

Seagate

ST2000NX0253 Function Test Report

Initiated by	Jeff Wang	Approved by	River.Lin
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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	Fail	Note1
Chapter 4	System Reliability Test		
4.01	Power On/Off Test	PASS	
4.02	Warm Boot Stress Test	PASS	
4.03	Full System, I/O Integrated Stress Test	Fail	Note2
Chapter 5	System Performance Test		
5.01	HDD Performance Test	PASS	
5.02	RAID Card and HDD Performance Test	Fail	Note3

Note1: Can not build RAID mode with LSI 9260-8i RAID Card. Please refer the Appendix A.

Note2: BurnIn Test program show “Error while reading from the disk” on RAID-0 mode. Please refer the Appendix A.

Note3: HD Tune program show “Read Error” on RAID-0 mode. Please refer the Appendix A.

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Product Specification :

Advantech Part Number : 96ND2TB-ST-SG7KE

Drive specification	ST2000NX0243 ST2000NX0283	ST2000NX0253 ST2000NX0283	ST1000NX0303 ST1000NX0343	ST1000NX0313 ST1000NX0353
Formatted (512 bytes/sector)*	2TB		1TB	
Guaranteed sectors	488,378,646	3,907,029,168	244,190,646	1,953,525,168
Heads	10		5	
Discs	5		3	
Bytes per sector	4096	512	4096	512
Recording density, KBPI (Kb/in max)	1889			
Track density, KTPI (ktracks/in avg.)	315			
Areal density, (Gb/in ² avg)	585			
Spindle speed (RPM)	7200			
Internal data transfer rate (Mb/s max)	2160			
Sustained data transfer rate OD (MiB/s max)	130 (136 MB/s max)			
I/O data-transfer rate (MB/s max)	600			
ATA data-transfer modes supported	PIO modes 0-4 Multiword DMA modes 0-2 Ultra DMA modes 0-6			
Cache buffer	128MB (129,536KB)			
Weight: (maximum)	198g (0.437 lb)		190g (0.419 lb)	
Average latency	4.16ms			
Power-on to ready (sec) (max)	20			
Standby to ready (sec) (max)	20			
Startup current (typical) 12V (peak)	2.0A 1.85A (optional configuration through Smart Command Transport)			
Voltage tolerance (including noise)	5V ±5% 12V ±5%			
Ambient temperature	5° to 55°C (operating/tested) -40° to 70°C (nonoperating)			
Temperature gradient (°C per hour max)	20°C (operating) 20°C (nonoperating)			
Relative humidity	5% to 95% (operating) 5% to 95% (nonoperating)			
Relative humidity gradient	20% per hour max			
Altitude, operating	-304.8 m to 3,048 m (-1000 ft to 10,000+ ft)			
Altitude, nonoperating (below mean sea level, max)	-304.8 m to 12,192 m (-1000 ft to 40,000+ ft)			
Operational Shock (max at 2 ms)	25 Gs			
Non-Operational Shock (max at 2 ms)	400 Gs			

Drive specification	ST2000NX0243 ST2000NX0283	ST2000NX0253 ST2000NX0303	ST1000NX0303 ST1000NX0343	ST1000NX0313 ST1000NX0353
Vibration, operating	10–500 Hz: 0.5 Gs			
Operation Rotational vibration	20–1500Hz: 16 rads/s ²			
Vibration, nonoperating	10–500 Hz: 2.4 Gms ref			
Drive acoustics, sound power (bels)				
Idle**	2.8 (typical) 3.0 (max)			
Performance seek	3.2 (typical) 3.4 (max)			
Nonrecoverable read errors	1 sector per 10 ¹⁵ bits read			
Annualized Failure Rate (AFR)	0.63% based on 8760 POH			
Warranty	To determine the warranty for a specific drive, use a web browser to access the following web page: http://www.seagate.com/support/warranty-and-replacements/ . From this page, click on the "Check to see if the drive is under Warranty" link. The following are required to be provided: the drive serial number, model number (or part number) and country of purchase. The system will display the warranty information for the drive.			
Load-unload cycles	300,000 (25°C, 50% rel. humidity) (600,000 design life testing)			
Supports Hotplug operation per Serial ATA Revision 3.2 specification	Yes			

Platform Configuration:

MIO-5271U

Item.	Description.
M/B Name	MIO-5271U
PCB Version.	A101-3
BIOS Version.	5271X017
CPU Model/Info	Intel Celeron 2980U 1.6GHz
Memory Type/Info/Size	Advantech 4GB DDR3L 1600 SO-DIMM
PCH Chipset	Intel ID9C43
Graphic Controller	Intel HD Graphics

MIO-5290

Item.	Description.
Project Name.	MIO-5290
PCB Version.	A101-2
BIOS Version.	5290X015
CPU Model/Info	Intel Core i7-3555LE 2.5GHz
Memory Type/Info	Transcend 8G DDR3 1600 SO-DIMM
PCH Chipset	Intel QM77
Graphic Controller	Intel HD Graphics 4000

