

# **MINERVA**

PE0807 SFF-8644 1x2,4X with Redriver to PCIe x8 Gen3 AIC

### Performance & Burn In Test Rev 1.0

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#### 1. Overview

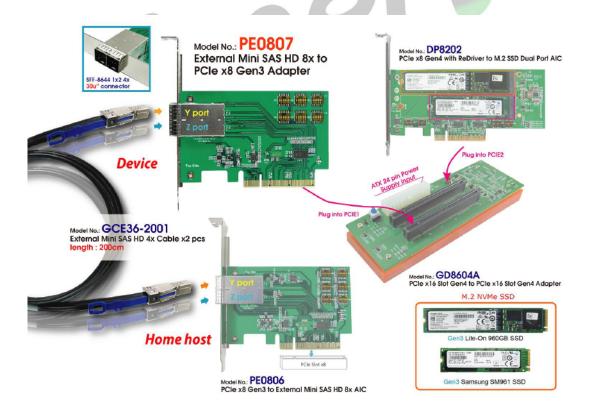
This riser card has built-in external Mini SAS HD(SFF-8644) 1x2,4X connector. It is designed to for extend PCIe x8 channel reach. The ReDriver may support CTLE boosts up to 15 dB at 4 GHz.

#### 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:	PE0806 PCIe x8 with ReDriver to SFF-8644 1x2, 4X AIC for Host
Add in Card:	PE0807 SFF-8644 1x2, 4X with ReDriver to PCIe x8AIC for Device
Cable:	PCIe Gen 3 external Mini SAS 1x1,4X, 200cm Cable x2pcs
Adapter:	GD8604A PCIe x16 Slot to PCIe x16 Slot adapter
Add in Card:	DP8202 PCIe x8 to M.2 dual port
OS :	Microsoft Windows 10 64bit OS

2.2 Test target: PE0806, PE0807, GD8604A & PE0802 with PCIe Gen M.2 NVMe SSD



#### 2.3 Install Hardware

First inserts the M.2 SSD into the PE0802 M.2 connector, then with copper nuts, and screws to fix SSDs. (Please refer to the Installation Notes). Plugs PE0802 into GD8604A device port PCIe x16 Slot and PE0807 into GD8604A host port PCIe x16 Slot. The PE0807 connects to the PE0806 AIC card (PCIe x16 Gen 4 to SFF-8644 1x2, 4X), using the GCE36-2001 Cable, and Plugs PE0806 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.

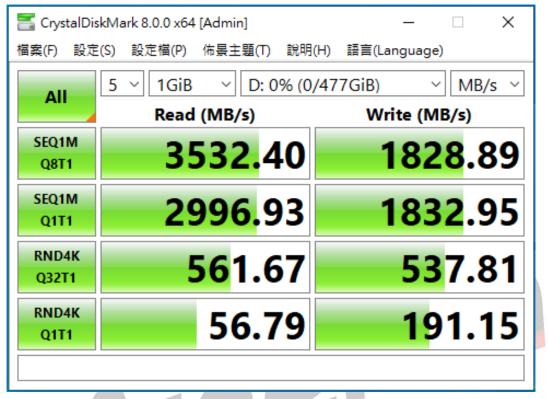
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#### 2.5 CrystalDiskMark 8.0.0 x64 performance test

Weight Sequential Read & Write / default = 1MB)

2.5.1 Samsung SM961 M.2 22x80mm /512GB in Drive D: performance as below:



#### 2.5.2 LITEON M.2 22x110mm /1TB in Drive E: performance as below: 🔚 CrystalDiskMark 8.0.0 x64 [Admin] × 設定檔(P) 佈景主題(T) 說明(H) 語言(Language) 檔案(F) 設定(S) 5 ~ 1GiB E: 0% (0/894GiB) MB/s ~ $\sim$ $\sim$ All Read (MB/s) Write (MB/s) SEQ1M **2115**.83 923.94 Q8T1 SEQ1M 925.12 **1803**.30 Q1T1 RND4K **50**6.78 **529.78** Q32T1 RND4K 47.80 168.69 Q1T1

