



# MINERVA

## PR9401 PCIe Gen 2 2-Lane RAID Card for mSATA 2-port & M.2 2-port

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### Performance & Burn In Test Rev. 1.0 in RAID 0 Mode

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# PR9401 PCIe Gen2 x2 RAID Card

## 1. Overview

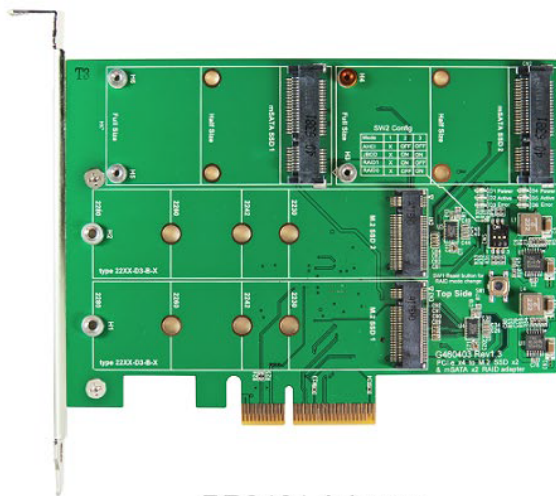
PR9401 RAID card offers PCIe Gen 2 x2 interface, built-in 2-port Mini PCI-e & 2-port M.2 B key connector can be combined mSATA SSDx2 or M.2 SSDx2 into a RAID 0, RAID 1, JBOD mode of operation.

## 2. Tools and Results of Performance Measurement

### 2.1 Test Platform

M/B : GIGABYTE **Z270-Gaming 8**  
CPU : Intel **i7-7700**, 3.6GHz/ 8M Cache/ LGA1151  
Memory : Kingston **KVR21N15D8/8**, **DDR4-2133MHz**, **16G**(8GB DIMM\*2)  
ATX Power : COOLER MASTER G750M, **750W ATX**, 12V V2.2 Power Supply  
Graphic : Z270 Chipsets built-in **HD Graphics 630**  
OS : Microsoft **Windows 10 64bit OS**

### 2.2 Test target: PR9401 RAID Add in Card and M.2 SATA 256GB SSDx2



PR9401 Adapter



M.2 SATA SSD (SAM 256GB)

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## 2.3 Install Hardware

Inserts M.2 SSDx2 into PR9401 RAID card 's M.2 B-key connector, and then with coppers, and screws to fix SSDs. (Please refer to the Installation Notes). Plug PR9401 RAID Add in Card in **PCIe slot of GIGABYTE Z270-Gaming 8**.

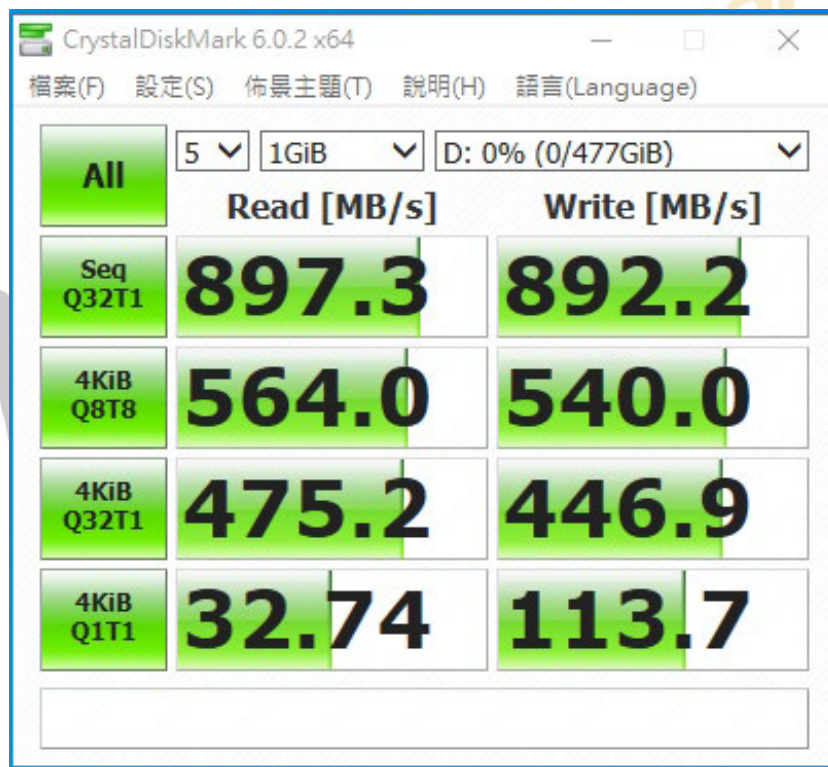
## 2.4 BIOS & Windows 10 OS environment setup

