Seagate ®

Data Sheet

Constellation® ES

High-capacity storage designed for seamless enterprise integration

2 TB, 1 TB and 500 GB • 7,200 RPM •
3.5-inch form factor • 6 Gb/s SAS and SATA 6 Gb/s

Key Advantages

• Fifth-generation, enterprise, nearline drive designed for 24×7 operation

• Up to 2 TB capacity for data-hungry enterprise business applications

• Best-in-class enhanced rotational vibration tolerance ensures unrivalled performance in high-density applications requiring continuous data access

• Enhanced efficiencies with PowerChoice™ host-selectable power options for unprecedented savings during slow or idling periods

• Seagate RAID Rebuild™ development platform significantly reduces hours of lost productivity

• Multi-drive firmware maximised for enterprise system availability

• Robust performance with dual processor and ramp load technologies (35% average sustained throughput increase over previous generation)

• Provides business sustainability with Seagate Unified Storage architecture

  - 6 Gb/s SAS performance with error detection and correction (IOEDC/IOECC) capabilities and PI (Protection Information)

  - Self-Encrypting Drive (SED) option cuts IT drive retirement expenses while protecting data securely and is one of the easiest, most cost-effective security measures you can implement[1]

  - FIPS Self-Encrypting Drive option provides all the benefits of SED and is NIST certified to meet US, Canadian and UK government data encryption compliance requirements[1, 2]

Best-fit Applications

• High-capacity data centre storage

• Mainstream enterprise external storage arrays (SAN, NAS, DAS)

• Enterprise backup and restore — D2D, virtual tape

• Centralised surveillance

• Cloud storage

[1] Self-Encrypting Drive (SED) and FIPS Self-Encrypting Drive options require TCG-compliant host or controller support. Not available in all countries.

[2] See FIPS 140-2 Level 2 Certificate at http://csrc.nist.gov/groups/STM/cmvp/documents/140-1/1401vend.htm.