#### 2.6 AS SSD Benchmark 2.0 performance test

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

2.6.1 Samsung SM961 M.2 22x80mm /512GB in Drive D: performance as below:

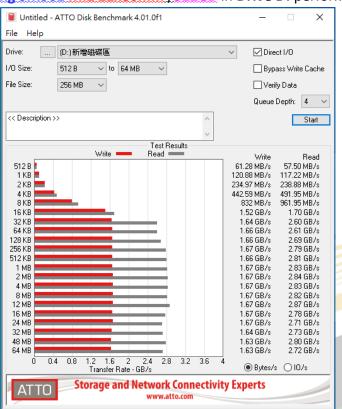
👗 AS SSD Benchmark 2.0.73	16.34247	– 🗆 X
File Edit View Tools	Language Help	
D: SAMSUNG MZVKW512HMJ	P-00000 ~ 1 GB ~	
SAMSUNG CXA7 secnvme - OK 1024 K - OK 476.94 GB	Read:	Write:
⊠ Seq	3097.40 MB/s	1768.70 MB/s
⊠ 4K	53.04 MB/s	166.30 MB/s
☑ 4K-64Thrd	1214.16 MB/s	1164.57 MB/s
☑ Acc.time	0.022 ms	0.020 ms
Score:	1577	1508
	38	33
Star	t	Abort

#### 2.6.2 LITEON M.2 22x110mm /1TB in Drive E: performance as below:

AS SSD Benchmark 2.0.73	16.34247	– 🗆 X
File Edit View Tools	Language Help	
E: LITEON EP2-KB960	∼ 1 GB ~	
LITEON EP2-KB960 9KW28P7 stornyme - OK 1024 K - OK 894.25 GB	Read:	Write:
⊠ Seq	2140.19 MB/s	873.99 MB/s
⊠ 4K	45.24 MB/s	162.14 MB/s
☑ 4K-64Thrd	1109.34 MB/s	813.07 MB/s
☑ Acc.time	0.020 ms	0.024 ms
Score:	1369	1063
	30	75
		ang ang ang
Star	t	Abort

#### 2.7 ATTO Disk Benchamrk 4.01 performance test

2.7.1 Samsung SM961 M.2 22x80mm /512GB in Drive D: performance as below:



### 2.7.2 LITEON M.2 22x110mm /1TB in Drive E: performance as below:

📕 Untitled - ATTO Disk E File Help	enchmark 4.01.0f1	- 🗆 X
Drive: (E:)新增磁	「「「」「」「」「」「」「」」	✓ V Direct I/O
I/O Size: 512 B	✓ to 64 MB ✓	Bypass Write Cache
File Size: 256 MB	~	Verify Data
		Queue Depth: 4 🗸
LUB 16 U		
<< Description >>	< >	Start
	Test Results	
512 B 1 KB 2 KB 4 KB 16 KB 32 KB 16 KB 128 KB 128 KB 128 KB 128 KB 128 KB 128 KB 100 KB	Write - Read -	Write         Read           6.58 MB/s         20.58 MB/s           23.68 MB/s         45.78 MB/s           23.68 MB/s         45.78 MB/s           364.92 MB/s         150.46 MB/s           364.92 MB/s         150.46 MB/s           364.92 MB/s         150.46 MB/s           907.72 MB/s         544.43 MB/s           881.28 MB/s         1.50 GB/s           872.68 MB/s         2.09 GB/s           872.268 MB/s         2.00 GB/s           872.02 MB/s         2.10 GB/s           872.02 MB/s         2.10 GB/s           874.15 MB/s         2.18 GB/s           878.43 MB/s         2.16 GB/s           874.15 MB/s         2.01 GB/s           874.15 MB/s         2.01 GB/s           877.91 MB/s         2.00 GB/s           877.91 MB/s         2.00 GB/s           860.55 MB/s         2.10 GB/s           861.65 MB/s         2.10 GB/s           874.17 MB/s         2.10 GB/s           863.65 MB/s         2.10 GB/s           863.65 MB/s         2.10 GB/s           874.77 MB/s         2.04 GB/s           874.77 MB/s         2.04 GB/s
64 MB 0 0.4 0.8 1.2 Tr	1.6 2 2.4 2.8 3.2 3.6 ansferRate-GB/s	876.71 MB/s 1.90 GB/s 4 ● Bytes/s ◯ IO/s
	ge and Network Connectiv www.atto.com	ity Experts