AIMB-582WG2

Item.	Description.
Project Name.	AIMB-582WG2
PCB Version.	A101-2
BIOS Version.	W582X020
CPU Model/Info	Intel Xeon E3-1275V2 3.5GHz
Memory Type/Info	Transcend 1GB DDR3 1333 x2
PCH Chipset	Intel ID1E53
Graphic Controller	Intel HD Graphics P4000

ASMB-584

Item.	Description.
Project Name.	ASMB-584
PCB Version.	A101-3
BIOS Version.	S584X028
CPU Model/Info	Intel Xeon E3-1275V3 3.5GHz
Memory Type/Info	ATP 4GB DDR3 1600 x2
PCH Chipset	Intel C226
Graphic Controller	Intel HD Graphics P4600 / P4700

PCE-5127QG2

Item.	Description.
Project Name.	PCE-5127QG2
PCB Version.	A101-2
BIOS Version.	5127X020
CPU Model/Info	Intel Core i7-3770 3.4GHz
Memory Type/Info	Transcend 8GB DDR3 1600 x2
PCH Chipset	Intel Q77
Graphic Controller	Intel HD Graphics 4000


PCE-7128G2

Item.	Description.
Project Name.	PCE-7128G2
PCB Version.	A101-3
BIOS Version.	7128X201
CPU Model/Info	Intel Core i7-4770S 3.1GHz
Memory Type/Info	Transcend 8GB DDR3 1600 x2
PCH Chipset	Intel C226
Graphic Controller	Intel HD Graphics 4600

Test Programs :

Test Program	Version
CrystalDiskMake	V3.0.3
ATTO Disk	V2.47
Anvil's Storage Utilities	V1.1.0.337
HD Tune Pro	V5.50
Passmark performance	V8.0 build 1043
I/OMETTER	2008.06.18-RC2
PassMark Burn-In Test Pro	V7.1 build 1017
PassMark Rebooter	V1.3 build 1004
Boot up Record Program	V1.42

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

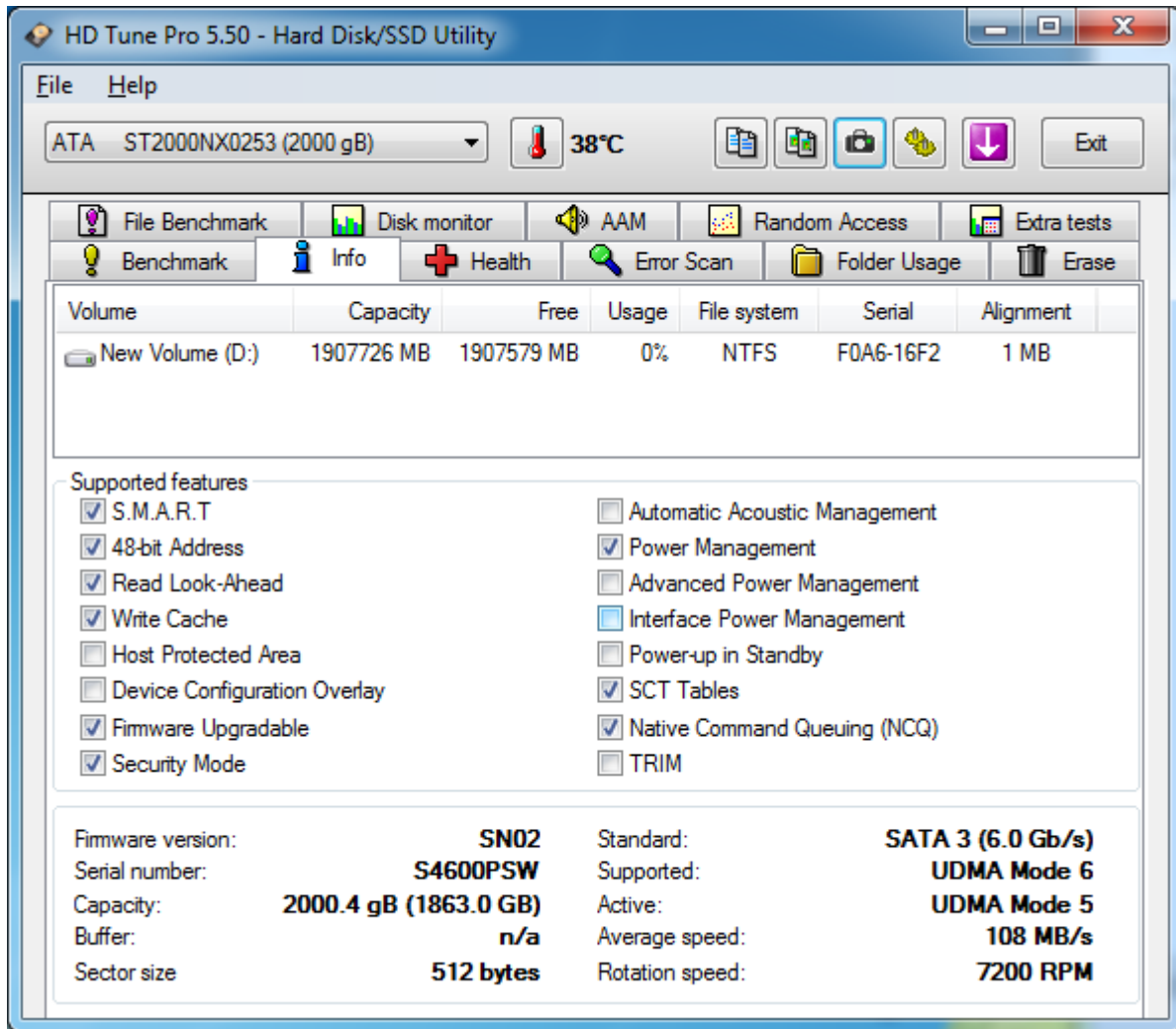
1.01.01.04 Test Criteria :

