

ST4000NM0033

Test Report

Initiated by	River Lin	Approved by	Jackie Wang
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Revision History :

Date	Revision	Description	Creator
2014/08/14	V1.0	The First version released.	River lin
2014/8/22	V1.1	Update P/N : 96HD4TB-ST-SG7KE	River.lin

Test Results Definition :

Criteria	Definition
PASS	Test result pass and function work perfectly.
Fail	Test fail or can not meet the spec requirement.
Limitation	There are no plans to fix this function.
N/A	Spec not support or driver not ready.
No Test	No test tool or device or FW not ready, please write reason to the "Remark".

Test Results Summary :

Num.	Test Item	Result	Remark
Chapter 1	Function Test		
1.01	HDD Function Test	PASS	
1.02	SATA IDE Mode Test	PASS	
1.03	SATA AHCI Mode Test	PASS	
Chapter 2	Software Compatibility Test		
2.01	OS and Driver Install Test	PASS	
Chapter 3	Hardware Compatibility Test		
3.01	CPU Board Compatibility Test	PASS	
3.02	RAID Card Compatibility Test	PASS	
Chapter 4	System Reliability Test		
4.01	Power On/Off Test	PASS	
4.02	Warm Boot Stress Test	PASS	
4.04	Full System, I/O Integrated Stress Test	PASS	
Chapter 5	System Performance Test		
5.01	HDD Performance Test	PASS	
5.02	RAID Card and HDD Performance Test	PASS	

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Product Information :

Item.	Description.
Advantech Part Number	96HD4TB-ST-SG7KE
Manufacturer	Seagate
Model Number	ST4000NM0033
Form Factor	3.5"
Interface	Serial ATA SATA
Capacity	4TB
Spindle Speed	7200 rpm
Host Transfer Rate	6GB
Bytes Per Sector	512
Annualized Failure Rate(AFR)	0.63
Mean Time Between Failure (MTBF)	1,400,000hours
Power On Hour(POH)	8760
Voltage Tolerance	+5.0V \pm 5%, +12.0V \pm 5%,
Operating Temperature	-40°C to 70°C
Firmware	0001
Country of Origin	China
Dimension (LxWxH)	147.mm x 101.6mm x26.1mm
RoHS Status (Yes/No)	Yes

Platform Configuration:**AIMB-582W**

Item.	Description.
M/B Name	AIMB-582WG2
PCB Version.	A101-2
BIOS Version.	W582J03
CPU Model/Info	Intel® E3 1275 3.5GHz
Memory Type/Info/Size	DDR3 1333G*2
PCH Chipset	C216
Graphic Controller	Intel ® HD Graphics
Audio Codec	ALC892
LAN1 Controller	Intel ® 82583V
LAN2 Controller	Intel ® 82579LM

AIMB-503L

Item.	Description.
Project Name.	AIMB-503L
PCB Version.	A101-3
BIOS Version.	A503X009
CPU Model/Info	Intel® i5-4670S 3.1GHz
Memory Type/Info	DDR3 1333G*2
PCH Chipset	Intel H81 PCH
Graphic Controller	Intel HD Graphic
Audio Codec	ALC892
LAN1 Controller	Realtek 8111E
LAN2Controller	Realtek 8111E

AIMB-584

Item.	Description.
Project Name.	AIMB-701VG
PCB Version.	A101-3
BIOS Version.	A701X313

CPU Model/Info	Intel® i7-2600 3.40GHz
Memory Type/Info	DDR3 1333G*2
PCH Chipset	Intel H61 PCH
Graphic Controller	Intel HD Graphic
Audio Codec	ALC892
LAN1 Controller	Intel® 82579V


AIMB-784

Item.	Description.
Project Name.	AIMB-784
PCB Version.	A101-3
BIOS Version.	A784X018
CPU Model/Info	Intel® i7-4770S 3.1GHz
Memory Type/Info	DDR3 1333G*2
PCH Chipset	Intel Q87 PCH
Graphic Controller	Intel HD Graphic
Audio Codec	ALC892
LAN1 Controller	Intel® I217
LAN2Controller	Intel® I211

