

# 96HD1TB-ST-WD7KE Test Report

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Rev.A1

# **Revision History**

Revision Date	Revision	Description	Creator
2014-3-18	1.0	First version released	Jason.Jiang

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# Testing Report and Approval Sheet Performed in KUNSHAN

Rev.A1

# **Content**

Test Item	ı List Summary	5
Product 1	Information	7
Test Plat	form	9
Test Soft	ware 1	.0
Test Item	ı <sup>1</sup>	1
Chap	ter 1: Function test	1
1.1	Device Information confirm	.1
Basic	function test	.3
1.2	HDD LED test	4
Chap	ter 2: Compatibility test	4
2.1	With OS compatibility test	4
2.2	With motherboard compatibility test 1	4
2.3	With RAID card compatibility test	.5
Chap	ter 3: Performance test	.6
3.1	HD Tach	.6
3.2	HD Tune	.7
3.2.1	Read test 1	.7
3.2.2	Write test	.7
Chap	ter 4: Reliability test1	.8
4.1	Loading test	8



Rev.A1

# **Test Result Definition**

Item	Description
Pass	Compatibility test properly without any problem.
Fail	Compatibility test can't work properly and can't meet the product spec, please describe issue to the "Remark" item.
No test	No test (no test tool or device or driver not ready), please write reason to the "Remark" item.
N/A	Spec not support.
Limitation	Compatibility issue Limitation, it needs formal approval mail or other formal reply from PM or Applicant or Manufacturer.



Rev.A1

# **Test Item List Summary**

Num.	Test item	Result	Remark
Chapter 1	Function test	Pass	
1.1	Device Information confirm	Pass	
1.2	Basic function test	Pass	
1.3	HDD LED test	Pass	
Chapter 2	Compatibility test	Pass	
2.1	With OS compatibility test	Pass	
2.2	With motherboard compatibility test	Pass	
2.3	With RAID card compatibility test	Pass	
Chapter 3	Performance test	Pass	
3.1	HD Tach	Pass	
3.2	HD Tune	Pass	
Chapter 4	Reliability test	Pass	
4.1	Loading test	Pass	

#### Appendix 1:Motherboard compatibility List

MB/SBC	Core Chipset	Remark
PCA-6011	Intel G41+ICH7	
PCE-5124	Intel Q35 GMCH+ICH9DO	
ASMB-782	Intel C216	
PCE-5026	Intel H61	
AIMB-782	Sandy bridge Q77	
PCE-5128	Intel Q87	



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Rev.A1

Appendix 2:Raid card compatibilityList

P-TD Part Number	Band	MN/PN	BIOS	Driver Rev	Remark
96RC-SAS-4C-PE-HP	HighPoint	Rocket SAS RAID 2640	V1.4	1.6.12.524	Win7 64bit
96RC-SAS-8P-PE-LS2	LSI	SAS 9750-8i	5.11.00.007	6.504.5.0	Win8 64bit
96RC-SAS-8P-PE-LS3	LSI	SAS 9271-8i	5.42.00	6.506.01.00	Win7 32bit
96RC-SAS-4P-PE-AD1	ADAPTEC	ASR-6405E	V5.2-0[Build 19127]	7.1.0.30034	Win8 32bit
96RC-SAS-8P-PE-AD1	ADAPTEC	ASR-6805E	V5.2-0[Build 19109]	7.1.0.30034	Win7 32bit
96RC-SAS-8P-PE-AD	ADAPTEC	ASR-6805	V5.2-0[Build 19127]	7.1.0.30034	Win7 64bit
96RC-SAS-16-PE-AD2	ADAPTEC	ASR-71605	V5.2-0[Build 30855]	b30850	Server2008 R2