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
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	ASR-6805 (512MB)
BurnIn	Running passmark 30mins	PASS	

1.02 SATA IDE Mode Function Test

1.02.01.01 Test Purpose :

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

1.02.01.02 Test Standard :

Please refer to the Project Hardware and BIOS specification

1.02.01.03 Test Tools :

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

1.02.01.04 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.

1.02.01.05 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 S4 mode, the system should be resume from S4 mode. This can work properly, and repeat 3times.
6. Enter Start-> shutdown on OS, then press power button turn on and boot into OS of DUT. This can work properly, and repeat 3times.
7. Enter Start-> restart on OS, then boot into OS of DUT. This can work properly, and repeat 3times.

1.02.01.06 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

1.03.01.01 Test Purpose :

The purpose of this test is to ensure the functional of the SATA AHCI 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
4. Intel F6 Install Floppy Driver or AHCI driver on USB flash disk.

1.03.01.04 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.

1.03.01.05 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 S4 mode, the system should be resume from S4 mode. This can work properly, and repeat 3times.
6. Enter Start-> shutdown on OS, then press power button turn on and boot into OS of DUT. This can work properly, and repeat 3times.
7. Enter Start-> restart on OS, then boot into OS of DUT. This can work properly, and repeat 3times.
8. Setting Enabled Hot Plug SATA Port on BIOS.
9. The DUT SATA should be Hot Plug and work properly, and repeat 3times.

1.03.01.06 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 x64	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		
MIO-5271U	5271X017	A101-3	Win7/Win8.1 Server 2008R2/Server 2012	PASS	
MIO-5290	5290X015	A101-2	Win7/Win8.1 Server 2008R2/Server 2012	PASS	
ASMB-584	S584X028	A101-3	Win7/Win8.1 Server 2008R2/Server 2012	PASS	
AIMB-582WG2	W582X020	A101-2	Win7/Win8.1 Server 2008R2/Server 2012	PASS	
PCE-5127QG2	5127X020	A101-2	Win7/Win8.1 Server 2008R2/Server 2012	PASS	
PCE-7128G2	7128X201	A101-3	Win7/Win8.1 Server 2008R2/Server 2012	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 :

ASMB-584

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	Fail	Note4

Note4: Can not build RAID mode with LSI 9260-8i RAID Card.

MB: ASMB-584 A101-3

RAID Card: LSI 9260-8i (S-109)

HDD: Seagate ST2000NX0253

Please refer the Appendix A1.

Chapter 4 : System Reliability Test

4.01 Power On/Off Test (Deep Sleep Mode Disabled or Not Support)

4.01.01.01 Test Purpose :

The purpose of this test is to examine and validate the stability of the Power On/Off function.

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. Boot Up Record Program.
3. DOS boot device

4.01.01.04 Test Criteria :

1. The test must PASS the Power on / off circling test \geq 1000 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. Make sure Deep Sleep Mode setting to Disabled on BIOS.
5. Boot to DOS boot device w/ Boot Up Record Program.
6. Setup testing cycle time, and chang to zero of run number on Power on/off test equipment.
7. Start power on/off test and pass over1000 times.
8. Make sure PSON1 or HW Jumper set as ATX Mode.
9. Make sure BIOS item: After AC power Failure MUST set as "Always On".
10. Make sure Deep Sleep Mode setting to Disabled on BIOS.
11. Boot to DOS boot device w/ Boot Up Record Program.
12. Setup testing cycle time, and chang to zero of run number on Power on/off test equipment.
13. Start power on/off test and pass over 200 times.
14. Make sure PSON1 or HW Jumper set as AT Mode.
15. Make sure BIOS item: After AC power Failure MUST set as "Always Off".
16. Make sure Deep Sleep Mode setting to Disabled on BIOS.
17. Boot to DOS boot device w/ Boot Up Record Program.
18. Setup testing cycle time, and chang to zero of run number on Power on/off test equipment.
19. Start power on/off test and pass over1000 times.