Test Programs :

Test Program	Version
CrystalDiskMake	V3.0.3
ATTO Disk	V2.46
Anvil's Storage Utilities	V1.1.0.337
HD Tune Pro	V5.5
Passmark performance	V8.0 build1031
I/OMETTER	2004.07.30
PassMark Burn-In Test Pro	V7.1 build 1017
PassMark Rebooter	V1.3 build 1004
PassMark Sleeper	V2.3 build 1009
Power on/off	V3.3

Test Equipments :

Model	Description
Power on/off test equipment (ATX/AT)	

Chapter 1 : Function Test

1.01 HDD Function Test

1.01.01.01 Test Purpose :

The purpose of SATA test is to analyze and validate the functional \ performance capabilities \ quality and stability.

1.01.01.02 Test Standard :

Please refer to the Project Hardware and BIOS specification.

1.01.01.03 Test Tool :

1. SATA cable
2. SATA HDD
3. SATA DVD-ROM

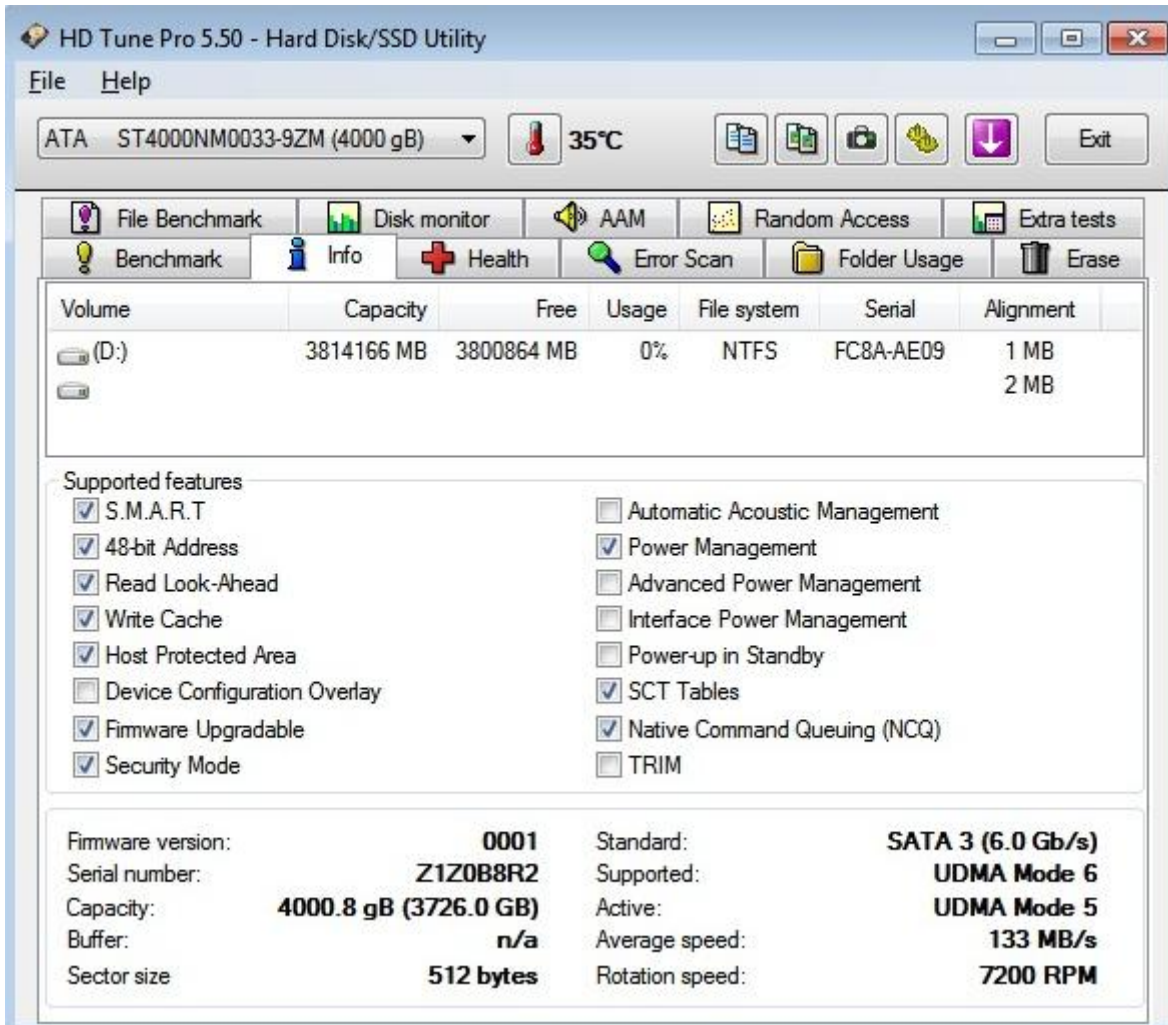
1.01.01.04 Test Criteria :