#### 2.8 AnvilBenchmark\_V110\_B337

2.8.1 Samsung SM961 M.2 22x80mm /512GB in Drive D: performance as below:

ile Ben	nchmarks	lOmeter	System Info	Settings	Test size 1GB	▼ Drive	甯 d: 僚	「増磁碟區」	✓ Screenshot	Help	
SD B	enchm	nark						SAI			P-000 B/CX
	Read	Resp. ti	me	MB read	IOPS		MB/s				
Seq 4	МВ	1.3125		2,048.0	761.90	3,0	47.62				
4K		0.0719	ms	679.4	13,913.91		54.35				
4K Q	D4	0.0795	ms	2,455.3	50,285.08	1	96.43		5.123.89		
4K Q.	016	0.1213	ms	6,442.2	131,929.24	5	15.35	Run read	5,123.89 <b>5,123</b> .8	39	
32	ĸ	0.1443	ms	3,251.0	6,928.08	2	16.50				
128	SK 🛛	1.0829	ms	1,733.4	923.48	1	15.44		13,217	.83 , <b>217.8</b>	2
	Write	Resp. ti	ime M	B written	IOPS		MB/s	Run	13	5,217.8	3
Seq 4	ІМВ	2.3164		1,024.0	431.70	1,7	26.81				
4K		0.0205	ms	640.0	48,684.28	1	90.17		8,093.94		
4K Q	D4	0.0264	ms	640.0	151,777.21	5	92.88	Run write	8,093.9	74	
4K Q.C	016	0.0490	ms	640.0	326,638.49	1,2	75.93				
X <b>570S AO</b> F AMD Ryze	RUS MASTEF en 7 3700X (	企業版 64 位: R/F1, AM4 3-Core Process		2)	Drives : Notes :				SAMSUNG MZVKW Drive D: 476.9/476. NTFS - Cluster size 4 Storage driver secr	iGB free (99. 0968	
Memory : 3	32,706 MB sional Edit								Alignment 1024KB OK Compression 100% ()		

### 2.8.2 LITEON M.2 22x110mm /1TB in Drive E: performance as below:

e Benchmarks	IOmeter System	n Into   Settings	Test size 1GB	Drive 🖃 e: 🕅	「増磁係區」	✓ Screenshot Help	
SD Benchm	nark				LITEC	ON EP2-KB960 960GB/9K	W2
Read	Resp. time	MB read	IOPS	MB/s			
Seq 4MB	2.2578ms	2,048.0	442.91	1,771.63			
4K	0.0843ms	579.3	11,864.57	46.35			
4K QD4	0.0912ms	2,140.9	43,844.83	171.27		4,835.20	
4K QD16	0.1071ms	7,291.6	149,330.66	583.32	Run read	4,835.20	
32K	0.1272ms	3,688.0	7,859.87	245.62			
128K	0.1678ms	11,187.9	5,960.51	745.06		10,296.49	
Write	Resp. time	MB written	IOPS	MB/s	Run	10,296.49	,
Seq 4MB	4.5156ms	1,024.0	221.45	885.81			
4K	0.0230ms	640.0	43,463.00	169.78	Run write	<sup>5,461.29</sup> 5,461.29	
4K QD4	0.0350ms	640.0	114,143.34	445.87	Run Write	5,401.29	
4K QD16	0.0733ms	640.0	218,346.56	852.92			
	企業版 64 位元 Build	(19042)	Drives :			LITEON EP2-KB960 960GB/9KW Drive E: 894.3/894.1GB free (100.0	
570S AORUS MASTE MD Ryzen 7 3700X			Notes :			NTFS - Cluster size 4096B Storage driver <b>stornyme</b>	
lemory : 32,706 MB						storage unver stornvine	

