

**Specificații Tehnice pentru Lot nr. 1: Soluția de asigurare a copiilor de rezervă**

	Specificații Tehnice	Cantitatea
<b>Type and name</b>	<b>Synology RackStation RC18015xs+</b>	2
CPU	Intel Xeon E3-1230 v2 64-bit Quad Core 3.3 (base) / 3.7 (turbo) GHz Hardware Encryption Engine (AES-NI)	
Memory	8 GB DDR3 ECC	
External Ports	4x RJ-45 1GbE LAN Port (with Link Aggregation / Failover support) + 1 for Heartbeat 2x USB 3.0 Port 1x Expansion Port	
Form Factor	1U rack mount	
Certification	EAC CCC FCC CE BSMI	
Warranty	5 years	
<b>Type and name</b>	<b>Synology Expansion Unit RXD1215sas</b>	
Drive Bays	12	
Compatible Drive Typ	3.5" SAS HDD 2.5" SAS HDD 2.5" SAS SSD	
Maximum Internal Raw Capacity	192 TB (16 TB drive x 12)	
Hot Swappable Drive	Yes	
External Ports	2x SAS IN-port 2x SAS OUT-port	
Certification	FCC CE BSMI	
Warranty	5 Years	
<b>Type and name</b>	<b>Samsung 860 PRO MZ-76P1T0BW</b>	10
Specification	2.5" SATA SSD 1.0TB R/W:560/530MB/s, 100K IOPS, MJX, VNAND 2bit ML	
<b>Type and name</b>	<b>Seagate ST16000NM002G</b>	110
Specification	3.5" 12 Gb/s SAS 16 TB 7,200 RPM	
<b>Type and name</b>	<b>Intel® Ethernet Converged Network Adapter X710-DA4</b>	2
Port Configuration	Quad	
Data Rate Per Port	10/1GbE	
Controller Intel® Ethernet Controller	X710	
System Interface Type	PCIe v3.0 (8.0 GT/s)	
Storage Over Ethernet	iSCSI NFS	
<b>Type and name</b>	Software components: DiskStation Manager, Synology Active Backup, Synology File Station	2
<b>Type and name</b>	Livrarea, instalarea si configurarea soluție	1
<b>Type and name</b>	Instruirea personalului privind gestionarea soluție	1



# High-Availability Cluster

## RackStation RC18015xs+ / Expansion Unit RXD1215sas

Synology high-availability cluster integrates two RackStation RC18015xs+ as dual computing nodes and multiple Expansion Unit RXD1215sas as shared storage units, providing the secure, reliable, and superior-performance network attached storage solution for large scale businesses. Synology RC18015xs+ and RXD1215sas are backed with Synology's 5-year limited warranty.

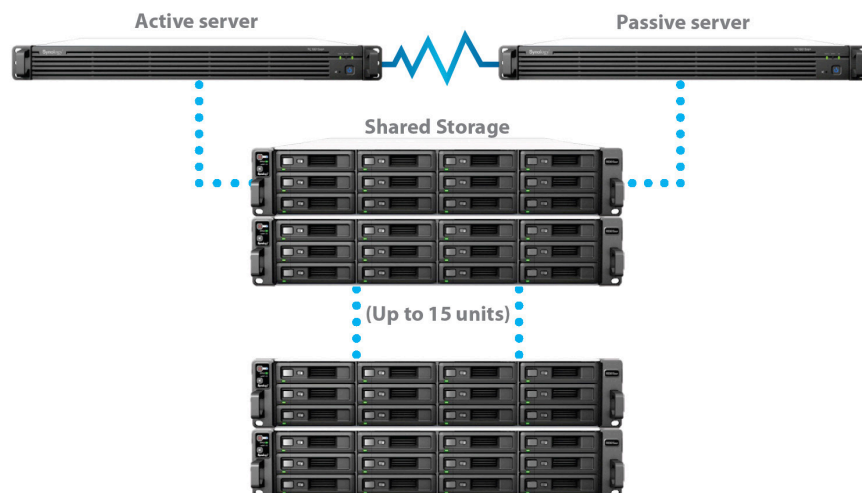
### Highlights

- High-availability cluster<sup>1</sup> powered by dual computing nodes & shared storage
- Data protection by snapshot technology
- SSD cache support
- Scale up to 180 drives with 15 Synology RXD1215sas<sup>2</sup>
- Superior performance fueled by quad-core 3.3GHz CPU in each computing node
- Optional 10GbE network capability<sup>3</sup>
- VMware<sup>®</sup>, Citrix<sup>®</sup>, and Microsoft<sup>®</sup> Hyper-V<sup>®</sup> certified
- Backed with Synology's 5-year limited warranty & Synology Replacement Service (SRS)

### Reliable Active/Passive Failover Cluster

System and service availability is critical for businesses. However, server component, environmental problems, human errors, or system malfunctions happen sometimes that might lead to service interruption and raise the cost of running businesses.