1. The BIOS must detect SATA devices information.
2. The SATA function can install OS and work well on OS without hang, restart, or blue screen or any problems.
3. The Device Management can not have any exclamation point and question mark.
4. Mark sure pass w/program without any error occurs.

1.01.01.05 Test Procedure :

1. Insert SATA HDD and DVD-ROM into the DUT
2. The BIOS detect SATA port HD correct information.
3. Install OS and all drivers.
4. SATA HDD can be copy/del/read/write file.
5. Install the PassMark BurnIn Pro program, and setting :
 - (a) Select tests to perform and their duty cycle: Select Disk(s) and Optical Drive(s)/ 100% Loading/Auto Stop After : 30Minutes.
 - (b) Set test preferences: Select "Disk"-> Select Test this drive/ set File size: 15(% of disk), other setting value keep defaults Preference.
 - (c) Then Press "Start selected tests" for test.
6. After finished testing, the test result will show on screen.
7. Change other port, and repeat 1~6.

1.01.01.06 Test Data :



Test Item	Description	Result	Remark
Post information	POST should show the correct model name	PASS	
BIOS information	BIOS detect correct information	PASS	
Device Manager	Device Management can not have any exclamation point and question mark, and detect correct information	PASS	
Install OS & driver	Can install OS and driver	PASS	
SATA Port	Mark should all SATA port can detect and reboot shutdown	PASS	
RAID Card	Mark should all SAS port of RAID can detect and reboot shutdown	PASS	
BurnIn	Running passmark 30mins	PASS	

1.02 SATA IDE Mode Function Test

1.03.01.01 Test Purpose :

The purpose of this test is to ensure the functional of the SATA IDE Mode.

1.03.01.02 Test Standard :

Please refer to the Project Hardware and BIOS specification

1.03.01.03 Test Tools :

1. SATA HDD
2. SATA DVD-ROM
3. PassMark Burn In test Pro

1.03.01.04 Test Criteria :

1. The BIOS Setting IDE mode for DUT.
2. DUT must install OS and all drivers for IDE mode without any problems or error occurs.

1.03.01.05 Test Procedure :

1. Plug SATA HDD and DVD-ROM into DUT.
2. Setting IDE mode of SATA Mode on BIOS.
3. To install OS and drivers.
4. Install PassMark BurnIn Pro program and run 30min. After finished testing, the result will show on screen.
5. Enter S1 mode, the system should be resume from S1 mode. This can work properly, and repeat 3times.
6. Enter S3 mode, the system should be resume from S3 mode. This can work properly, and repeat 3times.
7. Enter S4 mode, the system should be resume from S4 mode. This can work properly, and repeat 3times.
8. Enter Start-> shutdown on OS, then press power button turn on and boot into OS of DUT. This can work properly, and repeat 3times.
9. Enter Start-> restart on OS, then boot into OS of DUT. This can work properly, and repeat 3times.

