



DATA SHEET

Scalable. Responsive. Innovative.

Exos X14 and Exos X14z



Seagate manufactures hard drives that specifically address the needs of the hyperscale storage market. As the flagship of the Seagate® X class, the Exos™ X14 and Exos X14z enterprise hard drives is the highest-capacity hard drive in the fleet.



Best-Fit Applications

- Hyperscale applications/cloud data centres
- Massive scale-out data centres
- Big data applications
- High-capacity density RAID storage
- Mainstream enterprise external storage arrays
- Distributed file systems, including Hadoop and Ceph
- Enterprise backup and restore — D2D, virtual tape
- Centralised surveillance

Maximum Storage Capacity for Highest Rack Space Efficiency

14 TB per drive¹ for 40% more petabytes per rack

Industry's lowest power and weight for optimum data centre TCO

Highest 14 TB hard drive performance with enhanced caching, making it perfect for big data applications

Hyperscale SATA model tuned for large data transfers

PowerBalance™ feature optimises IOPS/Watt

Helium sealed-drive design with no porosity and uniform density

Superior material and weld-width design for a more robust, hermetically sealed-drive enclosure that protects from helium leaks

Digital environmental sensors for measuring internal pressure, helping to ensure high reliability, performance and quality

Latest hermetic interconnect technology supporting higher data rate heads and higher pin counts for extreme thermal conditions

