

# **MINERVA** DP7401 PCIe 4.0 x16 with ReDriver to SlimSAS 8i x2 A.I.C

## Performance & Burn In Test Rev 1.0

## Notice: This test report is for lane0 ~ lane 7 of DP7401 PCIe x16 AIC

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### 1. Overview

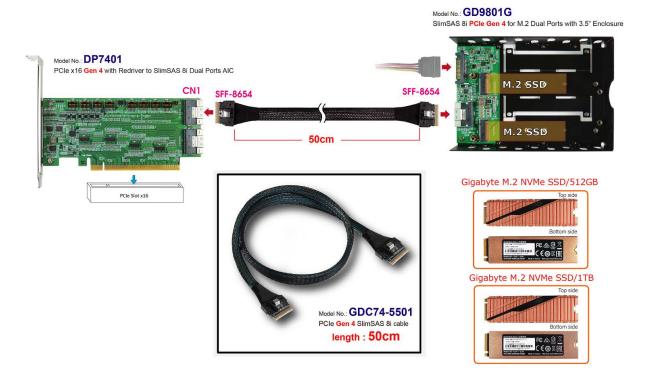
This riser card has built-in SlimSAS(SFF-8654) 8i dual port connector. It is designed for use by PCIe x16 to be bifurcated four x4 link width or can extend PCIe x16 channel reach. The ReDriver may support CTLE boosts up to **13 dB at 8 GHz**.

### 2. Tools and Results of Performance Measurement

#### 2.1 Test Platform

M/B :	GIGABYTE X570 AORUS MASTER
CPU :	AMD Ryzen 7, 3700X 8-Core
Memory :	Kingston KVR26N19D8/16, DDR4-2666MHz, 32GB(16GB DIMM*2)
ATX Power :	COOLER MASTER G750M, <b>750W ATX</b> , 12V V2.2 Power Supply
Add in Card:	DP7401 PCIe x16 to SlimSAS(SFF-8654) 8i x2 AIC
Cable:	PCIe Gen 4 SlimSAS(SFF-8654) 8i to SlimSAS(SFF-8654) 8i Cable
Adapter:	GD9801G SlimSAS(SFF-8654) 8i to M.2 dual ports adapter
OS :	Microsoft Windows 10 64bit OS

#### 2.2 Test target: D7401, GD9801G adapter with GIGABYTE M.2 1TB & M.2 500GB NVMe SSD



#### 2.3 Install Hardware

First inserts the M.2 SSD into the GD9801G M.2 connector, then with copper nuts, and screws to fix SSDs. (Please refer to the Installation Notes). To connect the GD9801G adapter to the DP7401 AIC card (PCIe x16 Gen 4 to SFF-8654 8i x2) using the GDC74-5501 Cable, and Plugs DP7401 AIC into GIGABYTE X570 AORUS MASTER.

#### 2.4 BIOS & Windows 10 OS environment setup

- 2.4.1 Primary SATA NVMe SSD install Windows 10 OS.
- 2.4.2 Two M.2 NVMe SSDs , formatted to NTFS Mode. Don't install any program.

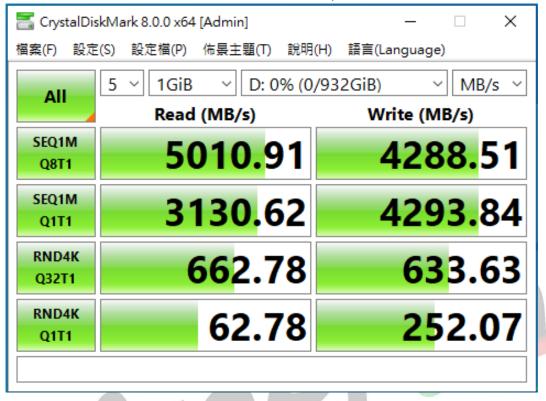
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2.5 CrystalDiskMark 8.0.0 x64 performance test