Synology high-availability (HA) cluster solution is born to alleviate this problem by combining two RackStation RC18015xs+ and multiple Expansion Unit RXD1215sas as one HA cluster. The two RC18015xs+ computing nodes provide **Active / Passive automatic failover**. If the active server suffers a malfunction, the passive server is able to provide quick relief by taking over all the running applications and services, ensuring high levels of availability.



The connected RXD1215sas acts as the shared storage pool of the two servers, so no data replication is required, saving more energy and rack spaces. The storage capacity is expandable by adding more RXD1215sas (up to 15 sets) to the HA cluster, providing the scalability up to 180 HDDs and a maximum raw capacity beyond 1 petabyte.



The Btrfs file system brings storage management to the next level by providing more efficient storage utilization, scheduled shared folder snapshot, and file / folder-level data restoration.

## Btrfs: Next Generation Storage Efficiency

RC18015xs+ introduces the **Btrfs file system**, bringing the most advanced storage technologies to meet the management needs of modern large scale businesses:

- **Built-in data integrity check** detects data and file system corruption with data and meta-data checksums and improve overall stability.
- **Flexible Shared Folder/User Quota System** provides comprehensive quota control on all user accounts and shared folders.
- **Advanced snapshot technology** with customizable backup schedule allows up to **256 copies** of shared folder backups without occupying huge storage capacity and system resources.
- **File or folder level data restoration** brings huge convenience and saves time for users who wish to restore only the specific single file or folder.
- **Cloud Station with file versioning** reduces down to half of storage consumption when compared with Ext4 file system.

## Superior Performance

RC18015xs+ delivers superior performance at over **2,270 MB/s throughput** and **355,400 IOPS** with dual 10GbE connection using link aggregation.<sup>4</sup> Through advanced flash technology, the combination of hard drives and SSD cache boosts throughput efficiently while minimizing cost per gigabyte.

In addition to the default 4 Gigabit ports, RC18015xs+ comes with one **PCIe 3.0 x8 slot** (running at x8 mode), allowing installation of one 10GbE network interface card (NIC) for maximized bandwidth.

Equipped with **8GB ECC RAM** and up to **32GB expansion** support, RC18015xs+ ensures data accuracy as well as superior performance to provide a rigorous foundation for the mission-critical tasks of your businesses.

## Various Reliability Mechanisms

In addition to the active / passive server design, both RC18015xs+ and RXD1215sas come with redundancy of key system components including **power supply units, SAS modules, SAS connection cables, system fans, LAN ports**, even the **Heartbeat link**. In case of failure, the system components are designed for easy replacement and further reduce the chance of system down-time.

## Virtualization Certified

RC18015xs+ provides seamless storage solutions for virtualization environments, including **VMware®, Citrix®, and Hyper-V®**. Being **VMware vSphere® 5** and **VAAI®** integration certified, RC18015xs+ helps offload specific storage operations and optimizes computation power for unparalleled performance and efficiency in VMware environments. As the centralized storage of a virtual environment, RC18015xs+ enables virtual machine migration, allowing movement from server to server whilst eliminating service downtime and disruption to user. **Windows® Offloaded Data Transfer (ODX)** and **Synology Advanced LUN** support extremely improves the efficiency on massive data transfer and migration. **Synology Snapshot Manager** offers better support to servers under VMware vSphere or Windows environment. IT managers can expect guaranteed VM status and data consistency in its highest form.