1.03.01.06 Test Data :

Test Item	Description	Result	Remark
SATA IDE Mode	Win7 Ultimate SP1_X86 Installation Test.	PASS	
	Win8.1 Pro_X86 Installation Test.	PASS	
	ACPI S4 Mode	PASS	
	OS shut down	PASS	
	Warm Boot Test.	PASS	

1.03 SATA AHCI Mode Function Test

1.03.01.07 Test Purpose :

The purpose of this test is to ensure the functional of the SATA AHCI Mode.

1.03.01.08 Test Standard :

Please refer to the Project Hardware and BIOS specification

1.03.01.09 Test Tools :

1. SATA HDD
2. SATA DVD-ROM
3. PassMark Burn In test Pro
4. Intel F6 Install Floppy Driver or AHCI driver on USB flash disk.

1.03.01.10 Test Criteria :

1. The BIOS Setting AHCI mode for DUT.
2. DUT must install OS and all drivers for AHCI mode without any problems or error occurs.

1.03.01.11 Test Procedure :

1. Plug SATA HDD and DVD-ROM into DUT.
2. Setting AHCI mode of SATA Mode on BIOS.
3. To install OS and drivers, during install process, need to upload AHCI driver from Floppy or USB flash disk.
4. Install PassMark BurnIn Pro program and run 30min. After finished testing, the result will show on screen.
5. Enter S1 mode, the system should be resume from S1 mode. This can work properly, and repeat 3times.
6. Enter S3 mode, the system should be resume from S3 mode. This can work properly, and repeat 3times.
7. Enter S4 mode, the system should be resume from S4 mode. This can work properly, and repeat 3times.
8. Enter Start-> shutdown on OS, then press power button turn on and boot into OS of DUT. This can work properly, and repeat 3times.
9. Enter Start-> restart on OS, then boot into OS of DUT. This can work properly, and repeat 3times.
10. Setting Enabled Hot Plug SATA Port on BIOS.
11. The DUT SATA should be Hot Plug and work properly, and repeat 3times.

1.03.01.12 Test Data :

Test Item	Description	Result	Remark
SATA AHCI Mode	Win7 Ultimate SP1_X64 Installation Test.	PASS	
	Win8.1 Pro_X64 Installation Test.	PASS	
	ACPI S4 Mode	PASS	

	OS shut down	PASS	
	Warm Boot Test.	PASS	
	Hot Plug	PASS	

Chapter 2 : Software Compatibility Test

2.01 OS and Driver Install Test

2.01.01.01 Test Purpose :

The purpose of this test is to ensure the OS compatibility of the DUT.

2.01.01.02 Test Standard :

Please refer to the Project Hardware and BIOS specification

2.01.01.03 Test Tools :

1. Microsoft OS installation DVD depends on X86/X64.

2.01.01.04 Test Criteria :

1. The OS X86/X64 installation process must complete without any error occurs.
2. The Server OS X86/X64 installation process must complete without any error occurs.
3. Device Management can not have any exclamation point and question mark.

2.01.01.05 Test Procedure :

1. Plug OS DVD or Server OS into DVD-ROM, and start install follow installation process.
2. After finish OS install, install all drivers for the DUT.
3. Make sure drivers of the DUT can install, and device management can not have any unknown device.

2.01.01.06 Test Data :

Test Item	Description	Result	Remark
Win7 Ultimate SP1 x86	OS Installation – English.	PASS	
	Driver Installation.	PASS	
	Device Management Check.	PASS	
Win7 Ultimate SP1 x64	OS Installation – English.	PASS	
	Driver Installation.	PASS	
	Device Management Check.	PASS	
Win8.1 Pro x86	OS Installation – English.	PASS	
	Driver Installation.	PASS	
	Device Management Check.	PASS	
Win8.1 Pro x64	OS Installation – English.	PASS	
	Driver Installation.	PASS	
	Device Management Check.	PASS	
Win Server_2008 R2 SP1 Enterprise_x64	OS Installation – English.	PASS	
	Driver Installation.	PASS	

	Device Management Check.	PASS	
Win Server 2012 Standard_x64	OS Installation – English.	PASS	
	Driver Installation.	PASS	
	Device Management Check.	PASS	

Chapter 3 : Hardware Compatibility Test

3.01 CPU Board Compatibility Test

3.01.01.01 Test Purpose :

The purpose of this test is to validate and ensure the CPU Board compatibility of the DUT.