Rev.A1

# **Product Information**

Advantech Part Number	96HD1TB-ST-WD7KE
Manufacturer	WD
Model Number	WD1002F9YZ-09H1JL0
<b>Model Generation</b>	Enterprise-level
Form Factor	3.5''
Interface	SATAIII
Capacity	1.0TB
Cache Capacity	128MB
Rotation Speed (RPM )	7200RPM
Host Transfer Rate	6Gb/s
Internal Transfer Rate	187MB/s(max)
Bytes per physical sector	512 (logical) / 4096 (physical)
Number of disc	1
Power On Hour (POH)	24x7
<b>Annualized Failure Rate (AFR)</b>	1 per 10 <sup>14</sup> bits read
MTBF	N/A
Voltage Tolerance	5V ± 5% &12V±10%
<b>Operating Temperature</b>	5° to 55°C
Firmware	01.01M02
Country of origin	Malaysia
Dimension (W x H x D)	101.6x x147.0x26.1(mm)
ROHS Status (Yes/No)	Yes



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Rev.A1

#### Photo:







Rev.A1

# **Test Platform**

MB/SBC	PCA-6011		
PCB version	A101-3	CPU	Intel Core2 E8400 3.00GHZ
BIOS version	V1.11	DRAM	Apacer 2GB DDR3 1333 DIMM
Core Chipset	Intel G41+ICH7	Backplane	PCA-6114P12_B301-1
VGA Chipset	G41 integrated	Other	
MB/SBC	PCE-5124		
PCB version	A101-2	CPU	Intel Core2 E8400 3.00GHZ
BIOS version	V1.23	DRAM	Transcend 1G DDR2 667 DIMM
Core Chipset	Intel Q35 GMCH+ICH9DO	Backplane	PCE-5B12-07_A101-1
VGA Chipset	Q35 integrated	Other	
MB/SBC	ASMB-782		
PCB version	A101-3	CPU	E31275 V2 3.50GHz
BIOS version	V1.11(S782X024)	DRAM	Apacer 4G DDR3 1333 2 DIMM
Core Chipset	Intel C216 chipset		
VGA Chipset	CPU integrated	Other	
MB/SBC	PCE-5026VG		
MID/SDC	FCE-3020 VG		
PCB version	A101-2	CPU	Intel i3-2100 3.1GHZ
		CPU DRAM	Intel i3-2100 3.1GHZ Apacer DDR3 1333 4GB DIMM
PCB version	A101-2		
PCB version BIOS version	A101-2 V1.10	DRAM	Apacer DDR3 1333 4GB DIMM
PCB version BIOS version Core Chipset	A101-2 V1.10 Intel H61	DRAM Backplane	Apacer DDR3 1333 4GB DIMM
PCB version BIOS version Core Chipset VGA Chipset	A101-2 V1.10 Intel H61 CPU integrated	DRAM Backplane	Apacer DDR3 1333 4GB DIMM
PCB version BIOS version Core Chipset VGA Chipset MB/SBC	A101-2 V1.10 Intel H61 CPU integrated AIMB-782QG2	DRAM Backplane Other	Apacer DDR3 1333 4GB DIMM PCE-5B12-07_A101-1
PCB version BIOS version Core Chipset VGA Chipset MB/SBC PCB version	A101-2 V1.10 Intel H61 CPU integrated AIMB-782QG2 A101-4	DRAM Backplane Other	Apacer DDR3 1333 4GB DIMM  PCE-5B12-07_A101-1  Intel I3-2100 3.10GHz
PCB version BIOS version Core Chipset VGA Chipset  MB/SBC PCB version BIOS version	A101-2 V1.10 Intel H61 CPU integrated  AIMB-782QG2 A101-4 V1.11	DRAM Backplane Other  CPU DRAM	Apacer DDR3 1333 4GB DIMM  PCE-5B12-07_A101-1  Intel I3-2100
PCB version BIOS version Core Chipset VGA Chipset  MB/SBC PCB version BIOS version Core Chipset	A101-2 V1.10 Intel H61 CPU integrated  AIMB-782QG2 A101-4 V1.11 Intel Ivy Bridge Q77	DRAM Backplane Other  CPU DRAM Backplane	Apacer DDR3 1333 4GB DIMM  PCE-5B12-07_A101-1  Intel I3-2100
PCB version BIOS version Core Chipset VGA Chipset  MB/SBC PCB version BIOS version Core Chipset VGA Chipset	A101-2 V1.10 Intel H61 CPU integrated  AIMB-782QG2 A101-4 V1.11 Intel Ivy Bridge Q77 CPU integrated	DRAM Backplane Other  CPU DRAM Backplane	Apacer DDR3 1333 4GB DIMM  PCE-5B12-07_A101-1  Intel I3-2100
PCB version BIOS version Core Chipset VGA Chipset  MB/SBC PCB version BIOS version Core Chipset VGA Chipset	A101-2 V1.10 Intel H61 CPU integrated  AIMB-782QG2 A101-4 V1.11 Intel Ivy Bridge Q77 CPU integrated  PCE-5128	DRAM Backplane Other  CPU DRAM Backplane Other	Apacer DDR3 1333 4GB DIMM  PCE-5B12-07_A101-1  Intel I3-2100  3.10GHz  Apacer 4GB DDR3 1333 DIMM  PCE-5B12-07_A101-1
PCB version BIOS version Core Chipset VGA Chipset  MB/SBC PCB version BIOS version Core Chipset VGA Chipset  MB/SBC PCB version	A101-2 V1.10 Intel H61 CPU integrated  AIMB-782QG2 A101-4 V1.11 Intel Ivy Bridge Q77 CPU integrated  PCE-5128 A101-3	DRAM Backplane Other  CPU DRAM Backplane Other	Apacer DDR3 1333 4GB DIMM  PCE-5B12-07_A101-1  Intel I3-2100