- 2.4.1 Primary port installed Windows 10 x64 OS.
- 2.4.2 Secondary port is PR9401+ M.2 256GB SATA SSD x2

## 2.5 CrystalDiskMark 6.0.2 x64 performance test

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

- 2.5.1 Samsung M.2 SATA 256GBx2 in **Z270-Gaming 8 RAID 0** performance as below:

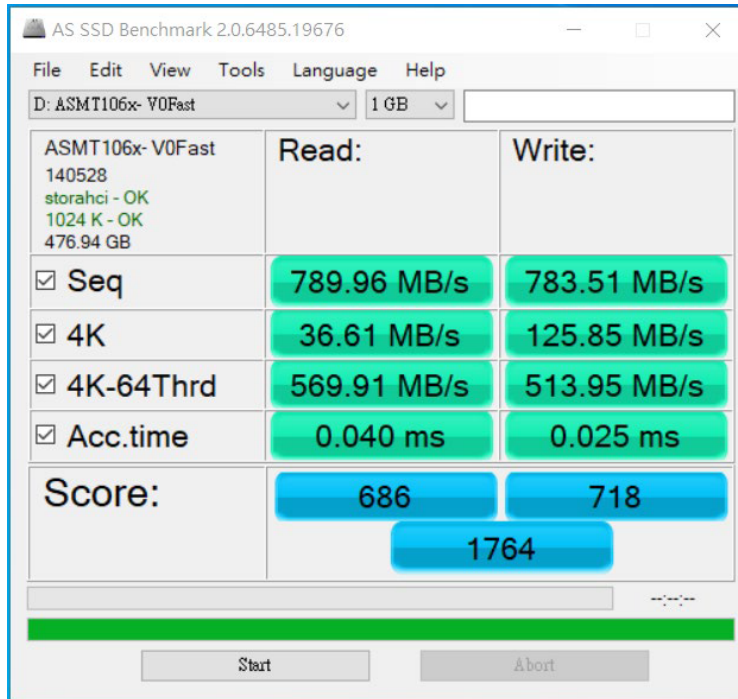


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## 2.6 AS SSD Benchmark 2.0.6 performance test

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

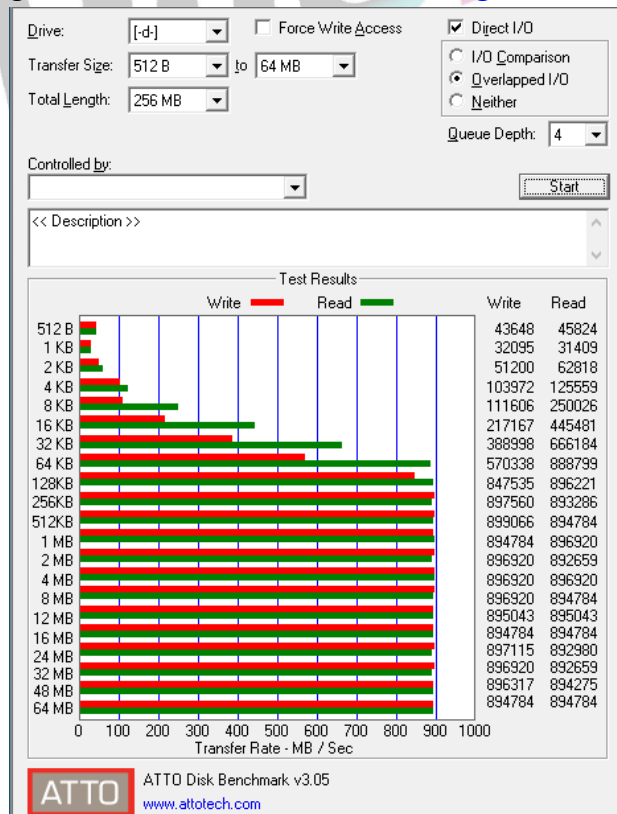
2.6.1 Samsung M.2 SATA 256GBx2 in Z270-Gaming 8 RAID 0 performance as below:



## 2.7 ATTO Disk Benchmark performance test

✘Benchmark (Sequential Read / default block size = 8MB)

2.7.1 Samsung M.2 SATA 256GBx2 in Z270-Gaming 8 RAID 0 performance as below:



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## 2.8 AnvilBenchmark\_V110\_B337

2.8.1 Samsung [M.2 SATA 256GBx2](#) in **Z270-Gaming 8 RAID 0** performance as below:

Anvil's Storage Utilities 1.1.0 (2014-January-1)

File | Benchmarks | IOmeter | System Info | Settings | Test size: 1GB | Drive: d: [新增磁碟區] | Screenshot | Help

### SSD Benchmark

ASMT106x- V0Fast 512GB/140528

Read	Resp. time	MB read	IOPS	MB/s
Seq 4MB	5.0645ms	2,048.0	197.45	789.82
4K	0.1328ms	367.6	7,527.76	29.41
4K QD4	0.1942ms	1,005.8	20,598.19	80.46
4K QD16	0.2116ms	3,691.4	75,600.13	295.31
32K	0.2040ms	2,300.5	4,902.90	153.22
128K	0.4155ms	4,517.9	2,406.97	300.87

Write	Resp. time	MB written	IOPS	MB/s
Seq 4MB	5.2500ms	1,024.0	190.48	761.90
4K	0.0298ms	640.0	33,578.39	131.17
4K QD4	0.2288ms	640.0	17,485.37	68.30
4K QD16	0.2295ms	640.0	69,718.26	272.34

Run read: 2,264.73

Run write: 2,308.48

Run: 4,573.22

Microsoft Windows 10 企業版 64 位元 Build (18362)  
Z270X-Gaming 8/F3, U3E1  
Intel(R) Core(TM) i7-7700 CPU @ 3.60GHz  
Memory : 16,301 MB  
Professional Edition

Drives :  
Notes :

ASMT106x- V0Fast 512GB/140528  
Drive D: 476.9/476.8GB free (100.0%)  
NTFS - Cluster size 4096B  
Storage driver storahci  
Alignment 1024KB OK  
Compression 100% (Incompressible)

# PR9401 PCIe Gen2 x2 RAID Card

## 3. Burn In Tests and Results

### 3.1 BurnInTest v8.1 Pro for Samsung M.2 SATA 256GBx2 in RAID 0

#### 3.1.1 system information as below:



**System summary**

Windows 10 Enterprise Edition build 18362 (64-bit),  
1 x Intel(R) Core(TM) i7-7700 CPU @ 3.60GHz,  
16GB RAM,  
Intel(R) HD Graphics 630,  
238GB HDD, 477GB SSD,

**General**

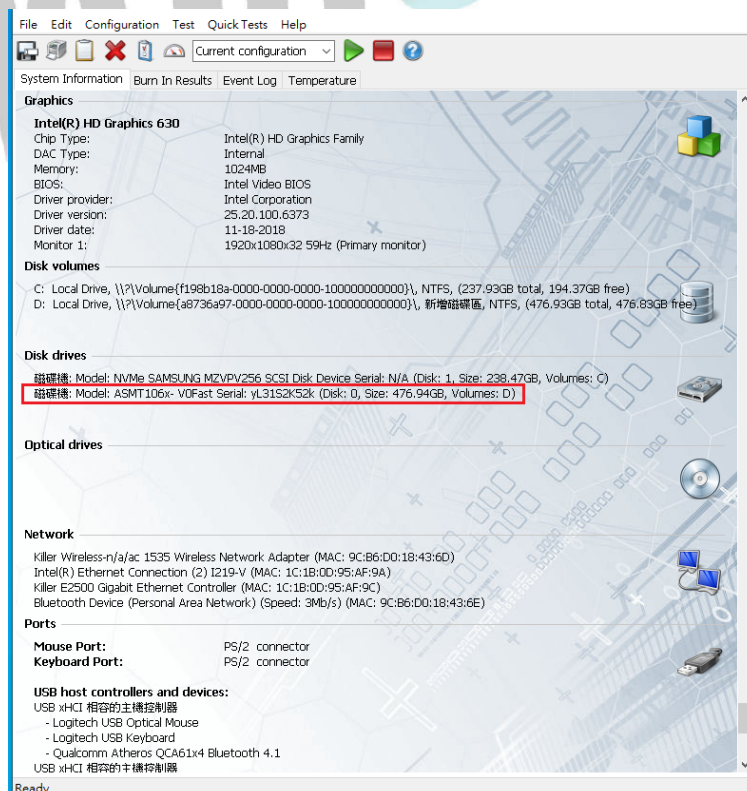
**System Name:** DESKTOP-A77DCD3  
**Motherboard Manufacturer:** Gigabyte Technology Co., Ltd.  
**Motherboard Model:** Z270X-Gaming 8  
**Motherboard Version:** x.x.x  
**Motherboard Serial Number:** Default string  
**BIOS Manufacturer:** American Megatrends Inc.  
**BIOS Version:** F3  
**BIOS Release Date:** 12/13/2016  
**BIOS Serial Number:** Z270X-Gaming 8