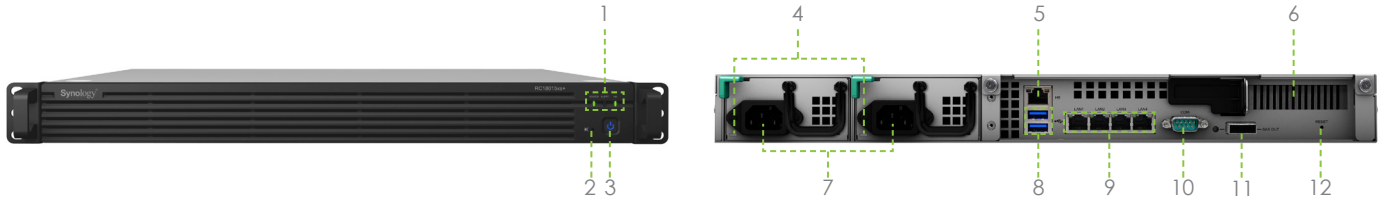
## Comprehensive Business Applications

Powered by the innovative **Synology DiskStation Manager (DSM)**, RC18015xs+ comes fully-equipped with applications and features designed specifically for large-scale business:

- Easy integration with existing business network environments through **Windows® AD** and **LDAP** directory services without recreating user accounts.
- **Windows ACL** support provides fine-grained access control and efficient privilege settings, allowing RC18015xs+ to fit seamlessly into current infrastructure.
- Built-in backup applications protect information assets by regularly backing up files and **iSCSI LUNs** locally and remotely.

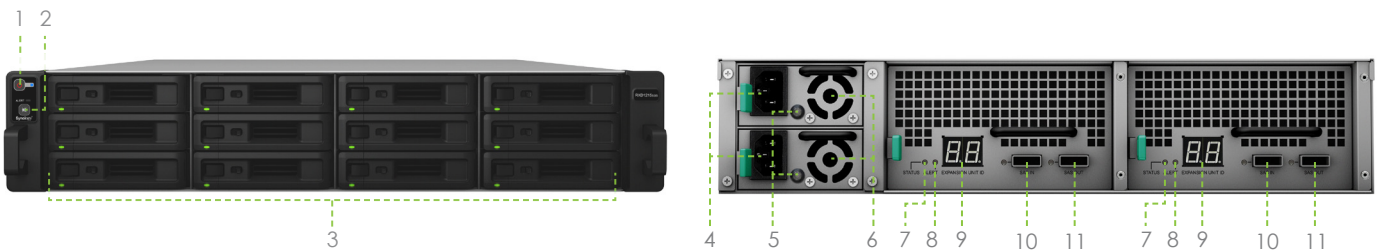
# Connections & Buttons

## RC18015xs+



1 LED indicators	2 Beep off button	3 Power button and indicator	4 PSU indicator
5 Heartbeat LAN port	6 PCIe NIC expansion slot	7 Power port	8 USB 3.0 port
9 Gigabit LAN port	10 Console port	11 SAS OUT port	12 RESET button

## RXD1215sas



1 Power button and indicator	2 Beep off button	3 Drive tray	4 Power port
5 PSU indicator and beep off button	6 PSU fan	7 STATUS indicator	8 ALERT indicator
9 Expansion unit ID indicator	10 SAS IN port	11 SAS OUT port	

# Technical Specifications

## Hardware - RC18015xs+

CPU	Intel Xeon E3 quad-core 3.3GHz
Hardware encryption engine	Yes (AES-NI)
Memory	8GB ECC RAM (expandable, up to 32GB)
Internal drive	N/A (pairing with RXD1215sas is required)
External port	USB 3.0 x 2, SAS OUT port x 1
Size (HxWxD)	44mm x 430mm x 480mm
Weight	7.3 Kg
System fan	Dual fan (40mm x 40mm x 28mm) module x 3
LAN	Gigabit x 5 (including 1 for Heartbeat connection)
PCIe 3.0 x8 slot	Add-on network interface card x 1 (optional)
Wake on LAN/WAN	Yes

## Hardware - RXD1215sas

Compatible drive type	3.5" or 2.5" SAS x 12 (SATA drive is not supported)
Maximum internal raw capacity	144 TB (12 TB HDD X 12) <sup>5</sup> (Actual capacity differs according to volume types)
External ports	SAS IN x 2, SAS OUT x 2
Hot swappable drive	Yes
Size (HxWxD)	88mm x 430mm x 692mm
Weight	18 Kg
System fan	4 (60mm x 60mm)
Power recovery	Synchronized with RC18015xs+

## Hardware - Common Specifications

AC input power voltage	100V to 240V
Power frequency	50 to 60Hz, single phase
Operating temperature	5°C to 35°C (40°F to 95°F)
Storage temperature	-20°C to 60°C (-5°F to 140°F)
Relative humidity	5% to 95% RH

