



MINERVA

PE1603 PCIe 16 Lanes to SlimSAS 8i x2 Converter Card

Performance & Burn In Test Rev 1.0

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PE1603 Rev1.0 PCIe x16 for SFF-8654 Dual ports Riser Card

1. Overview

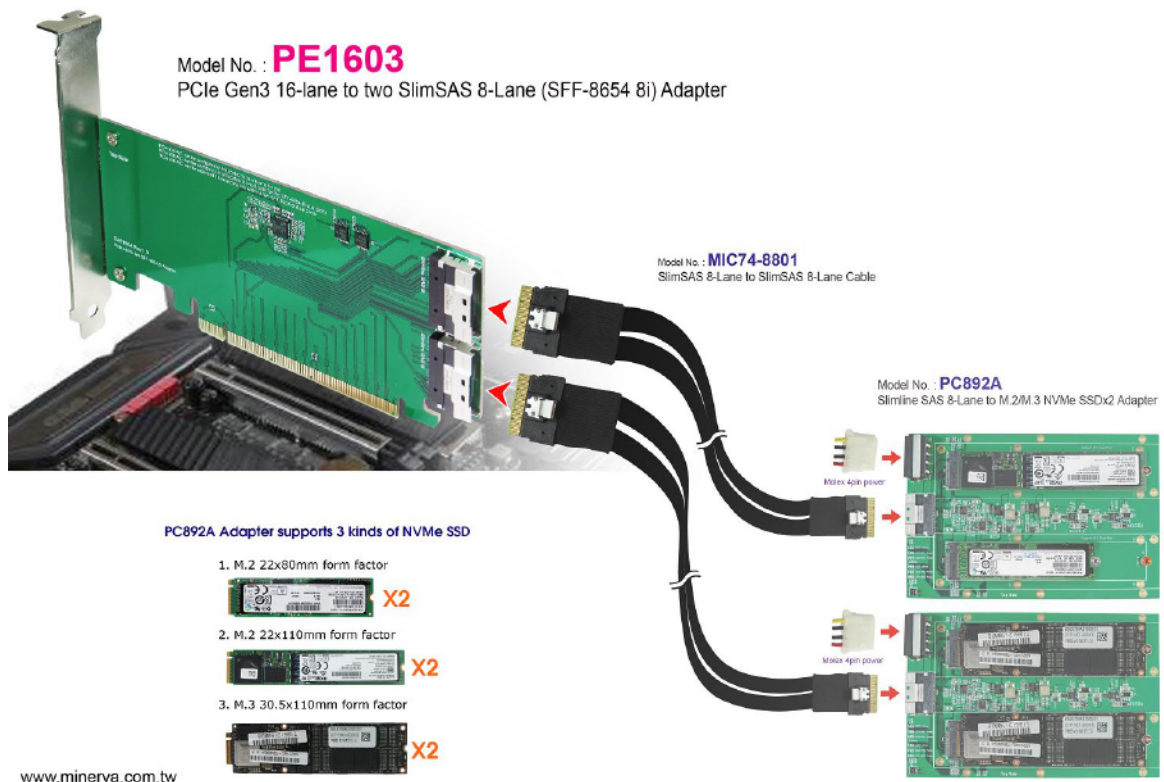
This riser card has built-in SFF-8654 8i dual ports connector. It is designed for use by PCIe x16 to configure two SFF-8654 8i bifurcations for x4 NVMe 4 ports.

2. Tools and Results of Performance Measurement

2.1 Test Platform

M/B : GIGABYTE **X570 AORUS MASTER**
CPU : AMD **Ryzen 7, 3700X 8-Core**
Memory : Kingston **KVR26N19D8/16, DDR4-2666MHz, 32GB**(16GB DIMM*2)
ATX Power : COOLER MASTER G750M, **750W ATX**, 12V V2.2 Power Supply
AIC: PE1603 PCIe x16 to SlimSAS 8i dual ports ADD-in Card
Adapter: PC892A SFF-8654 8i to M.2/M.3 dual ports Storage Adapter
Cable: SFF-8654 8i(SlimSAS) to SFF-8654 8i(SlimSAS) Cable x2
OS : Microsoft **Windows 10 64bit OS**

2.2 Test target: PE1603 AIC, PC892A adapter and M.3 NF1 & M.2 NVMe SSD



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2.3 Install Hardware

First inserts PE1603 AIC into GABYTE **X570 AORUS MASTER** PCIe x16 Slot and, using the MIC74-8801 Cable to connect PC892A adapter with M.3 NF1, M.2 NVMe SSD.

