



# MINERVA

## AD902A,D,F Converter Card

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### Performance & Burn In Test Rev. 1.0

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## 1. Overview

AD902A,D,F adapters, support 67pin B key type connector to convert M.2(NGFF) SSD into SATA III 7+15pin standard interface.

## 2. Tools and Results of Performance Measurement

### 2.1 Test Platform

M/B : ASUS **P8P67**  
CPU : Intel **i5-2500**, 3.3MHz/ 6G Cache/ 5GT  
Memory : Kingston **KVR1333D3N9K2/4G**, DDR3-1333MHz,4G(2GB DIMM\*2)  
ATX Power : TC START W500, **500W ATX**,12V V2.2 Power Supplier  
Graphic : MSI , **R6700** / AMD HD 6700 Series  
OS : Microsoft **Windows 7 64bit OS**

### 2.2 Test target: AD902A,D,F adapter and SSD(LITE-ON [LGT-128M6G](#))



AD902A Adapter



AD902D Adapter



Lite-On LGT-128M6G

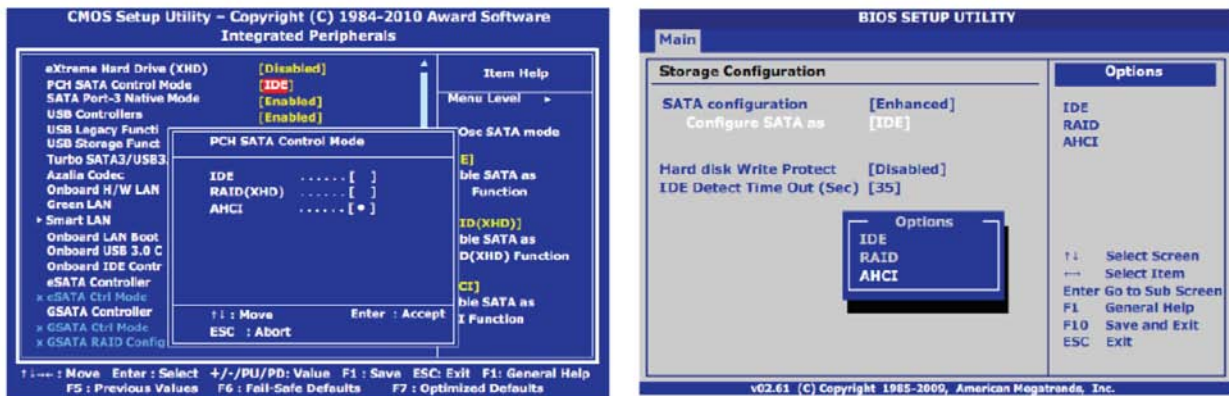
### 2.3 Install Hardware

Insert M.2(NGFF) SSD([LITE-ON LGT-128M6G](#)) into AD901B/AD901E converter's M.2 67pin B key connector, and then with coppers, and screws to fix SSDs. Connect AD901B/AD901E converter to SATA III Port of ASUS P8P67 motherboard.

