HDDScan for Windows
Ver. 3.1

Introduction

HDDScan is a freeware utility for storage devices diagnostics (HDD, RAID, Flash)
The program can scan storage device for Bad-blocks, show S.M.A.R.T. attributes and change some HDD parameters such as AAM, APM, etc.

Author: Artem Rubtsov

Support sites:
Russian: http://hddscan.ru/
English: http://hddscan.com/

Capabilities and requirements:

Supported storage devises:

- ATA/SATA HDD
- SCSI HDD
- USB HDD (see Appendix A)
- FireWire or IEEE 1394 HDD (see Appendix A)
- RAID volumes made of ATA/SATA/SCSI HDDs (surface tests only)
- USB Flash (surface tests only)

Storage device tests:

- Verification in linear mode
- Reading in linear mode
- Erasing in linear mode
- Reading in Butterfly mode (synthetic random read)

S.M.A.R.T.:

- Reading and analyzing S.M.A.R.T. parameters from ATA/SATA/USB/FireWire HDD
- Reading and analyzing Log Pages from SCSI HDD
- S.M.A.R.T. tests running on ATA/SATA/USB/FireWire HDD
- Temperature monitor on ATA/SATA/USB/FireWire/SCSI HDD

Additional features:

- Reading and analyzing identity information from ATA/SATA/USB/FireWire/SCSI HDD
- Changing AAM, APM, PM parameters on ATA/SATA/USB/FireWire HDD
- Reporting defect information on SCSI HDD
- Spindle start/stop function on ATA/SATA/USB/FireWire/SCSI HDD
- Reports can be saved in MHT format
- Reports can be printed
- Skins support (NEW)

Requirements:

- PC with CPU 1.5 ГГц and RAM 256 МБ
- OS Windows 2000 SP4, Windows XP SP2 or Windows Server 2003 (with restrictions).
- The program shouldn’t be started from read-only device

User interface

Main view:

Pic.1 Main view

Control elements:

- Select Drive drop box - contains list of supported storage devices in a system. List contains models and serial numbers of devices. Icon defines possible device.
- S.M.A.R.T. button – generates S.M.A.R.T. attributes report.
- Tasks button – shows pop-up menu with tasks
- Surface Tests element – opens Test selection windows (see Pic.2)
- S.M.A.R.T. element – same as S.M.A.R.T. button click
- S.M.A.R.T. Offline Tests – activates submenu with Short, Extended and Conveyance S.M.A.R.T. tests.
- Temperature Monitor element – starts temperature monitoring task
- Features element – activates Features submenus.
- Identity Info element – generates Identity information report.
- Skin selection – opens dialog to select skin

Test selection window:

Pic.2 Test selection window

Control elements:

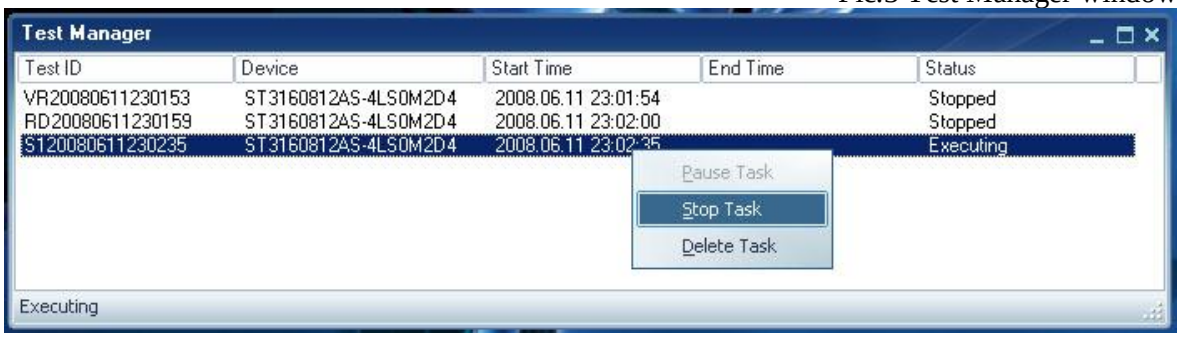
- Start LBA field – determines first logical sector number for testing.
- End LBA field – determines last logical sector number for testing.
- Block Size field – determines block size for testing (in logical sectors).
- Test radio buttons – select type of the test.
- Add Test button – adds test into a tests' queue.