## General

Networking Protocols	CIFS, AFP, NFS, FTP, WebDAV, CalDAV, iSCSI, Telnet, SSH, SNMP, VPN (PPTP, OpenVPN™, L2TP)
File System	Internal: Btrfs, ext4 External: Btrfs, ext4, ext3, FAT, NTFS, HFS+
Storage Management	Maximum single volume size: 108TB/200TB (32GB RAM required, for RAID 5 or RAID 6 groups only); Maximum internal volume #: 1024; Maximum iSCSI Target #: 128; Maximum iSCSI LUN#: 512; RAID clone/snapshot support; RAID Group support; Supported RAID Type : Basic, JBOD, RAID 0, RAID 1, RAID 5, RAID 6, RAID 10
File Sharing Capability	Maximum user account: 16000; Maximum user group: 512; Maximum shared folder: 512; Maximum concurrent CIFS/AFP/FTP connections: 2048
Privilege	Windows Access Control List (ACL)
Virtualization	VMware vSphere® 5, Microsoft Hyper-V®, Citrix® certified
Directory Service	Windows® AD integration: Domain users login via Samba (CIFS)/AFP/FTP/File Station, LDAP integration
Security	FTP over SSL/TLS, IP auto-block, firewall, encrypted network backup over Rsync, HTTPS connection
Utilities	Cloud Station, Evidence Integrity Authenticator, Photo Station Uploader, Snapshot Manager for VMware, Snapshot Manager for Windows, NFS Plug-in for VMware VAAI
Supported Clients	Windows XP onward, Mac OS X® 10.5 onward, Ubuntu 9.04 onward
Supported Browsers	Chrome®, Firefox®, Internet Explorer®: 8 or onward, Safari® 5 or onward, Safari (iOS 5 or later on iPad®), Chrome (Android™ 4.0 on tablets)
Language	English, Deutsch, Français, Italiano, Español, Dansk, Norsk, Svensk, Nederlands, Русский, Polski, Magyar, Português do Brasil, Português Europeu, Türkçe, Český, 日本語, 한국어, 繁體中文, 简体中文

## Applications

File Station	Virtual drive, remote folder, Windows ACL Editor, Compress/Extract Archived Files, Bandwidth Control for Specific Users or Groups, Create Sharing Links, Transfer Logs
Backup Solutions	Network backup; local backup; desktop backup; configuration backup; OS X Time Machine; Backup data to Amazon Glacier; shared folder sync - maximum task number: 32
Mail Server	Supported Mail Server protocols: POP3, SMTP, IMAP, Support LDAP/AD account
FTP Server	Bandwidth control for TCP connections, custom FTP passive port range, anonymous FTP, FTP SSL/TLS and SFTP protocols, boot over the Network with TFTP and PXE support, transfer log
Web Station	Virtual host (up to 30 websites), PHP/MySQL®, 3rd-party applications support
High Availability Manager	Combines two RC18015xs+ and multiple RXD1215sas into one high-availability cluster
Storage Analyzer	Volume and quota usage, total size of files, volume usage and trends based on past usage, size of shared folders, largest/most/least frequently modified files
Security Advisor	Malware detection/removal, user account/password, network, system-related security scan
Log Center	SSL connection, log rotation: 6 months, 1 year, 2 years, 3 years, email notification
iOS/Android™ Applications	DS cloud, DS file, DS finder, DS cam, DS note, DS audio, DS download, DS photo, DS video
Windows Phone® Applications	DS file, DS finder, DS audio, DS download, DS photo, DS video

## Add-on Packages

Surveillance Station	Maximum IP camera #: 90 (total of 2700 FPS at 720p, H.264) (Including two free camera licenses. Procurement of additional licenses is required.)
VPN Server	Maximum connections : 30; supported VPN protocols: PPTP, OpenVPN™, L2TP
Mail Station	Webmail interface for Mail Server; receiving mails from multiple POP3 mailboxes, customizable SMTP server
Antivirus Essential	Full system scan, scheduled scan, white list customization, virus definition auto update
Cloud Station	Maximum concurrent file transfers: 1024, retain historical and deleted file versions
Cloud Sync	Data sync with public cloud services: Dropbox, Google Drive, Baidu, Microsoft OneDrive, Box and hubiC
Note Station	Rich-Text note organization with versioning, encryption, sharing, media embedding and attachments
Other packages	Photo Station, Audio Station, Download Station, iTunes® Server, 3rd-party packages

## Environment and Packaging

Environment	RoHS compliant
Package Content	<b>RC18015xs+</b> : RC18015xs+ main unit x 1, AC power cord x 2, accessory pack x 1, quick installation guide x 1 <b>RXD1215sas</b> : RXD1215sas main unit x 1, AC power cord x 2, accessory pack x 1, Mini-SAS cable x 2, quick installation guide x 1
Optional Accessories	Camera License Pack, 8GB (4GB x 2) / 16GB (8GB x 2) ECC RAM Module Kit, Synology RKS1314 - Rail Kit Sliding, Synology Ethernet Adapter E10G15-F1, Expansion Unit (RXD1215sas x 14)
Warranty	5 years <sup>6</sup>

\*Model specifications are subject to change without notice. Please refer to [www.synology.com](http://www.synology.com) for the latest information.