### 2.4 BIOS & Windows 7 OS environment setup

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

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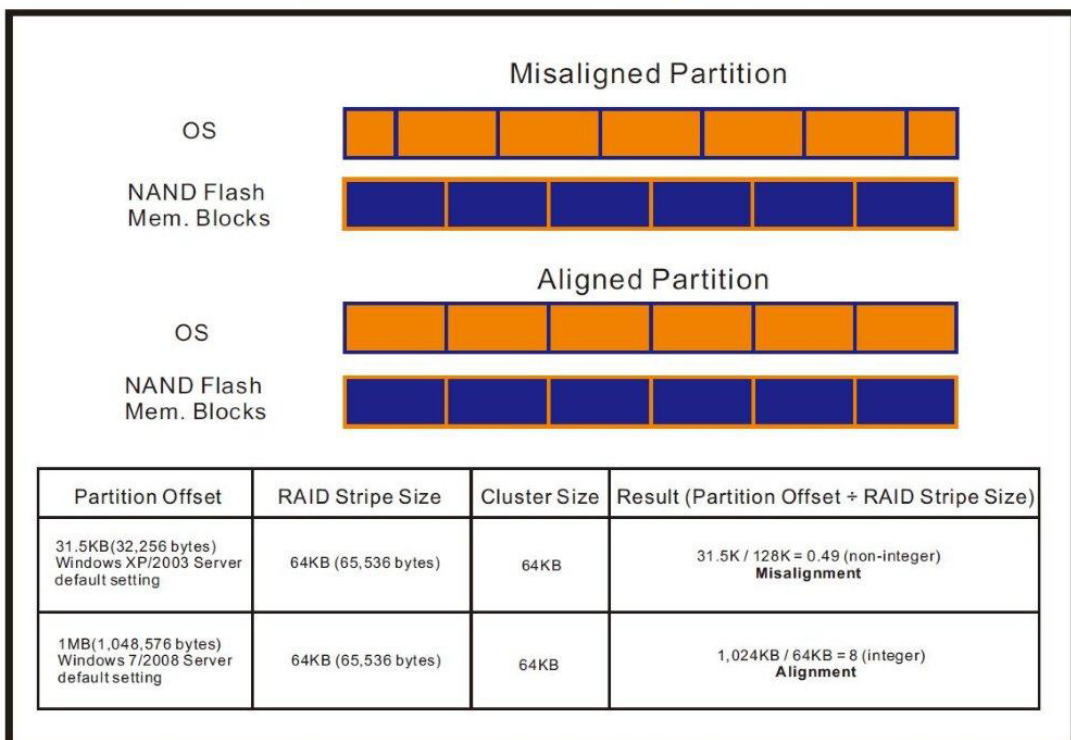


## 2.4.2 Partition Alignment & I/O Alignment

Windows XP and Windows Server 2000/2003 start partition offset at 31.5KB (32,256 bytes). Due to this misalignment, clusters of data are spread across physical memory block boundaries, incurring a read- modify-write penalty. As a result, the SSD controller must write up to 200% more data to the flash than is sent from the host to the drive.

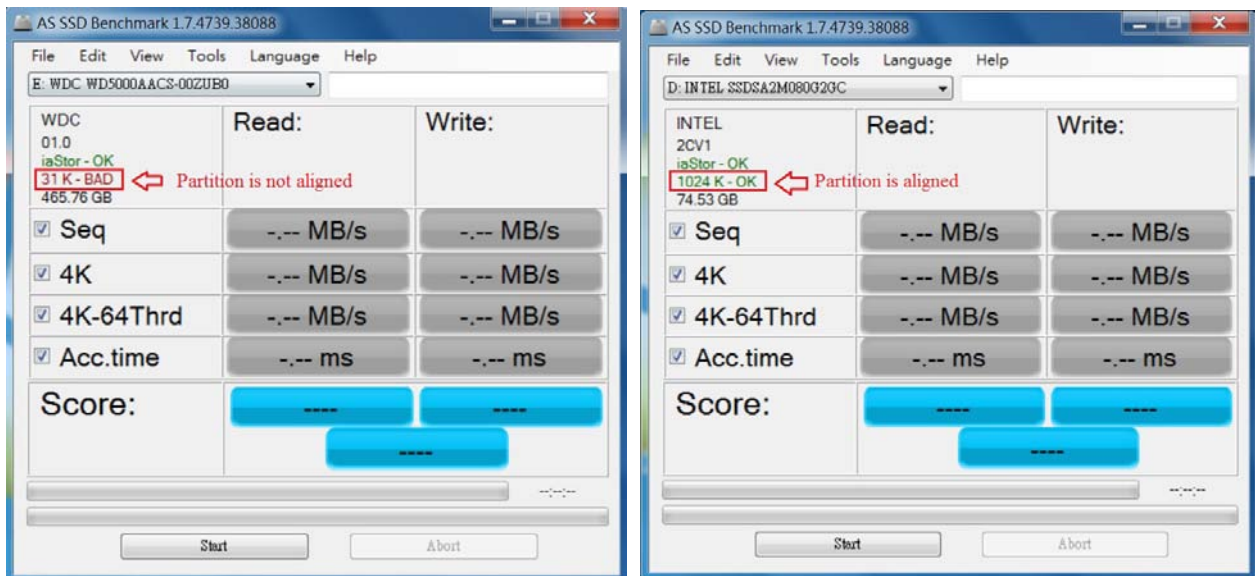
When choosing a partition starting offset, Storage Systems recommends that system integrators correlate the partition offset with the RAID stripe size and cluster size to achieve optimal SSD I/O performance. As following Figure shows an example of a misaligned partition offset and an example of an aligned partition offset for Windows Server.

