



MINERVA

GD9608A SlimSAS 8i dual port PCIe 4.0 to M.2 quad port

Performance & Burn In Test Rev 1.0

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1. Overview

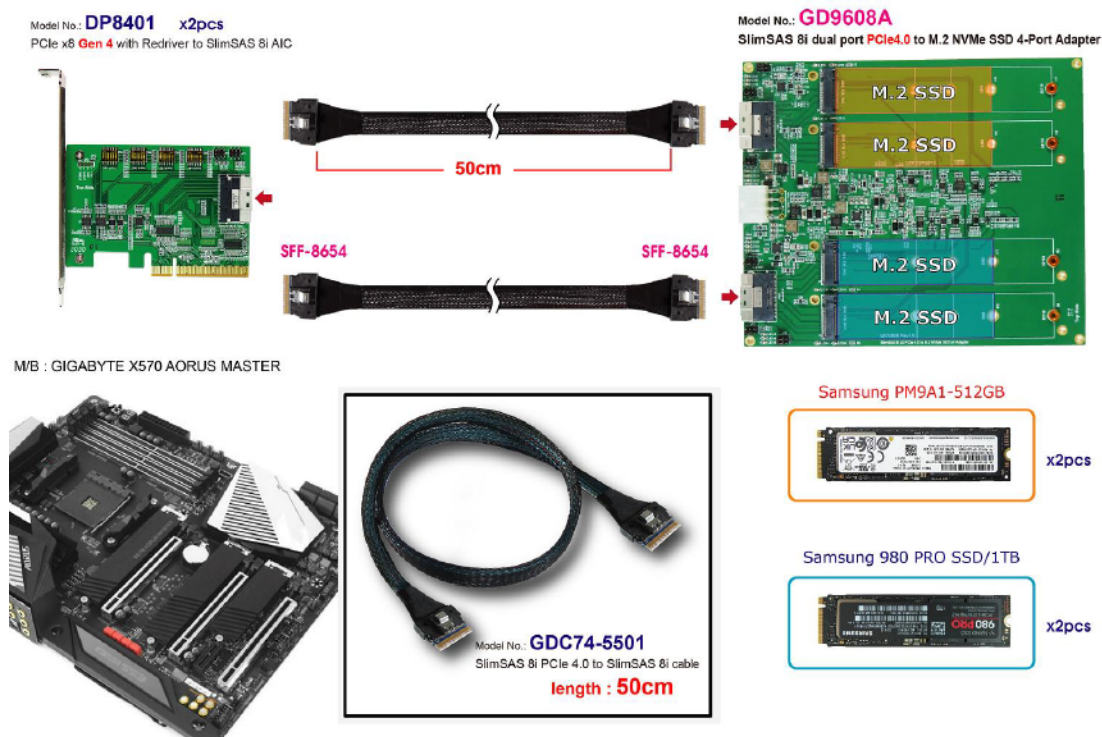
The GD9608A adapter provides four ports M.2 connector for M.2 SSD application. Its each individual M.2 port supports Hot Plug Power protection and input port is with SlimSAS 8i(SFF-8654) dual port connector. It is designed for use by PCIe x16 bifurcation AIC to be bifurcated four x4 link width.

2. Tools and Results of Performance Measurement

2.1 Test Platform

- M/B : ASUS **PRIME X570-PRO**
- 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
- Add in Card: DP8401 PCIe x16 to with ReDriver SlimSAS 8i(SFF-8654) AIC
- Cable: PCIe 4.0 SFF-8654 8i, 50cm Cable
- Adapter: GD9608A SlimSAS 8i dual port PCIe 4.0 to M.2 quad port adapter
- OS : Microsoft **Windows 10 64bit OS**

2.2 Test target: DP8401, GD9608A adapter with M.2 **512GB, 1TB SSD**



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2.3 Install Hardware

First inserts the M.2 SSD into the GD9608A M.2 connector and connects the GD9608A adapter to the DP8401 AIC card (PCIe x8 Gen 4 to SFF-8654 8i), using the **GDC74-5501 Cable**, and Plugs DP8401 AIC into PCIe x16 Slot of ASUS **PRIME X570-PRO** mainboard.

