

# **AD910A** 效能与烧机老化测试 Rev 1.0

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## 3. 老化工具及测试结果

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AD910A 转接卡,內建 M.2(NGFF) B-key 连接器,及使用高效率电源转换的 PWM Power IC,可提供稳定的最大电流 3A 输入,足够供给高容量 M.2(NGFF) SSD 瞬间最大电流,避免造成数据读写错误,完全正确将 M.2(NGFF) SATA III SSD 转换成 SATA 7+15pin 标准接口。

### 2. 效能测试工具及测试结果

### 2.1 测试平台

主板:	ASUS P8P67
CPU :	Intel i5-2500, 3.3MHz/ 6G Cache/ 5GT
内存:	Kingston KVR1333D3N9K2/4G, 1333MHz,2GByte DIMM*2
电源供应器:	TC START W500, 500W ATX,12V V2.2 Power Supplier
显示适配器:	MSI R6700 / AMD HD 6700 Series
操作系统:	Microsoft Windows 7 64bit OS

## 2.2 测试标的物 AD910A 转接卡及所使用的 SSD(LITE-ON LGT-128M6G)





LITE-ON LGT-128M6G

2.3 安装硬件

将 LITE-ON 128GB SSD(LGT-128M6G), 插入 AD910A 转接卡的 M.2 B-key 连接器中, 然后利用铜柱及螺丝固定 SSD, 再将转接卡上的 SATA 7pin 连接到 P8P67 主板 SATA III Port。

### 2.4 BIOS & WIN 7 OS 环境设定

#### 2.4.1 进入 BIOS(Basic Input /Output Setup)—改变 IDE 模式到 AHCI 模式

CMOS Setup Uti	ility – Copyright (C) 1984-2010 Aw Integrated Peripherals	ard Software	BIOS SETUP UTILITY	
eXtreme Hard Drive (X	HD) [Disabled]	Item Help	Storage Configuration	Options
PCH SATA Control Mod SATA Part-3 Native Mo USB Controllens USB Lagery Functi Turbo SATA3/USB3 Azaila Codec Onboard H/W LAN Green LAN Onboard LAN Boot Onboard USB 3.0 C Onboard IDE Contr aSTA7 Controller	e [IDE] de [Enabled] [Enabled] PCH SATA Control Mode IDE[] RAID(XHD)[] AHCL[+]	Menu Level Osc SATA mode E bie SATA as Function TD(XHD); bie SATA as D(XHD); function To(XHD) Function To(XHD) Function	SATA configuration [Enhanced] Configure SATA as [IDE] Hard disk Write Protect [Disabled] IDE Detect Time Out (Sec) [35] IDE RAID AHCL	IDE RAID AHCI ↑↓ Select Screen ↔ Select Item
* cSATA Ctrl Mode GSATA Controller * GSATA Ctrl Mode * GSATA RAID Config	ti: Move Enter : Accept ESC : Abort	ble SATA as I Function	· · · · · · · · · · · · · · · · · · ·	Enter Go to Sub Screen F1 General Help F10 Save and Exit ESC Exit
time: Move Enter: Sele F5 : Previous Value	ct +/-/PU/PD: Value F1 : Save ESC: F es F6 : Fail-Safe Defaults F7 : Optin	xit F1: General Help nized Defaults	v02.61 (C) Copyright 1985-2009, American M	egatrends, Inc.

2.4.2 分割区对齐与读写对齐

Windows XP 和 Windows Server2000/2003 操作系统延续早期 IBM DOS 启动 扇区,定义地址在 31.5KB 起始偏移地址(Offset)。由于这种限制,磁丛(Cluster) 的数据分散在物理闪存的边界,引起读 - 修改 - 写不顺利。其结果是,当主机 发送数据到 SSD 时,闪存控制器必须写入高于数据 200%的数据发送到 SSD,造成效率低落。

当选择一个 Partition 分割区起始偏移,存储系统的建议,系统最好可将 partition offset 整除 RAID Stripe size 和 Cluster 的大小,以达到最佳的 SSD I / O 性能。下面的图表示出未对齐的分区偏移和用于 Windows Server 对齐的分区偏移量的 一个例子。



