



MINERVA

PE2401 Converter Card

Performance & Burn In Test Rev. 1.0

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PE2401 Interposer Card

1. Overview

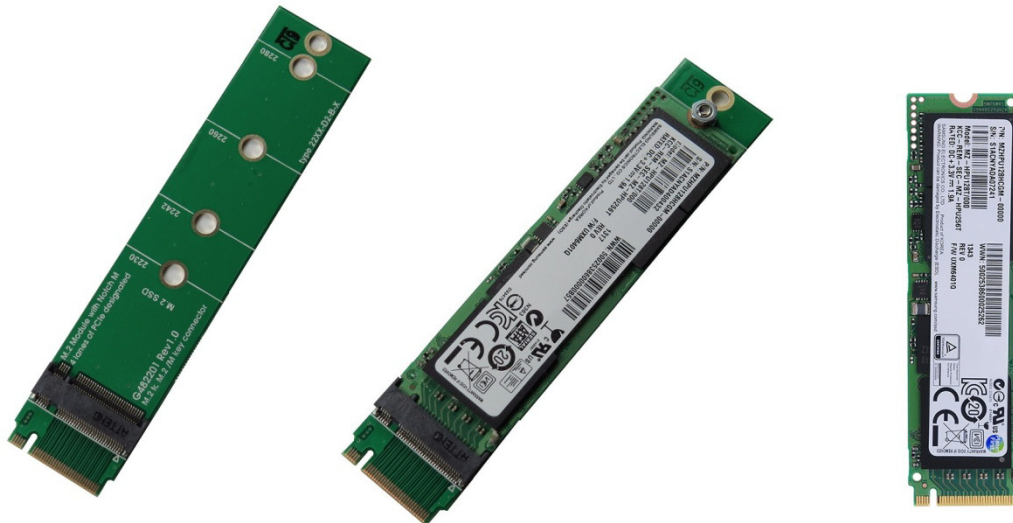
PE2401 Interposer card, is M.2 (NGFF) to M.2 (NGFF) converter. It built M.2 (NGFF) 67pin M key connector, and use 22x103(mm) form factor with M key notch golden finger board. PE2401 allows 22x30(mm), 22x42(mm), 22x60(mm) , 22x80(mm) M.2 PCI-e/ 4 Lane SSD inserted using.

2. Tools and Results of Performance Measurement

2.1 Test Platform

M/B : ASRock **Z97 Extreme 6**
CPU : Intel **i5-4426**, 3.2GHz/ 6M Cache/ LGA1150
Memory : Kingston **KVR16N11S8/4**, DDR3-1600MHz, 8G(4GB DIMM*2)
ATX Power : FSP RAIDER 550, **550W ATX**, 12V V2.2 Power Supply
Graphic : Z97 Chipsets built-in **HD Graphics 4600**
OS : Microsoft **Windows 8.1 64bit OS**

2.2 Test target: PE2401 adapter and M.2 PCI-e/ 4 Lane SSD(Samsung **MZHPU128HCGM**)



PE2401 Adapter

PE2401 + M.2 PCI-e 4 Lane SSD

Samsung MZHPU128HCGM

2.3 Install Hardware

Insert M.2 PCI-e 4 Lane SSD(Samsung **MZHPU128HCGM**) into PE2401 converter's M.2 67pin M key connector, and then with coppers, and screws to fix SSDs. Insert PE2401 converter to M.2_1 connector of ASRock Z97 Extreme 6 motherboard.

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2.4 BIOS & Windows 8.1 OS environment setup

2.4.1 In UFI BIOS(Basic Input/Output Setup) – Change IDE Mode into AHCI Mode

2.4.2 In Windows 8.1, formatted SSD to NTFS Mode. Don't install any program. Because FAT32 previous versions do not support NCQ, recommended formatted NTFS file mode.

2.4.3 AHCI support Queue Command

AHCI queue command protocol allows each disk contains 32 commands. So QD (Queue Depth) is 32.

