

# Samsung V-NAND SSD 970 PRO

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2018 Data Sheet

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Revision 1.0



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## Revision History

Revision Number	Description	Revision Date
001	Initial Release	April 2018

## THE SAMSUNG SSD 970 PRO

The Samsung SSD 970 PRO is the 3<sup>rd</sup> generation of Samsung's Client-PC NVMe SSD. The Samsung 970 PRO is specially designed for tech enthusiasts, hardcore gamers and professionals whose workloads are intensive on PCs and workstations. Featuring the latest Samsung 2bit MLC V-NAND technology and a newly enhanced Phoenix controller, the 970 PRO delivers fearless performance and unprecedented reliability in a small M.2 2280 form factor and offer customers the most advanced Samsung SSD technology currently available for Client PCs.

### Fearless Performance

Delivering unprecedented performance, the 970 PRO maximizes the potential of NVMe bandwidth. With much greater performance than the previous generation, the new 970 PRO offers unparalleled sequential read/write speeds of up to 3,500/2,700 MB/s respectively and random performance of up to 500,000 IOPS for both of read/write operations. The 970 PRO is the best solution for processing massive amounts of data, 4K graphic work, 4K/DirectX 12 games and data analytics.

### Unparalleled Reliability & Exceptional Endurance

The 970 PRO boasts exceptional endurance with up to 1,200 TBW, which is 50 percent higher than that of the previous model, thanks to the latest Samsung V-NAND technology.\* Thermal control solutions enable enhanced performance with reduced heat risk. Dynamic Thermal Guard(DTG) technology proactively prevents overheating, and a heat spreader with an integrated thin copper film dissipates heat more efficiently. A new nickel coating on the Phoenix controller also helps to shed heat faster during heavy workload use in order to ensure the high levels of quality and reliability for which Samsung is known. The 970 PRO comes with a 5-year warranty.

\*All documented endurance test results are obtained in compliance with JEDEC218 standards. Please visit [www.jedec.org](http://www.jedec.org) for detailed information on the standard.

### System Design Flexibility

The 970 PRO enables convenient storage expansion across many different devices. The 970 PRO comes in 512GB/1TB capacities in a compact M.2 2280 form factor. In addition, the 970 PRO offers high power efficiency as well as exceptional speed, making it the ideal solution to use with applications ranging from ultra-thin computing to high-performance computing systems.

### Advanced Data Encryption

The 970 PRO provides multiple advanced data encryption features. Self-Encrypting Drive (SED) security technology will help keep data safe at all times. The 970 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 970 PRO is compliant with various advanced security management solutions (TCG Opal and Encrypted Drive-IEEE1667).

### Samsung Data Migration and Magician Software

The 970 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 amount of source data is greater than the SSD's capacity. Magician provides personalized firmware checks and additional functionality tailored to the drives of individual users. It even updates the firmware automatically to make sure that the drive's 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 970 PRO

Usage Application	Client PCs			
Interface	PCIe Gen 3.0 x4, NVMe 1.3			
Hardware Information	Capacity <sup>1)</sup>	512GB	1TB(1,024GB)	
	Controller	Samsung Phoenix Controller		
	NAND Flash Memory	Samsung V-NAND 2bit MLC		
	DRAM Cache Memory	512MB LPDDR4	1GB LPDDR4	
	Dimension	Max 80.15 x Max 22.15 x Max 2.38(mm)		
	Form Factor	M.2(2280) <sup>2)</sup>		
Performance (Up to.) <sup>3)</sup>	Sequential Read	3,500 MB/s		
	Sequential Write <sup>3)</sup>	2,300 MB/s	2,700 MB/s	
	QD 1 Thread 1	Ran. Read	15,000 IOPS	
		Ran. Write	55,000 IOPS	
	QD 32 Thread 4	Ran. Read	370,000 IOPS	500,000 IOPS
Ran. Write		500,000 IOPS		
Power Consumption <sup>4)</sup>	Idle (ASPT on)	30 mW		
	Active (Avg.)	Read	5.2 W	
		Write	5.2 W	5.7 W
	DEVSLP	L1.2 mode	5 mW	
Reliability	Temp.	Operating	0°C to 70°C (Measured by S.M.A.R.T. Temperature. Proper airflow recommended)	
		Non-Operating	-45°C to 85°C	
	Humidity		5% to 95%, non-condensing	
	Shock	Non-Operating	1,500G(Gravity), duration: 0.5ms, 3 axis	
	Vibration	Non-Operating	20~2,000Hz, 20G	
	MTBF		1.5 million hours	
Warranty <sup>7)</sup>	TBW <sup>5) 6)</sup>	600TB	1,200TB	
	Period	5 years, Limited <sup>8)</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) 1GB = 1,000,000,000 bytes by IDEMA. A certain portion of capacity may be used for system file and maintenance use, thus the actual available capacity may differ from the labeled capacity.

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

3) Performance may vary based on SSD's firmware, system hardware & configuration and other factors. Please refer to testing configuration and notes on the next page.

4) Please refer to testing configuration and notes on the next page.

5) 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.

6) TBW means Total Bytes Written.

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

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

## PRODUCT LINEUP

Density	Model Name	Box Contents	Model Code
1TB (1,024GB*)	MZ-V7P1T0	Samsung SSD 970 PRO 1TB Warranty Statement	MZ-V7P1T0BW
512GB*	MZ-V7P512	Samsung SSD 970 PRO 512GB Warranty Statement	MZ-V7P512BW

\* GB: 1GB = 1,000,000,000 bytes. 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). To download the latest software & manuals, please visit [www.samsung.com/samsungssd](http://www.samsung.com/samsungssd).

### ※ Testing Configuration and notes

Below you will find a list of system configurations Samsung used to obtain the results reported in this Data Sheet.

	Read/Write Performance	Power Consumption
NVMe Interface	PCIe Gen 3.0 x4	PCIe Gen 3.0 x4
OS	Windows 10 Build 10240	Windows 10 PRO K x64
CPU	Intel Core i7™ -7700K @ 4.2GHz	Intel Core i7™ -7700K @ 4.2GHz
Memory	Samsung DDR4 32GB (16GB x 2ea)	DDR4 16GB (8GB x 2ea)
Chipset	ASUS PRIME Z270-A	Gigabyte GA-Z270X
Test Program	Sequential/Random : IOMeter 1.1.0	IOMeter 1.1.0