

96HD500G-ST-WD10KE

Test Report

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Revision History:

Revision Date	Revision	Description	Creator
2012/9/27	1.0	First version released	Jeans.Zhou

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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.

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	
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	High/Low temperature test	Pass	
4.2	Room temperature test	Pass	

Appendix 1: Motherboard List

MB/SBC	Core Chipset	MB/SBC	Core Chipset
PCE-5125Q	Intel Q57	FWA-3210	Intel Cougar Point C206
ASMB-781	Intel Cougar Point C206	UNO-2184	Intel QM67
AIMB-272	Intel Cougar Point-M QM67	PCA-6010	945GC+ICH7

Appendix 2: Raid card List

P-TD Part Number	Band	MN/PN	BIOS	Driver Rev	Remark
96RC-ST-2C-P-HP	HighPoint	RocketRAID1520	V2.1.090630	2.4.6.1110	Win XP 64bit
96RC-SAS-4C-PE-HP	HighPoint	RocketRAID2640	V1.3	1.5.10.1012	Win 7 64bit
96RC-SATA-2P-PE-LS	LSI	9650SE-2LP	BE9X 4.08.00.004	3.0.5.56	Win XP 64bit
96RC-SAS-4P-PE-LS	LSI	9240-4i	4.3000	5.1.112.32	Win7 32bit
96RC-SAS-8P-PE-LS1	LSI	9260-8i	3.24.00	5.1.112.32	Win XP 32bit

Product Information:

Advantech Part Number	96HD500G-ST-WD10KE
Manufacturer	WD
Model Number	WD5000HHTZ
Model Generation	WD VelociRaptor® VR333M
Form Factor	3.5''
Interface	SATA
Capacity	500GB
Cache Capacity	64MB
Rotation Speed (RPM)	10000RPM
Host Transfer Rate	6Gb/s
Internal Transfer Rate	200MB/s
Number of Disks	2
Power On Hour (POH)	24x7
Annualized Failure Rate (AFR)	<10 in 10 ¹⁶ bits read
MTBF	1.4 million hours
Voltage Tolerance	5V ± 5% and 12V ± 5%
Operating Temperature	0°C to 55°C
Firmware	04.06.A00
Country of origin	Malaysia
Dimension (W x H x D)	101.6x26.1x147(mm)
ROHS Status (Yes/No)	YES

Photo:



Test Platform

MB/SBC	PCE-5125Q		
PCB version	A101-2	CPU	Intel Core i3 530 2.93GHZ
BIOS version	125x0042	DRAM	Apacer DDR3 1333 2GB DIMM
Core Chipset	Intel Q57	Backplane	PCE-5B13-08_A102-1
VGA Chipset	CPU integrated VGA Controller	Other	

MB/SBC	ASMB-781		
PCB version	A101-3	CPU	Intel Core i3-2120 3.30GHZ
BIOS version	V1.10	DRAM	Transcend DDR3 1333 2GB DIMM
Core Chipset	PCHC206	Backplane	NA
VGA Chipset	ASPEED AST2300	Other	


MB/SBC	AIMB-272		
PCB version	A101-3	CPU	Intel Core i7-2710QE 2.10GHZ
BIOS version	A1.11	DRAM	Apacer DDR3 1333 1GB SODIMM
Core Chipset	Intel Cougar Point-M QM67	Backplane	NA
VGA Chipset	QM67 Integrated	Other	

MB/SBC	FWA-3210		
PCB version	A101-1	CPU	Intel Core i5-2400 3.10GHZ
BIOS version	NAMB3210x032	DRAM	Apacer DDR3 1333 2GB DIMM
Core Chipset	Intel C206 PCH	Backplane	NA
VGA Chipset	CPU integrated VGA Controller	Other	

MB/SBC	UNO-2184		
PCB version	A101-2	CPU	Intel Core i7-2715QE 2.10GHZ
BIOS version	2184x016x64	DRAM	Apacer DDR3 1333 1GBx2 SODIMM
Core Chipset	Intel QM67	Backplane	NA
VGA Chipset	Intel QM67 integrated	Other	

MB/SBC	PCA-6010		
PCB version	A101-2	CPU	Intel Core 2 E7500 2.92GHZ
BIOS version	V1.16	DRAM	Transcend DDR2 667 2GB
Core Chipset	Intel 945GC+ICH7	Backplane	PCA-6113P4R_C202-1
VGA Chipset	945GC integrated	Other	