2.5 SSD I/O Performance impact factors

2.5.1 SATA I/O performance -- depending on the SSD Controller IC

2.5.2 SATA I/O performance - -depending on the NAND Flash IC.

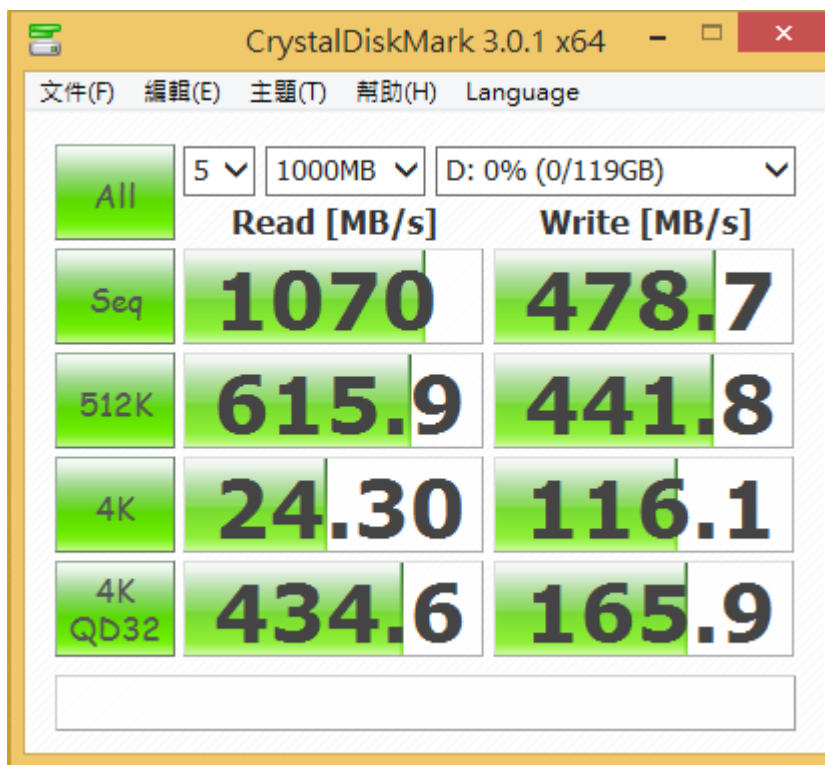
2.5.2.1 Toggle DDR mode or ONFI synchronous NAND Flash IC, will show good performance

2.5.2.2 Traditional asynchronous or SDR NAND Flash IC, will show poor performance

2.6 CrystalDiskMark 3.0.1 x64 performance test

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

2.6.1 Used Samsung [MZHPU128HCGM](#) performance as below:

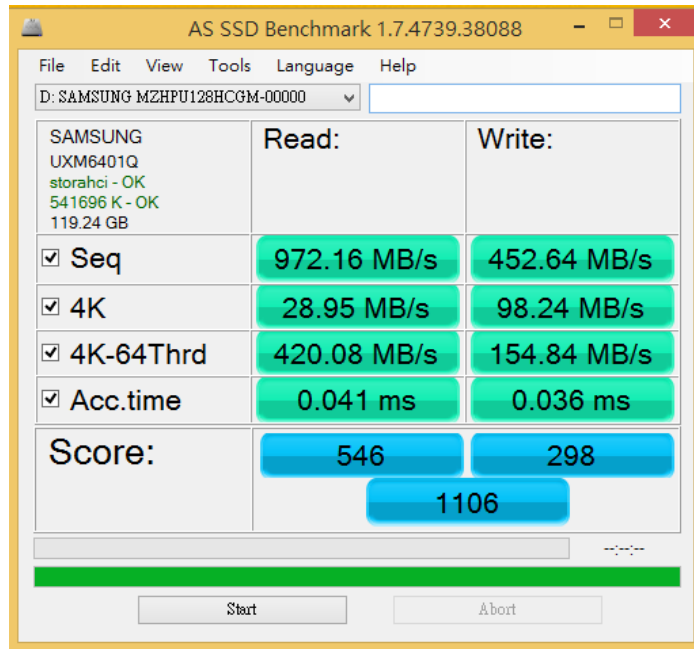


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2.7 AS SSD Benchmark 1.7 performance test

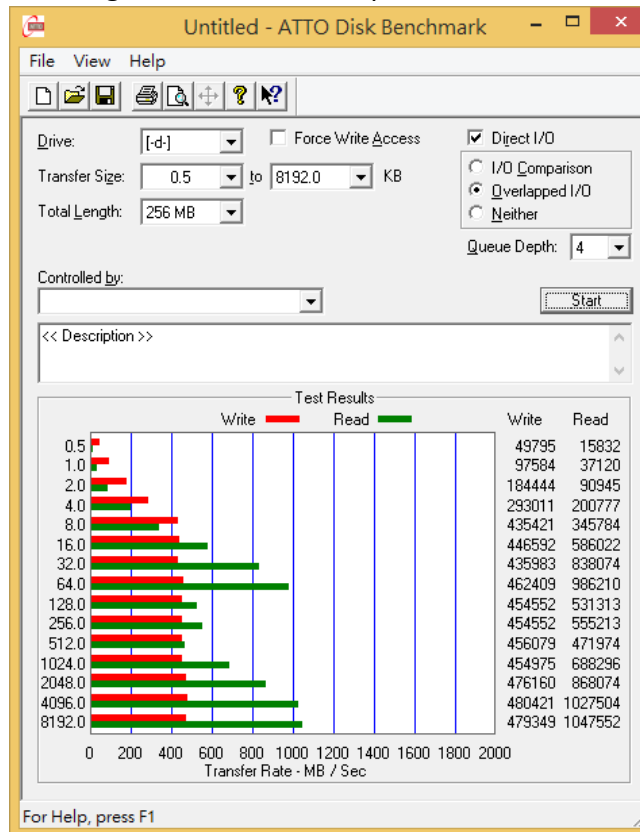
✂ Benchmark (Read & Write by MB/s, default block size = 16MB)