1. RC18015xs+ is designed to work as a high-availability (HA) cluster. Two RC18015xs+ and at least one RXD1215sas expansion unit are required to configure and set up the whole system and make it operate normally.
2. RC18015xs+ comes with one PCIe 3.0 x8 slot running at x8 mode, allowing installation of one add-on 10GbE network interface card (NIC). Please visit [www.synology.com](http://www.synology.com) for supported NIC models.
3. RC18015xs+ supports up to 15 Synology RXD1215sas, sold separately.
4. Performance figures could vary on different environments.
5. The maximum internal raw capacity is subject to change based on the capacity of the newest drive that RS18015xs+/RXD1215sas supports. Please refer to [www.synology.com](http://www.synology.com) for the latest information.
6. The warranty period starts from the purchase date as stated on your purchase receipt. Visit <http://www.synology.com> for more information.

## SYNOLOGY INC.

Synology is dedicated to taking full advantage of the latest technologies to bring businesses and home users reliable and affordable ways to centralize data storage, simplify data backup, share and sync files across different platforms, and access data on-the-go. Synology aims to deliver products with forward-thinking features and the best in class customer services.

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RC18015xs+/RXD1215sas-2019-ENU-REV005

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# Samsung V-NAND SSD 860 PRO

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2018 Data Sheet

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Revision 1.1





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## Revision History

Revision Number	Description	Revision Date
001	Initial Release	December 2017
002	Fix MTBF rating to 1.5 million hours	March 2018

## THE SAMSUNG SSD 860 PRO

The Samsung SSD 860 PRO is the new Samsung's Client-PC SATA SSDs, specially designed for high-end computing devices. Building on the reputation of the Samsung SSD 850 PRO, the world's first V-NAND SSD for Client PCs, the new Samsung SSD 860 PRO drives achieve top class performance for SATA SSDs, offering improvements in speed, reliability, and compatibility. The 860 PRO comes equipped with Samsung's newly designed MJX controller along with the latest 2bit MLC V-NAND architecture.

### Professional Performance

The legacy Serial-ATA (SATA) interface faces the theoretical bandwidth limitation of 600MB/s which many SSD manufacturers have tried to reach over the years. Among them, Samsung, which first brought V-NAND technology to the market through the 850 PRO, continuously strives to improve product reliability and performance, even with the SATA interface limitations. Powered by Samsung's latest 64-layer 2bit MLC V-NAND technology, the 860 PRO, the successor of the 850 PRO, delivers best-in-class sequential read (up to 560 MB/s) and write (up to 530 MB/s) speeds and along with high sustainable performance for the professionals who always pursue best achievement

### Ultimate Reliability

The 860 PRO offers guaranteed endurance and ultimate reliability, with up to approximately 8 times higher Total Bytes Written (TBW) than the 850 PRO and an industry-leading 5-year limited warranty. Up to 4,800 TBW powered by the latest V-NAND technology, which is the highest TBW rating industry-wide, will give you absolute confidence in your SSD\*.

\*All documented endurance test results are obtained in compliance with JESD218 standards. Please visit [www.jedec.org](http://www.jedec.org) for detailed information on the standard.

Furthermore, the 860 PRO assures long-term dependable performance with minimal performance degradation. The 860 PRO provides up to 25% better sustained performance compare to that of its predecessor. This means you can experience the high performance of the SSD even with heavy daily workload.

### Smart Compatibility with a Refined Controller

The 860 PRO delivers expanded system compatibility. The refined ECC algorithm and revamped controller generate strong sustainable performance near SATA's limits, and the improved queued trim provides for better Linux compatibility. The 860 PRO is uniquely designed for not only Client-PCs but also NASs (Network Attached Storages) and workstations thanks to its Samsung 2bit MLC V-NAND composition.

### Advanced Data Encryption

The 860 PRO provides multiple advanced data encryption features. Self-Encrypting Drive (SED) security technology will help keep data safe at all times. The 860 PRO includes an AES 256-bit hardware-based encryption engine to ensure that your personal files remain secure. Being hardware-based, the encryption engine secures your data without the performance degradation that you may experience with software-based encryption. Also, the 860 PRO is compliant with various advanced security management solutions (TCG Opal and Encrypted Drive-IEEE1667).