Proven enterprise-class reliability backed by **2.5 M-hr MTBF rating**

¹ Compared to 10 TB competitive product



| Specifications | SATA 6 Gb/s | 12 Gb/s SAS | SATA 6 Gb/s | 12 Gb/s SAS | SATA 6 Gb/s |
|---|--------------------|---------------------|--------------------|---------------------|--------------------|
| Capacity | 14 TB | 14 TB | 12 TB | 12 TB | 10 TB |
| Hyperscale (512e) | — | — | — | — | — |
| Hyperscale (4Kn) | — | — | — | — | — |
| Standard Model FastFormat™ (512e/4Kn) ¹ | ST14000NM0018 | ST14000NM0048 | ST12000NM0008 | ST12000NM0038 | ST10000NM0478 |
| SED Model FastFormat (512e/4Kn) ^{1,2} | ST14000NM0258 | ST14000NM0288 | ST12000NM0248 | ST12000NM0278 | ST10000NM0568 |
| SED-FIPS FastFormat (512e/4Kn) ^{1,2} | — | ST14000NM0378 | — | ST12000NM0368 | — |
| Features | | | | | |
| Helium Sealed-Drive Design | Yes | Yes | Yes | Yes | Yes |
| Protection Information (T10 DIF) | — | Yes | — | Yes | — |
| Super Parity | Yes | Yes | Yes | Yes | Yes |
| Low Halogen | Yes | Yes | Yes | Yes | Yes |
| PowerChoice™ Idle Power Technology | Yes | Yes | Yes | Yes | Yes |
| PowerBalance™ Power/Performance Technology | Yes | Yes | Yes | Yes | Yes |
| Hot-Plug Support ³ | Yes | Yes | Yes | Yes | Yes |
| Cache, Multi-segmented (MB) | 256 | 256 | 256 | 256 | 256 |
| Organic Solderability Preservative | Yes | Yes | Yes | Yes | Yes |
| RSA 2048 Firmware Verification (SD&D) | Yes | Yes | Yes | Yes | Yes |
| Reliability/Data Integrity | | | | | |
| Mean Time Between Failures (MTBF, hours) | 2,500,000 | 2,500,000 | 2,500,000 | 2,500,000 | 2,500,000 |
| Reliability Rating @ Full 24x7 Operation (AFR) | 0.35% | 0.35% | 0.35% | 0.35% | 0.35% |
| Non-recoverable Read Errors per Bits Read, Max | 1 sector per 10E15 | 1 sector per 10E15 | 1 sector per 10E15 | 1 sector per 10E15 | 1 sector per 10E15 |
| Power-On Hours per Year (24x7) | 8,760 | 8,760 | 8,760 | 8,760 | 8,760 |
| 512e Sector Size (Bytes per Sector) | 512 | 512, 520, 528 | 512 | 512, 520, 528 | 512 |
| 4Kn Sector Size (Bytes per Sector) | 4,096 | 4,096, 4,160, 4,224 | 4,096 | 4,096, 4,160, 4,224 | 4,096 |
| Limited Warranty (years) | 5 | 5 | 5 | 5 | 5 |
| Performance | | | | | |
| Spindle Speed (RPM) | 7,200 RPM | 7,200 RPM | 7,200 RPM | 7,200 RPM | 7,200 RPM |
| Interface Access Speed (Gb/s) | 6.0, 3.0 | 12.0, 6.0, 3.0 | 6.0, 3.0 | 12.0, 6.0, 3.0 | 6.0, 3.0 |
| Max. Sustained Transfer Rate OD (MB/s, MiB/s) | 261, 249 | 261, 249 | 245, 233 | 245, 233 | 245, 233 |
| Random Read/Write 4K QD16 WCD (IOPS) | 170/418 | 170/418 | 170/418 | 170/418 | 170/418 |
| Average Latency (ms) | 4.16 | 4.16 | 4.16 | 4.16 | 4.16 |
| Interface Ports | Single | Dual | Single | Dual | Single |
| Rotation Vibration @ 20-1500 Hz (rad/sec ²) | 12.5 | 12.5 | 12.5 | 12.5 | 12.5 |
| POWER CONSUMPTION | | | | | |
| Idling Average (W) | 5 W | 5 W | 5 W | 5 W | 5 W |
| Max Operating, Random Read/Write 4K/16Q (W) | 10.0, 6.0 | 10.2, 6.2 | 10.0, 6.0 | 10.2, 6.2 | 9.8, 5.8 |
| Power Supply Requirements | +12 V and +5 V | +12 V and +5 V | +12 V and +5 V | +12 V and +5 V | +12 V and +5 V |
| Environmental | | | | | |
| Temperature, Operating (°C) | 5°C – 60°C | 5°C – 60°C | 5°C – 60°C | 5°C – 60°C | 5°C – 60°C |
| Vibration, Non-operating: 2 to 500 Hz (Grms) | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 |
| Shock, Operating 2 ms (Read/Write) (Gs) | 70/40 Gs | 70/40 Gs | 70/40 Gs | 70/40 Gs | 70/40 Gs |
| Shock, Non-operating 2 ms (GS) | 250 | 250 | 250 | 250 | 250 |
| Physical | | | | | |
| Height (mm/in, max) ⁴ | 26.11 mm/1.028 in | 26.11 mm/1.028 in | 26.11 mm/1.028 in | 26.11 mm/1.028 in | 26.11 mm/1.028 in |
| Width (mm/in, max) ⁴ | 101.85 mm/4.01 in | 101.85 mm/4.01 in | 101.85 mm/4.01 in | 101.85 mm/4.01 in | 101.85 mm/4.01 in |
| Depth (mm/in, max) ⁴ | 147 mm/5.787 in | 147 mm/5.787 in | 147 mm/5.787 in | 147 mm/5.787 in | 147 mm/5.787 in |
| Weight (lb/g) | 690 g/1.521 lb | 690 g/1.521 lb | 690 g/1.521 lb | 690 g/1.521 lb | 690 g/1.521 lb |
| Carton Unit Quantity | 20 | 20 | 20 | 20 | 20 |
| Carts per Pallet / Carts per Layer | 40/8 | 40/8 | 40/8 | 40/8 | 40/8 |

¹ FastFormat models ship in 512e format state. When switching from 512e to 4Kn by executing the FastFormat routine, all data on the drive will be deleted. Note that data must be aligned to 4K sectors to see improved performance in 4Kn format.

² Self-Encrypting Drives (SED) and FIPS 140-2 Validated drives available through franchised authorised distributors. May require TCG-compliant host or controller support.

³ Supports Hotplug operation per Serial ATA Revision 3.3 specification

⁴ These base deck dimensions conform to the Small Form Factor Standard (SFF-8301) found at www.sffcommittee.org. For connector-related dimensions, see SFF-8323.