Test Software

Utilities	Version / Description
Power On/Off (For Reliability test)	
Passmark BurnIn Test Pro (For Reliability test)	V7.0 build 1013
HD Tach (For Performance test)	V3.0.4.0
HD Tune (For Performance test)	V2.52
NFCtest(For Function test)	Read /Write loop test
EVEREST Ultimate Edition	V5.5

Test Item

Chapter 1: Function test

1.1 Device Information confirm

The test ensures the product meets SPEC. Check Disk information under EVEREST Ultimate Edition- Storage-ATA- Device description, and paste the screenshot of test result as below.

Test result (MB/SBC: FWA-3210):

The screenshot displays the EVEREST Ultimate Edition [TRIAL VERSION] interface. The left sidebar shows a tree view with 'Storage' expanded to 'ATA'. The main window shows the 'Device Description' for 'WDC WD5000HHTZ-04N21V0 (WD-WXF1E32SR5D8)'. Below this, a table lists various ATA device properties and features.

Field	Value
ATA Device Properties	
Model ID	WDC WD5000HHTZ-04N21V0
Serial Number	WD-WXF1E32SR5D8
Revision	04.06A00
World Wide Name	5-0014EE-0ADF967E5
Device Type	SATA-III
Parameters	969021 cylinders, 16 heads, 63 sectors per track, 512 bytes per sector
LBA Sectors	976773168
Buffer	Unknown
Multiple Sectors	16
ECC Bytes	0
Unformatted Capacity	476940 MB
ATA Standard	ATA8-ACS
ATA Device Features	
<input checked="" type="checkbox"/> 48-bit LBA	Supported
<input checked="" type="checkbox"/> Advanced Power Management	Supported, Enabled
<input type="checkbox"/> Automatic Acoustic Management	Not Supported
<input checked="" type="checkbox"/> Device Configuration Overlay	Supported
<input checked="" type="checkbox"/> DMA Setup Auto-Activate	Supported, Disabled
<input checked="" type="checkbox"/> General Purpose Logging	Supported
<input checked="" type="checkbox"/> Host Protected Area	Supported, Enabled
<input type="checkbox"/> In-Order Data Delivery	Not Supported
<input checked="" type="checkbox"/> Native Command Queuing	Supported
<input checked="" type="checkbox"/> Phy Event Counters	Supported
<input checked="" type="checkbox"/> Power Management	Supported, Enabled
<input checked="" type="checkbox"/> Power-Up In Standby	Supported, Disabled
<input checked="" type="checkbox"/> Read Look-Ahead	Supported, Enabled