### Misaligned Partition vs. Aligned Partition

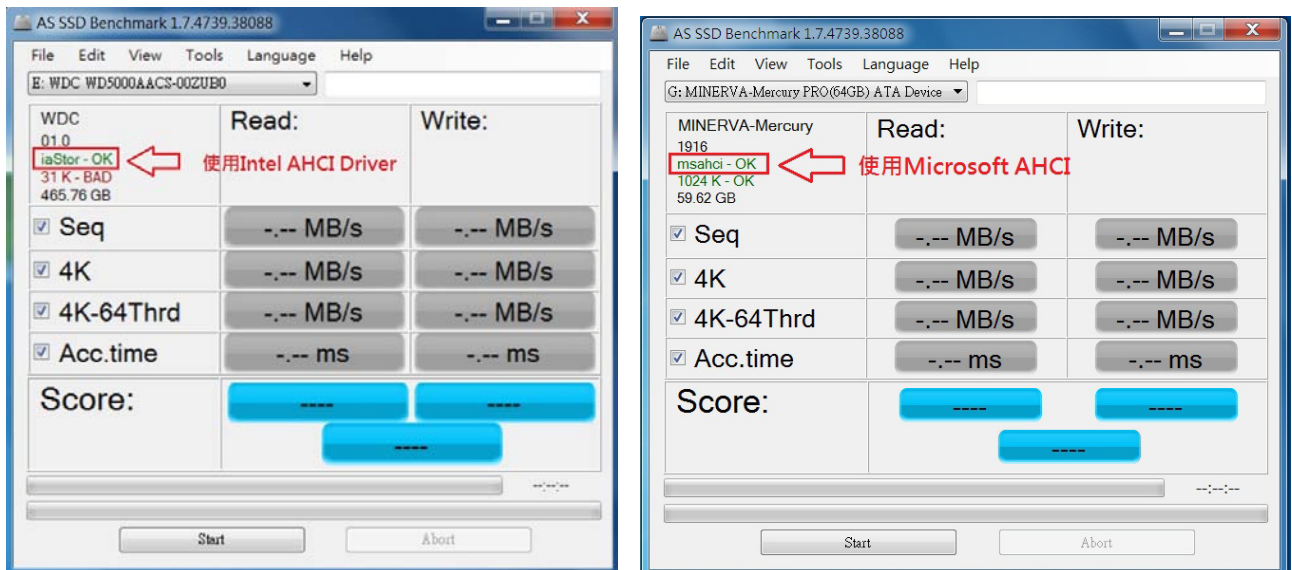


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※Using AS SSD Benchmark viewing partition is aligned



※Using AS SSD Benchmark to check vendor AHCI Drive is installed



- 2.4.3 In Windows 7, formatted SSD to NTFS Mode. Don't install any program. Because FAT32 previous versions do not support NCQ, recommended formatted NTFS file mode.
- 2.4.4 AHCI support Queue Command  
AHCI queue command protocol allows each disk contains 32 commands. so QD (Queue Depth) is 32.
- 2.4.5 SSD Write Cache Setting  
enable the Write Cache setting in Windows 7.

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## 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

### **Suggestion:**

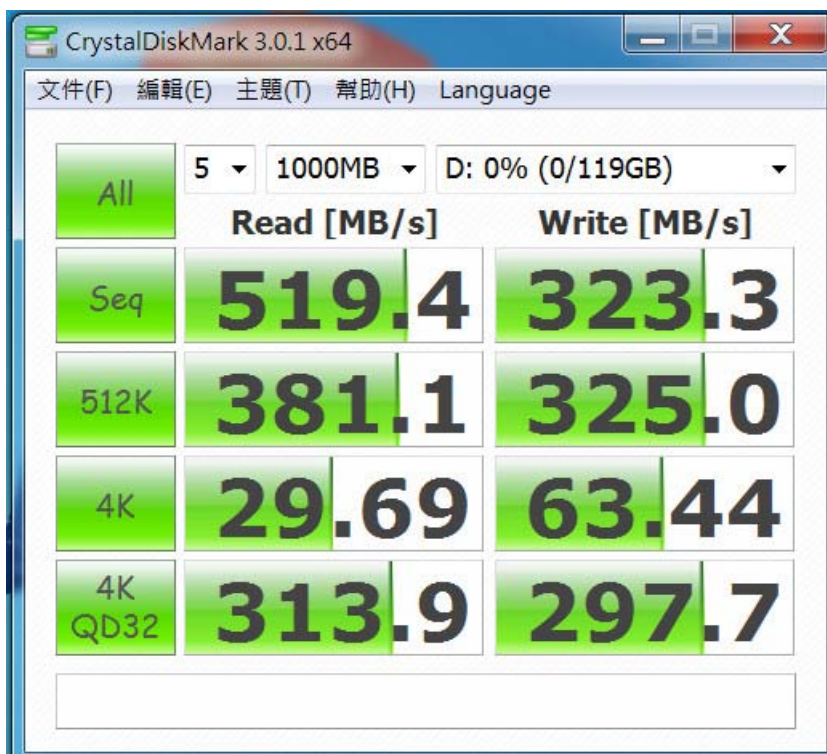
Please use the motherboard containing native SATA 6Gb/s Port testing, can provide more correct I/O performance. (Such as Intel 6 Series chipsets or AMD 9 Series Chipsets).