| Specifications | 12 Gb/s SAS |
|---|---------------------|
| Capacity | 10 TB |
| Hyperscale (512e) | — |
| Hyperscale (4Kn) | — |
| Standard Model FastFormat™ (512e/4Kn) ¹ | ST10000NM0528 |
| SED Model FastFormat (512e/4Kn) ^{1,2} | ST10000NM0578 |
| SED-FIPS FastFormat (512e/4Kn) ^{1,2} | ST10000NM0608 |
| Features | |
| Helium Sealed-Drive Design | Yes |
| Protection Information (T10 DIF) | Yes |
| Super Parity | Yes |
| Low Halogen | Yes |
| PowerChoice™ Idle Power Technology | Yes |
| PowerBalance™ Power/Performance Technology | Yes |
| Hot-Plug Support ³ | Yes |
| Cache, Multi-segmented (MB) | 256 |
| Organic Solderability Preservative | Yes |
| RSA 2048 Firmware Verification (SD&D) | Yes |
| Reliability/Data Integrity | |
| Mean Time Between Failures (MTBF, hours) | 2,500,000 |
| Reliability Rating @ Full 24x7 Operation (AFR) | 0.35% |
| Non-recoverable Read Errors per Bits Read, Max | 1 sector per 10E15 |
| Power-On Hours per Year (24x7) | 8,760 |
| 512e Sector Size (Bytes per Sector) | 512, 520, 528 |
| 4Kn Sector Size (Bytes per Sector) | 4,096, 4,160, 4,224 |
| Limited Warranty (years) | 5 |
| Performance | |
| Spindle Speed (RPM) | 7,200 RPM |
| Interface Access Speed (Gb/s) | 12.0, 6.0, 3.0 |
| Max. Sustained Transfer Rate OD (MB/s, MiB/s) | 245, 233 |
| Random Read/Write 4K QD16 WCD (IOPS) | 170/418 |
| Average Latency (ms) | 4.16 |
| Interface Ports | Dual |
| Rotation Vibration @ 20-1500 Hz (rad/sec ²) | 12.5 |
| POWER CONSUMPTION | |
| Idling Average (W) | 5 W |
| Max Operating, Random Read/Write 4K/16Q (W) | 10.2, 6.2 |
| Power Supply Requirements | +12 V and +5 V |
| Environmental | |
| Temperature, Operating (°C) | 5°C – 60°C |
| Vibration, Non-operating: 2 to 500 Hz (Grms) | 2.27 |
| Shock, Operating 2 ms (Read/Write) (Gs) | 70/40 Gs |
| Shock, Non-operating 2 ms (GS) | 250 |
| Physical | |
| Height (mm/in, max) ⁴ | 26.11 mm/1.028 in |
| Width (mm/in, max) ⁴ | 101.85 mm/4.01 in |
| Depth (mm/in, max) ⁴ | 147 mm/5.787 in |
| Weight (lb/g) | 690 g/1.521 lb |
| Carton Unit Quantity | 20 |
| Cartons per Pallet / Cartons per Layer | 40/8 |

¹ FastFormat models ship in 512e format state. When switching from 512e to 4Kn by executing the FastFormat routine, all data on the drive will be deleted. Note that data must be aligned to 4K sectors to see improved performance in 4Kn format.

² Self-Encrypting Drives (SED) and FIPS 140-2 Validated drives available through franchised authorized distributors. May require TCG-compliant host or controller support.

³ Supports Hotplug operation per Serial ATA Revision 3.3 specification

⁴ These base deck dimensions conform to the Small Form Factor Standard (SFF-8301) found at www.sffcommittee.org. For connector-related dimensions, see SFF-8323.

© 2019 Seagate Technology LLC. All rights reserved. Seagate, Seagate Technology, and the Spiral logo are registered trademarks of Seagate Technology LLC in the United States and/or other countries. Exos, the Exos logo, FastFormat, PowerBalance, PowerChoice, Seagate RAID Rebuild, and Seagate Secure are either trademarks or registered trademarks of Seagate Technology LLC or one of its affiliated companies in the United States and/or other countries. All other trademarks or registered trademarks are the property of their respective owners. When referring to drive capacity, one gigabyte, or GB, equals one billion bytes; and one terabyte, or TB, equals one trillion bytes. Your computer's operating system may use a different standard of measurement and report a lower capacity. In addition, some of the listed capacity is used for formatting and other functions, and thus will not be available for data storage. Actual data rates may vary depending on operating environment and other factors, such as chosen interface and disk capacity. The export or re-export of Seagate hardware or software is regulated by the U.S. Department of Commerce, Bureau of Industry and Security (for more information, visit www.bis.doc.gov), and may be controlled for export, import and use in other countries. Seagate reserves the right to change, without notice, product offerings or specifications. DS1974.5-1912GB December 2019