2.4 BIOS & Windows 10 OS environment setup

2.4.1 Primary SATA NVMe SSD install Windows 10 OS.

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

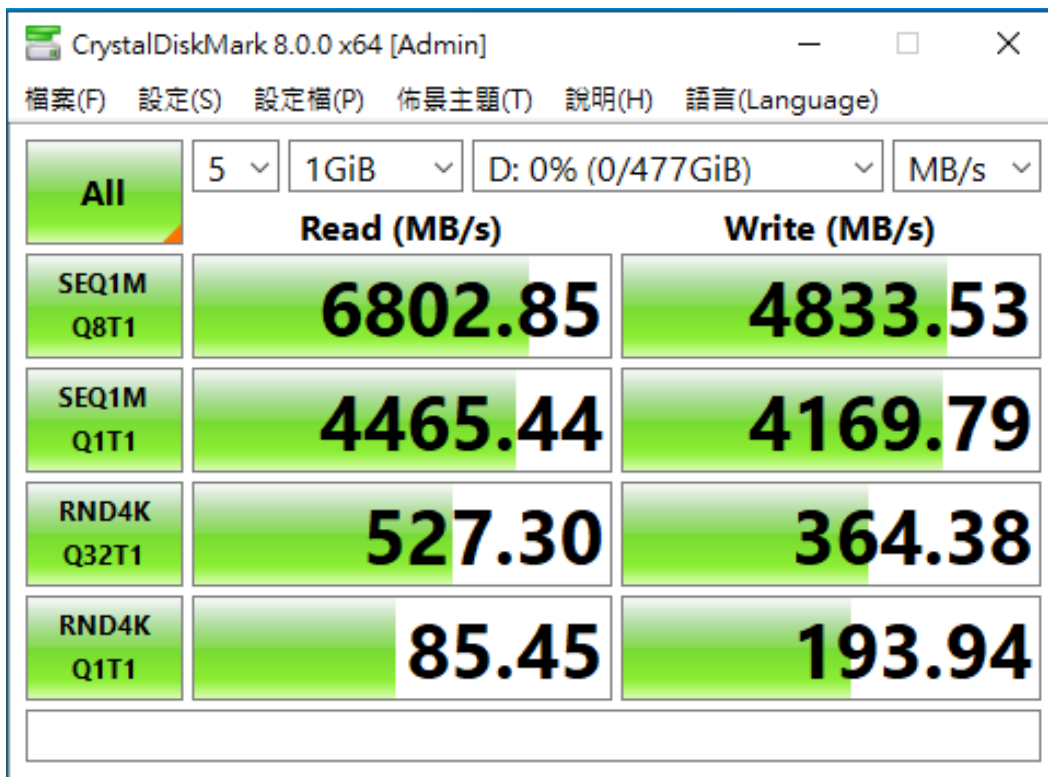


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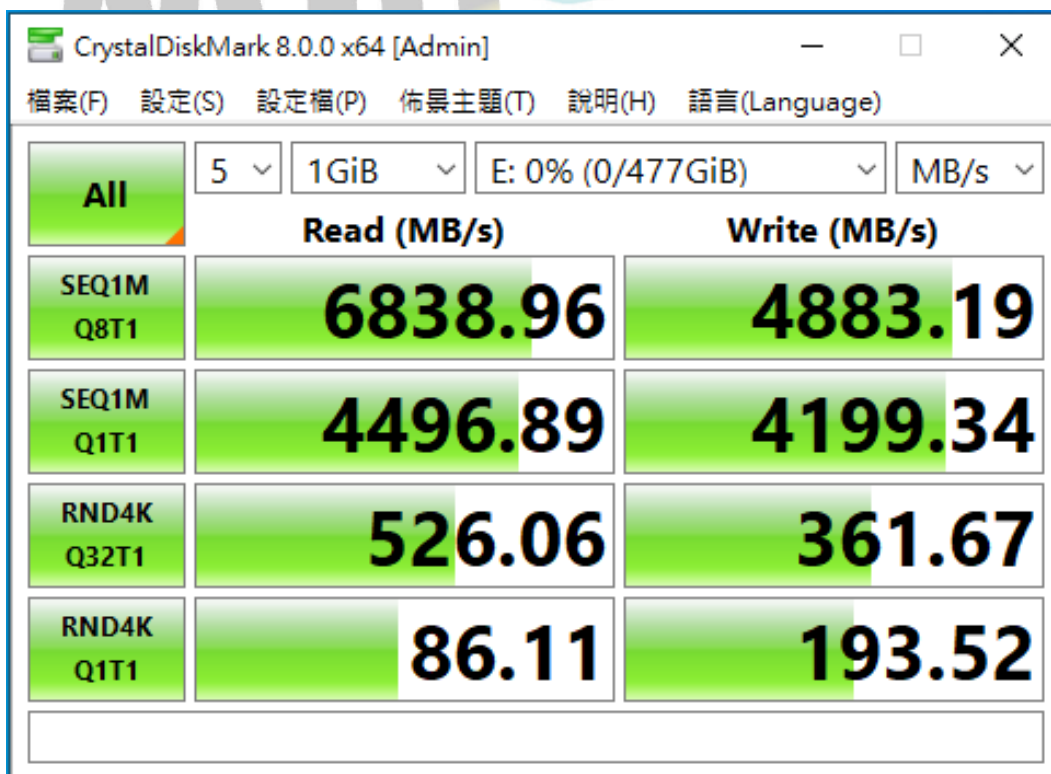
2.5 CrystalDiskMark 8.0.0 x64 performance test