2.4 BIOS & Windows 10 OS environment setup

2.4.1 Primary SATA SSD installed Windows 10 OS.

2.4.2 M.3 NF1, M.2 NVMe SS, formatted to NTFS Mode. Don't install any program.



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2.5 CrystalDiskMark 7.0 x64 performance test
※Benchmark (Sequential Read & Write / default = 1MB)

2.5.1 M.2 NVMe Samsung/512GB performance as below:

	Read [MB/s]	Write [MB/s]
All		
SEQ1M Q8T1	3567.69	1709.86
SEQ1M Q1T1	2941.79	1708.50
RND4K Q32T16	1374.98	1354.74
RND4K Q1T1	55.35	197.21

2.5.2 M.2 NVMe LITEON/960GB performance as below:

	Read [MB/s]	Write [MB/s]
All		
SEQ1M Q8T1	2326.97	901.39
SEQ1M Q1T1	1906.76	923.38
RND4K Q32T16	1179.92	945.09
RND4K Q1T1	49.07	191.01

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2.5.3 **M.3 NF1 Samsung/4TB** performance as below:

CrystalDiskMark 7.0.0 x64 [ADMIN] window showing performance for drive F: (0/3577GiB). The interface includes menu options (File, Settings, Presets, Themes, Help, Language) and test parameters (5, 1GiB, MB/s). The results table shows Read and Write speeds for various test patterns.

	Read [MB/s]	Write [MB/s]
All		
SEQ1M Q8T1	2823.56	1993.74
SEQ1M Q1T1	2132.07	1973.49
RND4K Q32T16	2330.14	1767.62
RND4K Q1T1	52.43	203.19

2.5.4 **M.3 NF1 Samsung/4TB** performance as below:

CrystalDiskMark 7.0.0 x64 [ADMIN] window showing performance for drive G: (0/3577GiB). The interface includes menu options (File, Settings, Presets, Themes, Help, Language) and test parameters (5, 1GiB, MB/s). The results table shows Read and Write speeds for various test patterns.

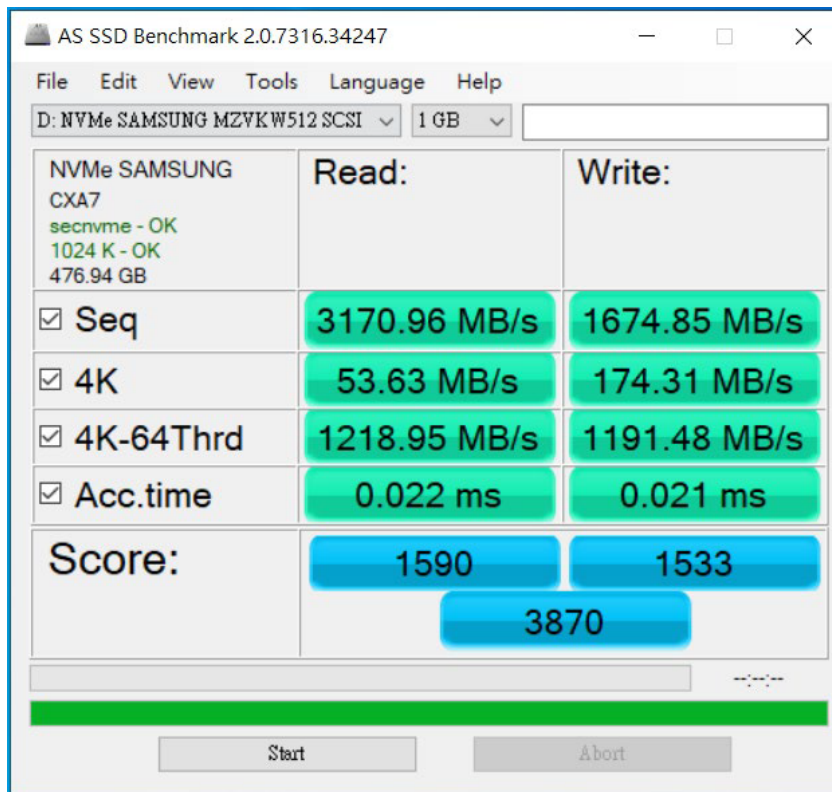
	Read [MB/s]	Write [MB/s]
All		
SEQ1M Q8T1	2813.27	1993.60
SEQ1M Q1T1	2138.13	1975.98
RND4K Q32T16	2325.21	1775.69
RND4K Q1T1	52.30	202.60