If you are using a motherboard plus SATA III host bus adapter, non-native 6Gb/s Port or SATA to PCI-e adapter provides 6Gb/s Port. I/O performance testing will be very much lower than the native SATA III Port.

## 2.6 CrystalDiskMark 3.0.1 x64 performance test

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

2.6.1 Used LITE-ON LGT-128M6G performance as below:

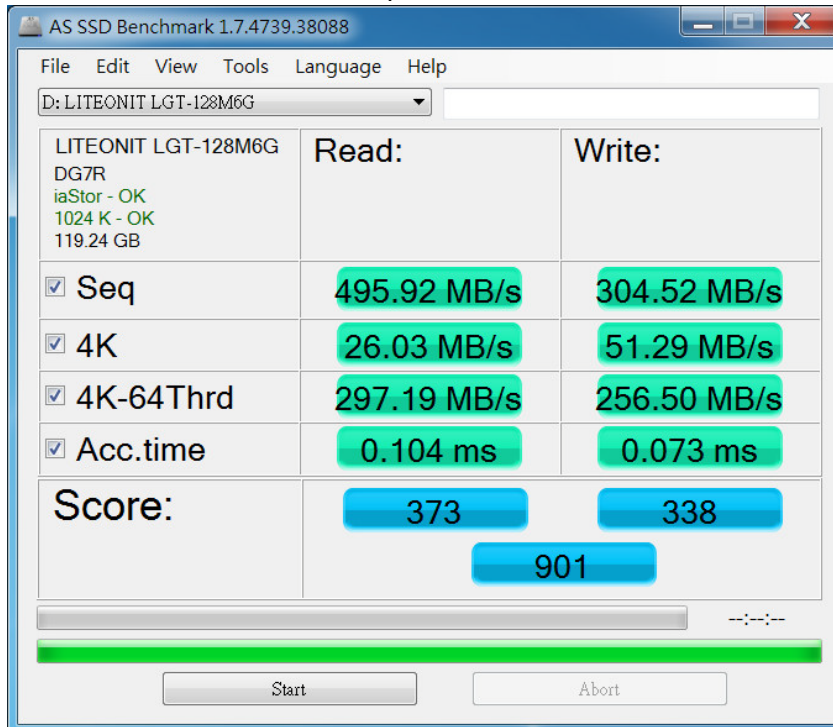


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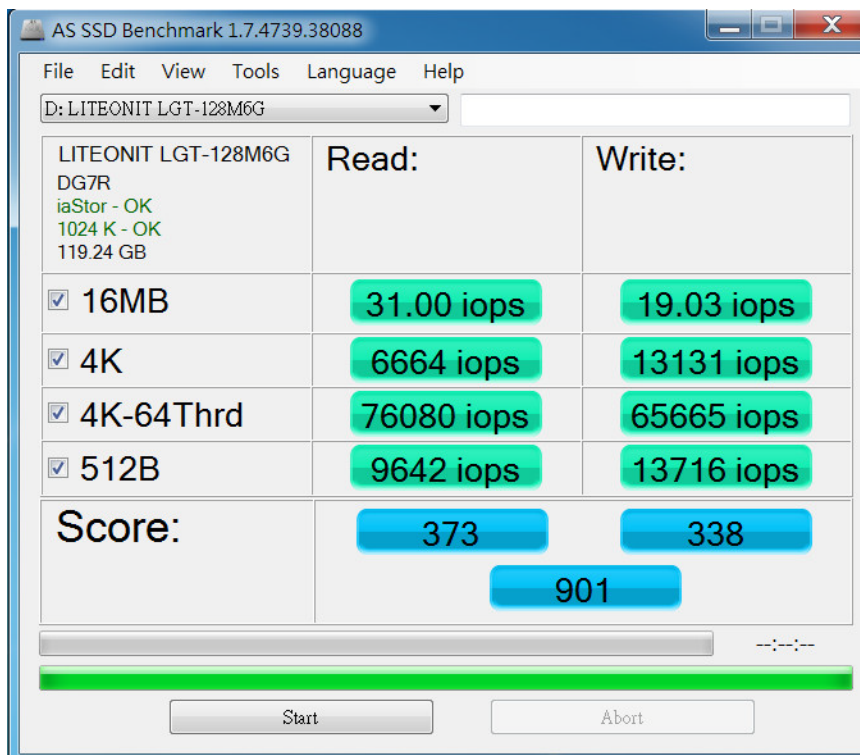
## 2.7 AS SSD Benchmark 1.6 performance test