3.01.01.02 Test Standard :

Please refer to the Project Hardware specification and BIOS specification.

3.01.01.03 Test Tools :

1. Different Chipsets of CPU Board

3.01.01.04 Test Criteria :

1. With a different CPU board connected. The DUT must PASS without any error occurs.
2. BIOS must detect current information
3. Device Management can not have any exclamation point and question mark.

3.01.01.05 Test Procedure :

1. Connect to CPU board and power on.
2. The system should be detected HDD, then install OS and drivers for this.
3. Confirm the all kinds of CPU board should work properly.

3.01.01.06 Test Data :

Test Item			Description	Result	Remark
CPU board	BIOS version	PCB Version	OS install		
AIMB-582W	W582XJ03	A101-2	Win7/Win8.1	PASS	
AIMB-503L	A503X009	A101-3	Win7/Win8.1	PASS	
AIMB-701	A701X313	A101-3	Win7/Win8.1	PASS	
AIMB-784	A784X018	A101-3	Win7/Win8.1	PASS	

3.02 RAID Card Compatibility Test

3.02.01.01 Test Purpose :

The purpose of this test is to validate and ensure the RAID Card compatibility of the DUT.

3.02.01.02 Test Standard :

Please refer to the Project Hardware specification and BIOS specification.

3.02.01.03 Test Tools :

1. Different Chipsets of RAID Card

3.02.01.04 Test Criteria :

1. With a different RAID Card connected. The DUT must PASS without any error occurs.
2. BIOS must detect current information
3. Device Management can not have any exclamation point and question mark.

3.02.01.05 Test Procedure :

1. Connect RAID Card into CPU board and power on.
2. Creative RAID 0 and 1 mode on RAID Card FW.
3. The system should be detected HDD, then install OS and drivers for this.
4. Confirm the all kinds of RAID Card should work properly.

3.02.01.06 Test Data :

Test Item		Description			Result	Remark
Type	Brand Name	Model	Interface	Advantech PN		
SAS/RAID8 internal port	Adaptec	ASR-6805 (512MB)	PCI-E X8	96RC-SAS-8P-PE-ADc	PASS	
SATA/SAS/RAID 8PORT 6GB/S	LSI	9260-8i	PCI-E X8	96RC-SAS-8P-PE-LS1	PASS	

Chapter 4 : System Reliability Test

4.01 Power On/Off Test

4.01.01.01 Test Purpose :

The purpose of this test is to examine and validate the stability of the Power On/Off and AT mode under Windows OS.

4.01.01.02 Test Standard :

Please refer to the Project Hardware specification and BIOS specification

4.01.01.03 Test Tools :

1. Power on/off test equipment.
2. Power on/off Program

4.01.01.04 Test Criteria :

1. The test must PASS the Power on / off circling test \geq 100 times, booting rate = 100%
2. The DUT must maintain a stable condition without any system crash, hang, blue screen or any problems.
3. The system must have no any error w/ Program.

4.01.01.05 Test Procedure :

1. Connect Power on/off test equipment to DUT for Power on/off test
2. Make sure PSON1 or HW Jumper set as ATX Mode.
3. Make sure BIOS item: After AC power Failure MUST set as "Always Off".
4. Install and execute Power on/off Program, and setting Timer : hr/min/sec on DUT.
5. Setup testing time, and change to zero of run number on Power on/off test equipment.
6. Start power on/off test and pass over 10 times.

4.01.01.06 Test Data :

Test Item	Description	Result	Remark
Power On/Off test (ATX mode)	1. BIOS item: After AC power Failure set as "Always Off" 2. H/W jumper set as ATX mode 3. Test at room temperature for 10 duration cycles 3. Booting rate = 100%	PASS	

4.02 Warm Boot Stress Test

4.02.01.01 Test Purpose :

The purpose of this test is to analyze and validate the functional performance capabilities, quality and stability of DUT warm boot capability.