Rev.A1

# **Test Software**

Utilities	Version / Description
Power On/Off (For Reliability test)	
Passmark BurnIn Test Pro (For Reliability test)	V7.0 build 1015
SiSoftware Sandra 2013	V19.11
HD Tach (For Performance test)	V3.0.4.0
HD Tune (For Performance test)	V5.0
HDD board(for HDD LED test)	DVA-830E_A101-7(add 20k resistor on R19)



Rev.A1

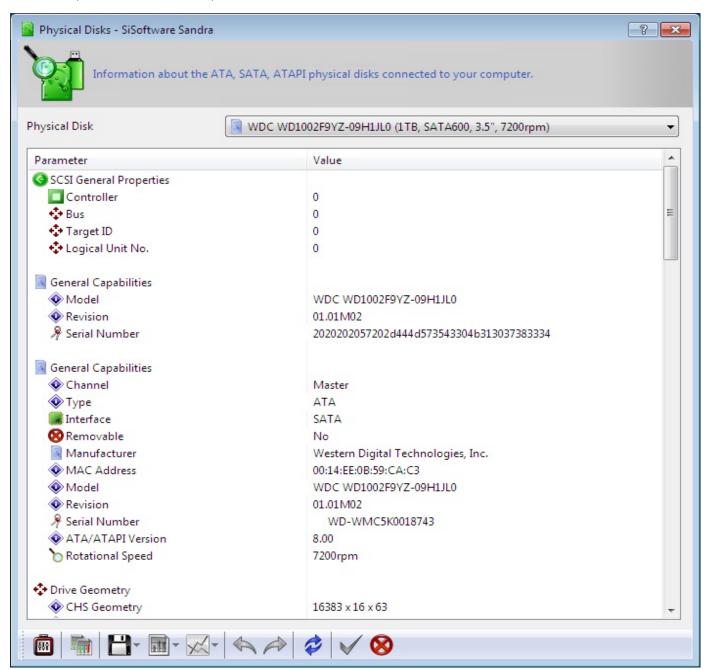
#### **Test Item**

# **Chapter 1: Function test**

#### 1.1 Device Information confirm

The test ensures the product meets SPEC. Check disk information under SiSoftware Sandra, and paste the screenshot of test result as below.