### **Misaligned Partition vs. Aligned Partition**

			AC CCD Panchmark 17 472	00.000	
AS SSD Benchmark 1.7.4739.	38088		AS SSD Benchmark 1.7.475	9.56066	
File Edit View Tools	Language Help		File Edit View Tool	s Language Help	
G: MINERVA-Mercury PRO(64GB	5) ATA Device 🔻		E: WDC WD5000AACS-00ZUE	30 🔻	
MINERVA-Mercury	Read:	Write:	WDC	Read:	Write:
1916			01.0 inShar OK 出田	21V PAD	
1024 K - OK	.024K - OK			SIK - DAD	
59.62 GB	表示分割區對齊, 可提	是升SSD 效率	465.76 GB 表示	分隔區沒有對齊,將影	響SSD效率
Sea	MB/s	MB/s	Seq	MB/s	MB/s
				MD/e	MD/a
☑ 4K	MB/s	MB/s	⊻ 4n	IVID/S	IVID/S
☑ 4K-64Thrd	MB/s	MB/s	4K-64Thrd	MB/s	MB/s
A			Acc time	me	me
Acc.time	ms	ms	Acc.ume	1115	1115
Score <sup>.</sup>			Score:		
	-				the second se
Sta	rt	Abort	Sta	rt	Abort
54		*****			

#### ※使用 AS SSD Benchmark 程序判断是否对齐

### ※使用 AS SSD Benchmark 程序判断使用哪一家厂商提供的 AHCI Driver

	File Edit View Tools		
		Language Help	
	E: WDC WD5000AACS-0020B	u •	
MINERVA-Mercury 1916 msahci - OK 1024 K - OK 59.62 GB			Write:
MB/s	☑ Seq	MB/s	MB/s
MB/s	☑ 4K	MB/s	MB/s
MB/s	4K-64Thrd	MB/s	MB/s
ms	Acc.time	ms	ms
	Score:		
Abort	Star	t	Abort
	Write:	Write:       WDC WD5000AACS-00ZUB         WDC       010         010       Isstor-OK         010       Isstor-OK	E: WDC WD5000AACS-00ZUB0         WDC       Read:         01.0       isstor-OK         isstor-OK       使用Intel AHCI Driver         465.76 GB       MB/S         MB/S       4K         MB/S       4K         MB/S       Acc.time         ms       Score:         Score:       Image: Core in the

2.4.3 WIN 7 格式化成 NTFS 模式,储存装置没有安装任何程序 由于 FAT32 之前版本的 FAT,不支持 NCQ,建议格式化成 NTFS 档案配置模式 何谓原生指令队列(NCQ-- Native Command Queuing)? 原生指令队列 (NCQ) 是进阶主机控制器接口 (AHCI) 的一种功能,可以让 ATA 磁盘驱动器一次接受多个指令并动态重新排列指令,以达到最高的效率。 NCQ 若搭配支持 NCQ 的硬盘机共同使用,可以提高随机工作负载的储存效能。

# 2.4.4 AHCI 支持 Queue Command 队列命令AHCI 队列命令协议允许每颗 SSD 最大包含 32 组命令,所以 QD 是 32。

2.4.5 SSD 快取写入设定启动 Windows 7 系统磁盘高速缓存写入设定。

### 2.5 SSD 读写效能高低表现影响因素

- 2.5.1 效能表现高低与 SSD 主控 Controller IC 有关
- 2.5.2 效能表现高低与所使用的 NAND Flash IC 有关
  - 2.5.2.1 使用 Toggle DDR mode 或 ONFI 同步 NAND Flash IC,效能表现佳。
  - 2.5.2.2 如使用**传统异步或是 SDR NAND Flash IC**,效能表现非常差(市售的入门款 SSD,大多采用此种 Flash)。

建议:

使用原厂主板提供的原生 SATA III, 6Gb/s Port 测试,能提供比较正确数据。 若使用主板外挂 SATA III 主控芯片所提供 6Gb/s Port,或是 SATA to PCI-e 适配卡所提供 6Gb/s Port,往往测试出来的数据会比原生 SATA III Port 低。

### 2.6 CrystalDiskMark 3.0.1 x64 效能测试

※Benchmark (Sequential Read & Write / 使用默认值 block size = 1MB )

2.6.1 使用 LITE-ON 128GB SSD(LGT-128M6G)效能表现如下:



# 2.7 AS SSD Benchmark 1.7 效能测试

※Benchmark (Read & Write by MB/s, 使用默认值 block size = 16MB)
2.7.1 使用 LITE-ON 128GB SSD(LGT-128M6G) 效能表现如下:

🚔 AS SSD Benchmark 1.7.4739.38088						
File Edit View Tools	File Edit View Tools Language Help					
LITEONIT LGT-128M6G DG7R iaStor - OK 1024 K - OK 119.24 GB	Read:	Write:				
I Seq	495.02 MB/s	266.04 MB/s				
☑ 4K	25.75 MB/s	50.44 MB/s				
☑ 4K-64Thrd	297.15 MB/s	262.75 MB/s				
Acc.time	0.068 ms	0.074 ms				
Score:	372	340				
	90	00				
::						
Star	Start Abort					

# 2.8 HD Tune Pro 5.5 效能测试

※Benchmark (Sequential Read, 使用默认值 block size = 8MB)

