Samsung V-NAND SSD 870 QVO

2020 Data Sheet

Revision 1.1



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Revision History

Revision Number	Description	Revision Date
1.0	Initial Release	June 2020
1.1	Change in improved sustained performance figure (30%→21%) (p.4)	June 2020

The Quality and Value Optimized SSD

870 QVO is Samsung's 2nd generation high-density 4-bit MLC based SSD with the new MKX controller, comes in capacities up to 8TB, making it the world's largest client SSD*. The predecessor 860 QVO contributed greatly to the growth of terabyte capacity sales in the SATA SSD market. Also, despite the concerns regarding 4-bit MLC SSD's performance and quality, 860 QVO has received overwhelmingly positive feedback from customers and tech media.

870 QVO gives enhanced optimized performance and proven reliability, which makes it an ideal solution for general users who require terabyte capacity SSDs with improved everyday computing experiences.

* As of Q3, 2020

Optimal Performance for Everyday Computing Experience

The 870 QVO provides best in class performance as sequential read (up to 560 MB/s) and write (up to 530 MB/s) approaches the limits of performance available with the SATA interface. These improvements are accompanied by enhanced random performance, bringing up to 13% higher speeds than 860 QVO in low queue depth workloads (QD1) which makes it an ideal solution for everyday computing experiences.

Proven Reliability

With enhanced 9x layer V-NAND characteristics and a refined new controller with an advanced ECC algorithm, the 870 QVO promises to deliver worry-free endurance up to 2,880TB of Total Bytes Written* along with a 3-year limited warranty. The sustained performance has been enhanced up to 21% higher than the predecessor 860 QVO, allowing 870 QVO to reliably provide better performance continuously for a longer time. Also, the endurance of Intelligent TurboWrite has been enhanced to last up to 3.8 times longer.

* All documented endurance test results are obtained in compliance with JESD218 Standards. Please visit www.jedec.org for detailed information on JESD218 Standards

Overwhelming Capacity

The 870 QVO is the world's largest client SSD to boast 8TB capacity, which surpasses even the largest capacity HDDs with 2.5" form factors. The fine-tuned MKX controller and enhanced V-NAND technology made it possible to build an 8TB SSD in a 2.5" 7mmT form factor.

* The largest capacity of SSD 8TB & HDD 5TB is as of Q3, 2020.

Samsung Data Migration and Magician Software

Samsung Magician and Data Migration software* supports the 870 QVO. These software programs provide consumers with powerful and convenient features with simple to use in managing their Samsung SSDs. The Samsung Magician software offers a personalized experience which varies based on the Samsung SSD in use, with different functions available for different SSDs. Samsung Data Migration software is renewed with a unified design with Magician, giving a very convenient upgrade experience to Samsung SSD users. It provides a very powerful "Custom Cloning" feature that enables migration work even when source data is greater than the SSD's capacity.

* To download Samsung Magician and Data Migration, please visit www.samsung.com/samsungssd

TECHNICAL SPECIFICATIONS

Samsung SSD 870 QVO						
Usage Application	Client PCs					
Interface	SATA 6 Gbps Interface, compatible with SATA 3 Gbps & 1.5 Gbps interfaces					
Hardware Information	Capacity[1]		1TB	2TB	4TB	8TB
	Controller		Samsung MKX Controller			
	NAND Flash Memory		Samsung 4bit MLC V-NAND			
	DRAM Cache Memory		1GB LPDDR4	2GB LPDDR4	4GB LPDDR4	8GB LPDDR4
	Dimension		100x 69.85x 6.8(mm)			
	Form Factor		2.5 inch			
Performance (Up to)[2]	Sequential Read		560 MB/s			
	Sequential Write[3]		530 MB/s			
	4KB Ran. Read (QD1)[4]		11,000	11,000	11,000	11,000
	4KB Ran. Write (QD1)[4]		35,000	35,000	35,000	35,000
	4KB Ran. Read (QD32)[5]		98,000	98,000	98,000	98,000
	4KB Ran. Write (QD32)[5]		88,000	88,000	88,000	88,000
Power Consumption[6]	Idle	DIPM on	30mW	30mW	35mW	45mW
	Active (Avg.)	Read/Write	2.1W/2.2W	2.1W/3.0W	2.2W/3.2W	2.4W/3.3W
	Device Sleep		3mW	4mW	7mW	10mW
Reliability	Temp.	Operating	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	Total Byte Written[7]		360TB	720TB	1,440TB	2,880TB
	Period		3 years limited[8]			
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 capacity may differ that indicated on the product label.
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 i7-7700K CPU@4.20GHz, DDR4 1200MHz 32GB, OS-Windows 10 Pro 64bit, Chipset-ASUS PRIME Z270-A.
3) Sequential write performance measurements are based on Intelligent TurboWrite technology. Performances after Intelligent Turbowrite are 80 MB/s (1TB), 160 MB/s (2/4/8TB).
4) QD1 Random performances after Intelligent TurboWrite are 5.0K IOPS (1/2/4/8TB) for reads, and 22K IOPS (1TB) and 34K IOPS (2/4/8TB) for writes.
5) QD32 Random performances after Intelligent TurboWrite are 45K IOPS (1TB) and 74K IOPS (2/4/8TB) for reads, and 22K IOPS(1TB), 42K IOPS(2/4/8TB) for writes.
6) Power consumption is measured with IOmeter1.1.0 version with Intel Core i7-7700K @ 4.2GHz, SAMSUNG DDR4 8GB, Gigabyte GA-Z270X, OS – Windows 10 PRO 64bit.
7) All documented endurance test results are obtained in compliance with JESD218 Standards. Please visit www.jedec.org for detailed information on JESD218 Standards
8) Please refer to the detailed warranty statement here at http://www.samsung.com/samsungssd

PRODUCT LINEUP

Density	Model Name	Box Contents	Model Code
1TB (1,000GB*)	MZ-77Q1T0	Samsung SSD 870 QVO 1TB Warranty Statement	MZ-77Q1T0BW MZ-77Q1T0B/AM MZ-77Q1T0B/CN
2TB (2,000GB*)	MZ-77Q2T0	Samsung SSD 870 QVO 2TB Warranty Statement	MZ-77Q2T0BW MZ-77Q2T0B/AM MZ-77Q2T0B/CN
4TB (4,000GB*)	MZ-77Q4T0	Samsung SSD 870 QVO 4TB Warranty Statement	MZ-77Q4T0BW MZ-77Q4T0B/AM MZ-77Q4T0B/CN
8TB (8,000GB*)	MZ-77Q8T0	Samsung SSD 870 QVO 8TB Warranty Statement	MZ-77Q8T0BW MZ-77Q8T0B/AM MZ-77Q8T0B/CN

* 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 and www.samsungssd.com.