4.01.01.06 Test Data :

ATX Power In

AIMB-584

Test Item	Description	Result	Remark
Power On/Off test (ATX mode, AC Off)	<ol style="list-style-type: none"> 1. BIOS item: After Ac power Failure set as "Always On" 2. H/W jumper set as ATX mode 3. Test at room temperature for 100 duration cycles 4. Booting rate = 100% 	Pass	MIO-5271 AIMB-582WG2 PCE-5127QG2

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 ≥ 500 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	<ol style="list-style-type: none"> 1.Run PassMark Rebooter V1.3 Build1004 2. Must PASS for 500 duration cycles. 3.Time Out Before reboot:10-25secs 4. Booting rate =100% 	PASS	MIO-5290 ASMB-584 PCE-7128G2

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 msut 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 toperform 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 ASMB-584

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 WD WD1002FAEX File system: NTFS	Pass	
RAID Card- RAID-0	SAS/RAID8 internal port Adaptec ASR-6805 (512MB) PCIE X8	Fail	Note5

Note5: BurnIn Test program show “Error while reading from the disk” on RAID-0 mode.

MB: ASMB-584 A101-3

RAID Card: ASR-6805_512MB (S-112)

HDD: Seagate ST2000NX0253

Please refer the Appendix A2.

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 ATTO 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)	ASMB -584	AIMB -582WG 2	PCE -5127Q G2	PCE -7128G2	MIO -5271U	MIO -5290	Remark
CrystalDiskMark	Max Read Seq Read (MB/s)	141.3	141.3	141.5	141.3	141.3	141.3	
	Max Write Seq Read (MB/s)	139.7	140.7	140.5	140.1	140.4	140.1	

HDD Performance (OS: Win7 Ultimate SP1 X64)								
Test Item and Software		ASMB -584	AIMB -582WG2	PCE -5127QG2	PCE -7128G2	MIO -5271U	MIO -5290	Remark
ATTO Disk Benchmark	Read (MB/s)	141.467	141.654	141.467	141.467	141.467	140.175	
	Write (MB/s)	141.281	141.467	141.281	141.467	140.358	139.81	

HDD Performance (OS: Win7 Ultimate SP1 X64)								
Test Item and Software		ASMB -584	AIMB -582WG2	PCE -5127QG2	PCE -7128G2	MIO -5271U	MIO -5290	Remark
Anvil's Storage Utilities	Read (MB/s)	180.83	181.52	181.14	181.49	182.01	181.08	
	Write (MB/s)	118.33	116.66	117.65	116.22	115.71	120.3	
	Totaal	299.16	298.18	298.79	297.71	297.72	301.38	

HDD Performance (OS: Win7 Ultimate SP1 X64)								
Test Item and Software		ASMB -584	AIMB -582WG2	PCE -5127QG2	PCE -7128G2	MIO -5271U	MIO -5290	Remark
PassMark Performance	DiskMark	987	1013	1015	980	984	1014	

HDD Performance (OS: Win7 Ultimate SP1 X64)								
Test Item and Software		ASMB -584	AIMB -582WG2	PCE -5127QG2	PCE -7128G2	MIO -5271U	MIO -5290	Remark
I/O METER (Physical)	Total I/O per Second	27489.67	16754.63	22041.84	26795.52	30660.11	12523.31	
	Total I/O MBs Second	107.38	65.45	86.1	104.67	119.77	48.92	
	Average I/O Response Time(ms)	0.0361	0.059	0.0449	0.037	0.0323	0.0792	
	Maximum I/O Response Time(ms)	31.0562	18.5277	9.8717	57.9987	29.6983	46.1239	

HDD Performance (OS: Win7 Ultimate SP1 X86_X64)								
Test Item and Software		ASMB -584	AIMB -582WG 2	PCE -5127Q G2	PCE -7128G2	MIO -5271U	MIO -5290	Remark
HD Tune Pro 5.5 (Read)	Burst Speed / (MB/s)	317.9	326.7	329.7	317.3	330.6	300.1	
	Transfer Rate - Min. (MB/s)	60.2	60.2	60.2	60.2	60.2	60.2	
	Transfer Rate - Max. (MB/s)	135.7	135.8	135.7	135.7	135.7	135.7	
	Transfer Rate - Average. (MB/s)	104.4	104.2	104.4	104.4	104.3	104.4	
	Access Time (ms)	11.7	12	12	11.8	11.5	11.9	
	CPU Utilization (%)	3.4	1.7	2	3.3	6.9	4.6	

