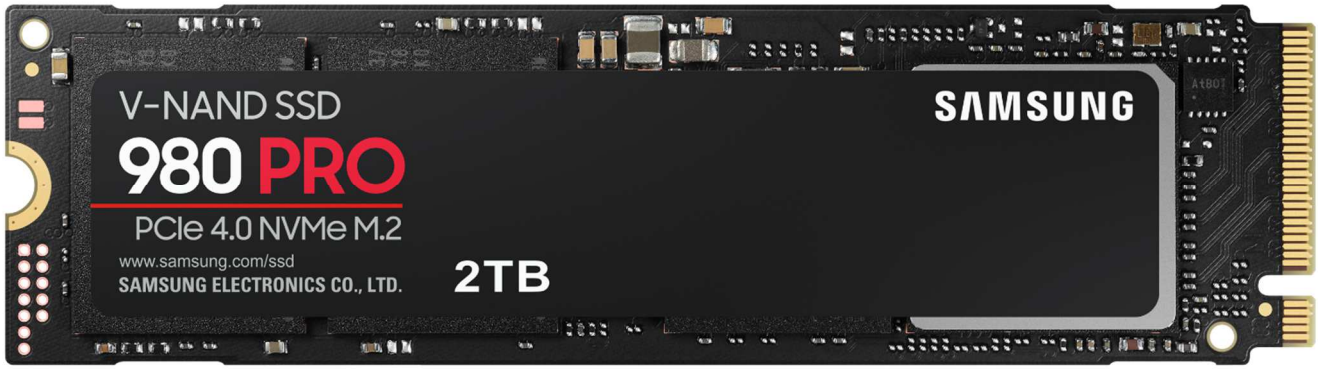
Samsung V-NAND SSD 980 PRO

2021 Data Sheet

Revision 2.1



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TECHNICAL SPECIFICATIONS

Samsung SSD 980 PRO						
Usage Application	Client PCs					
Interface	PCIe Gen 4.0 x4, NVMe 1.3c					
Hardware Information	Capacity[1]		250GB	500GB	1TB	2TB
	Controller		Samsung in-house Controller			
	NAND Flash Memory		Samsung V-NAND 3bit MLC			
	DRAM Cache Memory		512MB LPDDR4		1GB LPDDR4	2GB LPDDR4
	Dimension		Max 80.15 x Max 22.15 x Max 2.38 (mm)			
	Form Factor		M.2 (2280)			
Performance (Up to.)[2) 3) 4)]	Sequential Read		6,400 MB/s	6,900 MB/s	7,000 MB/s	7,000 MB/s
	Sequential Write		2,700 MB/s	5,000 MB/s	5,000 MB/s	5,100 MB/s
	QD 1 Thread 1	Ran. Read	22K IOPS	22K IOPS	22K IOPS	22K IOPS
		Ran. Write	60K IOPS	60K IOPS	60K IOPS	60K IOPS
	QD 32 Thread 16	Ran. Read	500K IOPS	800K IOPS	1,000K IOPS	1,000K IOPS
		Ran. Write	600K IOPS	1,000K IOPS	1,000K IOPS	1,000K IOPS
Power Consumption (Up to)[5]	Idle (ASPT on)		35mW			
	Active (Avg.)	Read	5.0 W	5.9 W	6.2 W	6.1W
		Write	3.9 W	5.4 W	5.7 W	5.6W
	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	-40°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[6]	TBW		150TB	300TB	600TB	1,200TB
	Period		5 years limited			
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) 980 PRO is backward compatible with PCIe 3.0. Sequential performances (up to): 3500 MB/s for reads, 2700MB/s (250GB), 3400MB/s (500GB), 3450 MB/s (1TB), 3470MB/s (2TB) for writes. Random performances (up to): 560K (250GB), 690K IOPS (500GB/1TB), 680K IOPS (2TB) for reads, 620K (250/500GB), 660K IOPS (1TB), 630K IOPS (2TB) for writes.
3) Sequential and random performance measurements are based on IOmeter1.1.0. Performance may vary based on SSD's firmware version, system hardware & configuration. Test System: AMD Ryzen 9 3900X 12-Core Processor CPU@3.79GHz, DDR4 2666MHz 16GBx2, OS-Windows 10 Pro 64bit, Chipset-ASUS-X570-ROG CROSSHAIR VIII FORMULAv
4) Sequential and random write performance was measured with Intelligent TurboWrite technology being activated. Intelligent TurboWrite operates only within a specific data transfer size. For detailed information, please contact your local service center
5) Power consumption is measured with IOmeter1.1.0 version with AMD Ryzen 7 3700X 8 Core @3.6GHz, DDR4 8GBx2, OS-Windows 10 Pro 64bit, Chipset-GIGABYTE-X570-AORUS MASTER
6) All documented endurance test results are in compliance with JESD218 Standards. Please visit www.jedec.org for detailed information on JESD218 Standards. TBW means Terabytes Written, Warranty provides coverage for the stated time period or the TBW, whichever comes first. Please refer to the detailed warranty statement here at http://www.samsung.com/samsungssd.

