Data Sheet

Constellation® ES.2

2TB and 3TB Capacity-Optimized Enterprise Hard Drives for Bulk-Data Applications

Key Advantages

- Highest-capacity enterprise drive for demanding data growth[1]
- Fifth-generation SAS and SATA drives designed for 24×7 reliability
- SAS-based, end-to-end data integrity and enhanced error correction for accurate data storage
- Best-in-class enhanced rotational vibration tolerance ensures consistent performance.
- Improved power and cooling efficiencies with low power consumption and enhanced PowerChoice™ technology
- Multi-drive firmware maximized for enterprise system availability
- Robust performance with dual processor and ramp load technologies
- Self-Encrypting Drive (SED) option (AES-256) cuts IT drive retirement costs while securely protecting data where it lives—on the drive.[2]
- FIPS 140-2 Validated™ drives protect *Sensitive but Unclassified and Protected* class data.[2,3]

Best-Fit Applications

- High-capacity bulk-data storage
- Mainstream enterprise external storage arrays (SAN, NAS, DAS)
- Enterprise backup and restore—D2D, virtual tape
- Centralized surveillance
- Cloud storage

1 Seagate recommends validating your configuration with your HBA/RAID controller manufacturer to ensure full 3TB capacity capabilities.
2 Self-Encrypting Drives (SED) and FIPS 140-2 Validated drives are not available in all models or countries. May require TCG-compliant host or controller support.
3 See FIPS 140-2 Level 2 Certificate at http://csrc.nist.gov/groups/STM/cmvp/documents/140-1/1401val2011.htm#1635



Constellation® ES.2

2TB and 3TB Capacity-Optimized Enterprise Hard Drives for Bulk-Data Applications

Specifications	6Gb/s SAS		SATA 6Gb/s	
	3TB[1,2]	2TB[1]	3TB[1,2]	2TB[1]
Standard Model Number	ST33000650SS	ST32000645SS	ST33000650NS	ST32000645NS
SED (AES-256) Model Number	ST33000651SS[3]	ST32000646SS[3]	ST33000651NS[3]	ST32000646NS[3]
SED (AES-256) FIPS 140-2 Model Number	ST33000652SS[3,4]	ST32000647SS[3,4]	ST33000652NS[3,4]	ST32000647NS[3,4]
Features				
Protection Information	Yes	Yes	—	—
Low Halogen	Yes	Yes	Yes	Yes
Cache, Multisegmented (MB)	64	64	64	64
Reliability/Data Integrity				
Mean Time Between Failures (MTBF, hours)	1.2 million	1.2 million	1.2 million	1.2 million
Reliability Rating @ Full 24x7 Operation (AFR)	0.73%	0.73%	0.73%	0.73%
Nonrecoverable Read Errors per Bits Read	1 sector per 10E15	1 sector per 10E15	1 sector per 10E15	1 sector per 10E15
Power-On Hours per Year	8760	8760	8760	8760
Bytes per Sector	512, 520, 528	512, 520, 528	512	512
Limited Warranty (years)[5]	5	5	5	5
Performance				
Spindle Speed (RPM)	7200	7200	7200	7200
Interface Access Speed (Gb/s)	6.0, 3.0, 1.5	6.0, 3.0, 1.5	6.0, 3.0, 1.5	6.0, 3.0, 1.5
Max. Sustained Transfer Rate (MB/s)	155	155	155	155
Seek Time, Average Read/Write (ms)	8.5/9.5	8.5/9.5	8.5/9.5	8.5/9.5
Average Latency (ms)	4.16	4.16	4.16	4.16
Interface Ports	Dual	Dual	Single	Single
Rotational Vibration @ 1500 Hz (rad/sec^2)	12.5	12.5	12.5	12.5
Power Consumption				
Idle (W)	7.4	7.4	7.7	7.7
Typical Operating, Random Read (W)	11.3	11.3	10.7	10.7
Power Supply Requirements	+12V and +5V	+12V and +5V	+12V and +5V	+12V and +5V
PowerChoice™ Technology	Yes	Yes	Yes	Yes
Environmental				
Temperature, Operating (°C)	5 to 60	5 to 60	5 to 60	5 to 60
Vibration, Nonoperating: <5Hz to 500Hz (Gs)	4.9	4.9	4.9	4.9
Shock, Operating, 2ms (Read/Write) (Gs)	70/40	70/40	70/40	70/40
Shock, Nonoperating, 1ms and 2ms (Gs)	300	300	300	300
Physical				
Height (in/mm, max)[6]	1.028/26.10	1.028/26.10	1.028/26.10	1.028/26.10
Width (in/mm, max)[6]	4.010/101.85	4.010/101.85	4.010/101.85	4.010/101.85
Depth (in/mm, max)[6]	5.787/147.00	5.787/147.00	5.787/147.00	5.787/147.00
Weight (lb/g)	1.543/700	1.543/700	1.543/700	1.543/700
Carton Unit Quantity	20	20	20	20
Cartons per Pallet	40	40	40	40
Cartons per Layer	8	8	8	8

1 One gigabyte, or GB, equals one billion bytes and one terabyte, or TB, equals one trillion bytes when referring to drive capacity.
2 Seagate recommends validating your configuration with your HBA/RAID controller manufacturer to ensure full 3TB capacity capabilities.
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May require TCG-compliant host or controller support.
4 See FIPS 140-2 Level 2 Certificate at http://csrc.nist.gov/groups/STM/cmvp/documents/140-1/1401val2011.htm#1635
5 Nearline products shipped between December 31, 2011, and June 30, 2012, have a 3-year limited warranty. Nearline products shipped before December 31, 2011, or after June 30, 2012, have a 5-year limited warranty.
6 These base deck dimensions conform to the Small Form Factor Standard (SFF-8201) found at www.sffcommittee.org.
For connector-related dimensions, see SFF-8223.

FIPS 140-2 INSIDE

Serial Attached SCSI

SERIAL ATA

Think Green™

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