HDD Performance (OS: Win7 Ultimate SP1 X86_X64)								
Test Item and Software		ASMB -584	AIMB -582WG 2	PCE -5127Q G2	PCE -7128G2	MIO -5271U	MIO -5290	Remark
HD Tune Pro 5.5 (Write)	Burst Speed / (MB/s)	187.1	279.6	277.7	286.1	221.3	230.3	
	Transfer Rate - Min. (MB/s)	57.9	58.1	58.1	57.9	57.9	57.9	
	Transfer Rate - Max. (MB/s)	132.5	132.1	132.4	131.8	132.3	131.9	
	Transfer Rate - Average. (MB/s)	101.5	101.4	101.4	101.4	101.4	101.5	
	Access Time (ms)	6.37	6.59	6.47	6.31	6.26	6.61	
	CPU Utilization (%)	3.4	1.8	1.8	3.6	7.8	3.9	

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 ATTO 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 :

ASMB-584

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)	261.7	287.4	259.357	306.345	2372	Read Error!	Read Error!	359.6	480	Note6

RAID 1 (ASR-6805)	249.1	155.6	210.125	172.35	1244	240.9	510.5	292.7	477.7	
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Note6: HD Tune program show "Read Error!" on RAID-0 mode.

MB: ASMB-584 A101-3

RAID Card: ASR-6805_512MB (S-112)

HDD: Seagate ST2000NX0253

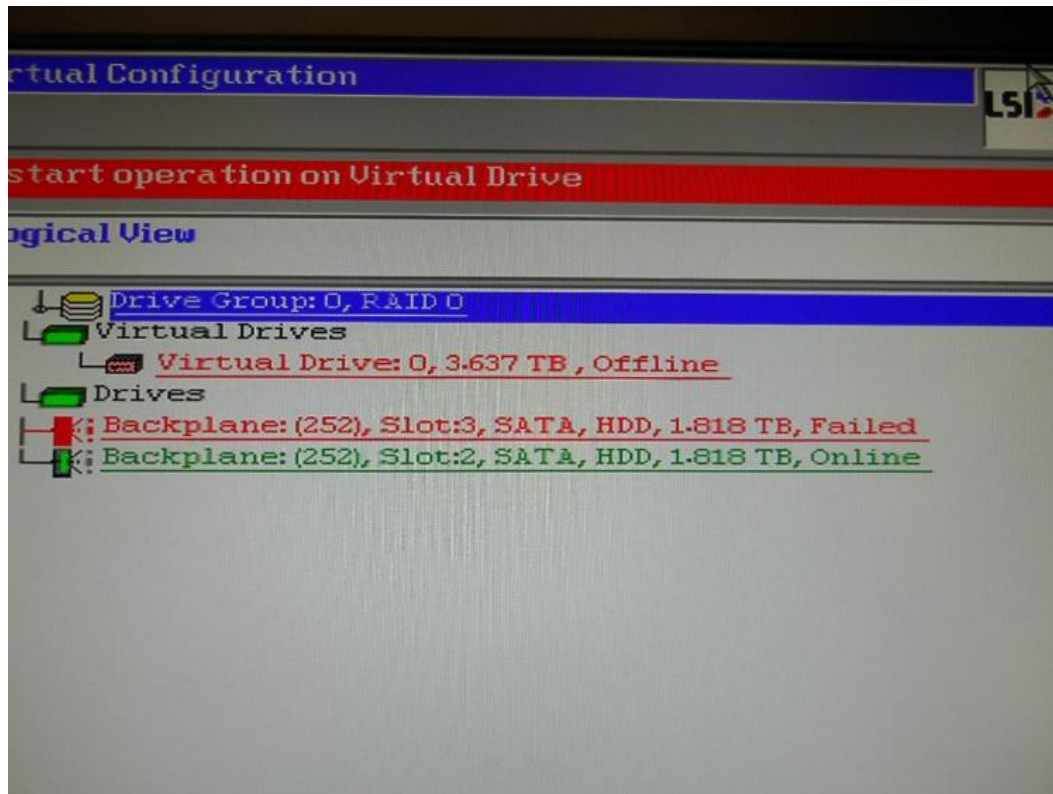
Please refer the Appendix A3.

Appendix.A

A1. Can not build RAID mode with LSI 9260-8i RAID Card.