### Samsung Data Migration and Magician Software

The 860 PRO comes with Samsung Data Migration and Magician software, which is easy to install and makes management of you SSD simple.\* Samsung Data Migration software is easy to use, yet provides a very powerful "Custom Cloning" feature that makes migration effortless even when the source data is greater than the SSD's capacity. Magician provides personalized firmware checks and additional functions tailored for individual users' drives. It even updates the firmware automatically to make sure that the drives' performance stays up to date.

\*To download Samsung Data Migration and Magician, please visit [www.samsung.com/samsungssd](http://www.samsung.com/samsungssd)

## TECHINCAL SPECIFICATIONS

## Samsung SSD 860 PRO

Usage Application	Client PCs						
Interface	SATA 6 Gb/s Interface, compatible with SATA 3 Gb/s & 1.5 interfaces						
Hardware Information	Capacity <sup>1)</sup>	256GB	512GB	1TB	2TB	4TB	
	Controller	Samsung MJX Controller					
	NAND Flash Memory	Samsung V-NAND 2bit MLC					
	DRAM Cache Memory	512MB LPDDR4		1GB LPDDR4	2GB LPDDR4	4GB LPDDR4	
	Dimension	100x 69.85x 6.8(mm)					
	Form Factor	2.5 inch					
Performance (Up to.) <sup>2)</sup>	Sequential Read	560 MB/s					
	Sequential Write <sup>3)</sup>	530 MB/s					
	4KB Ran. Read (QD1)	11,000 IOPS					
	4KB Ran. Write (QD1)	43,000 IOPS					
	4KB Ran. Read (QD32)	100,000 IOPS					
	4KB Ran. Write (QD32)	90,000 IOPS					
Power Consumption <sup>4)</sup>	Idle	DIPM On	40 mW	40 mW	40 mW	40 mW	40 mW
	Active (Avg.)	Read/Write	2 W	2 W	2.2 W	2.2 W	2.2 W
	Device Sleep		2 mW	2 mW	2.5 mW	4.5 mW	7 mW
Reliability	Temp.	Reliability	0°C to 70°C				
		Non-Operating	-45°C to 85°C				
	Humidity		5% to 95% non-condensing				
	Shock	Non-Operating	1,500G, duration: 0.5ms, 3 axis				
	Vibration	Non-Operating	20~2,000Hz, 20G				
	MTBF		1.5 million hours				
Warranty <sup>8)</sup>	TBW <sup>5) 6)</sup>	300TB	600TB	1,200TB	2,400TB	4,800TB	
	Period	5 years, Limited <sup>7)</sup>					
Supporting Features	TRIM (Required OS support), Garbage Collection, S.M.A.R.T						
Data Security	AES 256-bit Full Disk Encryption, TCG/Opal V2.0, Encrypted Drive(IEEE1667)						

1) GB: 1GB = 1,000,000,000 bytes. A certain portion of capacity may be used for system file and maintenance use, thus the actual available capacity may differ from the labeled total capacity.

2) Sequential performance measurements are based on CrystalDiskMark v. 5.0.2. Random performance measurements are based on IOMeter1.1.0. Performance may vary based on SSD's firmware version, system hardware & configuration. Test system configuration: Intel® Core i5-3550 CPU@3.3 GHz, DDR3 1333MHz 4GB, OS-Windows 7 Ultimate 64bit, Chipset-ASUS P8H77-V

3) Power consumption is measured with IOMeter1.1.0 version with Intel Core i7-7700K @ 4.2GHz, SAMSUNG DDR4 16GB, Gigabyte GA-Z270X, OS – Windows 10 PRO K x64

4) All documented endurance test results are obtained in compliance with JESD218 Standards. Please visit [www.jedec.org](http://www.jedec.org) for detailed information on JESD218 Standards

5) TBW means Total Bytes Written.

6) Please refer to the detailed warranty statement here at <http://samsung.com/samsungssd>.

7) Warranty provides coverage for the stated time period or the TBW, whichever comes first.