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

2.5.1 M.2 NVMe GIGABYTE / 1TB in Drive D: performance as below:



2.5.2 M.2 NVMe GIGABYTE / 500B in Drive E: performance as below:

🔚 CrystalDis	kMark 8.0.0 x64 [Admin]	- 🗆 X
檔案(F) 設定	(S) 設定檔(P) 佈景主題(T) 說明	(H) 語言(Language)
All	5 ~ 1GiB ~ E: 0% (2/	/466GiB) ~ MB/s ~
All	Read (MB/s)	Write (MB/s)
SEQ1M	<b>5006.</b> 16	2532.59
Q8T1	5000.10	2332.39
SEQ1M	3011.76	2535.00
Q1T1	5011.70	2333.00
RND4K	631.54	<b>58</b> 8.22
Q32T1	051.54	500.22
RND4K	56.81	218.46
Q1T1	50.01	210.40

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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 M.2 NVMe GIGABYTE / 1TB in Drive D: performance as below:

👛 AS SSD Benchmark 2.0.73	16.34247	– 🗆 X	
File Edit View Tools D: GIGABYTE GP-ASM2NE650			
GIGABYTE EGFM11.2 stornyme - OK 1024 K - OK 931.51 GB	Read:	Write:	
⊠ Seq	4163.13 MB/s	3837.44 MB/s	
⊠ 4K	78.22 MB/s	221.70 MB/s	
☑ 4K-64Thrd	2218.21 MB/s	2751.76 MB/s	
☑ Acc.time	0.018 ms	0.017 ms	
Score:	2713	3357	
	74	49	
Star	t	Abort	

### 2.6.2 M.2 NVMe GIGABYTE / 500B in Drive E: performance as below:

File Edit View Tools E: GIGABYTE GP-ASM2NE6500			
GIGABYTE EGFM11.1 stornvme - OK 1024 K - OK 465.76 GB	Read:	Write:	
⊠ <mark>Seq</mark>	4121.74 MB/s	2355.55 MB/s	
⊠ 4K	70.67 MB/s	179.20 MB/s	
☑ 4K-64Thrd	1865.59 MB/s	2518.29 MB/s	
☑ Acc.time	0.025 ms	0.019 ms	
Score:	2348	2933	
	64	03	
		;;	
Star	t	Abort	

#### 2.7 ATTO Disk Benchamrk 4.01 performance test

2.7.1 M.2 NVMe GIGABYTE / 1TB in Drive D: performance as below:

🛢 Untitled - ATTO Disk Benchmark 4.01.0f1	– 🗆 X
File Help	
Drive: (D:)新增磁碟區	V Direct I/O
1/0 Size: 512 B v to 64 MB v	Bypass Write Cache
	Dypass write cache
File Size: 256 MB V	Verify Data
	Queue Depth: 🛛 4 🔍
<< Description >>	Start
Test Results	
Write —— Read ——	Write Read
512 B	49.80 MB/s 45.42 MB/s
1 KB	96.96 MB/s 92.08 MB/s
	185.64 MB/s 179.76 MB/s
4 KB	359.06 MB/s 369.80 MB/s 659.53 MB/s 671.25 MB/s
16 KB	1.34 GB/s 1.33 GB/s
32 KB	2.87 GB/s 2.55 GB/s
64 KB	3.66 GB/s 2.83 GB/s
128 KB	3.84 GB/s 4.55 GB/s
256 KB	3.85 GB/s 5.22 GB/s
512 KB	3.86 GB/s 5.24 GB/s 📁
1 MB	3.86 GB/s 5.22 GB/s 🧾
2 MB	3.86 GB/s 5.20 GB/s
4 MB	3.86 GB/s 5.20 GB/s
8 MB	3.85 GB/s 5.21 GB/s
12 MB	3.86 GB/s 5.21 GB/s
16 MB	3.86 GB/s 5.21 GB/s 3.85 GB/s 5.21 GB/s
24 MB	3.85 GB/s 5.21 GB/s
48 MB	3.86 GB/s 5.21 GB/s 3.91 GB/s 5.21 GB/s
48 MB	3.91 GB/s 5.21 GB/s
0 0.6 1.2 1.8 2.4 3 3.6 4.2 4.8 5.4 6 Transfer Rate - GB/s	
ATTO Storage and Network Connectivit	ty Experts

