

GCE36-2001 SFF-8644 1x1,4X,200cm Cable

Performance & Burn In Test Rev 1.0

Table of Contents

- 1. Overview
- 2. Performance Measurement Tools and Results
 - 2.1 Test Platform
 - 2.2 Test target and M.2 NVMe SSD x2
 - 2.3 Install Hardware
 - 2.4 BIOS & Windows 10 OS environment setup
 - 2.5 CrystalDiskMark 8.0.0 x64 performance test
 - 2.6 AS SSD Benchmark 2.0 performance test
 - 2.7 ATTO Disk Benchamrk 4.01 performance test
 - 2.8 AnvilBenchmark_V110_B337 Benchmark performance test
- 3. Burn In Tests and Results
 - 3.1 BurnInTestv8.1 Pro burn in test
- 4. Summary

1. Overview

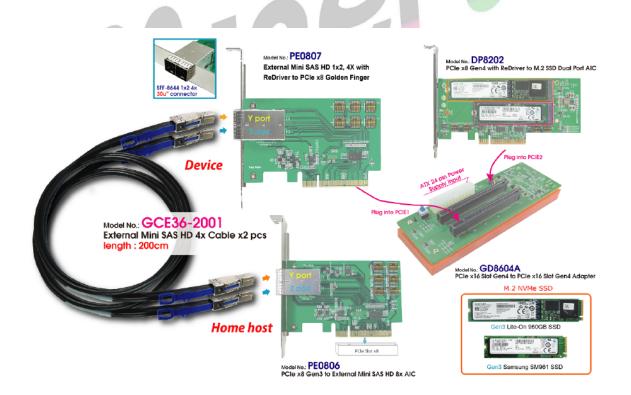
This riser card has built-in external Mini SAS HD(SFF-8644) 1x2,4X connector. It is designed to for extend PCIe x8 channel reach. The ReDriver may support CTLE boosts up to **15 dB at 4 GHz**.

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, 750W ATX , 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.

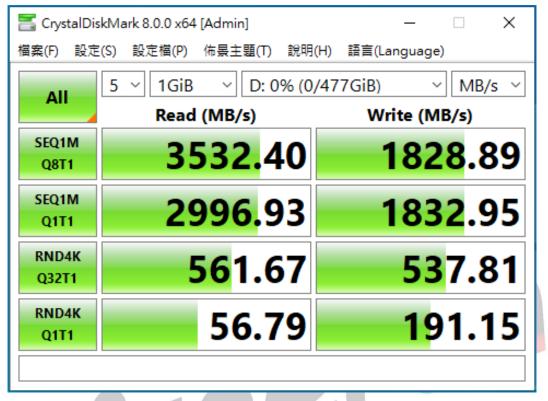
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2.5 CrystalDiskMark 8.0.0 x64 performance test

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

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



2.5.2 LITE	ON M.2 22x110mm /1TB 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% (0/894GiB) ~					
	Read (MB/s)	Write (MB/s)			
SEQ1M	2115.83	923.94			
Q8T1	2113.05	525.54			
SEQ1M	1803.30	925.12			
Q1T1	1005.50	525.12			
RND4K	52 9.78	50 6.78			
Q32T1	525.70	500.70			
RND4K	47.80	168.69			
Q1T1	77.00	100.03			
L					

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		
D: SAMSUNG MZVK W512HMJ	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

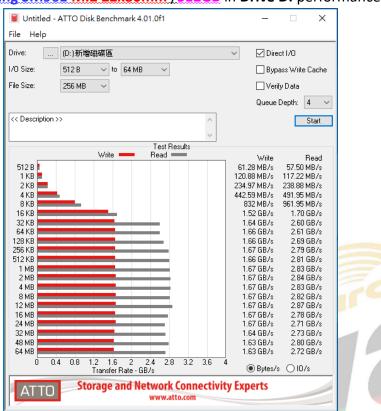
2.6.2 LITEON M.2 22x110mm /1TB in Drive E: performance as below:

AS SSD Benchmark 2.0.73	16.34247	– 🗆 X
File Edit View Tools		
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
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:

I/O Size: 512 B to 64 MB B File Size: 256 MB V V	irect I/O ypass Write Cache erify Data ue Depth: 4 ~
File Size: 256 MB	erify Data
Construction Quere Test Results Write	
< Test Results Write Read 512 B 6.58 MB/ 28.88 MB/ 28.88 MB/ 28.88 MB/ 364.92 MB/ 615.06 MB/ 364.92 MB/ 615.06 MB/ 364.92 MB/ 884.48 MB/ 364.92 MB/ 884.48 MB/ 887.28 MB/ 873.12 MB/ 873.12 MB/ 873.12 MB/	ue Depth: 🛛 4 🔍
Write Read Writ 512 B 258 MB/ 1 KB 258 MB/ 2 KB 366.92 MB/ 4 KB 907.72 MB/ 32 KB 884.48 MB/ 18 KB 881.28 MB/ 26 KB 873.12 MB/	
Write Read Write 512 B 6.58 MB/ 1 KB 23.68 MB/ 2 KB 364.92 MB/ 4 KB 364.92 MB/ 8 KB 907.72 MB/ 32 KB 884.48 MB/ 32 KB 881.28 MB/ 128 KB 872.68 MB/ 256 KB 873.12 MB/	Start
Write Read Write 512 B 6.58 MB/ 1 KB 23.68 MB/ 2 KB 364.92 MB/ 4 KB 364.92 MB/ 8 KB 907.72 MB/ 32 KB 884.48 MB/ 32 KB 881.28 MB/ 128 KB 872.68 MB/ 256 KB 873.12 MB/	
1 MB 874.15 MB/ 863.00 MB/ 863.00 MB/ 863.00 MB/ 863.00 MB/ 878.43 MB/ 874.15 MB/ 877.91 MB/ 860.59 MB/ 874.77 MB/ 874.77 MB/ 876.71 MB/ 876.	s 20.58 MB/s s 45.78 MB/s s 65.73 MB/s s 150.46 MB/s s 374.63 MB/s s 544.43 MB/s s 209 GB/s s 210 GB/s s 210 GB/s s 210 GB/s s 218 GB/s s 216 GB/s s 200 GB/s s 200 GB/s s 200 GB/s s 200 GB/s s 210 GB/s s 200 GB/s s 210 GB/s s 200 GB/s s 210 GB/s s 200 GB/s s 210 GB/s s 210 GB/s s 200 GB/s s 210 GB/s

2.8 AnvilBenchmark_V110_B337

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

Anvil's Storage I	Utilities 1.1.0 (2	014-January	-1)					- 🗆	×
le Benchmarks	lOmeter	System Info	Settings	Test size 1GB	▼ Drive 🖃	d:[新増磁碟區]	 ✓ Screenshot 		
SD Benchr	mark					SAN	ISUNG MZVKV	V512HMJP 512GE	
Read	Resp. ti	me N	/IB read	IOPS		B/s			
Seq 4MB	1.3125	ms 2	2,048.0	761.90	3,047.	.62			
4K	0.0719	ms	679.4	13,913.91	54.	.35			
4K QD4	0.0795	ms 2	2,455.3	50,285.08	196.	.43	5,123.89		
4K QD16	0.1213	ms (6,442.2	131,929.24	515.	.35 Run read	5,123.8	9	
32K	0.1443	ms 🗧	3,251.0	6,928.08	216.	.50			
128K	1.0829	ms 👘	,733.4	923.48	115.		13,217.	83	
Write	Resp. ti	ime MB	written	IOPS	М	B/s Run	13	,217.83	1
Seq 4MB	2.3164	ms ′	1,024.0	431.70	1,726.	81			
4K	0.0205	ms	640.0	48,684.28	190.		8,093.94 8,093.9	4	
4K QD4	0.0264	ms	640.0	151,777.21	592.	.88 Run write	0,095.8		
4K QD16	0.0490	ms	640.0	326,638.49	1,275.	93			
Microsoft Windows 1		元 Build (19042)) _(Drives :			SAMSUNG MZVKW Drive D: 476.9/476.5		
(570S AORUS MAST AMD Ryzen 7 3700)				Notes :			NTFS - Cluster size 4	096B	0)
4mD Ryzen 7 3700/ 4emory : 32,706 ME		01		notes.			Storage driver secn	vme	
Professional Ec							Alignment 1024KB OK		