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

2.7.1 Used LITE-ON [LGT-128M6G](#) performance as below:



2.7.2 Used LITE-ON [LGT-128M6G](#) IOPS as below:

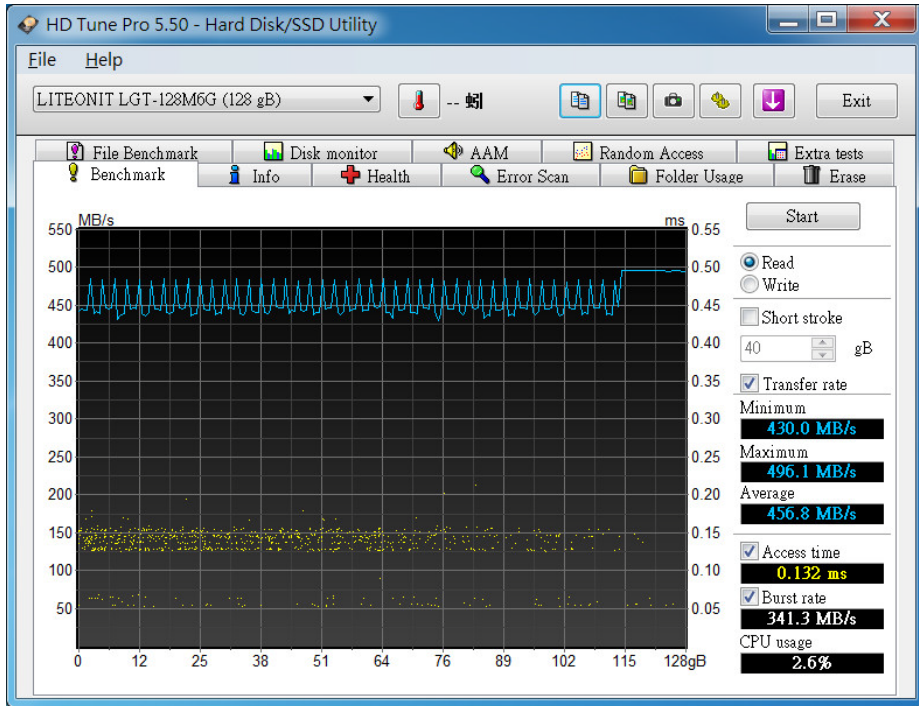


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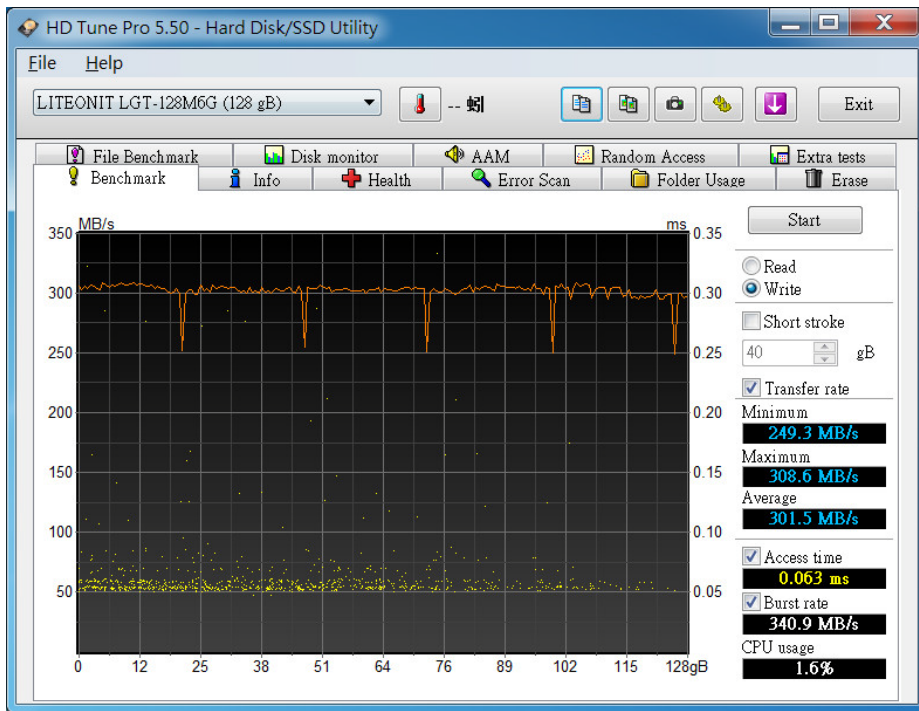
