

# Samsung SSD 960 EVO M.2

Data Sheet Rev.1.1 (February 2017)



## Summary

- PCIe 3.0 x4 NVM Express SSD for Client PCs
- M.2 (2280)
- Samsung V-NAND 3bit MLC
- Samsung Polaris controller
- Intelligent TurboWrite
- Samsung Magician Software for SSD management

## Samsung NVMe SSD 960 EVO

The new Samsung NVMe SSD 960 EVO expands Samsung's Client PC NVMe SSD line-up and brings the technology to the mainstream market. The 960 EVO will

particularly appeal to those customers that want to discover next generation PC performance. It offers ultimate performance levels and through its availability in 250GB, 500GB and 1TB capacities in combination with its solid reliability make it the smart customer choice.

## Raising performance expectations

Building on the PCIe Gen. 3.0 x 4 lane interface, the 960 EVO, in combination with Samsung's advanced 3rd generation 3-bit MLC V-NAND Flash, the newly developed Polaris controller and launch of the Intelligent TurboWrite technology, is able to offer sequential read performance of 3,200 MB/s and sequential write speeds of up to 1,900 MB/s. It achieves random performance of up to 380,000 IOPS and 360,000 IOPS for read and write operations respectively. This

means that the 960 EVO's performance trails only the 960 PRO as the world's most advanced client PC SSD.

## Resting easy with solid reliability

Based on Samsung's extensive experience with 3-bit MLC Flash NAND, now in the 3rd Generation of its acclaimed V-NAND Flash technology, the 960 EVO promises to deliver extensive endurance at up to 400TB of Total Bytes Written and/or a warranty of 3 years. The 960 EVO also delivers high sustained performance, lower power consumption and an innovative heat dissipating label that prolongs peak data transferability by more than 25% relative to the 2-bit MLC based 950 PRO.

## Improved thermal solutions

In most cases of data transfers, heavy workloads induce heat. Once temperatures reach a threshold, memory performance may be adversely affected. As the leader in SSD memory solutions, the 960 EVO adopts a new heat spreader for dissipating heat more efficiently during heavy workload use. It achieves this by integrating a thin copper film and because copper is a great heat conductor it helps to shed heat faster than would be possible without the label.

## Advanced data encryption

The 960 EVO provides the same data encryption features as other Samsung SATA SSDs. Self-Encrypting Drive (SED) security technology will help keep data safe at all times. It 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 performance degradation that you may experience with a software-based encryption. Also, the 960EVO is compliant with advanced security management solutions (TCG Opal).

## Samsung Magician Software

The 960 EVO comes with the newly upgraded Samsung Magician software — an advanced software solution for users to monitor, manage and maintain the drive. Magician provides personalized firmware checking and additional functions tailored for individual user's drives. It even updates the firmware automatically to make sure that the drive's performance stays up to date.\*

\* Magician 4.9.7 and older versions do not support Samsung NVMe SSD 960 PRO and 960 EVO.

## Technical Specifications

Samsung SSD 960 EVO					
<b>Usage Application</b>	Client PCs				
<b>Interface</b>	PCIe Gen 3.0 x4, NVMe 1.2				
<b>Hardware Information</b>	Capacity	250GB <sup>†</sup>	500GB <sup>†</sup>	1TB(1,000GB <sup>†</sup> )	
	Controller	Samsung Polaris Controller			
	NAND Flash Memory	Samsung V-NAND 3bit MLC Flash memory			
	DRAM Cache Memory	512MB LP DDR3	1GB LP DDR3		
	Dimension	Max 80.15 x Max 22.15 x Max.2.38 (mm)			
	Form-Factor	M.2(2280) <sup>††</sup>			
<b>Performance*</b> (Up to.)	Sequential Read	3,200MB/s			
	Sequential Write	1,500MB/s	1,800MB/s	1,900MB/s	
	QD 1 Thread 1	Ran. Read	14,000 IOPS		
		Ran. Write	50,000 IOPS		
	QD 32 Thread 4	Ran. Read	330,000 IOPS	330,000 IOPS	380,000 IOPS
		Ran. Write	300,000 IOPS	330,000 IOPS	360,000 IOPS
<b>Power Consumption**</b>	Idle	Typ. 40mW			
	Active (AVG.)	Read	Typ. 5.3W	Typ. 5.4W	Typ. 5.7W
		Write	Typ. 4.2W	Typ. 4.4W	Typ. 4.8W
	DEVSLP	L1.2 mode	Typ. 5mW		
<b>Data Security</b>	AES 256-bit for User Data Encryption, TCG/Opal				
<b>Supporting Features</b>	TRIM(Required OS support), Garbage Collection, S.M.A.R.T				
<b>Temperature</b>	Operating	0°C to 70°C (Measured by SMART Temperature. Proper airflow recommended)			
	Non-Operating	-45°C to 85°C			
<b>Humidity</b>	5% to 95%, non-condensing				
<b>Shock</b>	Non-Operating	1,500G, duration: 0.5ms, 3 axis			
<b>Vibration</b>	Non-Operating	20~2,000Hz, 20G			
<b>Reliability</b>	MTBF	1.5 million hours			
<b>Weight</b>	Model	Max 7.7g	Max 8g	Max 8g	
	<b>Warranty</b>	Total Bytes Written	100 TBW****	200 TBW****	400 TBW****
	Period	3 years limited			