※Benchmark (Sequential Read & Write / default = 1MB)

2.5.1 SAMSUNG PM9A1 M.2 / 512GB in CN1: performance as below:



2.5.2 SAMSUNG PM9A1 M.2 / 512GB in CN2: performance as below:



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2.5.3 SAMSUNG 980 PRO M.2 / 1TB in CN3: performance as below:

	Read (MB/s)	Write (MB/s)
SEQ1M Q8T1	6732.28	4941.33
SEQ1M Q1T1	4218.23	4247.47
RND4K Q32T1	525.26	361.27
RND4K Q1T1	86.07	193.05

2.5.4 SAMSUNG 980 PRO M.2 / 1TB in CN4: performance as below:

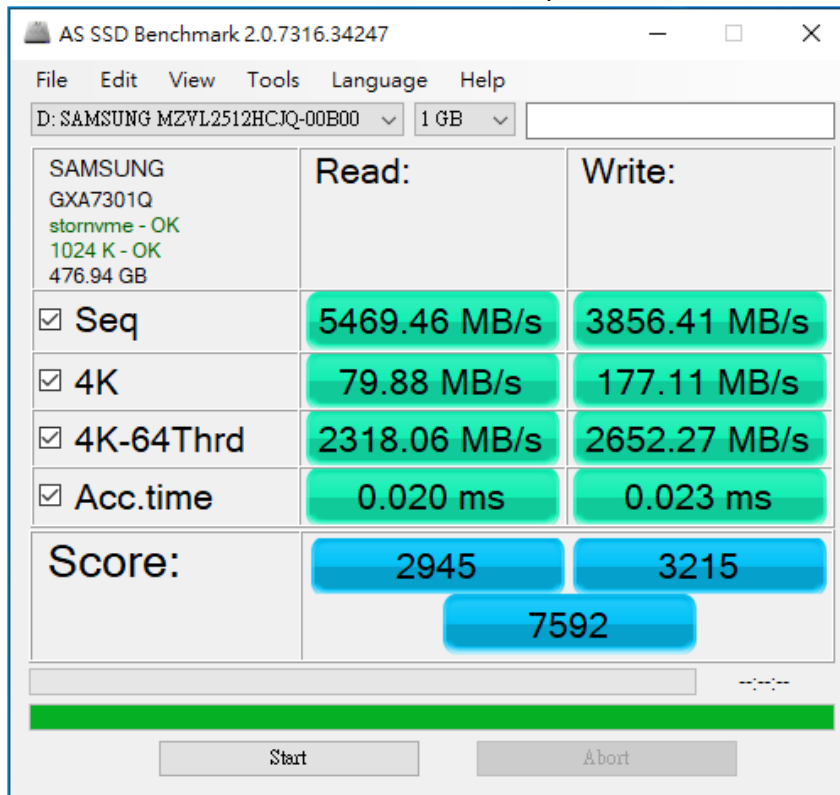
	Read (MB/s)	Write (MB/s)
SEQ1M Q8T1	6606.83	5012.99
SEQ1M Q1T1	4226.28	4257.32
RND4K Q32T1	528.75	362.07
RND4K Q1T1	86.13	193.47