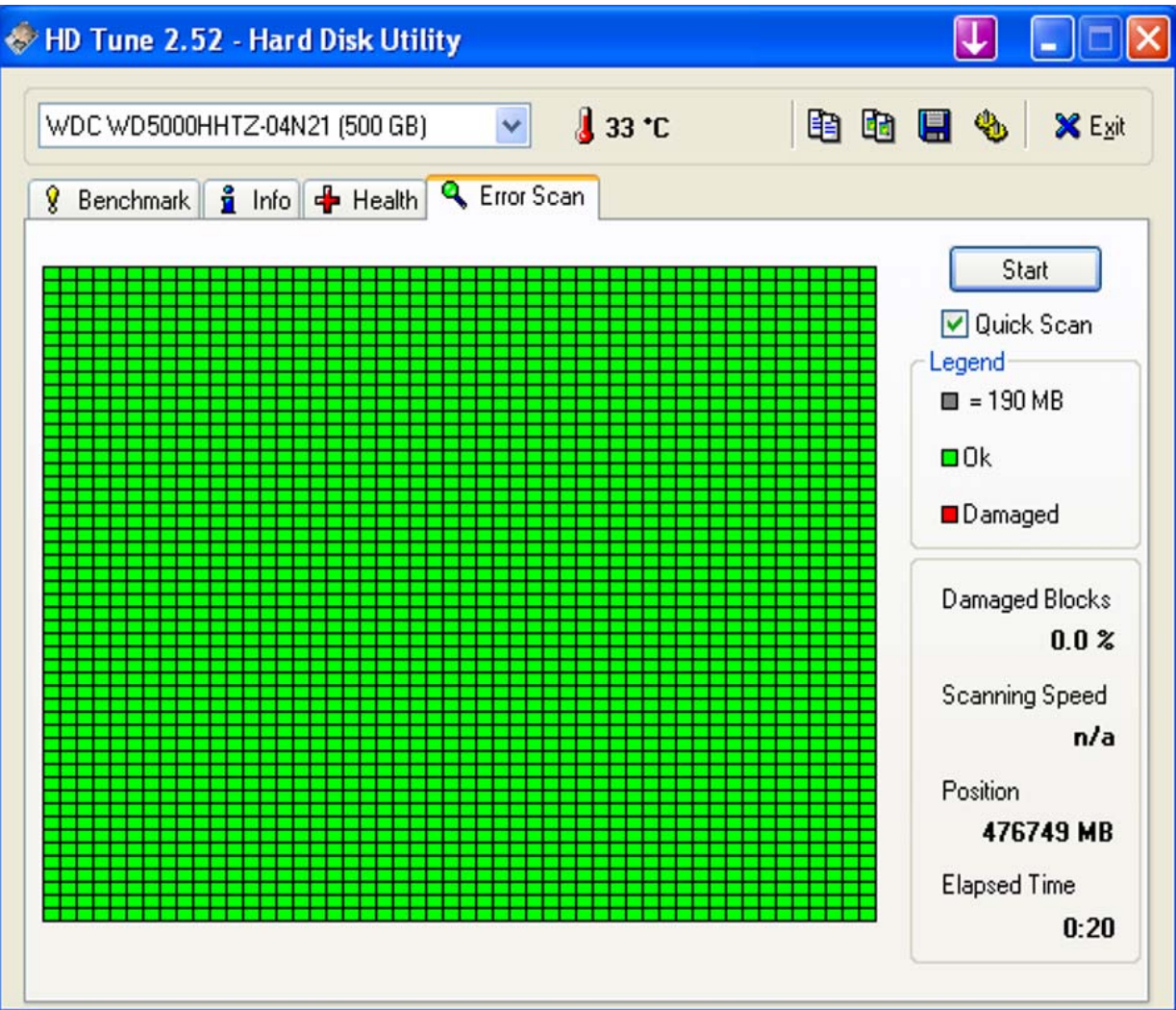
1.2 Basic function test

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. Check Disk data read and write test, run NFC test, the test must pass at 3 cycles of 2GB file.
3. Run HD TUNE test error scan without any problem, and paste the screenshot of test result as below.

MB/SBC: FWA-3210

Test Item	Result	Remark
Disk partition and format test	Pass	
NFC test	Pass	
Disk errors scan test	Pass	
Error scan test result:		
 <p>The screenshot shows the HD Tune 2.52 interface. The drive selected is WDC WD5000HHTZ-04N21 (500 GB) with a temperature of 33 °C. The 'Error Scan' tab is active, showing a grid of green blocks indicating a successful scan. The 'Start' button is visible, along with a 'Quick Scan' checkbox that is checked. The legend indicates that green blocks represent 'Ok' and red blocks represent 'Damaged'. The 'Damaged Blocks' section shows 0.0%. The 'Scanning Speed' is n/a, the 'Position' is 476749 MB, and the 'Elapsed Time' is 0:20.</p>		

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 NFC test under the OS, the test must pass at 3 cycles of 2GB file.

Test platform	PCE-5125Q	
OS	Version	Result
Windows XP	Windows XP professional edition32 bit with SP3	Pass
Windows XP	Windows XP professional edition64it with SP3	Pass
Windows 7	Windows 7 Ultimate 32bit	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. Make sure Partition and format function is normal.
3. Run NFC test, the test must pass at 3cycles of 2GB file.
4. Run Power on/off, the test must pass at least 10 times.
5. Run Burn-in test 30 minutes with disk, the test must pass at 100% loading.

MB/SBC	Drive model	Capacity	OS	Result	Remark
PCE-5125Q	WD5000HHTZ	500.1GB	Win XP 64bit	Pass	
ASMB-781	WD5000HHTZ	500.1GB	Win7 32bit	Pass	
AIMB-272	WD5000HHTZ	5001.GB	Win XP 32bit	Pass	
FWA-3210	WD5000HHTZ	500.1GB	Win XP 32bit	Pass	
UNO-2184	WD5000HHTZ	500.1GB	Win XP 64bit	Pass	
PCA-6010	WD5000HHTZ	500GB	Win XP 32bit	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 NFC test, the test must pass at 3 cycles of 2GB file.
5. Run Power on/off, the test must pass at least 10 times.