4.02.01.02 Test Standard :

Please refer to the Project Hardware specification and BIOS specification

4.02.01.03 Test Tools :

1. PassMark Rebooter

4.02.01.04 Test Criteria :

1. The test must PASS the Reboot circling test ≥ 10 times, booting rate = 100%
2. The DUT must maintain a stable condition without any system crash, hang, blue screen or any problems.
3. The system must have no any error w/ Program.

4.02.01.05 Test Procedure :

1. Install PassMark Rebooter program.
2. Executing program, and setting
 - (a) Maximum reboots 10 cycles.
 - (b) Delay Time Out setting before each reboot: 20~25 sec.
 - (c) Enabled Auto load Rebooter at startup.
3. Then start test Cycle.

4.02.01.06 Test Data :

Test Item	Description	Result	Remark
Windows 7 Ultimate SP1 X64	1.Run PassMark Rebooter V1.3 Build1004 2. Must PASS for 10 duration cycles. 3.Time Out Before reboot:10-25secs 4. Booting rate =100%	PASS	

4.03 Full System, I/O Integrated Stress Test

4.03.01.01 Test Purpose :

The purpose of this test is to examine and validate the quality and stability all IO of the DUT.

4.03.01.02 Test Standard :

Please refer to the Project Hardware specification and BIOS specification

4.03.01.03 Test Tools :

1. PassMark BurnIn Pro

4.03.01.04 Test Criteria :

1. The Full loading test must PASS run over 12hours
2. The DUT must maintain a stable condition without any system crash, hang, blue screen, restart or any other problems.
3. The system must have no any error w/ PassMark BurnIn Pro Program.

4.03.01.05 Test Procedure :

1. Insert tool into all of IO port on DUT.
2. Install PassMark BurnIn Pro program.
3. Executing BurnIn test, and setting :

- (a) Select tests to perform and their duty cycle: Setp Auto Stop “720” Minutes, select need to test items
- (b) Set test preferences: setup need to setting items.
- (c) All setting finish, press “Start selected tests” for test.

4. The DUT run program over 12hours.

4.03.01.06 Test Data :

I/O Integrated Stress Test: Windows 7 Ultimate SP1 X64

Test Item	Description	Result	Remark
CPU	100% Loading	PASS	
RAM	100% Loading	PASS	
VIDEO	100% Loading	PASS	
2D Graphics	100% Loading	PASS	
3D Graphics	100% Loading	PASS	
SATA1	SATA HDD Seagate ST3250312AS File system: NTFS	PASS	
RAID Card	SAS/RAID8 internal port Adaptec ASR-6805 (512MB) PCIEX8	PASS	

Test Item	Description	Result	Remark
CPU	100% Loading	PASS	
RAM	100% Loading	PASS	
VIDEO	100% Loading	PASS	
2D Graphics	100% Loading	PASS	
3D Graphics	100% Loading	PASS	
SATA1	SATA HDD Seagate ST3250312AS File system: NTFS	PASS	
RAID Card	SAS/RAID8 internal port LSI 9260-8i PCIEX8	PASS	

Chapter 5 : System Performance Test

5.01 HDD Performance Test

5.01.01.01 Test Purpose :

The purpose of this test is to ensure the HDD performance of the DUT.

5.01.01.02 Test Standard :

Please refer to the Project Hardware specification and BIOS specification.