2.8.1 使用 LGT-128M6G formatted sequential Read 效能表现如下:



# 2.9 ATTO Disk Benchmark V2.47 效能测试

2.9.1 使用 LITE-ON 128GB SSD(LGT-128M6G) 效能表现如下:

🚔 Untitled - ATTO Disk Benchmark	
File View Help	
Drive: [-d-]  Force Write Access	Direct I/O
Transfer Size: 0.5 💌 to 8192.0 💌 KB	I/O <u>C</u> omparison
Total Length: 256 MB	Overlapped I/O Neither
	eue Depth: 4 🔻
Controlled by:	
<b>_</b>	Start
<< Description >>	*
	-
Test Results	
Write Read	Write Read
0.5	32175 34944
1.0	59648 67072
	108550 109604
8.0	221806 290963
16.0	259522 364216
32.0	299704 403779
64.0	322677 495103
128.0	327422 501276
256.0	318827 522241
512.0	319566 527637
1024.0	319566 528936
4000.0	319566 531555
8192.0	319566 519971
0 100 200 300 400 500 600 700 800 900 1 Transfer Rate - MB / Sec	000
For Help, press F1	NUM

# 2.10 AnvilBenchmark\_V110 效能测试

### 2.10.1 使用 LITE-ON 128GB SSD(LGT-128M6G) 效能表现如下:

🙆 Anvil's Storage l	🔁 Anvil's Storage Utilities 1.1.0 (2014-January-1)					
File Benchmark	s   IOmeter   System	Info Settings	Test size 1GB	▼ Drive ■ d: [新 <sup>‡</sup>	曾磁碟區	▼ Screenshot Help
SSD Benchma	ark					LITEONIT LGT-128M6G 128GB/DG7R
Read	Resp. time	MB read	IOPS	MB/s		
Seq 4MB	8.0742ms	2,048.0	123.85	495.40		
4K	0.1446ms	337.7	6,915.90	27.02		
4K QD4	0.1447ms	1,349.9	27,645.06	107.99		1,750.54
4K QD16	0.2356ms	3,315.4	67,898.80	265.23	Run read	1,750.54
32K	0.2784ms	1,684.4	3,591.55	112.24		
128K	0.7206ms	2,603.4	1,387.82	173.48		3,587.69
Write	Resp. time	MB written	IOPS	MB/s	Run	3,587.69
Seq 4MB	12.9805ms	1,024.0	77.04	308.16		
4K	0.0690ms	565.9	14,488.00	56.59	Durit	1,837.15
4K QD4	0.0847ms	640.0	47,256.84	184.60	Run write	1,037.13
4K QD16	0.2504ms	640.0	63,899.97	249.61		
Microsoft Window P8P67/1502, LGA Intel(R) Core(TM) is Memory : 4,073 Professional Editi	Microsoft Windows 7 旗艦版 64-bit Build (7600) P8P67/1502, LGA1155 Intel(F) Core(TM) I5-2500 CPU @ 3.30GHz Memory : 4,073 MB Professional Edition		Drives : Notes :			LTFEONIT LGT-128M6G 128GB/DG7R Drive D: 119.2/119.1GB free (99.9%) NTFS - Cluster size 4096B Storage driveriaStor 10.5.0.1026 Alignment 1024KB OK Compression 100% (Incompressible)

3. 老化工具及测试结果

## 3.1 BurnInTest v7.1 Pro 老化烧机测试

# 3.1.1 系统信息如下:

👸 BurnInTest V7.1 Pro			ĸ
File Edit Configuration Tes	t Quick Tests Help		
🖬 🎒 📋 💥 🚺 🛆 Curre	ent configuration 🔻 խ 📕 🥝		
System Information Burn In Results	Event Log Temperature		
Graphics			
AMD Radeon HD 6770			
Chip Type:	ATI display adapter (0x68BA)		
DAC Type:	Internal DAC(400MHz)		
BIOS:	113.4036900.103		
Driver provider:	ATL Technologies Inc.		
Driver version:	8.820.0.0		
Driver date:	1-12-2011		
Monitor 1:	1920x1080x32 60Hz (Primary monitor)		
Disk volumes			
C: Local drive INTES (59 53GB tot	al 41 DECR free)		
Disk drives			
磁碟機· Model: LITEONIT LGT-128M	466 Serial: 002317113853 (Dick: 0, Size: 118-2468, Volumec: N/A)	-	
磁碟機: Model: Effectivit Editization	Serial: 0000000121009082940 (Disk: 1, Size: 59.62GB, Volumes: C)	Ser 1	
Ontical drives			
opacaramos		$\bigcirc$	
		6	
Network			=
Realtek PCIe GBE Family Controller	(Speed: 100Mb/s) (MAC: BC:AE:C5:78:0B:C1)		-
		2	
Ports			
通訊連接埠:	COM1 - RS232 Serial Port (max Baud rate: 115200)		-
Paady	DD/2 connector	102	-
Reauy			đ