Show error message on RAID Card Utility

Fail HDD: ST2000NX0253 / FW: SN02 / SN: S4600PVT



MB: ASMB-584 A101-3

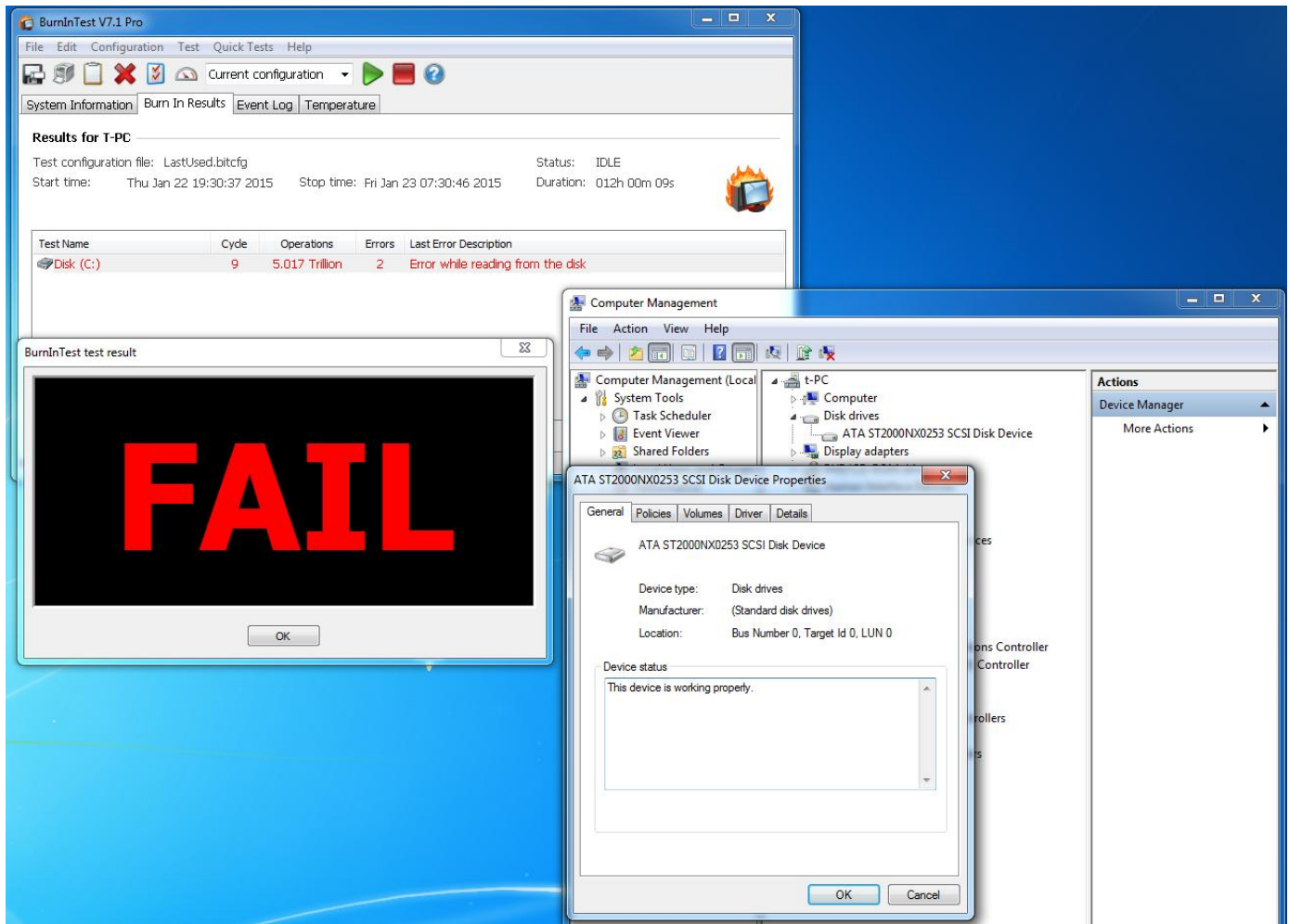
RAID Card: LSI 9260-8i (S-109)

Verify HDD:

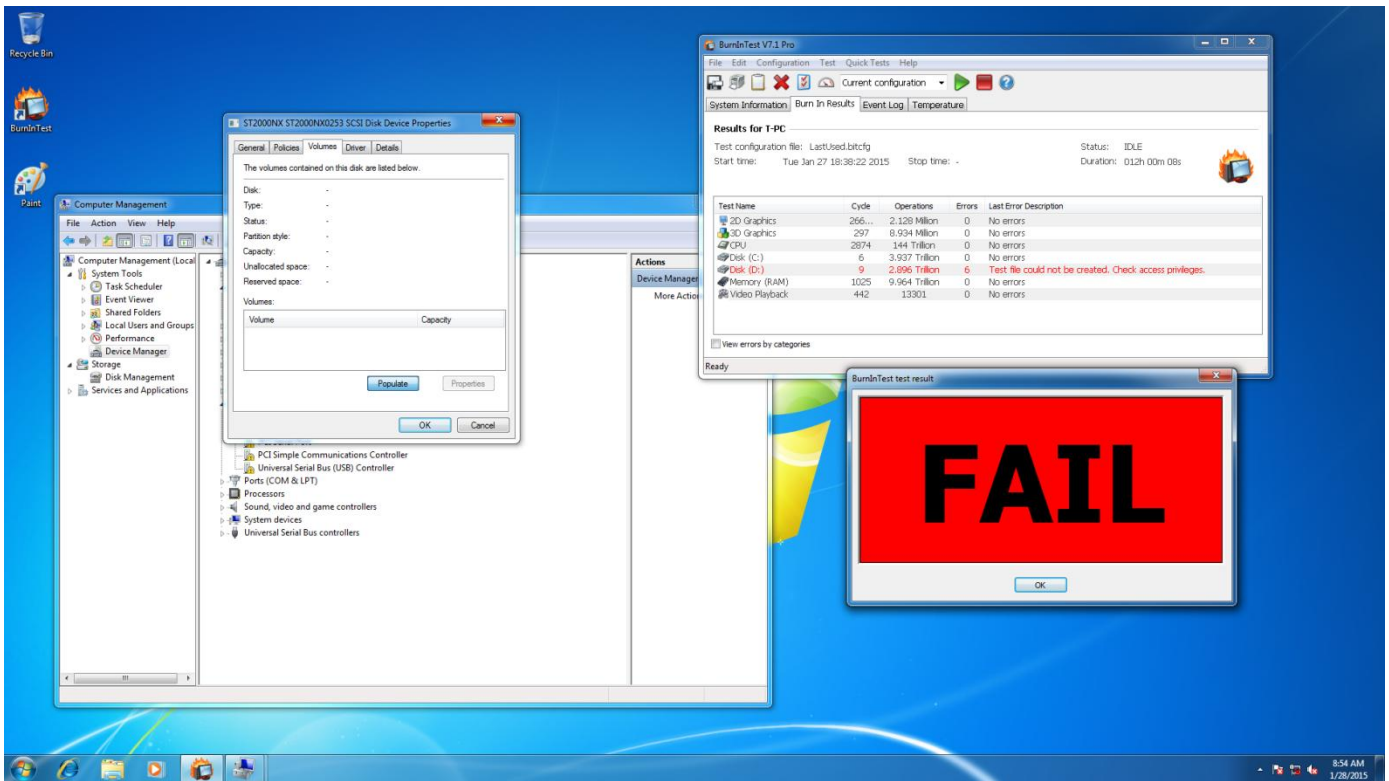
➤ WD 5000LPLX: Pass

Verify BurnIn Test V7.1

➤ Single HDD: Fail (ST2000NX0253 / FW: SN02 / SN: S4600PVT)

