MINERVA
SU406A / Rev2.0   Converter Card

Performance & Burn In Test   Rev. 2.0

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# SU406A/Rev2.0　Converter Card

1. Overview

SU406A adapter, built-in U.2(SFF-8639) connector, SATA 7+15pin connector, provide a port **M.2 M-key** connector. First M.2 NVMe SSD inserts M.2 M-key connector, use Mini SAS HD to U.2(SFF-8639) cable, connected to the PCI-e to Mini SAS HD(SFF-8643) adapter, then M.2 NVMe SSD can be work.

2. Tools and Results of Performance Measurement

2.1　Test Platform

M/B :　　　GIGABYTE **Z170X UD5 TH**

CPU :　　　Intel **i5-6500**, 3.2GHz/ 6M Cache/ LGA1150

Memory :　Kingston **KVR21N15D8/8**, DDR4-2133MHz, 16GB(8GB DIMM*2)

ATX Power : FSP RAIDER 550, **550W ATX**, 12V V2.2 Power Supply

Graphic :　Z170 Chipsets built-in **HD Graphics 530**

Adapter:　PE0404 PCIe to SFF-8643 Mini SAS HD Adapter

CABLE:　　Amphenol U.2(SFF-8639) to SFF-8463 Mini SAS HD Cable

OS :　　　Microsoft **Windows 10 64bit OS**

2.2　Test target: SU406A adapter & Sumsung SM961 **512GB** NVMe SSD
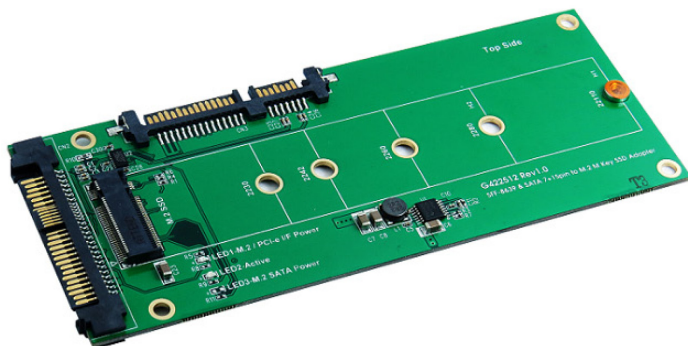
SU406A Adapter　　　　　　　　　　　Samsung SM961 M.2 SSD

2.3　Install Hardware

Insert M.2 NVMeSSD into SU406A converter's M.2 connector, and then with coppers, and screws to fix SSDs. (Please refer to the Installation Notes). Connect SU406A converter to PE0404 adapter(PCI-e 4-lane to Mini SAS HD SFF-86437) using U.2 cable, Plug PE0404 into **PCI-e slot of Z170X UD5 TH**.

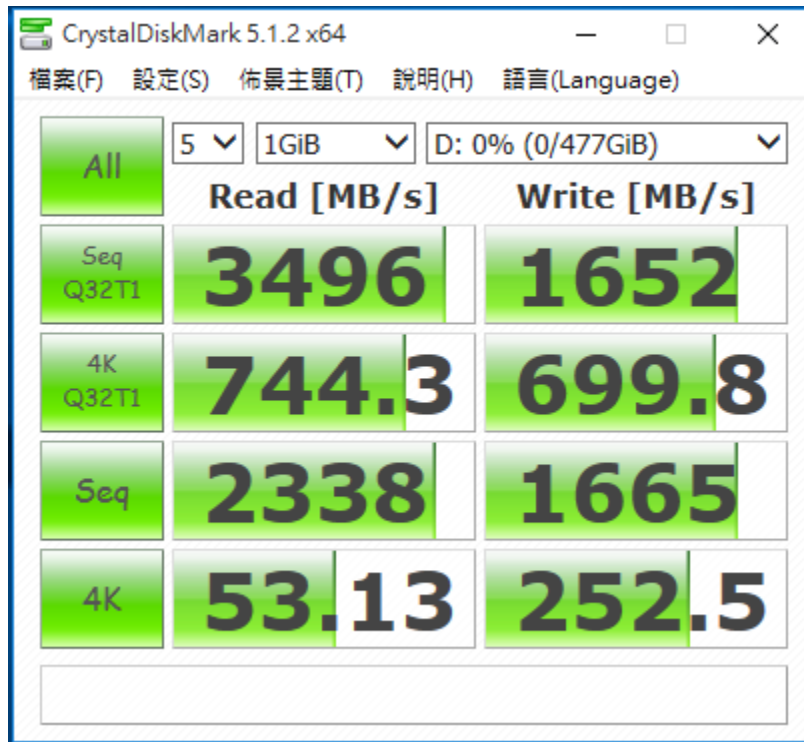### 2.4　BIOS & Windows 10 OS environment setup