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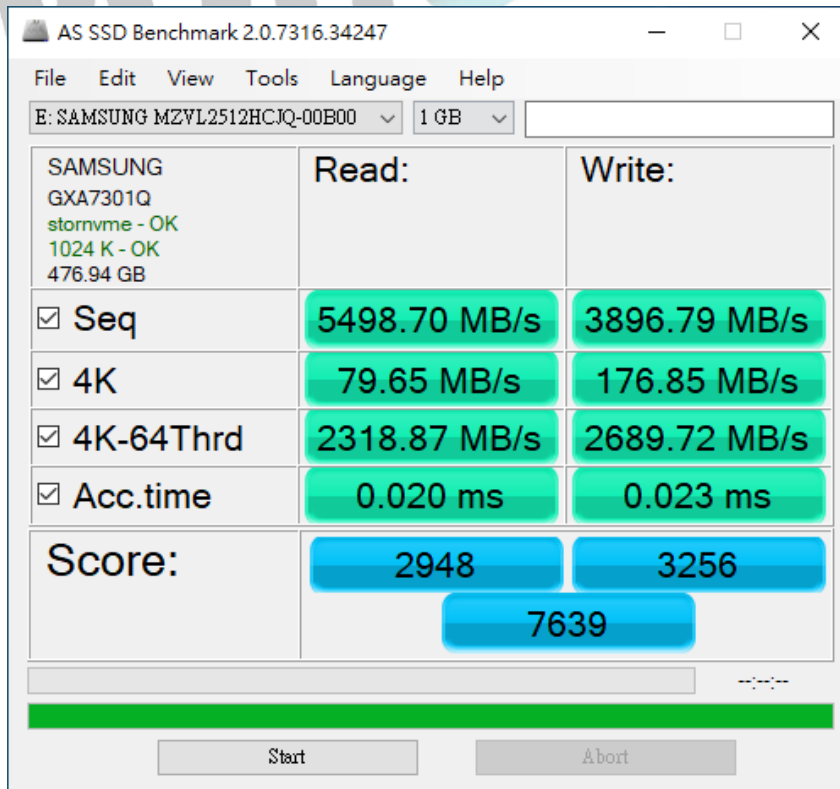
2.6 AS SSD Benchmark 2.0 performance test

