

R2096E SATA 3 to SATA 2-port & M.2 2-port RAID

RAID JBOD Mode Performance & Burn In Test Rev. 1.0

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1. Overview

R2096E RAID card offers SATA 3 interface, built-in 2-port SATA 7-pin connector & 2-port M.2 B key connector, can be combined two SATA SSD into a RAID 0, RAID 1, JBOD mode. **This test report is based M.2 NGFF SSD x2, JBOD set as a benchmark.**

2. Tools and Results of Performance Measurement

2.1 Test Platform

M/B :	ASRock Z97 Extreme 6
CPU :	Intel i5-4426, 3.2GHz/ 6M Cache/ LGA1150
Memory :	Kingston KVR16N11S8/4, DDR3-1600MHz, 8G(4GB DIMM*2)
ATX Power :	FSP RAIDER 550, 550W ATX , 12V V2.2 Power Supply
Graphic :	Z97 Chipsets built-in HD Graphics 4600
OS :	Microsoft Windows 8.1 64bit OS

2.2 Test target: R2096E RAID Card and M.2 NGFF SSD(LGT-128M6G/128GBx2)





R2096E Adapter

LGT-128M6G / 128GB x2

2.3 Install Hardware

2.3.1 Insert M.2 SSDx2 into R2096E converter's M.2 B key connector, and then with coppers, and screws to fix SSDs. (Please refer to the Installation Notes).
 Connect R2096E converter to SATA III Port of ASRock Z97 Extreme6.

2.4 BIOS & Windows 8 OS environment setup

2.4.1 Install Windows 8.1 x64 OS.

2.5 CrystalDiskMark 3.0.1 x64 performance test
 ※Benchmark (Sequential Read & Write / default = 1MB)

2.5.1 Used LITE-ON LGT-128M6Gx2 in JBOD performance as below:



2.6 AS SSD Benchmark 1.7 performance test

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

2.6.1 Used LITE-ON LGT-128M6Gx2 in JBOD performance as below:

🚢 AS SSD Benchmark 1.7.4739.38088 – 🗖 💌					
File Edit View Tools Language Help					
C: ASMT109x- Volume					
ASMT109x- Volume 2143 5 storahci - OK 359424 K - OK 238.48 GB	Read:	Write:			
⊡ Seq	423.64 MB/s	308.99 MB/s			
☑ 4K	21.28 MB/s	51.30 MB/s			
☑ 4K-64Thrd	32.76 MB/s	80.15 MB/s			
☑ Acc.time	0.203 ms	0.073 ms			
Score:	96	162			
	312				
Start Abort					

2.7 ATTO Disk Benchmark performance test

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

2.7.1 Used LITE-ON LGT-128M6Gx2 in JBOD performance as below:

🗀 🛛 Untitled - ATTO Disk Benchmark 🗧 🗖 🗙		
File View Help		
Drive: [-c-] - Force Write Access	Direct 1/0	
Transfer Size: 0.5 V to 8192.0 V KB C I/O Comparison		
Total Length: 256 MB ▼	 Overlapped I/O Neither 	
	Queue Depth: 4 💌	
Controlled <u>by</u> :	,	
	Start	
<< Description >>	^	
]	~	
Test Results Write —— Read ——	Write Read	
0.5	22161 21120	
	42645 40501 77860 73252	
4.0	127524 127524	
	180869 193609 224778 277257	
32.0	259089 334707	
64.0	290316 379011 321126 399084	
256.0	327422 419900	
512.0	331401 462819	
1024.0	330585 467424 328965 448460	
4096.0	331401 445272	
8192.0	331401 433960	
0 50 100 150 200 250 300 350 400 45 TransferRate-MB/Sec	0 500	
For Help, press F1		

2.8 AnvilBenchmark_V110_B337

2.8.1 Used LITE-ON LGT-128M6Gx2 in JBOD performance as below:

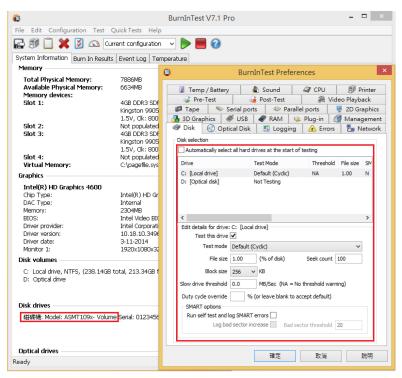
🔁 Anvil's Storage Utilities 1.1.0 (2014-January-1) – 🗖 🗙						
File Benchmarks	IOmeter System	n Info Settings	Test size 1GB	▼ Drive 🖃 c: []		✓ Screenshot Help
SSD Benchmark ASMT109x- Volume 256GB/2143 5						
Read	Resp. time	MB read	IOPS	MB/s		
Seq 4MB	10.2832ms	2,048.0	97.25	388.98		
4K	0.1939ms	251.8	5,156.41	20.14		
4K QD4	0.4762ms	410.2	8,400.48	32.81		975.09
4K QD16	1.9052ms	410.1	8,398.19	32.81	Run read	975.09
32K	0.2954ms	1,588.4	3,385.15	105.79		
128K	0.7747ms	2,422.8	1,290.84	161.36		1,961.49
Write	Resp. time	MB written	IOPS	MB/s	Run	1,961.49
Seq 4MB	13.0625ms	1,024.0	76.56	306.22		
4K	0.0849ms	461.0	11,783.26	46.03	Run write	986.40 986.40
4K QD4	0.1911ms	640.0	20,936.42	81.78	Hun write	380.40
4K QD16	0.7479ms	640.0	21,394.51	83.57		
Microsoft Windows 8	3.1 専業版 64 位元 Build	(9600)				ASMT109x- Volume 256GB/2143 5
Z97 Extreme6/P1.70, CPUSocket Intel(R) Core(TM) i5-4460 CPU @ 3.20GHz			Drives : Notes :			Drive C: 238.1/212.2GB free (89.1%) NTFS - Cluster size 4096B
Intel(H) Core(TM) IS-4460 CPO @ 3.20GH2 Memory : 7,886 MB			Notes .			Storage driver storahci
Professional Edition						Alignment 359424KB OK Compression 100% (Incompressible)
compression 200 /a (uncompressione)						

3. Burn In Tests and Results

- 3.1 BurnInTest v7.1 Pro
 - 3.1.1 system information for LITE-ON LGT-128M6Gx2 in JBOD as below:



3.1.2 show JBOD SSD test mode(default cyclic -- 10 ways cycle test)



3.1.3 show LITE-ON LGT-128M6Gx2 in JBOD 24-hour Burn-in test PASSED

6	BurnInTest V7.1 Pro	_ 🗆 🗡			
File Edit Configuration Test	t Quick Tests Help				
	🔛 🗐 🗋 💥 🛛 Current configuration 🔹 🍉 🗮 🕜				
System Information Burn In Res	uits Event Log Temperature				
Results for MINERVA					
Test configuration file: LastUse	d.bitcfg S	itatus: IDLE			
Start time: Sun Mar 22 10):39:05 2015 Stop time: Mon Mar 23 10:39:13 2015 D	Duration: 024h 00m 08s			
Test Name	Cycle Operations Errors Last Error Description				
	282 1.662 Trillion O No errors				
	BurnInTest test result	×			
	PASSE				
	FAJJL				
	OK				
View errors by categories					
Ready					

- 4. Summary
 - 4.1 R2096E is SATA III Interface, I/O speed, max. to 600MB/s.
 - 4.2 R2096E adapter I/O performance is based on M.2 NGFF SSD.