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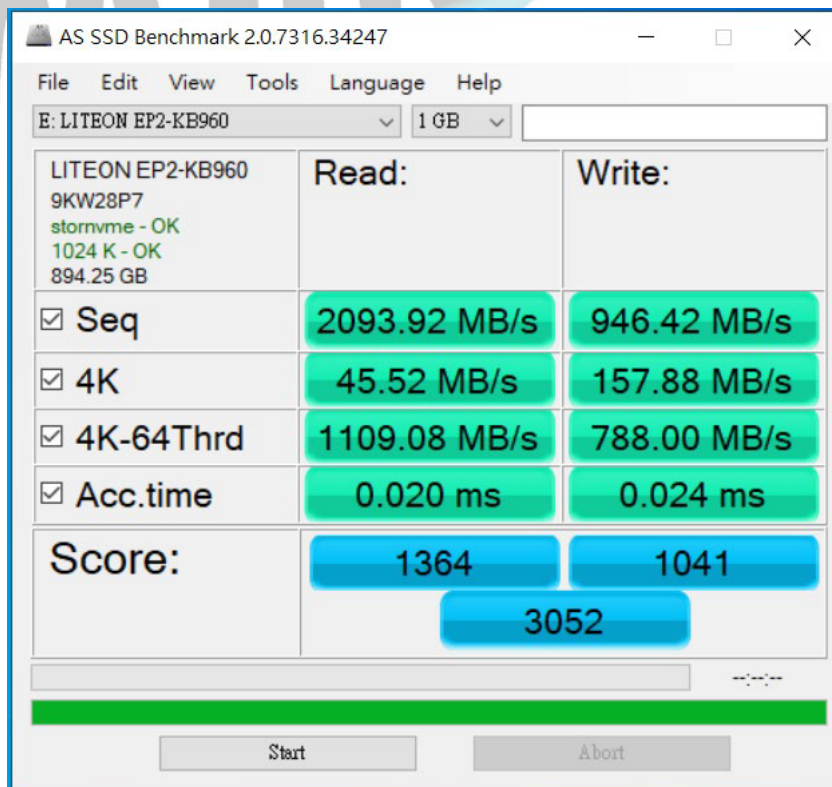
2.6 AS SSD Benchmark 2.0.6 performance test

✘Benchmark (Read & Write by MB/s, default block size = 16MB)