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

2.6.1 SAMSUNG PM9A1 M.2 / 512GB in CN1: performance as below:

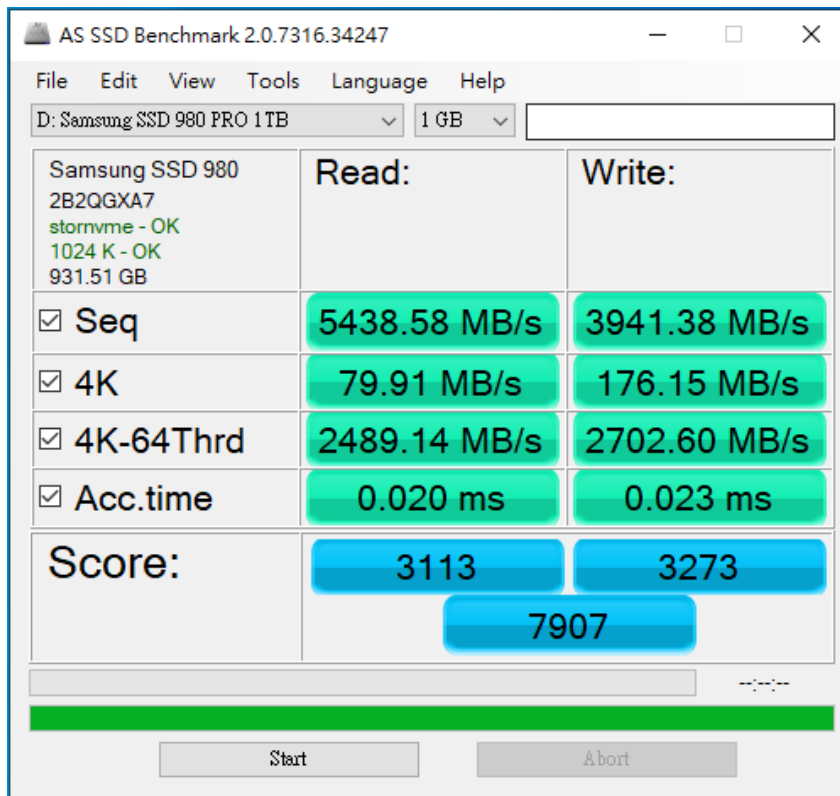


2.6.2 SAMSUNG PM9A1 M.2 / 512GB in CN2: performance as below:

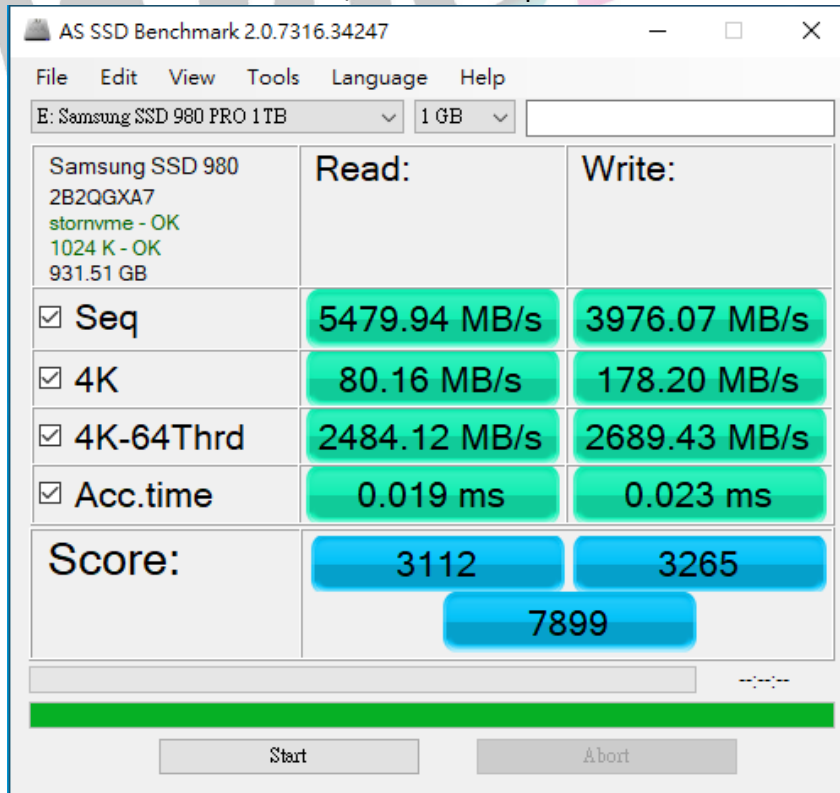


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2.6.3 SAMSUNG 980 PRO M.22 / 1TB in CN3: performance as below:



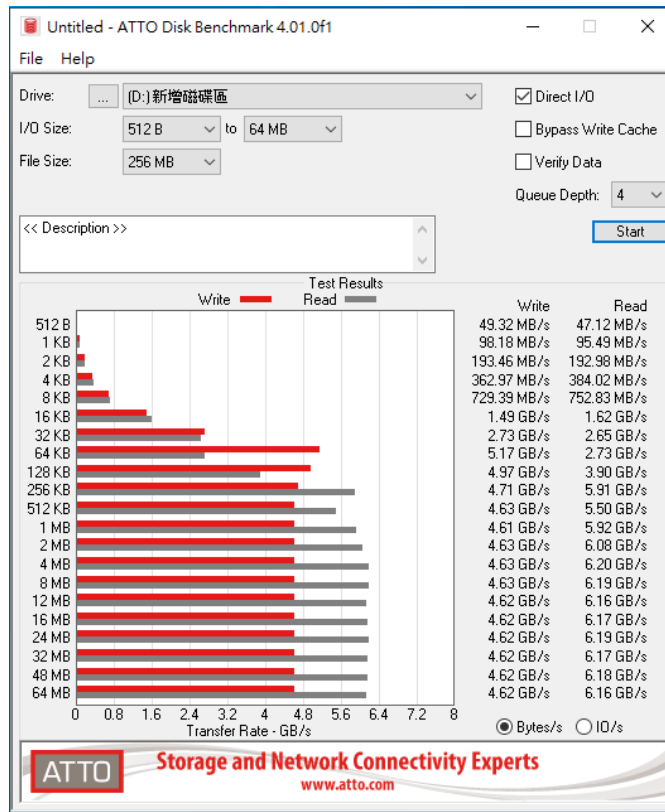
2.6.4 SAMSUNG 980 PRO M.2 / 1TB in CN4: performance as below:



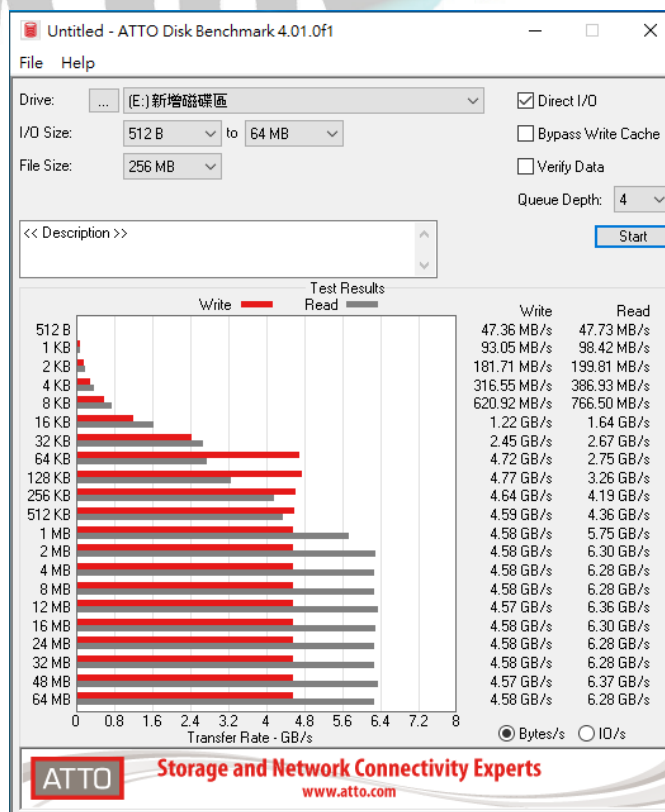
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2.7 ATTO Disk Benchmark 4.01 performance test