5.01.01.03 Test Tools :

1. CrystalDiskMark
2. ATTO Disk Benchmark
3. HDD Tune Pro
4. Anvil's Storage Utilities
5. Passmark performance
6. I/OMETER

5.01.01.04 Test Criteria :

1. Executing the Benchmark Test default item of CrystalDiskMark
2. Executing the Benchmark Test of AS AUTO Disk Benchmark
3. Executing the Benchmark Test HDD Benchmark of Anvil's Storage Utilities
4. Executing the Benchmark Test HDD Tune Pro Benchmark
5. Executing the Benchmark Test Disk of Passmark performance
6. Executing the Benchmark Test Disk of I/O Meter

5.01.01.05 Test Procedure :

1. Install and execute CrystalDiskMark, setting “need to test HDD” and press “All” start test.
2. Install and execute ATTO Disk Benchmark, setting Drive “need to test HDD” and press “Start” for test.
3. Install and execute HD Tune Pro Benchmark, setting “need to test HDD” and “Read” press “Start” for test.
4. Install and execute HD Tune Pro Benchmark, setting “need to test HDD” and “Write” press “Start” for test.
5. Install and execute Anvil's Storage Utilities, setting SSD Benchmark and “need to test HDD” then start test.
6. Install and execute Passmark performance, setting Disk and “need to test HDD” then pres”All” start test.
7. Install and execute of I/O Meter, setting PHYSICAL Drive and Disk Worker, then start test.
8. Record all of test results.

5.01.01.06 Test Data :

HDD Performance (OS: Win7 Ultimate SP1 X64)									
Test Item and Software	Comment / (unit)	MIO -5290	MIO -5271	SOM -5894	AIMB -582W	AIMB -584	AIMB -701	AIMB -784	Remark
CrystalDiskMark	Max Read Seq Read (MB/s)	186.6	184.8	184.8	186.7	184.8	186.5	184.5	
	Max Write Seq Read (MB/s)	185.1	182.9	182.9	185.0	182.6	184.3	182.6	

HDD Performance (OS: Win7 Ultimate SP1 X64)									
Test Item and Software		MIO -5290	MIO -5271	SOM -5894	AIMB -582W	AIMB -584	AIMB -701	AIMB -784	Remark
ATTO Disk Benchmark	Read (MB/s)	189959	186800	186737	189046	186579	189046	187245	
	Write (MB/s)	188592	184721	185175	189501	184491	187692	185042	

HDD Performance (OS: Win7 Ultimate SP1 X64)									
Test Item and Software		MIO -5290	MIO -5271	SOM -5894	AIMB -582W	AIMB -584	AIMB -701	AIMB -784	Remark
Anyil's Storage Utilities	Read (MB/s)	223.64	221.6	221.8	226.24	221.83	224.15	221.63	
	Write (MB/s)	121.99	121.66	122.77	120.56	123.30	123.38	121.96	
	Totaal	345.63	343.27	344.56	346.80	345.13	347.53	343.59	

HDD Performance (OS: Win7 Ultimate SP1 X64)									
Test Item and Software		MIO -5290	MIO -5271	SOM -5894	AIMB -582W	AIMB -584	AIMB -701	AIMB -784	Remark
PassMark Performance	DiskMark	1325	1296	1320	1324	1311	1319	1164	

HDD Performance (OS: Win7 Ultimate SP1 X64)									
Test Item and Software		MIO -5290	MIO -5271	SOM -5894	AIMB -582W	AIMB -584	AIMB -701	AIMB -784	Remark
I/O METER (Physical)	Total I/O per Second	11943.15	18400.78	18537.29	15277.25	27676.27	15264.52	20077.40	
	Total I/O MBs Second	46.65	71.88	72.41	59.68	108.11	59.63	78.43	

HDD Performance (OS: Win7 Ultimate SP1 X64)									
Test Item and Software		MIO -5290	MIO -5271	SOM -5894	AIMB -582W	AIMB -584	AIMB -701	AIMB -784	Remark
	Average I/O Response Time(ms)	0.0831	0.054	0.0537	0.0645	0.0359	0.0650	0.0493	
	Maximum I/O Response Time(ms)	46.7944	30.4704	28.3854	54.0047	39.8234	26.2077	30.9717	