2.4.1　Install Windows 10 OS. Don't install any program.

2.4.2　SU406A+SM961 SSD Formatted NTFS

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2.5　CrystalDiskMark 5.1.2 x64 performance test

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

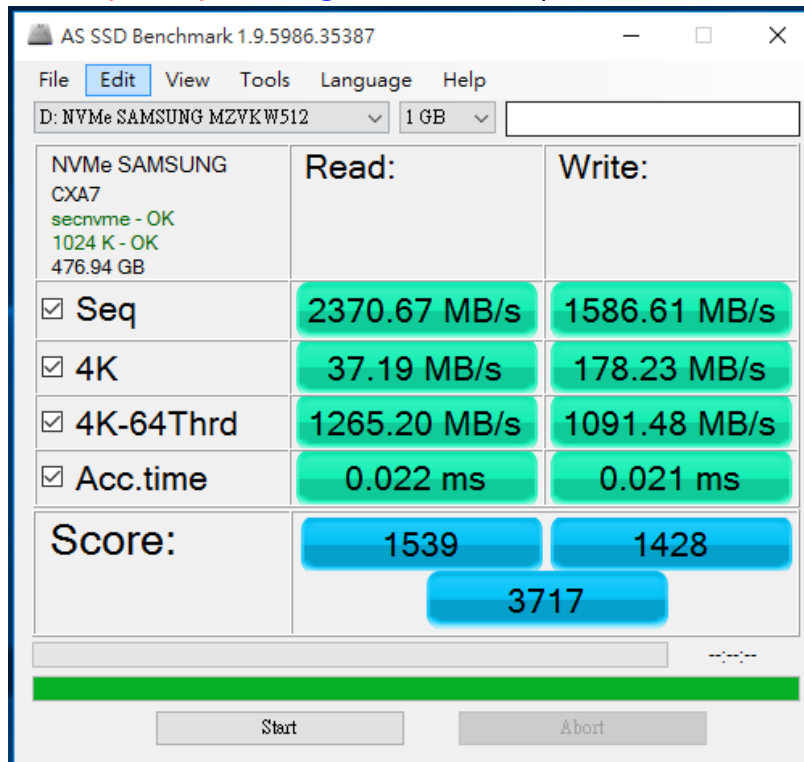2.5.1　Show **M.2(NVMe) Samsung SM961**/**512GB** performance as below:

2.6　AS SSD Benchmark 1.9 performance test

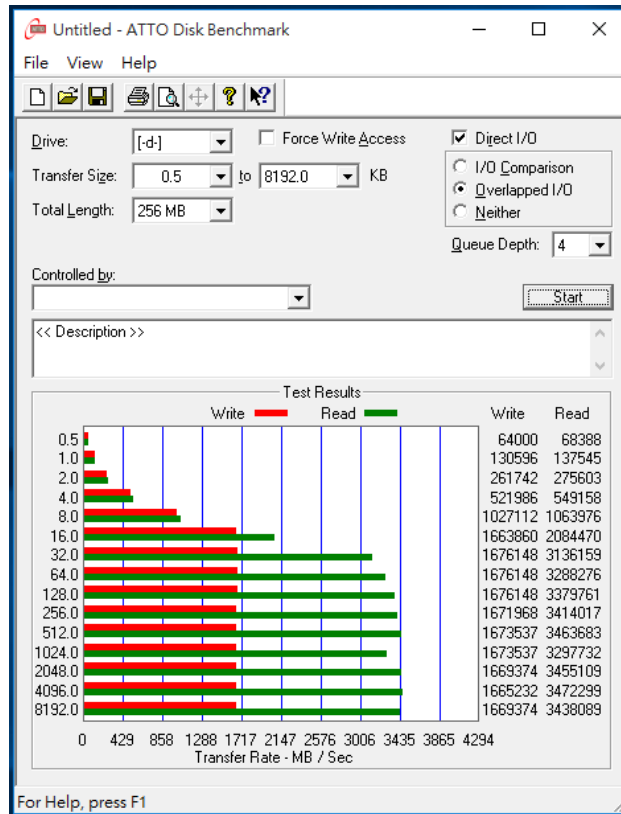※Benchmark (Read & Write by MB/s, default block size = 16MB)