Test result (MB/SBC:PCA-6011):

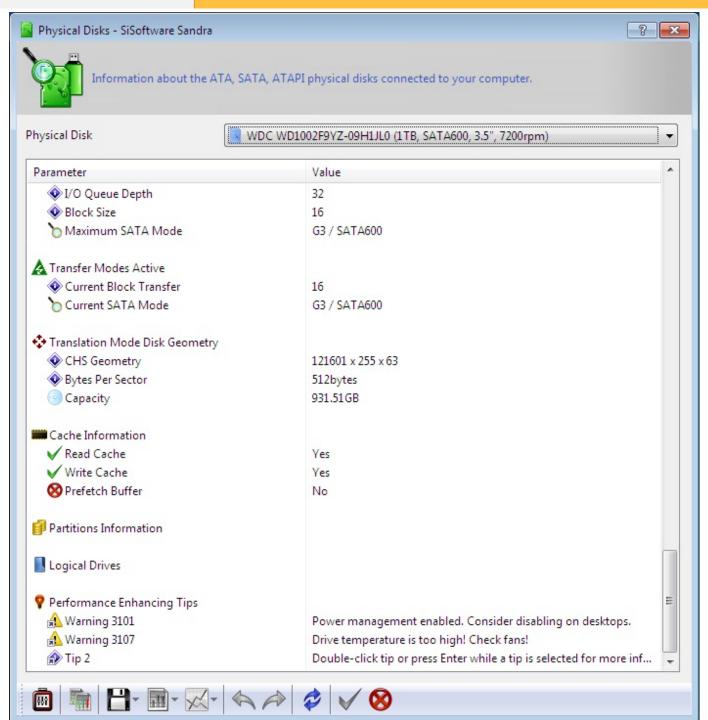




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#### Testing Report and Approval Sheet Performed in KUNSHAN

Rev.A1





Rev.A1

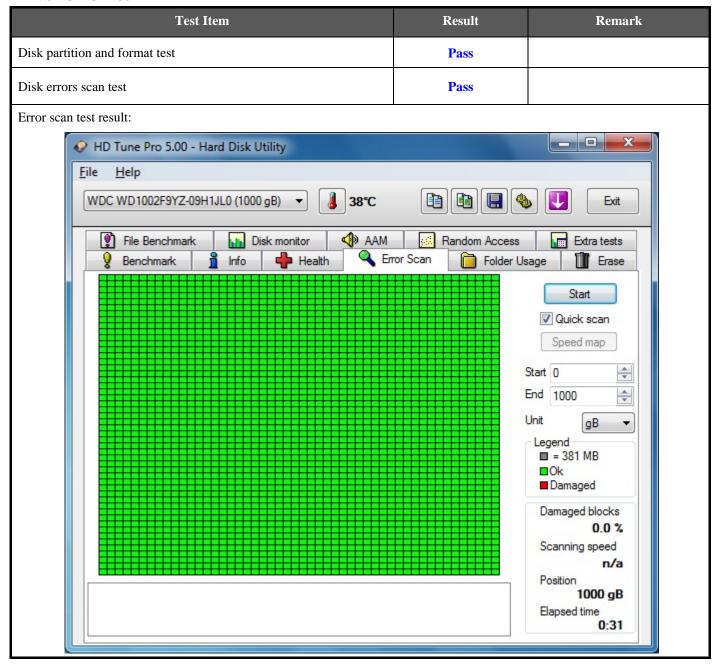
#### **Basic function test**

The test ensures the product basic function normally. Please see the table list as below:

Please see the test criteria as below:

- 1. The disk can partition and format without any problem;
- 2. Run HD TUNE test error scan without any problem, and paste the screenshot of test result as below.

#### MB/SBC:PCA-6011





Rev.A1

#### 1.2 HDD LED test

The test ensures the function of HDD LED on SATA P11 is effective.

Please see the table list as below:

- 1. The Power LED (LED1) can be lighted all the time when HDD power on.
- 2. The Active LED (LED2) can blink when HDD in working status.

HDD Board	PCE-5026	
Item	Result	Remark
LED1	Pass	
LED2	Pass	

## **Chapter 2: Compatibility test**

#### 2.1 With OS compatibility test

The test ensures mainstream windows OS can be installed and boot into OS properly.