2.6.1 M.2 NVMe Samsung/512GB performance as below:

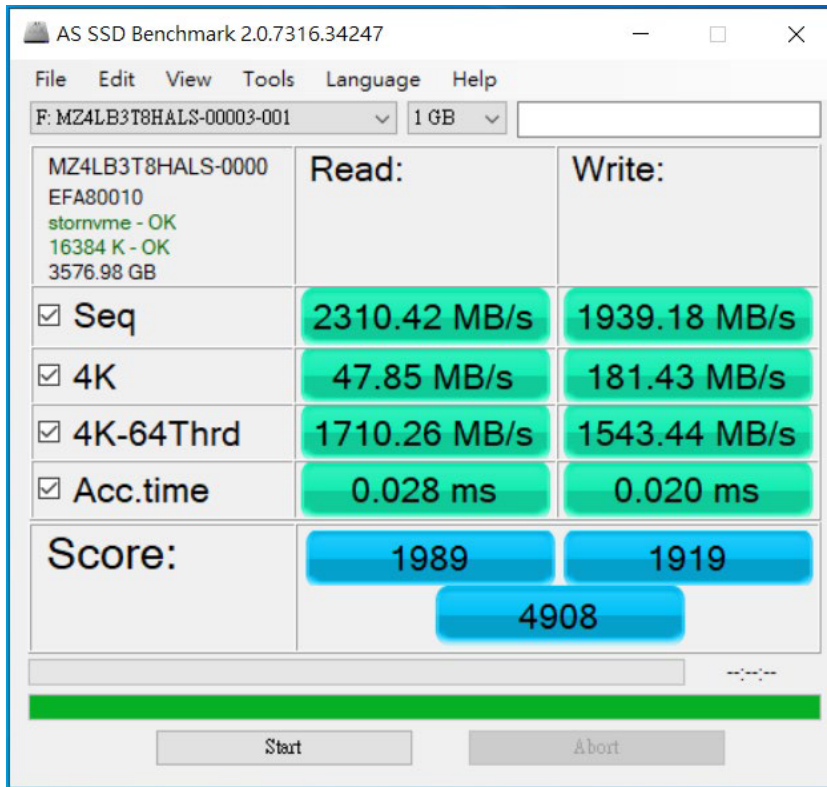


2.6.2 M.2 NVMe LITEON/960GB performance as below:

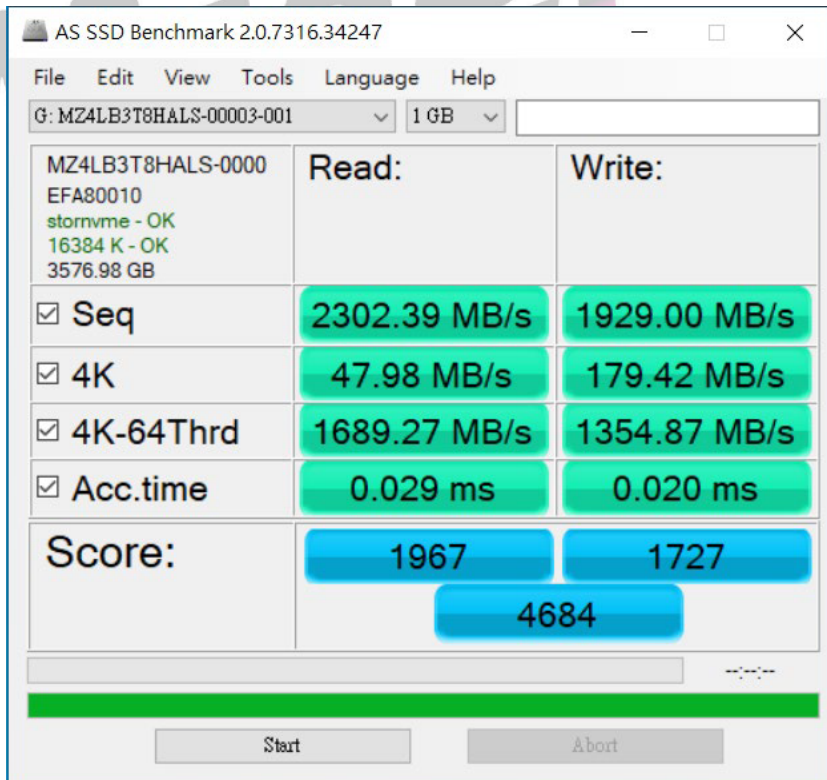


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2.6.3 **M.3 NF1 Samsung/4TGB** performance as below:



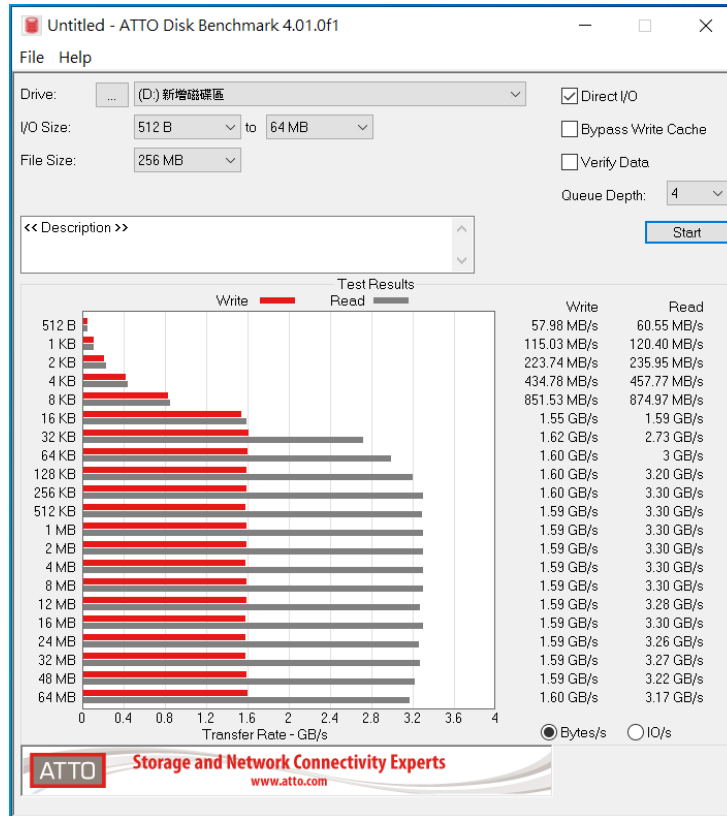
2.6.4 **M.3 NF1 Samsung/4TGB** performance as below:



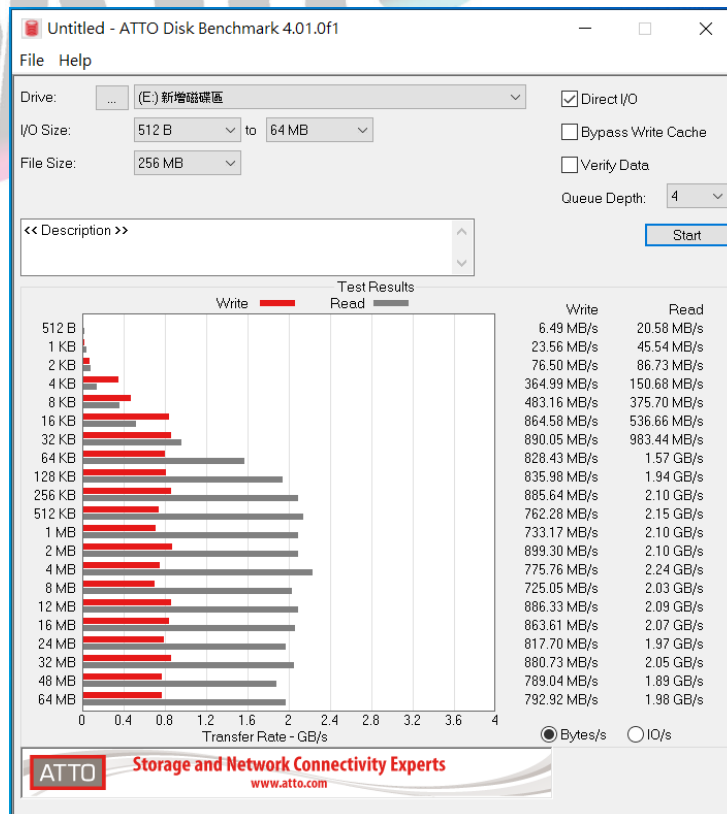
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2.7 ATTO Disk Benchmark 4.01. performance test