**CPU**

**CPU manufacturer:** GenuineIntel [Online CPU comparison](#)  
**CPU type:** Intel(TM) Core(TM) i7-7700 CPU @ 3.60GHz  
**CPUID:** Family 6, Model 95, Stepping 9  
**Physical CPU's:** 1  
**Cores per CPU:** 4  
**Hyperthreading:** Enabled  
**CPU features:** MMX SSE SSE2 SSE3 SSSE3 SSE4.1 SSE4.2 DEP PAE Intel64 VMX SMX AES  
**Clock frequencies:**  
**Measured CPU speed:** 4003.9 MHz  
**Cache per CPU package:**  
**L1 Instruction Cache:** 4 x 32 KB  
**L1 Data Cache:** 4 x 32 KB  
**L2 Cache:** 4 x 256 KB  
**L3 Cache:** 8 MB

**Memory**

**Total Physical Memory:** 16301MB  
**Available Physical Memory:** 14118MB  
**Memory devices:**  
0: : Not populated  
1: : 8192MB,  
2: : Not populated  
3: : 8192MB,  
**Virtual memory:** C:\pagefile.sys (allocated base size 2432MB)



**Graphics**

**Intel(R) HD Graphics 630**  
**Chip Type:** Intel(R) HD Graphics Family  
**DAC Type:** Internal  
**Memory:** 1024MB  
**BIOS:** Intel Video BIOS  
**Driver provider:** Intel Corporation  
**Driver version:** 25.20.100.6373  
**Driver date:** 11-18-2018  
**Monitor 1:** 1920x1080x32 59Hz (Primary monitor)

**Disk volumes**

C: Local Drive, \\?\Volume{198b18a-0000-0000-0000-100000000000}\, NTFS, (237.93GB total, 194.37GB free)  
D: Local Drive, \\?\Volume{a0736a97-0000-0000-0000-100000000000}\, 新增磁碟區, NTFS, (476.93GB total, 476.83GB free)

**Disk drives**

磁碟機: Model: NVMe SAMSUNG MZVPV256 SCSI Disk Device Serial: N/A (Disk: 1, Size: 238.47GB, Volumes: C)  
磁碟機: Model: ASMT106x-V0Fast Serial: yL31S2k52k (Disk: 0, Size: 476.94GB, Volumes: D)

**Optical drives**

**Network**

Killer Wireless-n/a/ac 1535 Wireless Network Adapter (MAC: 9C:B6:D0:18:43:6D)  
Intel(R) Ethernet Connection (2) I219-V (MAC: 1C:1B:0D:95:AF:9A)  
Killer E2500 Gigabit Ethernet Controller (MAC: 1C:1B:0D:95:AF:9C)  
Bluetooth Device (Personal Area Network) (Speed: 3Mb/s) (MAC: 9C:B6:D0:18:43:6E)