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

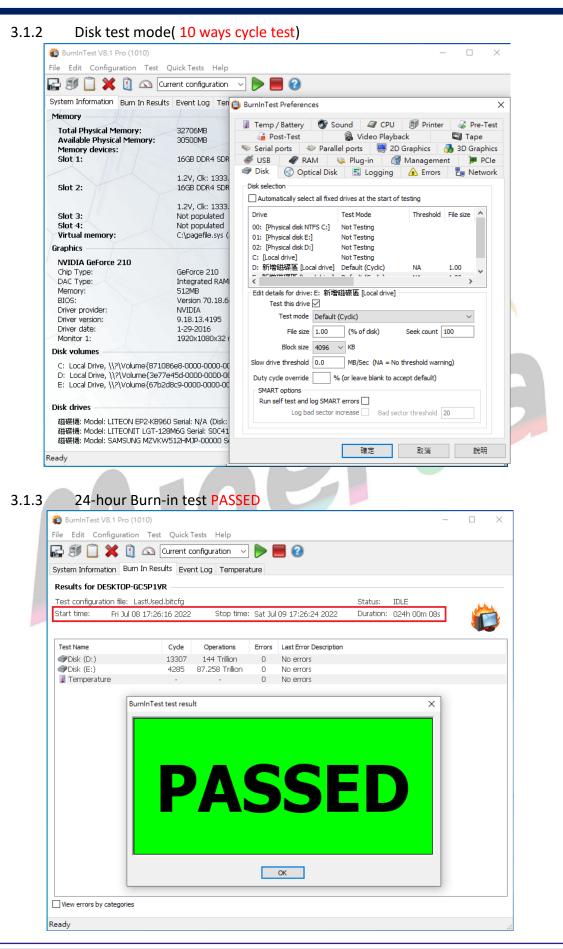
Anvil's Storage L	Jtilities 1.1.0 (2014-J	anuary-1)				-		×
File Benchmarks	IOmeter System	n Info Settings	Test size 1GB	▼ Drive 🖃 e: (新	増磁碟區」	✓ Screenshot Help)	
SSD Benchr	nark				LITEC	ON EP2-KB960 9600	B/9KW28	8F
Read	Resp. time	MB read	IOPS	MB/s				
Seq 4MB	2.2578ms	2,048.0	442.91	1,771.63				
4K	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	C 40	
Write	Resp. time	MB written	IOPS	MB/s	Run	10,29	6.49	
Seq 4MB	4.5156ms	1,024.0	221.45	885.81				
4K	0.0230ms	640.0	43,463.00	169.78		^{5,461.29} 5,461.29		
4K QD4	0.0350ms	640.0	114,143.34	445.87	Run write	5,461.29		
4K QD16	0.0733ms	640.0	218,346.56	852.92				
Microsoft Windows 1	0 企業版 64 位元 Build	(19042)				LITEON EP2-KB960 960G		7
X570S AORUS MAST			Drives :			Drive E: 894.3/894.1GB free NTFS - Cluster size 4096B	≥ (100.0%)	
AMD Ryzen 7 3700× Memory : 32,706 MB			Notes :			Storage driver stornvme		
Professional Ed						Alignment 1024KB OK Compression 100% (Incomp	raacibla)	
			·			Compression 100% (Incomp	ressible)	

3. <u>Burn In</u>

3.1 BurnInTest v8.1 Pro 3.1.1 system informa



Minerva Innovation Company



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.