## 2.7.2 M.2 NVMe GIGABYTE / 500B in Drive E: performance as below:

- ATTO Disk Benchmark 4.01.0f1	- 🗆 X
(E:) 新增磁碟區	V Direct I/0
512 B V to 64 MB V	Bypass Write Cache
256 MB ~	Verify Data
	Queue Depth: 4 🗸
>>> ^ ^	Start
Test Besults	
Write Read	Write     Read       33.57 MB/s     41.38 MB/s       73.63 MB/s     78.65 MB/s       161.69 MB/s     162.18 MB/s       304.83 MB/s     332.70 MB/s       661.48 MB/s     524.83 MB/s       1.33 GB/s     1.34 GB/s       2.21 GB/s     2.26 GB/s       2.36 GB/s     2.44 GB/s       2.36 GB/s     4.38 GB/s       2.36 GB/s     4.39 GB/s       2.36 GB/s     4.38 GB/s
	512 B   to   64 MB     256 MB       *>   Test Results     Write   Read     *   *

### 2.8 AnvilBenchmark\_V110\_B337

#### 2.8.1 M.2 NVMe GIGABYTE / 1TB in Drive D: performance as below:

🕽 Anvil's Storage l	Utilities 1.1.0 (2014	4-January-1)				
File Benchmarks	IOmeter Sys	tem Info   Settings	Test size 1GB	▼ Drive 🖃 d: 僚	「増磁碟區」	∨ Screenshot Help
SSD Benchr	mark				GIG	GABYTE GP-ASM2NE6500GT 1000GB/EGFM1
Read	Resp. time		IOPS	MB/s		
Seq 4MB	1.0371ms	2,048.0	964.22	3,856.87		
4K	0.0655ms	745.0	15,258.05	59.60		
4K QD4	0.0708ms	2,757.9	56,481.84	220.63		7,587.03
4K QD16	0.0884ms	8,840.6	181,054.81	707.25	Run read	7,587.03
32K	0.1021ms	4,000.0	9,798.67	306.21		
128K	0.1430ms	13,126.4	6,993.74	874.22		19,202.50
Write	Resp. time	MB written	IOPS	MB/s	Run	19,202.50
Seq 4MB	1.0391ms	1,024.0	962.41	3,849.62		
4K	0.0169ms	640.0	59,296.40	231.63		11,615.46 11,615.46
4K QD4	0.0242ms	640.0	165,607.17	646.90	Run write	11,015.40
4K QD16	0.0383ms	640.0	418,015.97	1,632.87		
Microsoft Windows 1		uild (18362)	Drives :			GIGABYTE GP-ASM2NE6500GTTD 10 Drive D: 931.5/931.4GB free (100.0%)
X570 AORUS MASTE AMD Ryzen 7 3700×			Notes :			NTFS - Cluster size 4096B
Memory: 32,714 MB						Storage driver <b>stornvme</b>
Professional Ed						Alignment 1024KB OK Compression 100% (Incompressible)

### 2.8.2 M.2 NVMe GIGABYTE / 500B in Drive E: performance as below:

le Benchmarks	IOmeter System	n Info Settings	Test size 1GB	🔽 Drive 🔳 e: 僚	増磁碟區]	✓ Screenshot Help
SD Benchn	nark				GIG	ABYTE GP-ASM2NE6500G <sup>1</sup> 500GB/EGFM
						500GB/EGPW
Read	Resp. time	MB read	IOPS	MB/s		
Seq 4MB	1.0996ms	2,048.0	909.41	3,637.66		
4K	0.0705ms	692.9	14,191.07	55.43		
4K QD4	0.0755ms	2,586.9	52,980.00	206.95		7,176.47
4K QD16	0.0934ms	8,364.9	171,312.60	669.19	Run read	7,176.47
32K	0.1255ms	3,738.2	7,966.37	248.95		
128K	0.1442ms	13,016.0	6,934.47	866.81		17,093.74
Write	Resp. time	MB written	IOPS	MB/s	Run	17,093.74
Seq 4MB	1.6484ms	1,024.0	606.64	2,426.54		
4K	0.0225ms	640.0	44,531.86	173.95		<sup>9,917.26</sup> 9,917.26
4K QD4	0.0241ms	640.0	165,738.97	647.42	Run write	9,917.20
4K QD16	0.0387ms	640.0	414,093.58	1,617.55		
Microsoft Windows 10	D 企業版 64 位元 Build	(18362)	21			GIGABYTE GP-ASM2NE6500GTTD 5
(570 AORUS MASTER AMD Ryzen 7 3700X			Drives : Notes :			Drive E: 465.8/463.7GB free (99.5%) NTFS - Cluster size 4096B
Memory: 32,714 MB			notes.			Storage driver <b>stornvme</b>
Professional Edi	ition					Alignment 1024KB OK