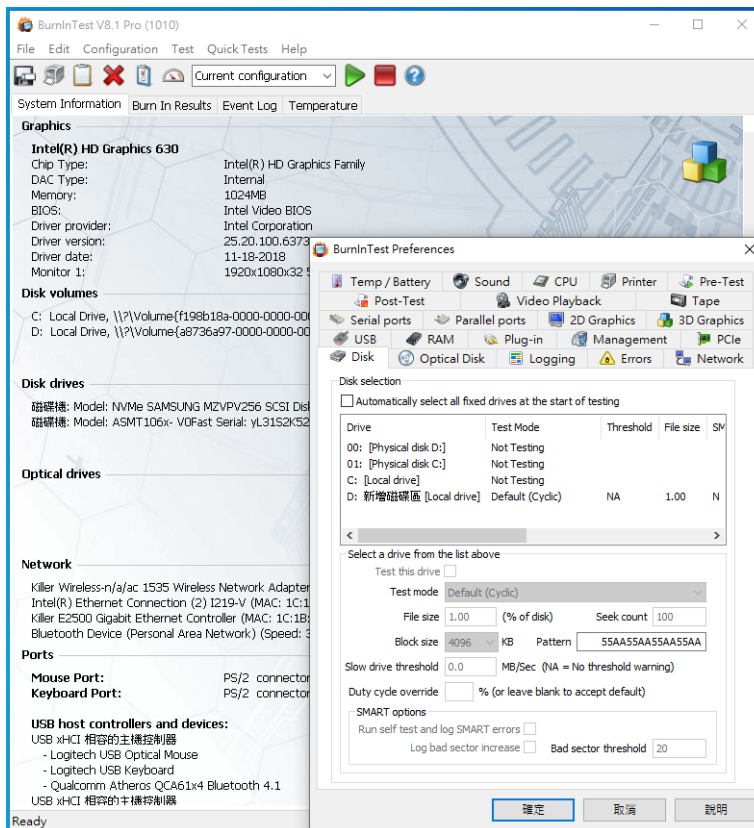
**Ports**

**Mouse Port:** PS/2 connector  
**Keyboard Port:** PS/2 connector

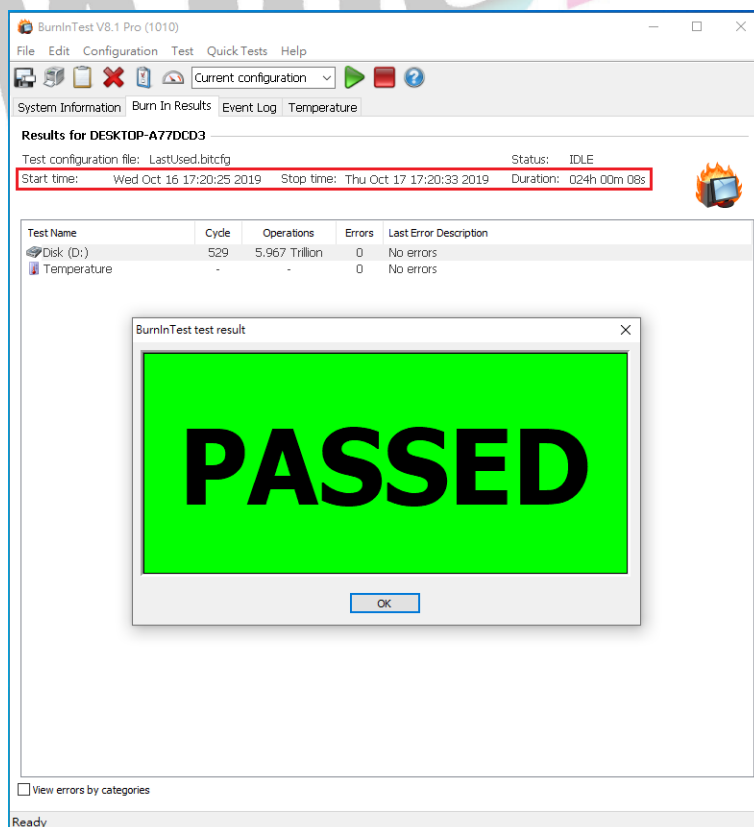
**USB host controllers and devices:**  
USB xHCI 相容的主機控制器  
- Logitech USB Optical Mouse  
- Logitech USB Keyboard  
- Qualcomm Atheros QCA61x4 Bluetooth 4.1  
USB xHCI 相容的主機控制器

# PR9401 PCIe Gen2 x2 RAID Card

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



## 3.1.3 24-hour Burn-in test PASSED



# PR9401 PCIe Gen2 x2 RAID Card

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## 4. Summary

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- 4.1 PR9401 is PCIe Gen2 2-Lane data width Interface, I/O speed, max. to 8Gbps.
- 4.2 PR9401 RAID Add in Card I/O performance is based on M.2 SSD.