## PRODUCT LINEUP

Density	Model Name	Box Contents	Model Name
256GB*	MZ-76P256	Samsung SSD 860 PRO 256GB Warranty Statement	MZ-76P256BW MZ-76P256B/EU MZ-76P256B/CN MZ-76P256B/KR
512GB*	MZ-76P512	Samsung SSD 860 PRO 512GB Warranty Statement	MZ-76P512BW MZ-76P512B/EU MZ-76P512B/CN MZ-76P512B/KR
1TB (1,024GB*)	MZ-76P1T0	Samsung SSD 860 PRO 1TB Warranty Statement	MZ-76P1T0BW MZ-76P1T0B/EU MZ-76P1T0B/CN MZ-76P1T0B/KR
2TB* (2,048GB*)	MZ-76P2T0	Samsung SSD 860 PRO 2TB Warranty Statement	MZ-76P2T0BW MZ-76P2T0B/EU MZ-76P2T0B/CN MZ-76P2T0B/KR
4TB (4,096GB*)	MZ-76P4T0	Samsung SSD 860 PRO 4TB Warranty Statement	MZ-76P4T0BW MZ-76P4T0B/EU MZ-76P4T0B/CN MZ-76P4T0B/KR

\* GB: 1GB = 1,000,000,000 bytes by IDEMA. The actual usable capacity may be less than the labeled capacity. For more information, including but not limited to the warranty provided for this product, please visit [www.samsung.com/ssd](http://www.samsung.com/ssd) and [www.samsungssd.com](http://www.samsungssd.com).



DATA SHEET

Scalable. Responsive. Innovative.

# Exos X16



Seagate manufactures hard drives that specifically address the needs of the hyperscale storage market. As the flagship of the Seagate® X class, the Exos® X16 enterprise hard drives are the highest-capacity hard drives in the fleet.



## Maximum Storage Capacity for Highest Rack Space Efficiency

**Industry's first 16 TB drive** for 33% more petabytes per rack<sup>1</sup>

**Highest 16 TB hard drive performance** with enhanced caching, making it perfect for cloud data centre and massive scale-out data centre applications

**Hyperscale SATA model** tuned for large data transfers and low latency

**PowerBalance™** feature optimises Watts/TB

**Helium sealed-drive design** delivers lower total cost of ownership through lower power and weight

**Next-generation helium side-sealing weld technology** for added handling robustness and leak protection

**Digital environmental sensors** to monitor internal drive conditions for optimal operation and performance

**Data protection and security:** Seagate Secure™ features for safe, affordable, fast, and easy drive retirement

Proven enterprise-class reliability backed by **5-year limited warranty and 2.5M-hr MTBF rating**

### 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

<sup>1</sup> Compared to 12 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	16TB	16TB	14TB	14TB	12TB
Standard Model FastFormat™ (512e/4Kn) <sup>1</sup>	ST16000NM001G	ST16000NM002G	ST14000NM001G	ST14000NM002G	ST12000NM001G
SED Model FastFormat (512e/4Kn) <sup>1,2</sup>	ST16000NM003G	ST16000NM004G	ST14000NM003G	ST14000NM004G	ST12000NM003G
SED-FIPS FastFormat (512e/4Kn) <sup>1,2</sup>	—	ST16000NM009G	—	ST14000NM012G	—
<b>Features</b>					
Helium Sealed-Drive Design	Yes	Yes	Yes	Yes	Yes
Protection Information (T10 DIF)	—	Yes	—	Yes	—
SuperParity	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 <sup>3</sup>	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
<b>Reliability/Data Integrity</b>					
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	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
<b>Performance</b>					
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	261, 249	261, 249	245, 233
Random Read/Write 4K QD16 WCD (IOPS)	170/440	170/440	170/440	170/440	170/440
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 <sup>2</sup> )	12.5	12.5	12.5	12.5	12.5
<b>POWER CONSUMPTION</b>					
Idle A (W) Average	5 W	5 W	5 W	5 W	5 W
Max Operating, Random Read/Write 4K/16Q (W)	10.0, 6.3	10.2, 6.2	10.0, 6.3	10.2, 6.2	9.5, 6.0
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
<b>Environmental</b>					
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)	50	50	50	50	50
Shock, Non-operating 2 ms (GS)	200	200	200	200	200
<b>Physical</b>					
Height (mm/in, max) <sup>4</sup>	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) <sup>4</sup>	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) <sup>4</sup>	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)	670 g/1.477 lb	670 g/1.477 lb	670 g/1.477 lb	670 g/1.477 lb	670 g/1.477 lb
Carton Unit Quantity	20	20	20	20	20
Cartons per Pallet / Cartons per Layer	40/8	40/8	40/8	40/8	40/8

<sup>1</sup> 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.