3.1.2 使用 BurnInTest v7.1 Pro 软件测试老化-磁盘测试模式(十种方式循环测试)

File       Edit       Configuration       Test       Image: Second S	👸 BurnInTest V7.1 Pro	
Image: Second Sector Second Second Second Second Sector Sector Second Sector	File Edit Configuration Test Qu	BurnInTest Preferences
AMD Radeon HD 6770         Chip Type:       ATT dt         DAC Type:       Intern         Memory:       1024W         BOS:       1134A         Driver provider:       ATT dt         Driver version:       0.820         Disk drives       112-24         Montor 1:       1920x         Disk drives       102-1128M6G Serier         BHRMR: Model: LITEONIT LGT-128M6G Serier       Not Testing         Disk drives       Test this drive ?         Edit details for drive: 00: [Physical disk raw]       Test this drive ?         Test this drive ?       Test this drive ?         File size 1.00       (% of disk)       Seek count 100         Block size 32        KB         Slow drive 0.0       MB/Sec (NA = No threshold         Duty cycle override       % (or leave blank to accept default)         SMART options       Run self test and log SMART errors       Bad sector 20         Ports       Doty for the set the set the set and log SMART errors       Bad sector 20	System Information Burn In Results Event I Graphics	Sound     Image: CPU     Image: Pre-Test     Image: Pre-Tes
Driver version:       ATI TE         Driver version:       0.820         Driver version:       0.820         Driver version:       0.224         Monitor 1:       112-24         Monitor 1:       1920x         Disk volumes       C: Local drive, NTFS, (59.53GB total, 41.0         C: Local drive, NTFS, (59.53GB total, 41.0       Not Testing         Disk drives       Edit details for drive: 00: [Physical disk raw]         Edit details for drive: 00: [Physical disk raw]       Test this drive V         Edit details for drive: 00: [Physical disk raw]       Test this drive V         Test mode       Default (Cyclic)         Optical drives       File size 1.00         Network       Realtek PCIe GBE Family Controller (Speed:         Realtek PCIe GBE Family Controller (Speed:       SMART errors         Log bad sector increase       Bad sector 20         Ports       Codi State 100	AMD Radeon HD 6770           Chip Type:         ATI dit           DAC Type:         Intern           Memory:         1024M           BIOS:         113-A	Optical Disk      Disk Copy Disk selection     Automatically select all hard drives at the start of testing
Disk drives         B酸树根: Model: LITEONIT LGT-128M6G Ber         B酸树根: Model: M4-CT064M4SSD2 Serial: 01         Optical drives         Disk drives         Optical drives         Disk drives         Block size         32 V KB         Slow drive         Duty cycle override         % (or leave blank to accept default)         SMART options         Run self test and log SMART errors         Log bad sector increase         Bad sector 20	Driver provider:         ATI Tr           Driver version:         8.820.           Driver date:         1-12-2           Monitor 1:         1920x           Disk volumes         C:           C:         Local drive, NTFS, (59.53GB total, 41.0	Drive         Test Mode         Thres         File         SMART:           00:         [Physical disk raw]         Default (Cyclic)         NA         1.00         N           C:         [Local drive]         Not Testing         Vot Testing         Vot Testing         Vot Testing
Network       Slow drive       0.0       MB/Sec. (NA = No threshold         Network       Duty cycle override       % (or leave blank to accept default)         SMART options       Run self test and log SMART errors         Log bad sector increase       Bad sector         Bailigkge:       COM1         Marken Dette       Drive	Disk drives 超磁機: Model: LITEONIT LGT-128M6G Ser 磁磁機: Model: M4-CT064M4SSD2 Seria: 01 Optical drives	It is a constraint of the set
Polity 通訊连接堆: COMI Fundmand Dust: DC/1 描示 ED/2	Network Realtek PCIe GBE Family Controller (Speed:	Slow drive 0.0 MB/Sec (NA = No threshold Duty cycle override % (or leave blank to accept default) SMART options Run self test and log SMART errors Log bad sector increase Bad sector 20
Peady HELL HX/H DX/H	Purts 通訊建接埠: COM1 Factorated Baset: DC/3	確定 取消 說明

3.1.3 使用 BurnInTest v7.1 Pro 软件测试老化-时间是 24 小时



- 4. 后记
  - 4.1 M.2(NGFF) SSD 是 SATA III 接口, 读写效能理论值,最高为 600MB.
  - 4.2 AD910A 转接卡读写效能高低,是由 M.2 (NGFF)SSD 决定.