PRODUCT LINEUP

Density	Model Name	Box Contents	Model Code
250GB*	MZ-V8P250	Samsung SSD 980 PRO 250GB Warranty Statement	MZ-V8P250BW MZ-V8P250B/AM
500GB*	MZ-V8P500	Samsung SSD 980 PRO 500GB Warranty Statement	MZ-V8P500BW MZ-V8P500B/AM
1TB (1,000GB*)	MZ-V8P1T0	Samsung SSD 980 PRO 1TB Warranty Statement	MZ-V8P1T0BW MZ-V8P1T0B/AM
2TB (2,000GB*)	MZ-V8P2T0	Samsung SSD 980 PRO 2TB Warranty Statement	MZ-V8P2T0BW MZ-V8P2T0B/AM

* 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, and to download the latest software & manuals, please visit www.samsung.com/ssd and www.samsungssd.com.

TEST CONFIGURATION

Below you will find a list of system configurations Samsung used to obtain the results reported in this Data Sheet. All performance data was measured with the SSD as a secondary drive

	Read/Write Performance	Power Consumption
Interface	PCIe Gen 4.0 x4	PCIe Gen 4.0 x4
OS	Windows 10 Pro 64bit	Windows 10 Pro 64bit
CPU	AMD Ryzen 9 3900X 12-Core CPU@3.79GHz	AMD Ryzen 7 3700X 8 Core @3.6GHz
Memory	DDR4 2666MHz 16GBx2	DDR4 8GBx2
Chipset	ASUS-X570-ROG CROSSHAIR VIII FORMULAv	GIGABYTE-X570-AORUS MASTER
Test Program	IOmeter 1.1.0	IOmeter 1.1.0

The test values in the review were obtained under the following BIOS settings.

1) BIOS version: 1201(2019/11/18)

2) Advanced/AMD CBS/CPU Common Options/Global C-state Control: Auto -> Disabled

3) Overclock

- 3-1) Ai Overclock Tuner: Default -> Manual
- 3-2) Memory Frequency: Auto -> DDR4-3600MHz
- 3-3) Core Performance Boost: Auto -> Disabled
- 3-4) CPU Core Ratio: Auto -> 43.75
- 3-5) Precision Boos Overdrive/Precision Boost Overdrive: Auto -> Disabled
- 3-6) DRAM Timing Control/DRAM CAS# Latency: Auto -> 17
  - DRAM Timing Control/Trcdrd : Auto -> 19
  - DRAM Timing Control/Trcdwr : Auto -> 19
  - DRAM Timing Control/DRAM RAS# PRE Time: Auto -> 18
  - DRAM Timing Control/DRAM RAS# ACT Time: Auto -> 36
- 3-7) DRAM Voltage: Auto -> 1.35

Revision History

Revision Number	Description	Revision Date
1.0	Initial Release	August, 2020
1.1	SKU information and test configuration is added	September, 2020
2.0	2TB Model added	January, 2021
2.1	The footnote 4 is fixed, the controller name is deleted	February, 2021