#### 3. Burn In Tests and Results

#### 3.1 BurnInTest v8.1 Pro



Minerva Innovation Company

🐞 BurnInTest V8.1 Pro (1010)		- 🗆 X
File Edit Configuration Test	Quick Tests Help	
🕞 🗊 📋 💥 🛐 🕰 Cu	rrent configuration	√ Þ 📕 🙆
System Information Burn In Result:	s Evention Tend	Durale Test Deferences
Memory	s Event Log Ten	BurnInTest Preferences
Total Physical Memory:	32706MB	👔 Temp / Battery 🚳 Sound 🖉 CPU 🗊 Printer 🍕 Pre-Test
Available Physical Memory:	30500MB	Post-Test 🙀 Video Playback 🖾 Tape
Memory devices: Slot 1:	16GB DDR4 SDR	Image: Serial ports         Image: Parallel ports
	1.02 cll., 1000	Tisk 💿 Optical Disk 📑 Logging 🙆 Errors 🍢 Network
Slot 2:	1.2V, Clk: 1333. 16GB DDR4 SDR	Disk selection
	1.2V, Clk: 1333.	Automatically select all fixed drives at the start of testing
Slot 3:	Not populated	Drive Test Mode Threshold File size
Slot 4: Virtual memory:	Not populated C:\pagefile.sys (.	00: [Physical disk NTFS C:] Not Testing 01: [Physical disk E:] Not Testing
Graphics		02: [Physical disk D:] Not Testing
NVIDIA GeForce 210		C: [Local drive] Not Testing D: 新增磁碟區 [Local drive] Default (Cyclic) NA 1.00
Chip Type: DAC Type:	GeForce 210 Integrated RAM	
Memory:	512MB	Edit details for drive: E: 新增磁碟區 [Local drive]
BIOS: Driver provider:	Version 70.18.6 NVIDIA	Test this drive 🗹
Driver version: Driver date:	9.18.13.4195 1-29-2016	Test mode Default (Cyclic)
Driver date: Monitor 1:	1-29-2016 1920x1080x32 (	File size 1.00 (% of disk) Seek count 100
Disk volumes	19	Block size 4096 V KB
C: Local Drive, \\?87108 D: Local Drive, \\?3e776		Slow drive threshold 0.0 MB/Sec (NA = No threshold warning)
E: Local Drive, \\?67b20		Duty cycle override % (or leave blank to accept default) SMART options
Disk drives		Run self test and log SMART errors
磁碟機: Model: LITEON EP2-KB96	Ω Serial: N/A (Disk:	Log bad sector increase Bad sector threshold 20
磁碟機: Model: LITEONIT LGT-12	8M6G Serial: SOC41	
磁碟機: Model: SAMSUNG MZVKW	1212HMDP-00000 St	確定 取消 說明
24-hour Burn-	in test <mark>PAS</mark>	SED
24-hour Burn-	in test <mark>PAS</mark>	SED · · ·
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👸 BurnInTest V8.1 Pro (1010) File Edit Configuration Test	_	
👸 BurnInTest V8.1 Pro (1010) File Edit Configuration Test	Quick Tests Help urrent configuration	×
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<ul> <li>Burnin Test V8.1 Pro (1010)</li> <li>File Edit Configuration Test</li> <li>File Edit Configuration Test</li> <li>File Edit Configuration Burn In Result</li> <li>Results for DESKTOP-GCSP1VR</li> <li>Test configuration file: LastUsed.k</li> <li>Start time: Fri Jul 08 17:26:1</li> </ul>	Quick Tests Help urrent configuration ts Event Log Tem bitcfg 16 2022 Stop t	- C × Perature Status: IDLE ime: Sat Jul 09 17:26:24 2022 Duration: 024h 00m 08s
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#### 4. Summary

- 4.1 M.2 NVMe SSD is PCIe Gen 3 / 4 Lane Interface, I/O speed, max. to32Gbps.
- 4.2 PE0807 AIC I/O performance is based on NVMe SSD.