Please see the test criteria as below:

- 1. Check disk capacity can display correctly;
- 2. Make sure Partition and format function is normal.
- 3. Run Burn-in test 30 minutes with disk, the test must pass at 100% loading.

Test platform	AIMB-782		
OS	Version	Result	
Windows XP	Windows XP professional edition 32bit	Pass	
Windows 7	Windows 7 Ultimate 32bit	Pass	
Windows 2008	Windows 2008 Server R2 64bit	Pass	
Windows 8	Windows 8 Ultimate 64bit	Pass	

## 2.2 With motherboard compatibility test

The test ensures the disk can work properly with different framework and chipsets of Motherboard.

Please see the test criteria as below:

- 1. Check disk model, capacity can display correctly, and record the result in BIOS.
- 2. The OS can be installed successfully and boot into OS properly.
- 3. Make sure Partition and format function is normal.
- 4. Run Power on/off, the test must pass at least 10 times.



Rev.A1

5. Run Burn-in test 30 minutes with disk, the test must pass at 100% loading.

MB/SBC	Drive model	Capacity	os	Result	Remark
PCA-6011	WD1002F9YZ-09H1JL0	1000.2GB	Win7 32bit	Pass	
PCE-5124	WD1002F9YZ-09H1JL0	1000.2GB	Win7 32bit	Pass	
ASMB-782	WD1002F9YZ-09H1JL0	1000.2GB	Win7 32bit	Pass	
PCE-5026	WD1002F9YZ-09H1JL0	1000.2GB	Win7 32bit	Pass	
AIMB-782	WD1002F9YZ-09H1JL0	1000.2GB	Win7 32bit	Pass	
PCE-5128	WD1002F9YZ-09H1JL0	1000.2GB	Win7 64bit	Pass	

#### 2.3 With RAID card compatibility test

The test ensures the disk can work properly with different RAID card.

Please see the test criteria as below:

- 1. The disk can be detected, and the BIOS of Raid card should show the correct drive model and capacity etc information.
- 2. Make sure the disk can build Raid, Check Raid disk size should be as below:

RAID Level	Size	RAID Level	Size
RAID 0	1+1=2	RAID 1	1+1=1
RAID 5	1+1+1=(N-1)*1	RAID 10	2+2=2

- 3. OS can be installed into the RAID disk without any problem.
- 4. Run Burn-in test 30 minutes with disk, the test must pass at 100% loading.
- 5. Run Power on/off, the test must pass at least 10 times.

MB/SBC:PCE-5026

RAID Card	Disk	RAID Level	Raid size	In Slot	os	Result	Remark
96RC-SAS-4C-PE-HP	WD1002F9YZ*2	RAID1	1000.12GB	PCIEX4_1	Win7 32bit	Pass	
96RC-SAS-8P-PE-AD2	WD1002F9YZ*2	RAID0	1862GB	PCIEX4_1	Win7 32bit	Pass	
96RC-SAS-4P-PE-AD1	WD1002F9YZ*2	RAID0	1.81TB	PCIEX1_1	Win8 32bit	Pass	
96RC-SAS-8P-PE-AD	WD1002F9YZ*2	RAID1	931GB	PCIEX16_1	Win7 64bit	Pass	
96RC-SAS-16-PE-AD2	WD1002F9YZ*2	RAID1	931GB	PCIEX16_1	Sever2008 R2 64bit	Pass	
96RC-SAS-8P-PE-LS2	WD1002F9YZ*2	RAID0	1.81TB	PCIEX16_1	Win8 64bit	Pass	
96RC-SAS-8P-PE-LS3	WD1002F9YZ*2	RAID1	931GB	PCIEX16_1	Win7 32bit	Pass	