HDD Performance (OS: Win7 Ultimate SP1 X86_X64)									
Test Item and Software		MIO -5290	MIO -5271	SOM -5894	AIMB -582W	AIMB -584	AIMB -701	AIMB -784	Remark
HD Tune Pro 5.5 (Read)	Burst Speed / (MB/s)	188.1	227.6	224.1	222.4	237.9	161.9	232.4	
	Transfer Rate - Min. (MB/s)	79.7	84.1	84.1	79.7	84.1	79.7	84.1	
	Transfer Rate - Max. (MB/s)	185.9	181.9	181.9	185.9	181.9	185.9	181.9	
	Transfer Rate - Average. (MB/s)	141.8	142.9	143.0	141.9	143.0	141.8	143.0	
	Access Time (ms)	12.3	12.2	12.4	12.3	12.4	12.4	12.5	
	CPU Utilization (%)	5.5	7.0	3.6	2.3	3.2	1.3	3.5	

HDD Performance (OS: Win7 Ultimate SP1 X86_X64)									
Test Item and Software		MIO -5290	MIO -5271	SOM -5894	AIMB -582W	AIMB -584	AIMB -701	AIMB -784	Remark
HD Tune Pro 5.5 (Write)	Burst Speed / (MB/s)	161.0	141.6	132.2	155.5	154.6	123.5	143.3	
	Transfer Rate - Min. (MB/s)	74.4	81.2	80.5	75.0	80.6	75.8	76.2	
	Transfer Rate - Max. (MB/s)	184.9	179.3	177.0	184.9	176.9	184.7	178.3	
	Transfer Rate - Average. (MB/s)	138.3	139.6	139.5	138.3	139.5	138.3	139.3	
	Access Time (ms)	3.63	3.54	3.58	3.76	3.58	3.64	3.57	
	CPU Utilization (%)	6.8	7.5	4.1	2.4	3.1	1.9	4.0	

5.02 RAID Card and HDD Performance Test

5.02.01.01 Test Purpose :

The purpose of this test is to ensure the HDD performance of the DUT.

5.02.01.02 Test Standard :

Please refer to the Project Hardware specification and BIOS specification.

5.02.01.03 Test Tools :

1. CrystalDiskMark
2. ATTO Disk Benchmark
3. HDD Tune Pro
4. Passmark performance

5.02.01.04 Test Criteria :

1. Executing the Benchmark Test default item of CrystalDiskMark
2. Executing the Benchmark Test of AS AUTO Disk Benchmark
3. Executing the Benchmark Test HDD Tune Pro
4. Executing the Benchmark Test Disk of Passmark performance

5.02.01.05 Test Procedure :

1. Install and execute CrystalDiskMark, setting “need to test HDD” and press “All” start test.
2. Install and execute ATTO Disk Benchmark, setting Drive “need to test HDD” and press “Start” for test.
3. Install and execute HD Tune Pro Benchmark, setting “need to test HDD” and “read” and press “Start” for test.
4. Install and execute HD Tune Pro Benchmark, setting “need to test HDD” and “Write” and press “Start” for test.
5. Install and execute Passmark performance, setting Disk and “need to test HDD” then pres”All” start test.
6. Record all of test results.

5.02.01.06 Test Data :

HDD Performance (OS:Win7 Ultimate SP1 X64)										
Test Item and Software	CrystalDiskMark		ATTO Disk Benchmark		PassMark Performance	HD Tune Pro 5.5 (Read)		HD Tune Pro 5.5 (Write)		Remark
	Max Read Seq Read (MB/s)	Max Read Seq Write (MB/s)	Read (MB/s)	Write (MB/s)	DiskMark	Max. (MB/s)	Burst Rate	Max. (MB/s)	Burst Rate	
RAID 0 (ASR-6805)	347.6	376.6	353786	402116	2811	345.0	531.9	381.9	491.8	
RAID 1 (ASR-6805)	322.1	183.6	289808	233501	1835	324.2	513.5	330.4	499.5	
RAID 0 (LSI 9260-8i)	364.1	352.3	371536	354955	2315	230.7	156.6	252.1	124.8	

RAID 1 (LSI 9260-8i)	149.4	157.4	331914	177771	1261	175.9	156.6	165.0	129.8	
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