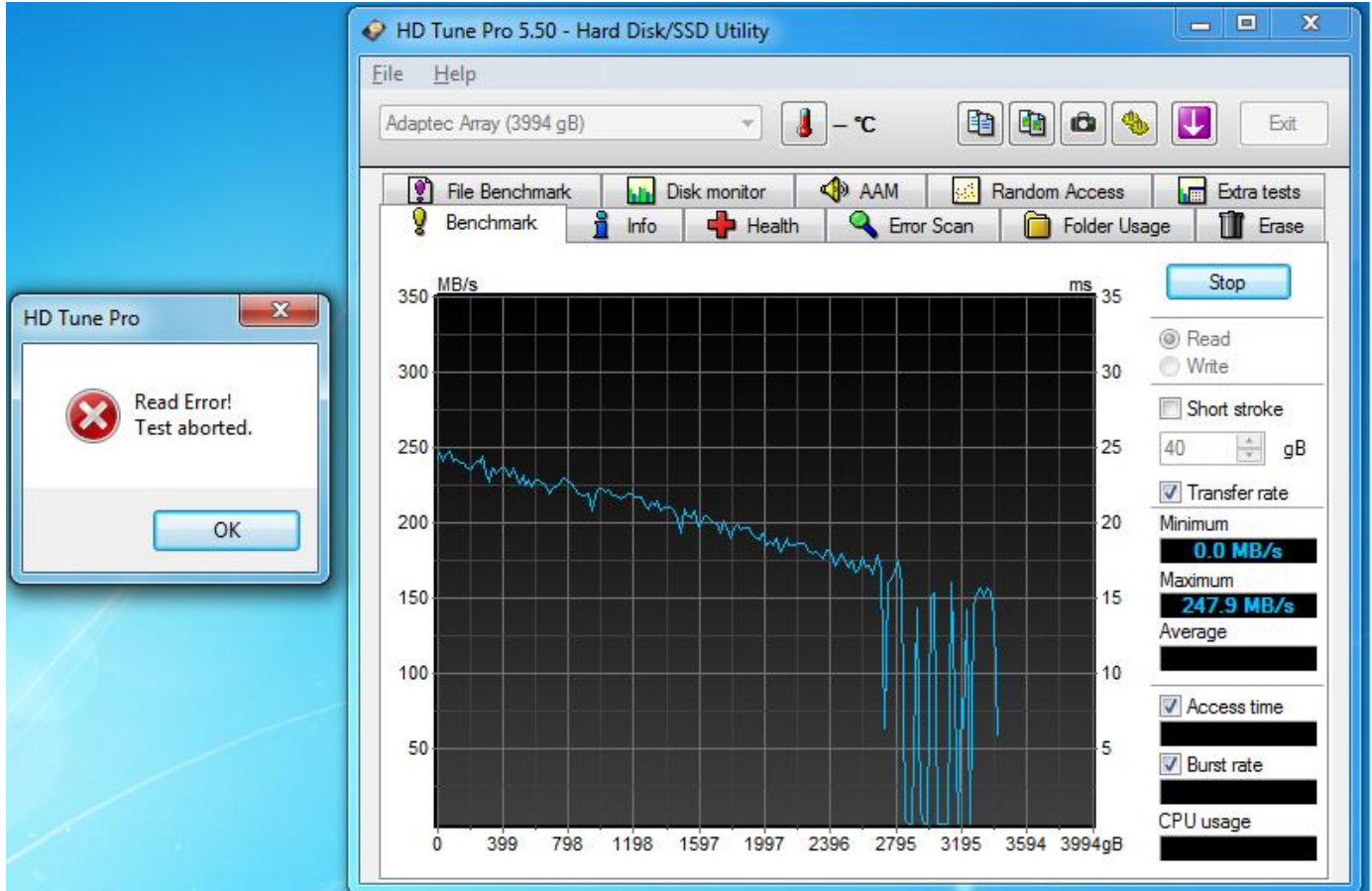


- Two HDD
 - ✧ OS HDD: Pass (ST2000NX0253 / FW: SN02 / SN: S4600PSW)
 - ✧ Second HDD: Fail (ST2000NX0253 / FW: SN02 / SN: S4600PVT)



A2. HD Tune program show “Read Error!” on RAID-0 mode.

Show error message on HD Tune-Read test



MB: ASMB-584 A101-3

RAID Card: ASR-6805_512MB (S-112)

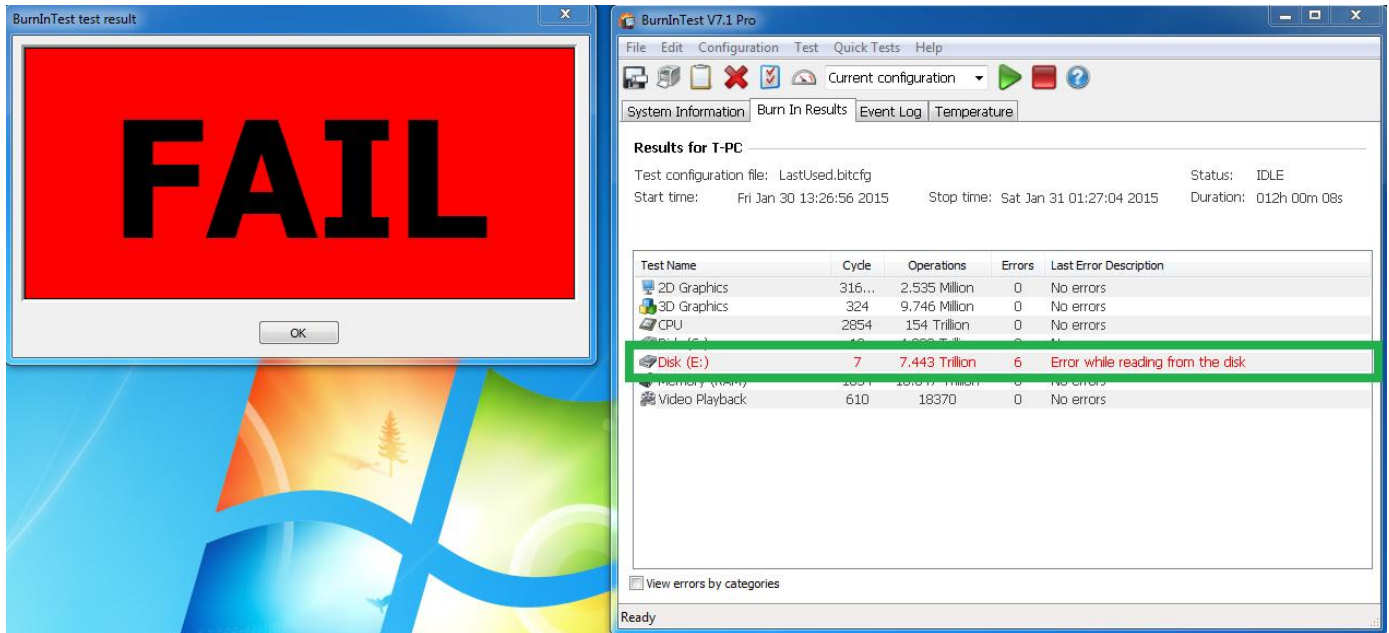
Fail HDD: ST2000NX0253 / FW: SN02 / SN: S4600PSW and S4600PVT

Verify HDD:

- WD 5000LPLX: Pass

A3. BurnIn Test program show “Error while reading from the disk” on RAID-0 mode.

Show error message on BurnIn Test



MB: ASMB-584 A101-3

RAID Card: ASR-6805_512MB (S-112)

Fail HDD: ST2000NX0253 / FW: SN02 / SN: S4600PSW and S4600PVT

Verify HDD:

➤ WD 5000LPLX: Pass