2.7.1 SAMSUNG PM9A1 M.2 / 512GB in CN1: performance as below:

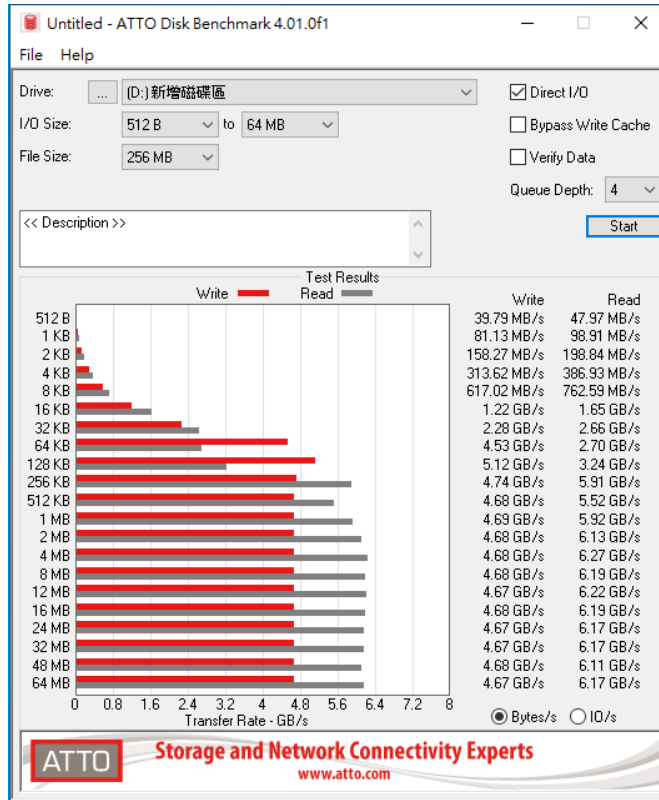


2.7.2 SAMSUNG PM9A1 M.2 / 512GB in CN2: performance as below:

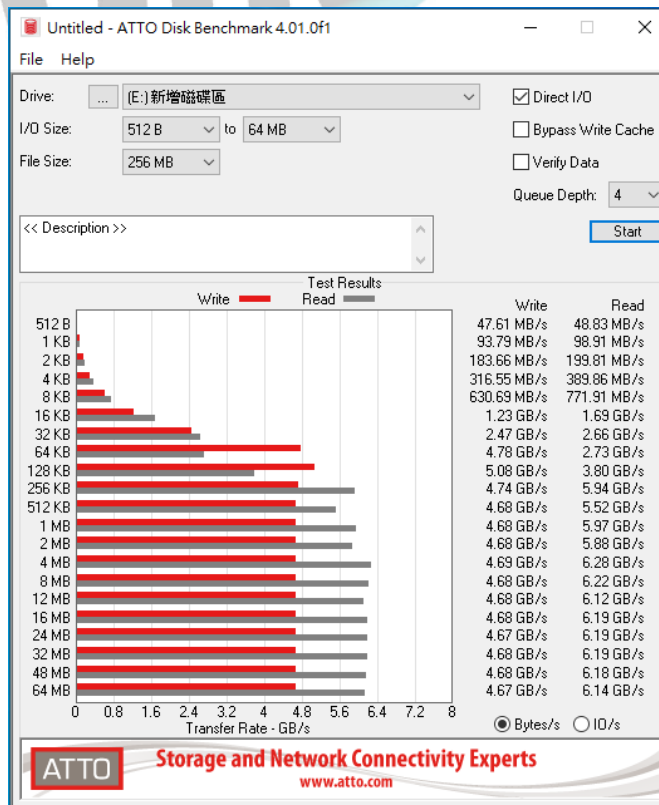


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2.7.3 SAMSUNG 980 PRO M.2 / 1TB in CN3: performance as below:



2.7.4 SAMSUNG 980 PRO M.2 / 1TB in CN4: performance as below:



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2.8 AnvilBenchmark_V110_B337