2.7.1 M.2 NVMe Samsung/512GB performance as below:

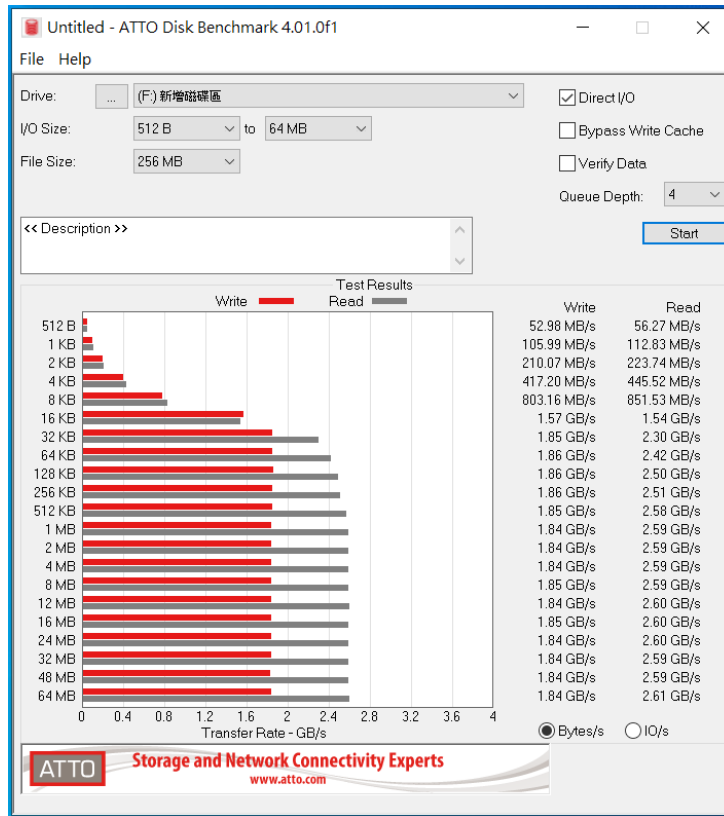


2.7.2 M.2 NVMe LITEON/960GB performance as below:

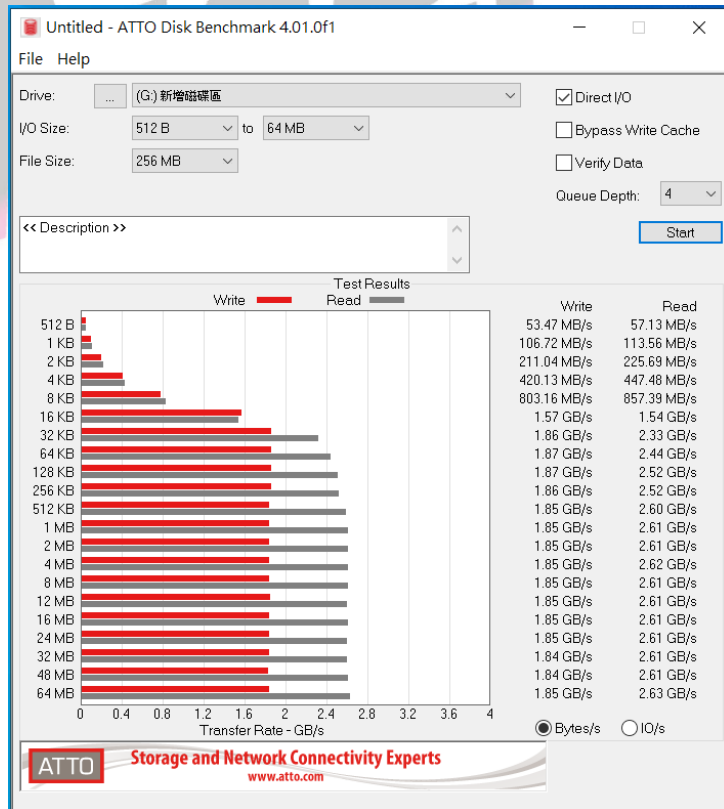


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2.7.3 **M.3 NF1 Samsung/4TGB** performance as below:



2.7.4 **M.3 NF1 Samsung/4TGB** performance as below:



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2.8 AnvilBenchmark_V110_B337

2.8.1 M.2 NVMe Samsung/512GB performance as below:



2.8.2 M.2 NVMe LITEON/960GB performance as below:



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2.8.3 **M.3 NF1 Samsung/4TGB** performance as below:

SSD Benchmark MZ4LB3T8HALS-00003-001 3840GB/EFA80010

Read	Resp. time	MB read	IOPS	MB/s
Seq 4MB	1.7090ms	2,048.0	585.14	2,340.57
4K	0.0790ms	618.3	12,662.80	49.46
4K QD4	0.0859ms	2,274.9	46,590.17	181.99
4K QD16	0.0972ms	8,033.6	164,527.61	642.69
32K	0.1435ms	3,268.8	6,966.50	217.70
128K	0.1604ms	11,701.4	6,234.08	779.26
Write	Resp. time	MB written	IOPS	MB/s
Seq 4MB	2.0781ms	1,024.0	481.20	1,924.81
4K	0.0209ms	640.0	47,887.99	187.06
4K QD4	0.0284ms	640.0	141,012.58	550.83
4K QD16	0.0425ms	640.0	376,989.00	1,472.61