## 2.8 HD Tune Pro 5.5 performance test

✂ Benchmark (Sequential Read & Write / default block size = 1MB)

2.8.1 Used LITE-ON LGT-128M6G Read performance as below:



2.8.1 Used LITE-ON LGT-128M6G Write performance as below:



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## 2.9 AnvilBenchmark RC6

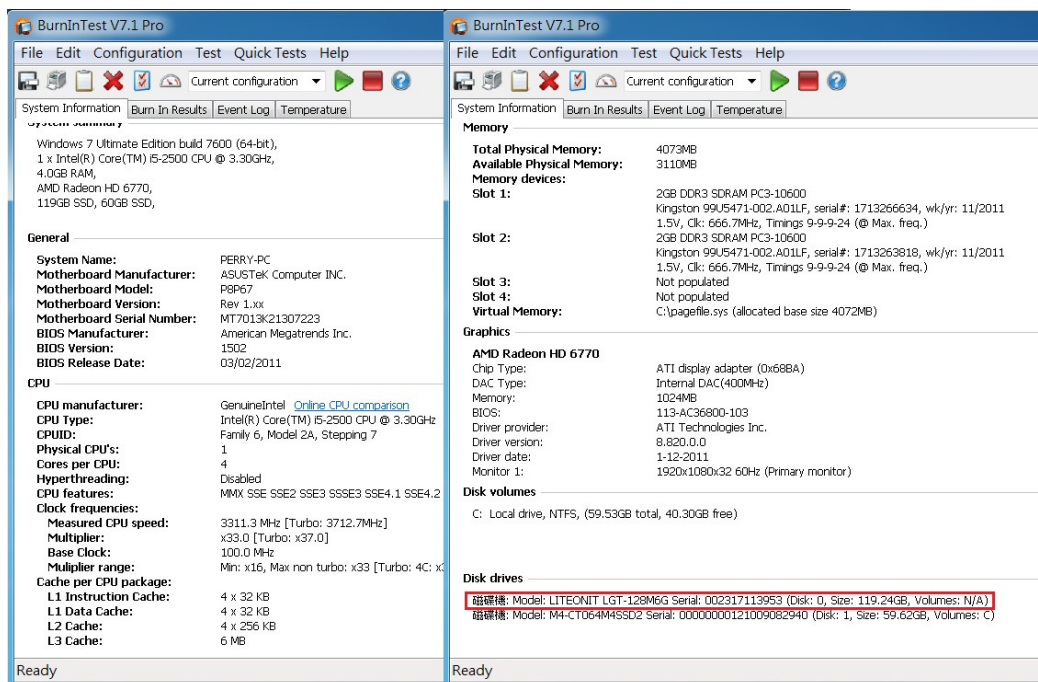
2.9.1 Used LITE-ON [LGT-128M6G](#) performance as below:



## Burn In Tests and Results

### 3.1 BurnInTest v7.1 Pro

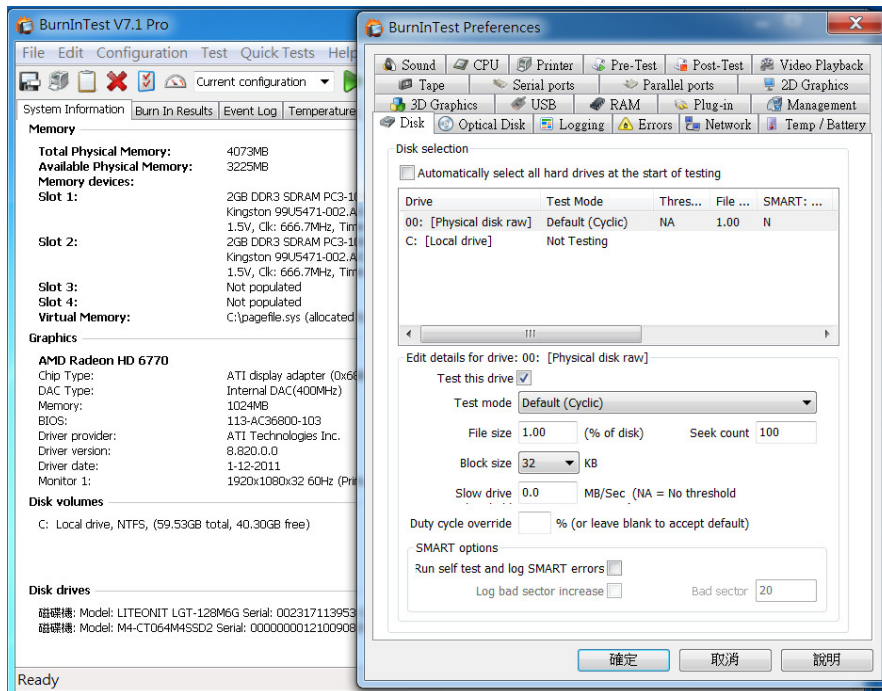
3.1.1 system information for LITE-ON [LGT-128M6G](#) as below:



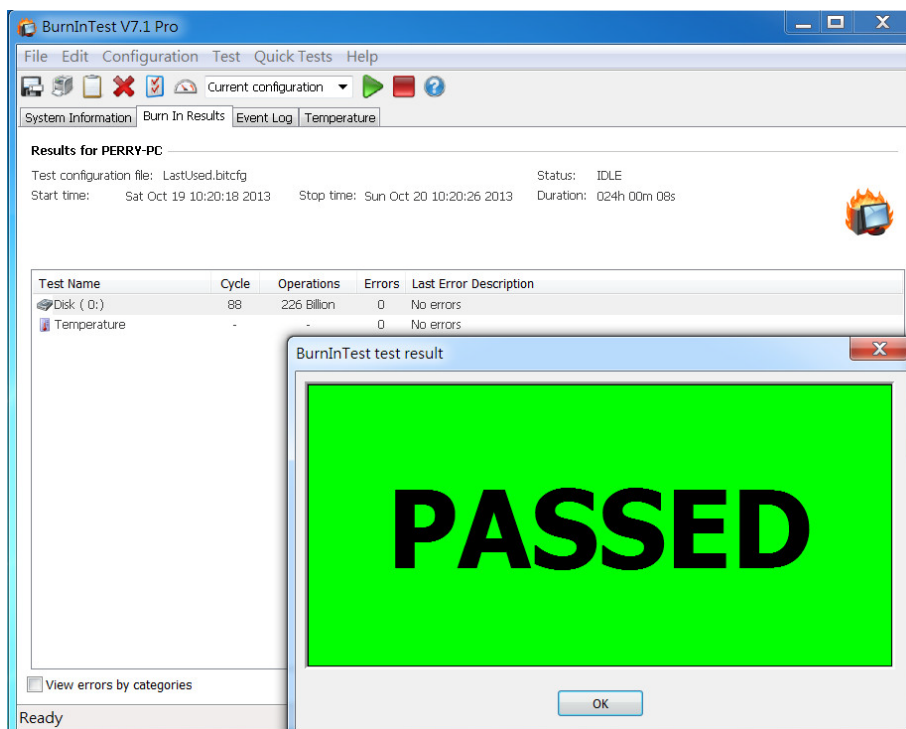


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## 3.1.2 show Disk test mode(default cyclic -- 10 ways cycle test)



## 3.1.3 show LITE-ON LGT-128M6G 24-hour Burn-in test PASSED



## 4. Summary

- 4.1 LITE-ON LGT-128M6G SSD is SATA III Interface, I/O speed, max. to 600MB/s.
- 4.2 AD902A,D,F adapter I/O performance is based on M.2(NGFF) SSD