2.6.1　Show **M.2(NVMe) Samsung SM961**/**512GB** performance as below:

2.7 ATTO Disk Benchamrk 2.47 performance test

2.7.1 Show **M.2(NVMe) Samsung SM961/512GB** performance as below:

2.8 AnvilBenchmark_V110_B337

2.8.1 Show **M.2(NVMe) Samsung SM961/512GB** performance as below:

Read	Resp. time	MB read	IOPS	MB/s
Seq 4MB	1.5859ms	2,048.0	630.54	2,522.17
4K	0.1005ms	485.8	9,949.16	38.86
4K QD4	0.0807ms	2,420.5	49,571.19	193.64
4K QD16	0.0985ms	7,934.2	162,492.16	634.74
32K	0.2446ms	1,918.4	4,088.31	127.76
128K	1.1529ms	1,628.0	867.34	108.42

Run read　4,630.73

Run　12,428.49

Write	Resp. time	MB written	IOPS	MB/s
Seq 4MB	2.5000ms	1,024.0	400.00	1,600.00
4K	0.0207ms	640.0	48,400.08	189.06
4K QD4	0.0319ms	480.0	167,109.02	652.77
4K QD16	0.0539ms	640.0	297,233.19	1,161.07

Run write　7,797.76

Microsoft Windows 10 企業版 64 位元 Build (10240)
Z170X-UD5 TH-CF/F20b, U3E1
Intel(R) Core(TM) i5-6500 CPU @ 3.20GHz
Memory : 16,296 MB
Professional Edition

Drives :
Notes :

NVMe SAMSUNG MZVKW512 512GB/CX
Drive D: 476.9/476.8GB free (100.0%)
NTFS - Cluster size 4096B
Storage driver secnvme

Alignment 1024KB OK
Compression 100% (Incompressible)