Run read: 5,574.93
Run write: 8,743.39
Run: 14,318.33

Microsoft Windows 10 企業版 64 位元 Build (18362)
X570 AORUS MASTER/F/SI, AM4
AMD Ryzen 7 3700X 8-Core Processor
Memory : 32,558 MB
Professional Edition

Drives :
Notes :

MZ4LB3T8HALS-00003-001 3840GB/EF
Drive F: 3,577.0/3,576.8GB free (100.0%)
NTFS - Cluster size 4096B
Storage driver: storvme
Alignment 16384KB OK
Compression 100% (Incompressible)

2.8.4 **M.3 NF1 Samsung/4TGB** performance as below:

SSD Benchmark MZ4LB3T8HALS-00003-001 3840GB/EFA80010

Read	Resp. time	MB read	IOPS	MB/s
Seq 4MB	1.7090ms	2,048.0	585.14	2,340.57
4K	0.0792ms	616.9	12,633.80	49.35
4K QD4	0.0859ms	2,273.8	46,567.04	181.90
4K QD16	0.0968ms	8,074.5	165,365.58	645.96
32K	0.1439ms	3,259.8	6,947.25	217.10
128K	0.1605ms	11,690.8	6,228.84	778.60
Write	Resp. time	MB written	IOPS	MB/s
Seq 4MB	2.0742ms	1,024.0	482.11	1,928.44
4K	0.0209ms	640.0	47,774.71	186.62
4K QD4	0.0285ms	640.0	140,339.18	548.20
4K QD16	0.0428ms	640.0	374,173.78	1,461.62

Run read: 5,578.32
Run write: 8,704.37
Run: 14,282.68

Microsoft Windows 10 企業版 64 位元 Build (18362)
X570 AORUS MASTER/F/SI, AM4
AMD Ryzen 7 3700X 8-Core Processor
Memory : 32,558 MB
Professional Edition

Drives :
Notes :

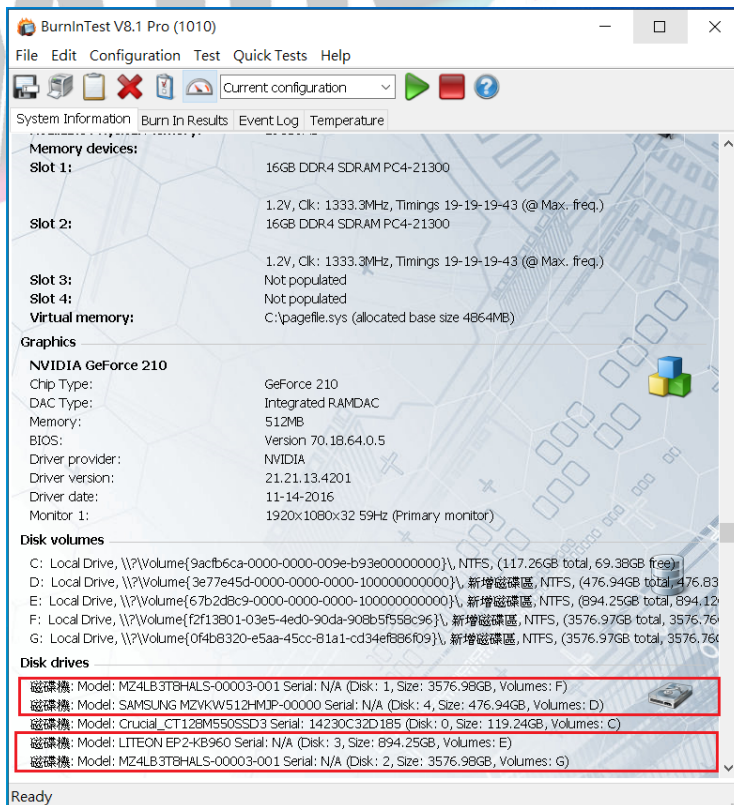
MZ4LB3T8HALS-00003-001 3840GB/EF
Drive G: 3,577.0/3,576.8GB free (100.0%)
NTFS - Cluster size 4096B
Storage driver: storvme
Alignment 16384KB OK
Compression 100% (Incompressible)

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3. Burn In Tests and Results

