

Samsung V-NAND SSD 970 EVO Plus

2019 Data Sheet

Revision 2.0



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Revision History

| Revision Number | Description | Revision Date |
|-----------------|-------------------------|---------------|
| 1.0 | Initial Release | Jan., 2019 |
| 2.0 | Added 2TB Specification | Mar., 2019 |

Samsung SSD 970 EVO Plus

The Samsung SSD 970 EVO Plus is a client PC NVMe SSD with Samsung's latest 3-bit MLC V-NAND. The 970 EVO Plus is specially designed for tech enthusiasts, hardcore gamers, and professionals who need unrivaled performance, superior reliability, and it boasts the best-in-class capacity for intensive workloads on PCs and workstations.

Unrivaled Performance

In combination with the latest Samsung V-NAND technology and firmware optimization, the 970 EVO Plus achieves random write speeds up to 57% faster than the 970 EVO. Also, it offers industry-leading sequential performance among NVMe SSDs with read/write speeds of up to 3,500/3,300 MB/s, respectively. The 970 EVO Plus performance will be the industry-leading and maximum within the current PCIe Gen3 interface.

Superior Reliability

The 970 EVO Plus boasts exceptional endurance with up to 1,200 terabytes¹⁾ written. Advanced thermal control solutions enhance 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 nickel coating on the Phoenix controller also helps to dissipate heat faster during heavy workload use in order to ensure the high levels of quality and reliability for which Samsung is known. The 970 EVO Plus comes with an industry-leading 5-year warranty.

1) All documented endurance test results are in compliance with JESD218 standards. Please visit www.jedec.org for detailed information.

System Design Flexibility

The 970 EVO Plus enables convenient storage expansion across many different devices. The 970 EVO Plus comes in a broad range of capacity options, made possible through Samsung's latest V-NAND technology. In addition, the 970 EVO Plus offers high power efficiency as well as exceptional speeds, making it the ideal solution to use with application ranging from ultra-thin computing to high-performance computing systems.

Advanced Data Encryption

The 970 EVO Plus provides multiple advanced data encryption features like Self-Encrypting Drive (SED) security technology that will help keep data safe at all times. The 970 EVO Plus includes an AES 256-bit hardware-based encryption engine to ensure that your personal files remain secure. The 970 EVO Plus is compliant with various advanced security management solutions (such as, TCG Opal and Encrypted Drive-IEEE1667).

Samsung Data Migration and Magician Software

Samsung Magician and Data Migration software supports the 970 EVO Plus. These powerful software programs offer consumers an easy way to manage their Samsung SSDs. With Magician, users can instantly gain an overview of critical drive information and compatibility issues. Users will find and implement the process of keeping their firmware, drivers and other settings up to date easier than ever.

The Samsung Data Migration software is simple to use – yet provides a very powerful “Custom Cloning” feature that enables migration work even when source data is greater than the SSD's capacity.

TECHNICAL SPECIFICATIONS

| Samsung SSD 970 EVO Plus | | | | | | |
|---------------------------------------|---|---------------------------------------|--|------------|------------|-----------|
| Usage Application | Client PCs | | | | | |
| Interface | PCIe Gen 3.0 x4, NVMe 1.3 | | | | | |
| Hardware Information | Capacity ¹⁾ | 250GB | 500GB | 1TB | 2TB | |
| | Controller | Samsung Phoenix 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) ²⁾ | | | | |
| Performance (Up to.) ^{3) 4)} | Sequential Read | 3500 MB/s | | | | |
| | Sequential Write | 2300 MB/s | 3200 MB/s | 3300 MB/s | | |
| | QD 1 Thread 1 | Ran. Read | 17K IOPS | 19K IOPS | | |
| | | Ran. Write | 60K IOPS | | | 62K IOPS |
| | QD 32 Thread 4 | Ran. Read | 250K IOPS | 480K IOPS | 600K IOPS | 620K IOPS |
| | | Ran. Write | 550K IOPS | | | 560K IOPS |
| Power Consumption ⁵⁾ | Idle (ASPT on) | | 30mW | | | |
| | Active (Avg.) | Read | 5 W | 5.5 W | | |
| | | Write | 4.2 W | 5.8 W | 6 W | |
| | 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 ⁹⁾ | TBW ^{6) 7)} | 150TB | 300TB | 600TB | 1,200TB | |
| | Period | 5 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) | | | | | |

- 1GB = 1,000,000,000 bytes by IDEMA. A certain portion of capacity may be used for system file and maintenance uses, thus the actual available capacity may differ from the labeled capacity.
- M.2 is the 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 popular M.2 are those with a width of 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.
- 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 configuration: Intel Core i7-7700K @ 4.2GHz, SAMSUNG DDR4 32GB, OS-Windows 10 Build 10240, Chipset-ASUS PRIME Z270-A.
- Sequential and random write performance was measured with Intelligent TurboWrite technology being activated. The sequential write performances for the portion of data exceeding over Intelligent TurboWrite buffer size are: 400 MB/s for 250GB, 900 MB/s for 500GB, 1700 MB/s for 1TB and 1750 MB/s for 2TB. The random write performances for the portion of data exceeding over Intelligent TurboWrite buffer size (tested with QD 32 Thread 4) are: 100,000 IOPS for 250GB, 200,000 IOPS for 500GB, 400,000 IOPS for 1TB and 420,000 IOPS for 2TB. Performance may vary depending on SSD's firmware, system hardware & configuration and other factors.
- 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.
- 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.
- Please refer to the detailed warranty statement here at <http://www.samsung.com/samsungssd>
- Warranty provides coverage for the stated time period or the TBW, whichever comes first.

PRODUCT LINEUP

| Density | Model Name | Box Contents | Model Code |
|-------------------|------------|--|------------------------------|
| 250GB* | MZ-V7S250 | Samsung SSD 970 EVO Plus 250GB Warranty Statement | MZ-V7S250BW MZ-V7S250B/AM |
| 500GB* | MZ-V7S500 | Samsung SSD 970 EVO Plus 500GB Warranty Statement | MZ-V7S500BW MZ-V7S500B/AM |
| 1TB (1,000GB*) | MZ-V7S1T0 | Samsung SSD 970 EVO Plus 1TB Warranty Statement | MZ-V7S1T0BW MZ-V7S1T0B/AM |
| 2TB (2,000GB*) | MZ-V7S2T0 | Samsung SSD 970 EVO Plus 2TB Warranty Statement | MZ-V7S2T0BW MZ-V7S2T0B/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.

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 2,400MHz 32GB (16GB x 2ea) | Samsung DDR4 2,133MHz 16GB (8GB x 2ea) |
| Chipset | ASUS PRIME Z270-A | Gigabyte GA-Z270X |
| Test Program | IOmeter 1.1.0 | IOmeter 1.1.0 |