2.8.1 SAMSUNG PM9A1 M.2 / 512GB in CN1: performance as below:



2.8.2 SAMSUNG PM9A1 M.2 / 512GB in CN2: performance as below:



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2.8.3 SAMSUNG 980 PRO M.2 / 1TB in CN3: performance as below:

SSD Benchmark Samsung SSD 980 PRO 1TB 1000GB/2B2QGXA7

Read	Resp. time	MB read	IOPS	MB/s
Seq 4MB	0.8223ms	2,048.0	1,216.15	4,864.61
4K	0.0481ms	1,015.1	20,789.32	81.21
4K QD4	0.0514ms	3,796.8	77,758.11	303.74
4K QD16	0.0591ms	13,222.1	270,787.12	1,057.76
32K	0.0870ms	4,000.0	11,489.09	359.03
128K	0.0996ms	16,000.0	10,039.22	1,254.90

Write	Resp. time	MB written	IOPS	MB/s
Seq 4MB	1.0391ms	1,024.0	962.41	3,849.62
4K	0.0214ms	640.0	46,715.77	182.48
4K QD4	0.0287ms	640.0	139,411.42	544.58
4K QD16	0.0387ms	640.0	413,163.75	1,613.92

Run read: 10,157.81
Run write: 11,055.05
Run: 21,212.86

Microsoft Windows 10 企業版 64 位元 Build (19045)
PRIME X570-PRO/3604, AM4
AMD Ryzen 7 3700X 8-Core Processor
Memory : 32,672 MB
Professional Edition

Drives :
Notes :

Samsung SSD 980 PRO 1TB 1000GB/2B
Drive D: 931.5/931.4GB free (100.0%)
NTFS - Cluster size 4096B
Storage driver: stornvme
Alignment 1024KB OK
Compression 100% (Incompressible)

2.8.4 SAMSUNG 980 PRO M.2 / 1TB in CN4: performance as below:

SSD Benchmark Samsung SSD 980 PRO 1TB 1000GB/2B2QGXA7

Read	Resp. time	MB read	IOPS	MB/s
Seq 4MB	0.8242ms	2,048.0	1,213.27	4,853.08
4K	0.0484ms	1,008.3	20,649.73	80.66
4K QD4	0.0514ms	3,800.2	77,827.73	304.01
4K QD16	0.0591ms	13,219.8	270,741.51	1,057.58
32K	0.0879ms	4,000.0	11,377.78	355.56
128K	0.1001ms	16,000.0	9,990.63	1,248.83

Write	Resp. time	MB written	IOPS	MB/s
Seq 4MB	1.0391ms	1,024.0	962.41	3,849.62
4K	0.0216ms	640.0	46,282.23	180.79
4K QD4	0.0286ms	640.0	139,981.11	546.80
4K QD16	0.0386ms	640.0	414,014.67	1,617.24

Run read: 10,131.68
Run write: 11,064.92
Run: 21,196.60

Microsoft Windows 10 企業版 64 位元 Build (19045)
PRIME X570-PRO/3604, AM4
AMD Ryzen 7 3700X 8-Core Processor
Memory : 32,672 MB
Professional Edition

Drives :
Notes :

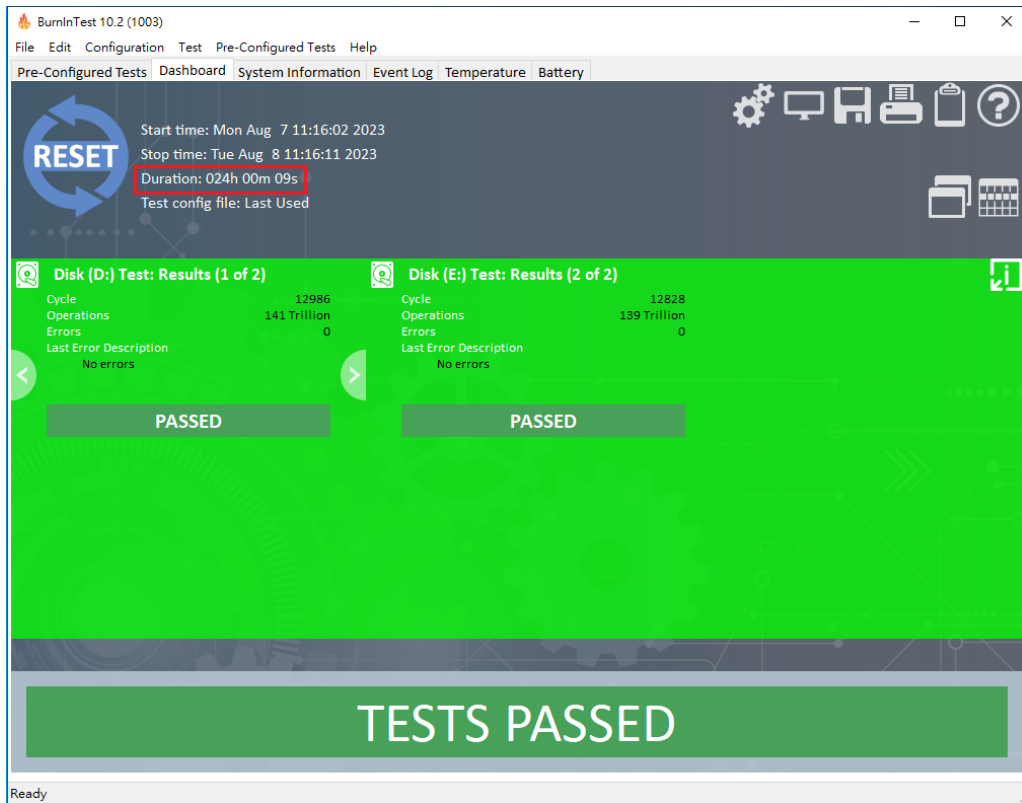
Samsung SSD 980 PRO 1TB 1000GB/2B
Drive E: 931.5/931.4GB free (100.0%)
NTFS - Cluster size 4096B
Storage driver: stornvme
Alignment 1024KB OK
Compression 100% (Incompressible)