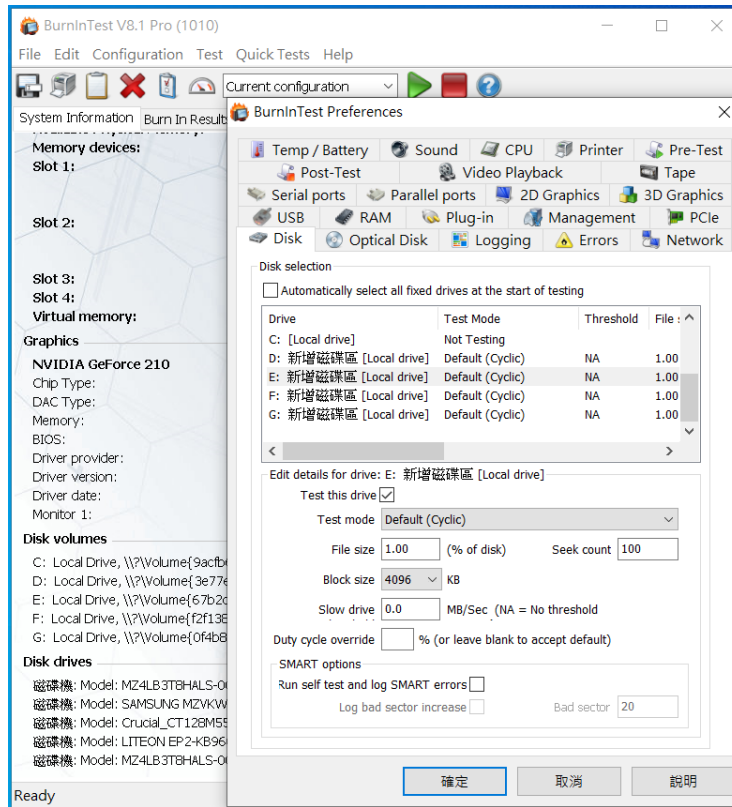
3.1 BurnInTest v8.1 Pro

3.1.1 system information as below:

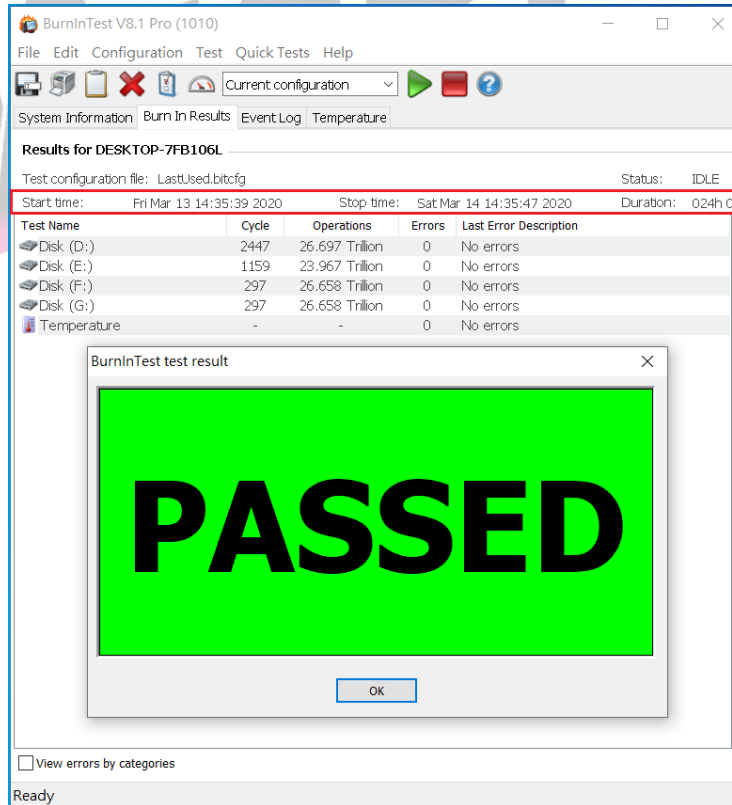


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3.1.2 Disk test mode (10 ways cycle test)



3.1.3 24-hour Burn-in test PASSED



4. Summary

- 4.1 M.3 NF1, M.2 NVMe SSD is PCI-e Gen 3 / 4 Lane Interface, I/O speed, max. to 32Gbps.
- 4.2 PE1603 adapter I/O performance is based on M.3 NF1, M.2 NVMe SSD.