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#### 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 Disk test mode( 10 ways cycle test)

mark and the	
rrent configuration	
; Event Log 🛛 Ten 🧯	BurnInTest Preferences
	👔 Temp / Battery 🎯 Sound 🗳 CPU 🗊 Printer 🍦 Pre-Test
32714MB	
	🗞 Serial ports 🛛 👋 Parallel ports 🔛 2D Graphics 🚮 3D Graphics
16GB DDR4 SDR	🍯 USB 🗬 RAM \land Plug-in 🕼 Management 🏓 PCle
	🧼 Disk 💿 Optical Disk 📑 Logging 🙆 Errors 🍢 Network
1.2V, Clk: 1333.	Disk selection
16GB DDR4 SDR	Automatically select all fixed drives at the start of testing
1.21/ (1/2) 1222	
	Drive Test Mode Threshold File size
	01: [Physical disk E:] Not Testing
C:\pagefile.sys (	02: [Physical disk D:] Not Testing
	C: [Local drive] Not Testing
	D: 新增磁碟區 [Local drive] Default (Cydic) NA 1.00 E: 新增磁碟區 [Local drive] Default (Cydic) NA 1.00
GeForce 210	E: 新增磁碟區 [Local drive] Default (Cyclic) NA 1.00 🗸
Integrated RAM	< >
512MB	Edit details for drive: E: 新增磁碟區 [Local drive]
Version 70.18.6	Test this drive 🗹
NVIDIA	Test mode Default (Cyclic) V
	File size 1.00 (% of disk) Seek count 100
1920/1000/02 (	Block size 4096 V KB
	Slow drive threshold 0.0 MB/Sec (NA = No threshold warning)
	Duty cycle override % (or leave blank to accept default)
202-0000-0000-00	SMART options
	Run self test and log SMART errors
	Log bad sector increase Bad sector threshold 20
IZIVEUJUUGTTD SB	確定 取消 説明
	- 🗆 X
Quick Tests Help	
rrent configuration	V Þ 📕 🙆
Evention Temp	erature
Lion Log Tomp	
-	Status: IDLE
2:20 2020 Stop tir	ne: Thu Dec 31 10:02:28 2020 Duration: 024h 00m 08s
Cycle Operations	Errors Last Error Description
5165 109 Trillion	0 No errors
	0 No errors n 0 No errors
5165 109 Trillion	0 No errors
165 109 Trillion 1020 63.956 Trillion	0 No errors 0 No errors 0 No errors
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s165 109 Trillion 020 63.956 Trillion st result	No errors No errors No errors No errors No errors No errors
s165 109 Trillion 020 63.956 Trillion st result	0 No errors n 0 No errors 0 No errors X
	32714MB 30353MB 16GB DDR4 SDR 1.2V, Clk: 1333, 16GB DDR4 SDR 1.2V, Clk: 1333, Not populated C:\pagefile.sys ( GeForce 210 Integrated RAM 512MB Version 70.18.6

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#### 4. Summary

- 4.1 M.2 NVMe SSD is PCIe Gen 4 / 4 Lane Interface, I/O speed, max. to 64Gbps.
- 4.2 DP7401 AIC I/O performance is based on NVMe SSD.

