixed random read/write workloads.

OptiNAND Technology Benefits

The Ultrastar DC HC570 is the 2nd-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 2.2TB/disk areal density leadership is extended to a new 10-disk platform, delivering 22TB capacity with 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™ is a feature enabled by OptiNAND that combines the performance of write cache enabled (WCE) mode and the data protection of write cache disabled (WCD) mode, offering the best of both scenarios. When operating in WCE mode, ArmorCache ensures that the DRAM cache will be safely written in event of an EPO and no data is lost. When operating in WCD mode, the drive will ensure that all user data in DRAM is safely written upon EPO, and the drive will operate with WCE-equivalent performance. Performance and data protection are now identical across both WCE and WCD modes.

Trusted Reliability and Quality for Data at Scale

The Ultrastar DC HC570 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. It offers security and encryption options to help protect data from unauthorized use, including SED models.

Trust Western Digital and the Ultrastar DC HC570 hard drive to deliver the highest capacity and greatest value for your data center.

Highlights

- 22TB capacity in a standard 3.5-inch form factor
- OptiNAND technology for highest capacities, with ArmorCache™ providing enterprise power loss protection and increased performance
- Reliable, field-proven, 8th-generation HelioSeal® design
- Low power for common data center sequential and random read/write workloads
- Industry-leading HDD technologies: ePMR, triple-stage actuator (TSA), HelioSeal
- 2.5M hours (projected) MTBF rating and 5-year limited warranty
- Self-encrypting drive options

Applications/Environments

- 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 Apache Hadoop® for Big Data Analytics

*Configuration: 42U, 10x 4U JBOD, 102 drives/chassis
## Specifications

<table>
<thead>
<tr>
<th></th>
<th>SATA Models</th>
<th>SAS Models</th>
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<tbody>
<tr>
<td>Model No.</td>
<td>WUH722222ALE61L</td>
<td>WUH722222ALS201</td>
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<td></td>
<td>WUH722222ALE61A</td>
<td>WUH722222ALS204</td>
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<tr>
<td><strong>Configuration</strong></td>
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<tr>
<td>Interface</td>
<td>SATA 6Gb/s</td>
<td>SAS 12Gb/s</td>
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<tr>
<td>Capacity</td>
<td>22TB</td>
<td>22TB</td>
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<tr>
<td>Format: Sector size (bytes)</td>
<td>4Kn: 4096 4Kn: 4096</td>
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<tr>
<td>Areal density (Gbits/sq. in.)</td>
<td>515e: 515e</td>
<td>515e: 515e</td>
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<tr>
<td>ArmorCache</td>
<td>Supported</td>
<td>Supported</td>
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<tr>
<td><strong>Performance</strong></td>
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<tr>
<td>Data buffer (MB)</td>
<td>512</td>
<td>512</td>
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<tr>
<td>Rotational speed (RPM)</td>
<td>7200</td>
<td>7200</td>
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<tr>
<td>Latency average (ms)</td>
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<td>Interface transfer rate (MB/s, max)</td>
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<td>1200</td>
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<tr>
<td>Sustained transfer rate (MB/s, max) / (MB/s, max)</td>
<td>291/277</td>
<td>291/277</td>
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<tr>
<td>Random Read 4KB QD=32 (IOPS)</td>
<td>565/565</td>
<td>565/565</td>
</tr>
<tr>
<td>Random* 50/50 Read/Write 4KB QD=4 (IOPS)</td>
<td>214</td>
<td>214</td>
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<tr>
<td><strong>Reliability</strong></td>
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<td></td>
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<tr>
<td>Error rate</td>
<td>1 in 10^6</td>
<td>1 in 10^6</td>
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<tr>
<td>Load/Unload cycles (at 40ºC)</td>
<td>600,000</td>
<td>600,000</td>
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<tr>
<td>Availability</td>
<td>24/7</td>
<td>24/7</td>
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<td>MTBF* (M hours, projected)</td>
<td>2.5</td>
<td>2.5</td>
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<tr>
<td>Annualized Failure Rate (AFR, projected)</td>
<td>0.35%</td>
<td>0.35%</td>
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<tr>
<td>Limited warranty (yrs)</td>
<td>5</td>
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</tbody>
</table>

### Acoustics

- Idle/Operating (Belts, typical): 2.0/3.2
- Power consumption efficiency at idle (W/TB): 0.26

### Power

- Requirement: +5 VDC, +12VDC
- Random 50/50 Read/Write, 4KB QD=4 (MAX IOPS (W))
- Power efficiency (W): 5.7
- Power consumption efficiency at idle (W/TB): 0.27

### Physical Size

- Dimensions (width x depth, mm): 101.6 (+/-0.25) x 147
- Weight (g, max): 670

### Environmental (Operating)

- Temperature: 5°C to 60°C
- Shock (half-sine wave, G): 40
- Vibration (G RMS 5 to 500 Hz): 0.7

### Environmental (Non-Operating)

- Ambient Temperature: -40°C to 70°C
- Shock (half-sine wave, G): 200
- Vibration (G RMS 2 to 200 Hz): 1.04

### How to Read the Ultrastar Model Number

**Example:** WUH722222ALxxxy

- **W** = Western Digital
- **U** = Ultrastar
- **H** = Helium (vs. S for Standard)
- **U** = Ultrastar
- **xx** = Interface
  - E6 = 512e SATA 6Gb/s,
  - 52 = 512e SAS 12Gb/s
- **yy** = Power Disable Pin 3 status
  - 0 = Power Disable Pin 3 support
  - 40 = Legacy Pin 3 config – no Power Disable support
- **zz** = Data Security Mode
  - 1 = SED*: Self Encrypting Drive
  - 3 = TCG-Enterprise and Sanitize Crypto
  - 4 = Base (SE)*: No Encryption
- **L** = Generation code
  - L = 26.1

### Notes

1. One MB is equal to one million bytes; one GB is equal to one billion bytes. Actual user capacity may be less due to operating environment.
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 may vary approximately 10% in the capacity of the HDD. 1MB = 1,048,576 bytes (2^20), 1TB = 1,000,000,000 bytes (10^9).
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 25°C drive reported temperature. Denrating of MTBF and AFR will occur above these parameters, up to 55ºC drive temperature. MTBF and AFR ratings do not predict an individual drive’s reliability and do not constitute a warranty.

### Dependencies

- How to Read the Ultrastar model number
- *ATA Security Feature Set comes with SSDs*