Test platform		PCE-5125Q (PCE-5B13-08_A102-1)			
Item	RAID card				
	HighPoint RR1520	HighPoint RR2640	LSI 9650SE-2LP-SG L	LSI 9240-4i	LSI 9260-8i
Advantech PN	96RC-ST-2C-P-H P	96RC-SAS-4C-PE-HP	96RC-SATA-2P-PE-LS	96RC-SAS-4P-PE-LS	96RC-SAS-8P-PE-LS1
Bus	PCI 32bit	PCIE X4	PCIE X1	PCIE X8	PCIE X8
BIOS	V2.4.090630	V1.3	BE9X 4.08.00.004	4.30.00	3.24.00
Driver	2.4.6.1110	1.5.10.1012	3.0.5.56	5.1.112.32	5.1.112.32
Disk	WD5000HHTZx2	WD5000HHTZx2	WD5000HHTZx2	WD5000HHTZx2	WD5000HHTZx2
RAID Level	RAID0	RAID1	RAID1	RAID1	RAID0
Raid size	1000.21GB	500.2GB	465.65GB	464.729GB	929.458GB
In Slot	P1PCIE4	PPCIE4	PPCIE4	PPCIE4	PPCIE4
OS	Win XP 64bit	Win 7 64bit	Win XP 64bit	Win 7 32bit	Win XP 32bit
Result	Pass	Pass	Pass	Pass	Pass
Remark					

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

MB/SBC	HD Tach version 3.0.4.0				Result	Remark
	Burst Speed (MB/s)	Average Read (MB/s)	CPU Utilization	Random Access Time (ms)		
PCE-5125Q	251.4	161.4	3%	7.4	Pass	
ASMB-781	426.9	163.0	3%	6.6	Pass	
AIMB-272	382.1	164.0	3%	6.3	Pass	
FWA-3210	428.1	163.0	3%	6.6	Pass	
UNO-2184	326.3	163.6	6%	6.5	Pass	
PCA-6010	246.7	163.0	6%	6.6	Pass	

3.2 HD Tune

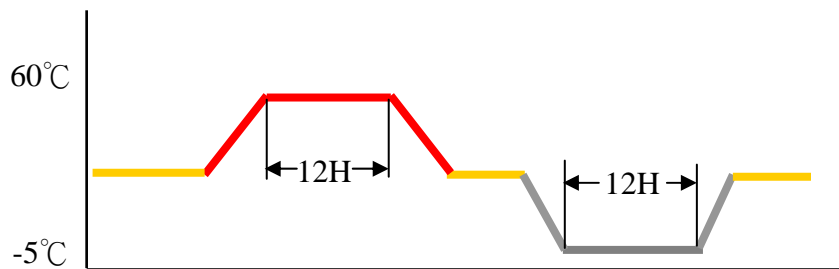
MB/SBC	HD Tune version 2.52						Result	Remark
	Minimum Transfer Rate (MB/s)	Maximum Transfer Rate (MB/s)	Average Transfer Rate (MB/s)	Access Time (ms)	CPU Usage	Burst Speed (MB/s)		
PCE-5125Q	122.2	182.0	155.7	6.4	4.8%	179.3	Pass	
ASMB-781	96.1	181.6	153.6	6.5	4.7%	248.7	Pass	
AIMB-272	122.2	183.1	155.9	6.4	3.4%	213.0	Pass	
FWA-3210	108.4	181.6	153.8	6.5	4.6%	241.6	Pass	
UNO-2184	97.4	182.0	154.2	6.6	3.8%	213.7	Pass	
PCA-6010	84.1	179.4	152.7	6.5	7.6%	181.3	Pass	

Chapter 4: Reliability test

4.1 High/Low temperature test

The test ensures the Disk can work properly in High/Low temperature of environment.

Test Environment: -5°C~60°C



Test platform	ASMB-781	
OS	Windows XP professional edition 32bit with SP3	
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

4.2 Room temperature test

The test ensures after High/Low temperature test, the Disk can work properly in room temperature.

Test platform	PCE-5125Q/AIMB-272/FWA-3210/PCA-6010	
OS	Windows XP professional edition 32bit with SP3	
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