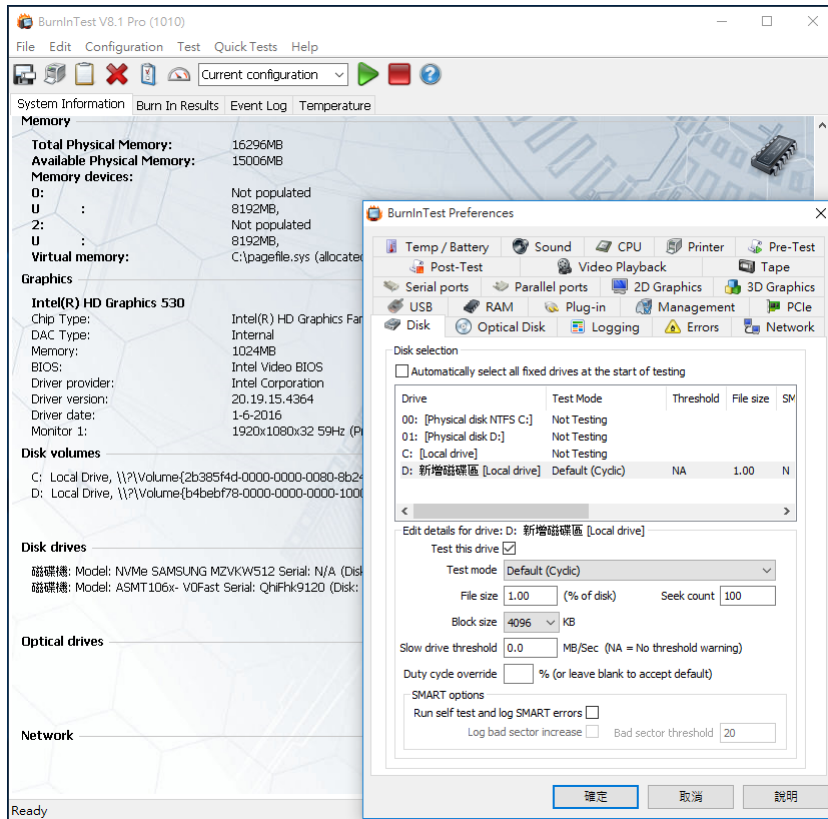# SU406A/Rev2.0　Converter Card

3. Burn In Tests and Results

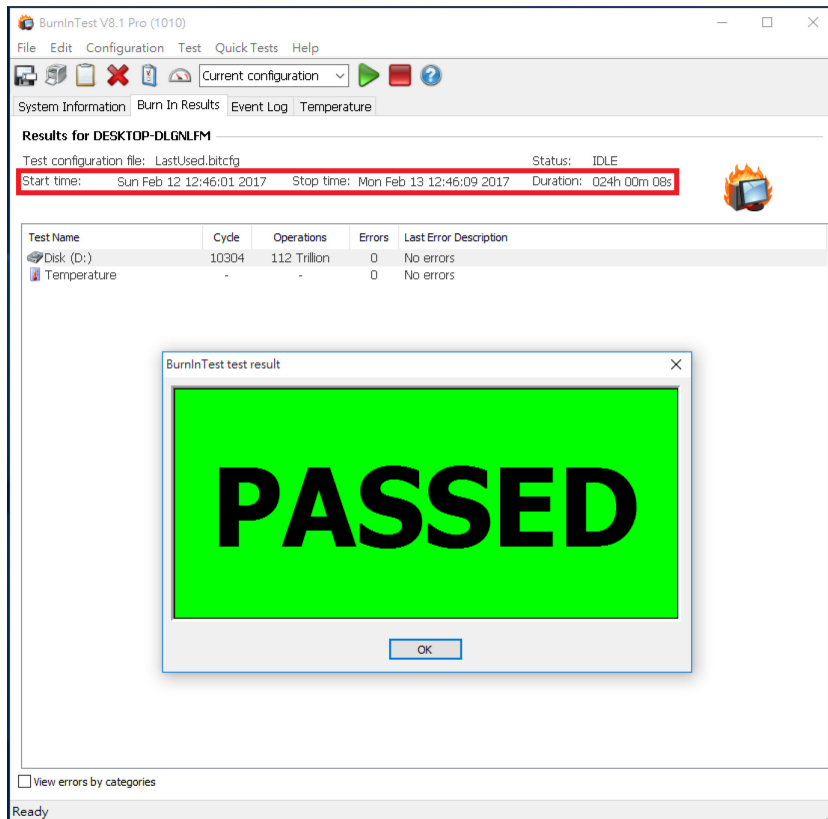### 3.1　BurnInTest v8.1 Pro

3.1.1　**system information** as below:
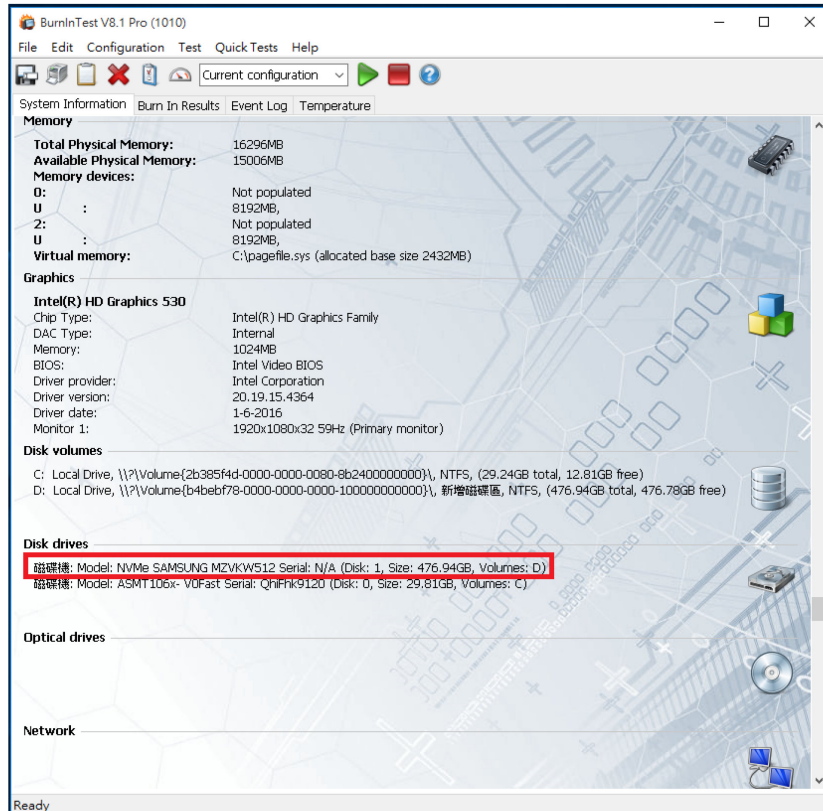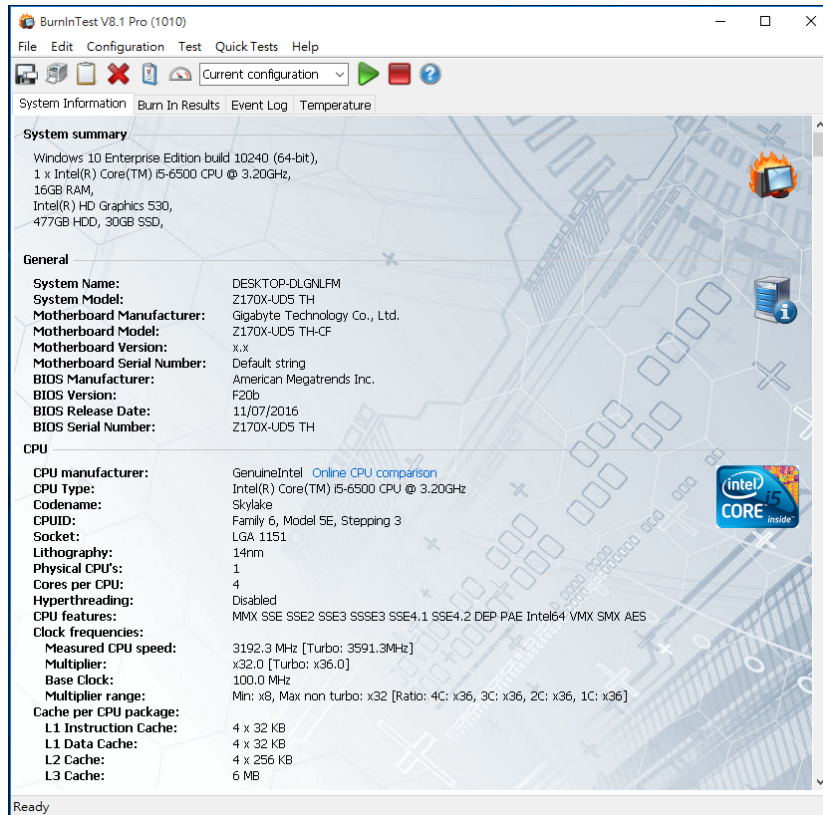
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3.1.2　　show SM961 SSD test mode(10 ways cycle test) .

3.1.3　　show 24-hour Burn-in test PASSED

4. Summary

    4.1   M.2 NVMe SSD is PCI-e Gen 3 / 4 Lane Interface, I/O speed, max. to 4GB/s.

    4.2   SU406A adapter I/O performance is based on M.2 NGFF SSD.