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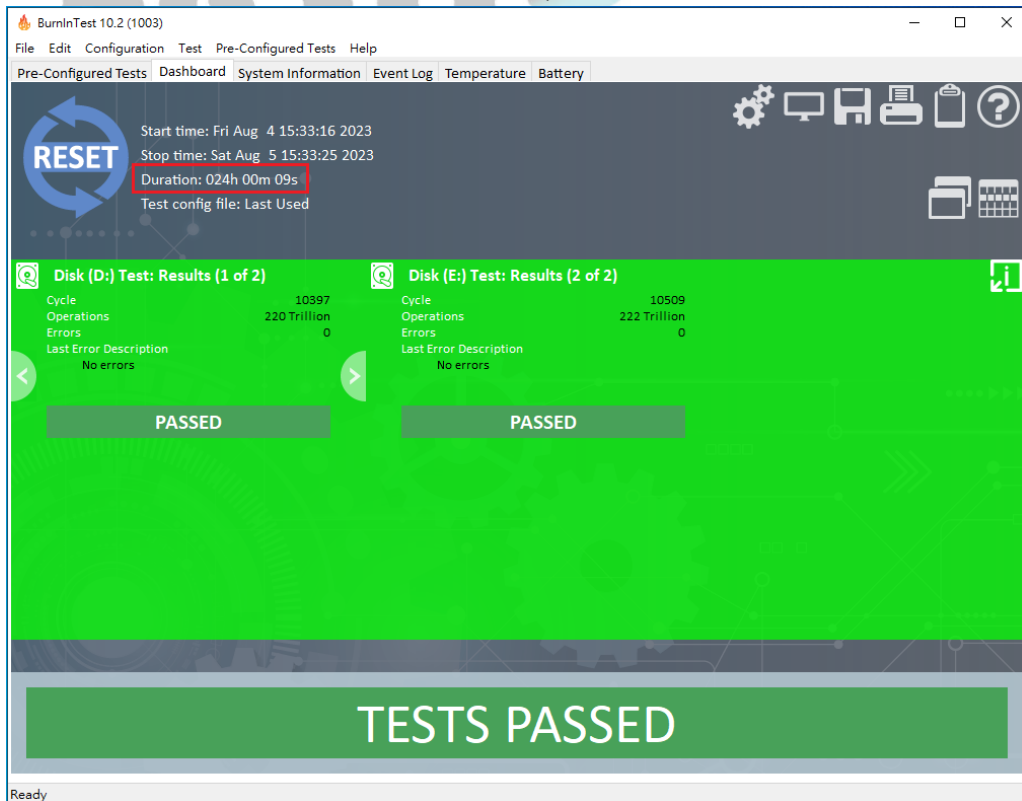
3. Burn In Tests and Results

3.1 BurnInTest v10.2 Pro

3.1.1 24-hour Burn-in test PASSED For CN1, CN2



3.1.2 24-hour Burn-in test PASSED For CN3, CN4



4. Summary

- 4.1 M.2 NVMe SSD is PCIe Gen 4 / 4 Lane Interface, I/O speed, max. to 64Gbps.
- 4.2 DP8401 AIC & GD9608A Adapter I/O performance is based on M.2 NVMe SSD.