2.7.1 Used Samsung [MZHPU128HCGM](#) performance as below:



2.8 ATTO Disk Benchmark 2.47 performance test

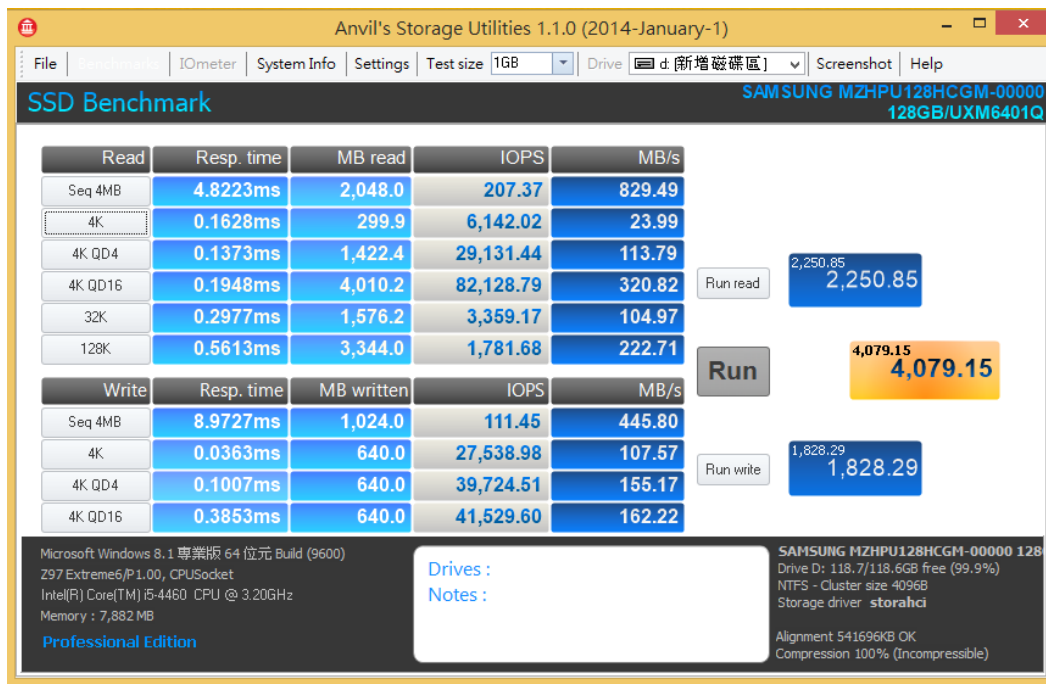
2.8.1 Used Samsung [MZHPU128HCGM](#) performance as below:



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2.9 AnvilBenchmark_V110_B337

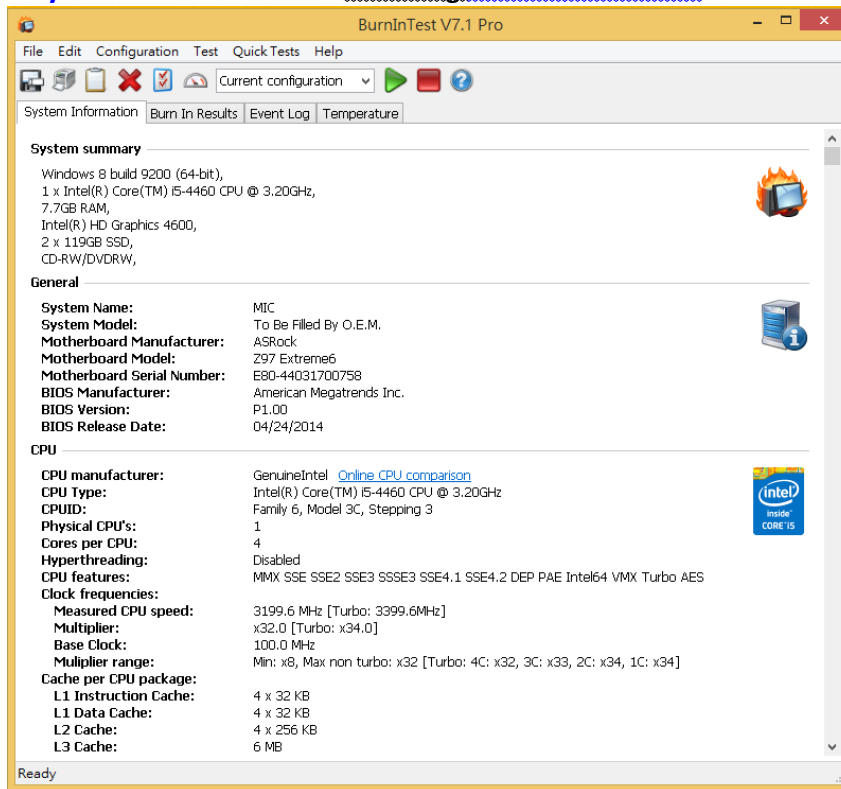
2.9.1 Used Samsung [MZHPU128HCGM](#) performance as below:



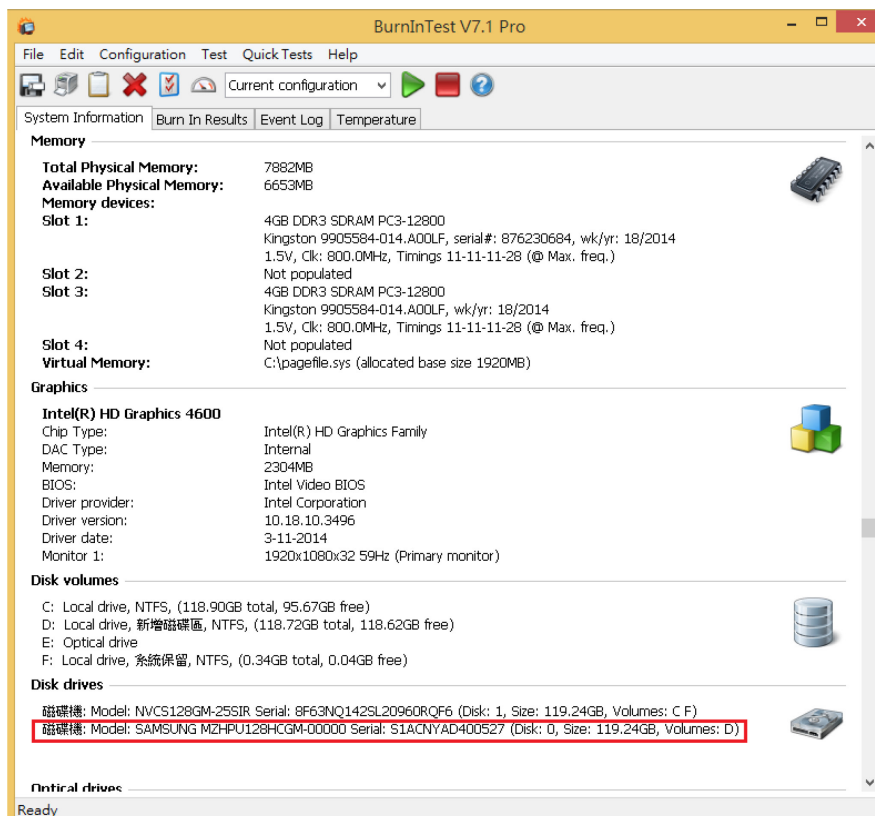
3. Burn In Tests and Results

3.1 BurnInTest v7.1 Pro

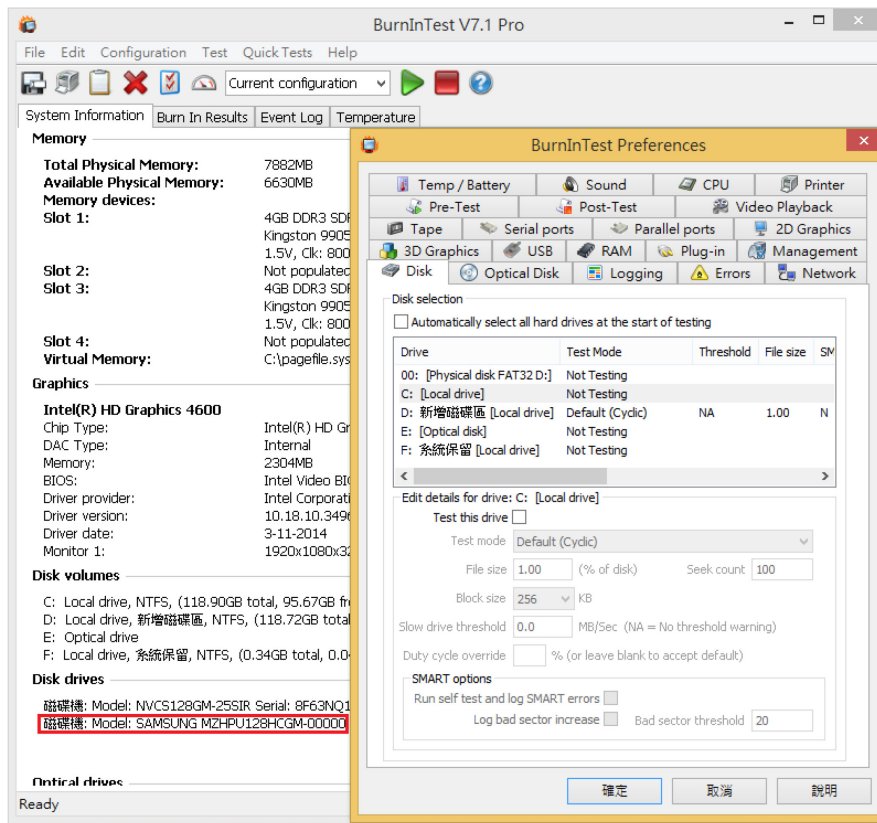
3.1.1 [system information](#) for Samsung [MZHPU128HCGM](#) as below:



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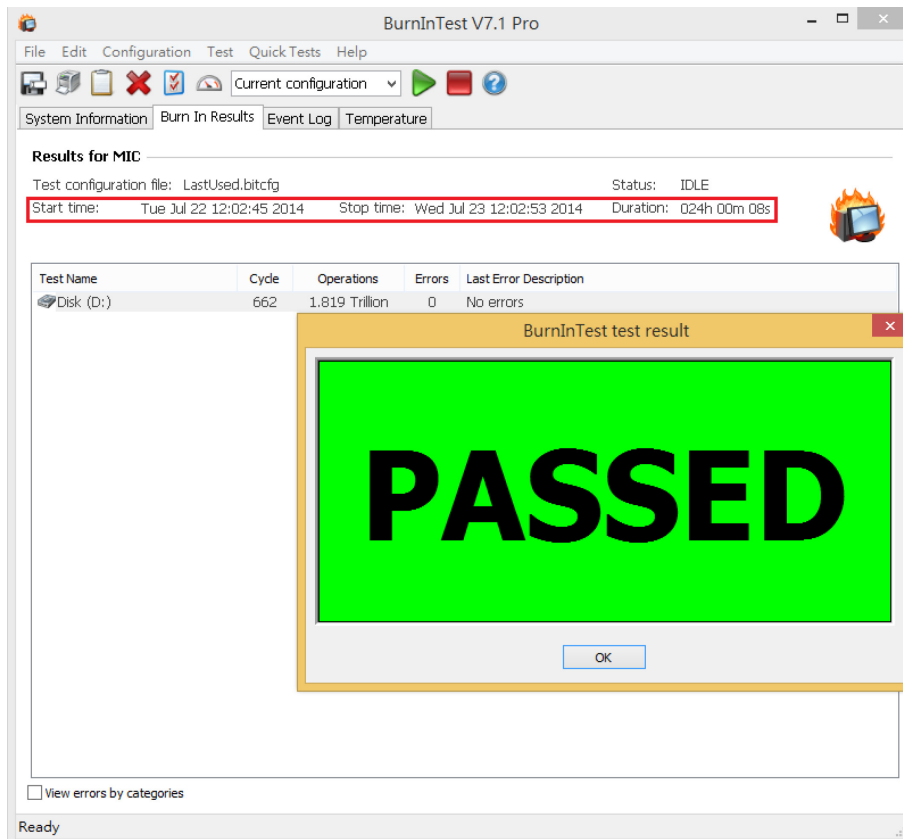


3.1.2 show Disk test mode(default cyclic -- 10 ways cycle test)



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3.1.3 show Samsung [MZHPU128HCGM](#) 24-hour Burn-in test **PASSED**



4. Summary

- 4.1 PCI-e Gen 2/ 1 Lane is 5Gbs
- 4.2 [Samsung MZHPU128HCGM](#) SSD is PCI-e Gen 2/ 4 Lane Interface, I/O speed, max. to 1.6GB/s.
- 4.3 PE2401 adapter I/O performance is based on [Samsung MZHPU128HCGM](#) SSD