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

<sup>3</sup> Supports Hotplug operation per Serial ATA Revision 3.3 specification

<sup>4</sup> These base deck dimensions conform to the Small Form Factor Standard (SFF-8301) found at [www.sffcommittee.org](http://www.sffcommittee.org). For connector-related dimensions, see SFF-8323.



Specifications	12Gb/s SAS	SATA 6 Gb/s	12 Gb/s SAS
Capacity	12TB	10TB	10TB
Standard Model FastFormat™ (512e/4Kn) <sup>1</sup>	ST12000NM002G	ST10000NM001G	ST10000NM002G
SED Model FastFormat (512e/4Kn) <sup>1,2</sup>	ST12000NM004G	ST10000NM003G	ST10000NM004G
SED-FIPS FastFormat (512e/4Kn) <sup>1,2</sup>	ST12000NM008G	—	ST10000NM010G
<b>Features</b>			
Helium Sealed-Drive Design	Yes	Yes	Yes
Protection Information (T10 DIF)	Yes	—	Yes
SuperParity	Yes	Yes	Yes
Low Halogen	Yes	Yes	Yes
PowerChoice™ Idle Power Technology	Yes	Yes	Yes
PowerBalance™ Power/Performance Technology	Yes	Yes	Yes
Hot-Plug Support <sup>3</sup>	Yes	Yes	Yes
Cache, Multi-segmented (MB)	256	256	256
Organic Solderability Preservative	Yes	Yes	Yes
RSA 2048 Firmware Verification (SD&D)	Yes	Yes	Yes
<b>Reliability/Data Integrity</b>			
Mean Time Between Failures (MTBF, hours)	2,500,000	2,500,000	2,500,000
Reliability Rating @ Full 24x7 Operation (AFR)	0.35%	0.35%	0.35%
Non-recoverable Read Errors per Bits Read	1 sector per 10E15	1 sector per 10E15	1 sector per 10E15
Power-On Hours per Year (24x7)	8,760	8,760	8,760
512e Sector Size (Bytes per Sector)	512, 520, 528	512	512, 520, 528
4Kn Sector Size (Bytes per Sector)	4096, 4160, 4224, 4096, 4160, 4224	4,096	4096, 4160, 4224, 4096, 4160, 4224
Limited Warranty (years)	5	5	5
<b>Performance</b>			
Spindle Speed (RPM)	7,200 RPM	7,200 RPM	7,200 RPM
Interface Access Speed (Gb/s)	12.0, 6.0, 3.0	6.0, 3.0	12.0, 6.0, 3.0
Max. Sustained Transfer Rate OD (MB/s, MiB/s)	245, 233	245, 233	245, 233
Random Read/Write 4K QD16 WCD (IOPS)	170/440	170/440	170/440
Average Latency (ms)	4.16	4.16	4.16
Interface Ports	Dual	Single	Dual
Rotation Vibration @ 20-1500 Hz (rad/sec <sup>2</sup> )	12.5	12.5	12.5
<b>POWER CONSUMPTION</b>			
Idle A (W) Average	5 W	5 W	5 W
Max Operating, Random Read/Write 4K/16Q (W)	10.0, 6.2	9.5, 6.0	10.0, 6.2
Power Supply Requirements	+12 V and +5 V	+12 V and +5 V	+12 V and +5 V
<b>Environmental</b>			
Temperature, Operating (°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
Shock, Operating 2 ms (Read/Write) (Gs)	50	50	50
Shock, Non-operating 2 ms (GS)	200	200	200
<b>Physical</b>			
Height (mm/in, max) <sup>4</sup>	26.11 mm/1.028 in	26.11 mm/1.028 in	26.11 mm/1.028 in
Width (mm/in, max) <sup>4</sup>	101.85 mm/4.01 in	101.85 mm/4.01 in	101.85 mm/4.01 in
Depth (mm/in, max) <sup>4</sup>	147 mm/5.787 in	147 mm/5.787 in	147 mm/5.787 in
Weight (lb/g)	670 g/1.477 lb	670 g/1.477 lb	670 g/1.477 lb
Carton Unit Quantity	20	20	20
Cartons per Pallet / Cartons per Layer	40/8	40/8	40/8, 40 / 8

<sup>1</sup> 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.

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

<sup>3</sup> Supports Hotplug operation per Serial ATA Revision 3.3 specification

<sup>4</sup> These base deck dimensions conform to the Small Form Factor Standard (SFF-8301) found at [www.sffcommittee.org](http://www.sffcommittee.org). For connector-related dimensions, see SFF-8323.



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