\* Sequential performance measurements based on CrystalDiskMark 5.1.2, and Random performance measurements based on IOMeter 1.1.0. Performance may vary based on SSD's firmware version, system hardware & configuration. Test system configuration: Intel Core i7-6700K @ 4.0GHz, DDR4 1,700MHz 16GB, OS – Windows10 Pro x64, ASROCK Z170 EXTREME 7  
Sequential Write performance measurements based on TurboWrite technology, These sequential write performance after TurboWrite region are 300MB/s(250GB), 600MB/s(500GB) and 1,200MB/s(1TB). Random Write performance measurements based on TurboWrite technology, These random write performance after TurboWrite region are 80,000IOPS (250GB), 160,000IOPS (500GB) and 300,000IOPS (1TB)

\*\* Power consumption measured with IOMeter 1.1.0 with Intel i7-5820K @ 3.3GHz, DDR4 8GB, ASUS X99-M WS/SE, OS- Windows10 Pro x64 and APST on

\*\*\* TBW means Terabytes Written

† 1GB=1,000,000,000 bytes by IDEMA. A certain portion of capacity may be used for system file and maintenance use, so the actual capacity may differ from what is indicated on the product label

††M.2 is a specification of form factor for ultra-thin PCs, The M.2 standard allows widths 12, 16, 22 and 30mm and lengths of 16, 26,30, 38, 42, 69, 80 and 110 mm, Commercially M.2 is popular with width 22mm and lengths 30, 42, 60 , 80 and 110mm. Samsung provides the most popular form factor with 22mm X 80mm model (i.e., 2280) to consider user convenience.

## Product Lineup

Density	Model Name	Box Contents	Model Code
1TB (1,000GB*)	MZ-V6E1T0	Samsung SSD 960 EVO 1TB Warranty statement	MZ-V6E1T0BW
500 GB*	MZ-V6E500	Samsung SSD 960 EVO 500GB Warranty statement	MZ-V6E500BW
250 GB*	MZ-V6E250	Samsung SSD 960 EVO 250GB Warranty statement	MZ-V6E250BW

\* 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.

For more information, please visit

[www.samsung.com/ssd](http://www.samsung.com/ssd) and [www.samsungssd.com](http://www.samsungssd.com)

To download the latest software & manuals, please visit [www.samsung.com/samsungssd](http://www.samsung.com/samsungssd)

### DISCLAIMER

SAMSUNG ELECTRONICS RESERVES THE RIGHT TO CHANGE PRODUCTS, INFORMATION AND SPECIFICATIONS WITHOUT NOTICE.

Products and specifications discussed herein are for reference purposes only. All information discussed herein may change without notice and is provided on an "AS IS" basis, without warranties of any kind. This document and all information discussed herein remain the sole and exclusive property of Samsung Electronics. No license of any patent, copyright, mask work, trademark or any other intellectual property right is granted by one party to the other party under this document, by implication, estoppels or otherwise. Samsung products are not intended for use in life support, critical care, medical, safety equipment, or similar applications where product failure could result in loss of life or personal or physical harm, or any military or defense application, or any governmental procurement to which special terms or provisions may apply. For updates or additional information about Samsung products, contact your nearest Samsung office.

### COPYRIGHT © 2016

This material is copyrighted by Samsung Electronics. Any unauthorized reproductions, use or disclosure of this material, or any part thereof, is strictly prohibited and is a violation under copyright law.

### TRADEMARKS & SERVICE MARKS

The Samsung Logo is the trademark of Samsung Electronics. Adobe is a trademark and Adobe Acrobat is a registered trademark of Adobe Systems Incorporated. All other company and product names may be trademarks of the respective companies with which they are associated.