Seagate
5-Year
Warranty

FIPS 140-2 INSIDE

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Specifications	6 Gb/s SAS,			SATA 6 Gb/s			SATA 3 Gb/s		
	2 TB[1]	1 TB[1]	500 GB[1]	2 TB[1]	1 TB[1]	500 GB[1]	2 TB[1]	1 TB[1]	500 GB[1]
Standard Model	ST32000444SS ST2000NM0001[5]	ST31000424SS ST1000NM0001[5]	ST3500414SS ST500NM0001[5]	ST2000NM0011	ST1000NM0011	ST500NM0011	ST32000644NS	ST31000524NS	ST3500514NS
SED 256 Model	ST2000NM0021[2]	ST1000NM0021[2]	ST500NM0021[2]	ST2000NM0031[2]	ST1000NM0031[2]	ST500NM0031[2]			
SED 128 Model	ST32000445SS[2]	ST31000425SS[2]	ST3500415SS[2]						
SED 128 with FIPS Model	ST32000446SS[3]	ST31000426SS[3]	ST3500416SS[3]						
Features									
Protection Information	Yes[5]	Yes[5]	Yes[5]	–	–	–	–	–	–
Low Halogen	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Self-Encrypted Drive (SED) Option	Yes	Yes	Yes	Yes	Yes	Yes	–	–	–
Configuration/Organisation									
Bytes per Sector	512, 520, 528	512, 520, 528	512, 520, 528	512	512	512	512	512	512
Reliability/Data Integrity									
Power-On Hours (annual)	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760	8,760
Mean Time Between Failures (MTBF, hours)	1.2 million	1.2 million	1.2 million	1.2 million	1.2 million	1.2 million	1.2 million	1.2 million	1.2 million
Reliability Rating at Full 24×7 Operation (AFR)	0.73%	0.73%	0.73%	0.73%	0.73%	0.73%	0.73%	0.73%	0.73%
Non-recoverable Read Errors per Bits Read	1 sector per 10^{15}	1 sector per 10^{15}	1 sector per 10^{15}	1 sector per 10^{15}	1 sector per 10^{15}	1 sector per 10^{15}	1 sector per 10^{15}	1 sector per 10^{15}	1 sector per 10^{15}
IOEDC (I/O Error Dectection Code)	Reads/Writes	Reads/Writes	Reads/Writes	Reads/Writes	Reads/Writes	Reads/Writes	Reads/Writes	Reads/Writes	Reads/Writes
IOECC (I/O Error Correction Code)	Reads/Writes	Reads/Writes	Reads/Writes	Writes	Writes	Writes	Writes	Writes	Writes
Load/Unload Cycles (at 40°C)	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000	300,000
Interface Ports	Dual	Dual	Dual	Single	Single	Single	Single	Single	Single
Limited Warranty (years)	5	5	5	5	5	5	5	5	5
Performance									
Spindle Speed (RPM)	7,200	7,200	7,200	7,200	7,200	7,200	7,200	7,200	7,200
Seek Time, Average Read/Write (ms)	8.5/9.5	8.5/9.5	8.5/9.5	8.5/9.5	8.5/9.5	8.5/9.5	8.5/9.5	8.5/9.5	8.5/9.5
Max Sustained Transfer Rate (MB/s)	150	150	150	140	150	150	140	140	140
Cache, Multi-segmented (MB)	Up to 64	Up to 64	Up to 64	64	64	64	64	32	32
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	6.0, 3.0, 1.5	6.0, 3.0, 1.5	3.0, 1.5	3.0, 1.5	3.0, 1.5
Rotational Vibration @ 1,500Hz (rad/s²)	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
Power Management									
Power Supply Requirements	+12V and +5V	+12V and +5V	+12V and +5V	+12V and +5V	+12V and +5V	+12V and +5V	+12V and +5V	+12V and +5V	+12V and +5V
Idling (W)	7.26	5.41	4.67	6.39	4.61	3.74	6.39	4.61	3.74
Typical Operating Power (W) Random Read Random Write	10.43 10.15	8.04 7.28	7.89 7.18	9.03 7.80	7.42 6.21	6.47 5.31	9.03 7.80	7.42 6.21	6.47 5.31
PowerChoice™ Option (W)	As low as 1.39	As low as 1.34	As low as 1.44	As low as 0.53	As low as 0.57	As low as 0.55	As low as 0.53	As low as 0.57	As low as 0.55
Environmental									
Operating Temperature Range (°C)	5 to 60	5 to 60	5 to 60	5 to 60	5 to 60	5 to 60	5 to 60	5 to 60	5 to 60
Vibration (Gs) Operating: 5 to 500Hz Non-operating: 10 to 500Hz	0.5 2.0	0.5 2.0	0.5 2.0	0.25 4.9	0.25 4.9	0.25 4.9	0.25 4.9	0.25 4.9	0.25 4.9
Shock (Gs) Operating, 2ms Non-operating: 1ms and 2ms	70 300	70 350	70 350	70 300	70 350	70 350	70 300	70 350	70 350
Physical									
Height (in/mm)[4]	1.028/26.11	1.028/26.11	1.028/26.11	1.028/26.11	1.028/26.11	1.028/26.11	1.028/26.11	1.028/26.11	1.028/26.11
Width (in/mm)[4]	4.010/101.85	4.010/101.85	4.010/101.85	4.010/101.85	4.010/101.85	4.010/101.85	4.010/101.85	4.010/101.85	4.010/101.85
Depth (in/mm)[4]	5.787/147.00	5.787/147.00	5.787/147.00	5.787/147.00	5.787/147.00	5.787/147.00	5.787/147.00	5.787/147.00	5.787/147.00
Weight (lb/g)	1.57/713	1.41/640	1.34/608	1.57/713	1.411/640	1.345/611	1.57/713	1.411/640	1.345/611
Carton Unit Quantity	20	20	20	20	20	20	20	20	20
Cartons per Pallet	40	40	40	40	40	40	40	40	40
Cartons per Layer	8	8	8	8	8	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] Self-Encrypting Drive model; requires TCG-compliant host or controller support. Not available in all countries.
[3] FIPS Self-Encrypting Drive model; Requires TCG-compliant host or controller support. Not available in all countries.
[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.
[5] Protection Information included

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