Rev.A1

#### Ps:RAID card infomation

Advantech PN	Band	MN/PN	Bus	BIOS	Driver
96RC-SAS-4C-PE-HP	HighPoint	Rocket SAS RAID 2640	PCIEX4	V1.4	1.6.12.524
96RC-SAS-8P-PE-AD2	ADAPTEC	ASR-6805E R5	PCIEX4	V5.2-0[Build 19109]	7.1.0.30034
96RC-SAS-4P-PE-AD1	ADAPTEC	ASR-6405E	PCIEX1	V5.2-0[Build 19127]	7.1.0.30034
96RC-SAS-8P-PE-AD	ADAPTEC	ASR-6805	PCIEX8	V5.2-0[Build 19127]	7.1.0.30034
96RC-SAS-16-PE-AD2	ADAPTEC	ASR-71605	PCIEX8	V5.2-0[Build 30855]	b30850
96RC-SAS-8P-PE-LS2	LSI	SAS 9750-8i	PCIEX8	5.11.00.007	6.504.5.0
96RC-SAS-8P-PE-LS3	LSI	SAS 9271-8i	PCIEX8	5.42.00	6.506.01.00

# **Chapter 3: Performance test**

The test ensures the disk performance can reach the average value. Record the benchmark score and compare the score with other product.

#### 3.1 HD Tach

		HD	Tach				
MB/SBC	Burst Speed	Average Read	CPU	Random Access	Result	Remark	
	(MB/s)	(MB/s)	Utilization	Time (ms)			
PCA-6011	247.4	141.9	4%	13.6	Pass	Win7 32bit	
PCE-5124	242.9	144.7	4%	14.0	Pass	Win7 32bit	
ASMB-782	359.0	142.0	2%	13.4	Pass	Win7 32bit	
PCE-5026	218.7	140.8	2%	13.9	Pass	Win7 32bit	
AIMB-782	354.8	144.8	3%	13.6	Pass	Win7 32bit	
PCE-5128	324.7	141.3	8%	13.6	Pass	Win7 64bit	

Rev.A1

# 3.2 HD Tune

#### 3.2.1Read test

	HD Tune								
MB/SBC	Minimum Transfer Rate (MB/s)	Maximum Transfer Rate (MB/s)	Average Transfer Rate (MB/s)	Access Time (ms)	CPU Usage	Burst Speed (MB/s)	Result	Remark	
PCA-6011	72.0	169.3	134.5	13.7	3.1%	209.5	Pass	Win7 32bit	
PCE-5124	83.1	169.4	135.8	13.7	3.5%	209.0	Pass	Win7 32bit	
ASMB-782	86.1	172.6	138.0	13.6	1.8%	337.3	Pass	Win7 32bit	
PCE-5026	83.1	163.2	133.8	13.9	2.5%	177.9	Pass	Win7 32bit	
AIMB-782	86.1	172.6	138.2	13.6	2.2%	330.2	Pass	Win7 32bit	
PCE-5128	83.1	168.5	133.7	13.8	9.5%	304.2	Pass	Win7 64bit	

#### 3.2.2Write test

	HD Tune							
MB/SBC	Minimum Transfer Rate (MB/s)	Maximum Transfer Rate (MB/s)	Average Transfer Rate (MB/s)	Access Time (ms)	CPU Usage	Burst Speed (MB/s)	Result	Remark
PCA-6011	83.4	166.7	132.7	27.9	3.2%	198.4	Pass	Win7 32bit
PCE-5124	79.2	163.5	126.2	27.9	4.0%	190.1	Pass	Win7 32bit
ASMB-782	83.5	167.0	133.3	28.0	2.1%	274.8	Pass	Win7 32bit
PCE-5026	83.6	166.0	132.5	27.8	2.6%	167.4	Pass	Win7 32bit
AIMB-782	83.6	167.7	133.3	27.8	2.4%	253.9	Pass	Win7 32bit
PCE-5128	83.6	164.9	132.5	27.6	9.1%	256.3	Pass	Win7 64bit



Rev.A1

# **Chapter 4: Reliability test**

# 4.1 Loading test

The test ensures under the environment of high load the HDD can work properly.

Test platform	PCE-5026	
os	Windows 7 Ultimate 32bit	
Item	Pass Criteria	Result
Power on/off	Power on/off 100 times, successful boot rate 100%;	Pass
Passmark Burn_in	Set DISK loading 100%, all disks file size 15%; The result of all disks should be Passed when running Burn_in for 12 hours.	Pass