Tests capabilities and limitations:

- Can be started only one test at a time. Author wasn't able to get stable test results with two or more simultaneous tests.
- Verify test may have restriction on Block Size with 256, 16384 or 65536 sectors because of Windows limitations.
- Verify test may work in improper way on USB/Flash devices.
- In Verify mode device reads block of data into internal buffer only and checks for consistency, there is no data transferring through interface connector. The program measures operation time for each block. The program tests blocks one by one from minimum to maximum.
- In Read mode device reads block of data and transfers it thorough interface. The program reads block of data into temporary buffer and measures time of operation for each block. The program tests blocks one by one from minimum to maximum.
- In Erase mode the program prepares block of data field with special pattern and number of logical sector. The program sends the block of data to drive and drive writes the block (**All data in the block on drive will be overwritten and gone forever!**) The program measures operation time for each block. The program tests blocks one by one from minimum to maximum.
- Butterfly Read mode is similar to Read mode difference only in blocks' order. Blocks are tested by pairs. The first block in the first pair will be Block 0, the second block in the first pair will be Block N (where N is number of last block for testing). Next pair will be Block 1 and Block N-1. Test ends in the middle of testing area. The program measures operation time.

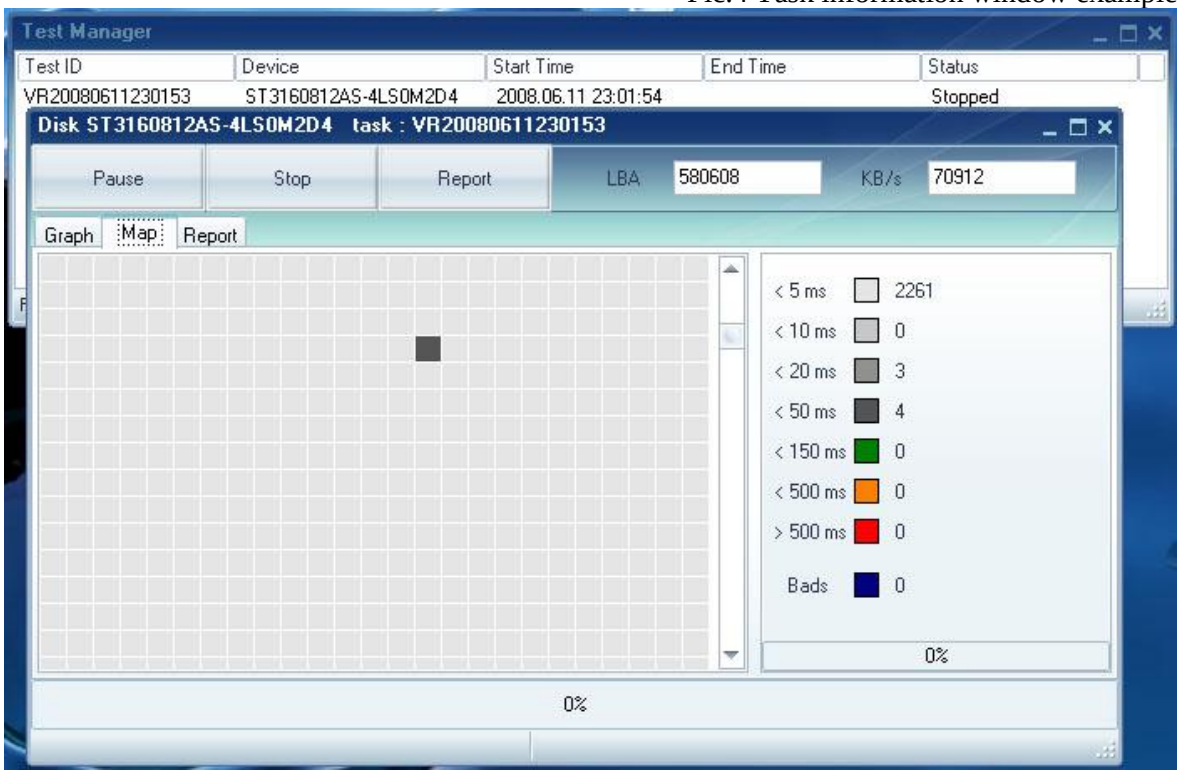
Test Manager window:

Pic.3 Test Manager window



This window contains test queue. All test, S.M.A.R.T. test and Temperature Monitor tests go right to the Test Manager. Manager allows deleting tests from queue; some test could be paused or stopped.
Double click on a task will open task information window

Pic.4 Task information window example



Test information window

This window contains information about test. Test could be paused or stopped and report with results can be generated.

Graph Tab:
Shows testing speed for each block. Information is showing as a graph.

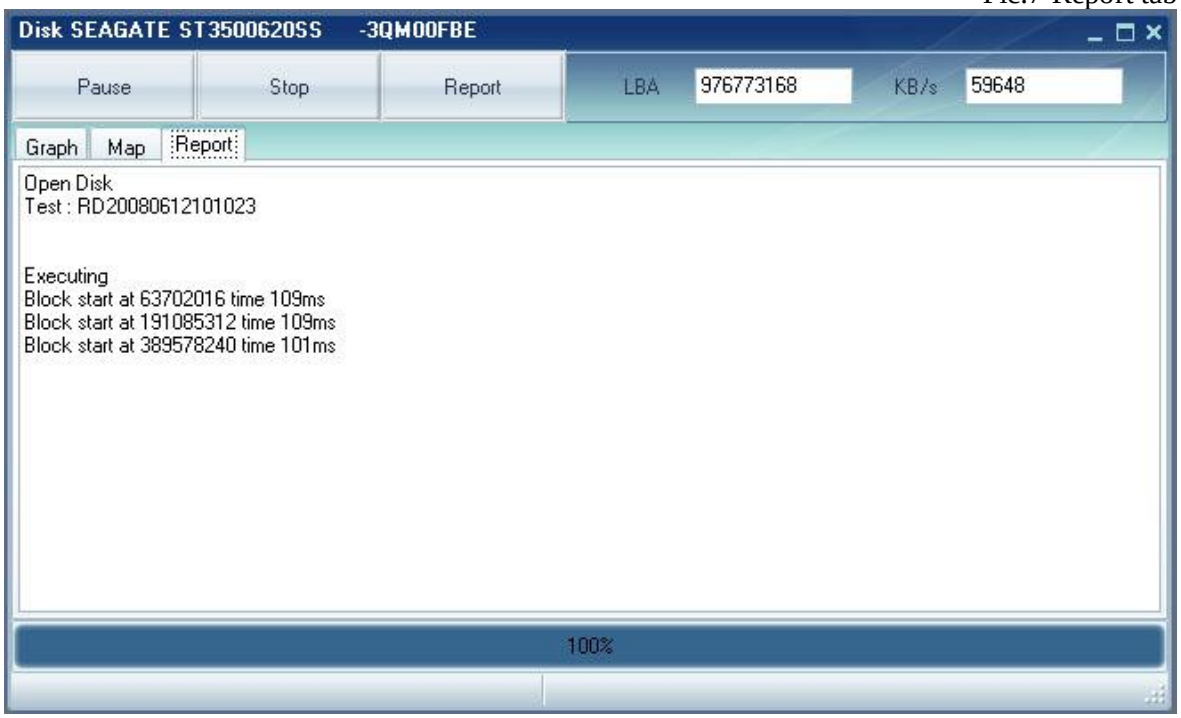
Pic.5 Graph tab

Map Tab:
Shows testing time for each block. Information is showing as a map.

Pic.6 Map tab

Report Tab:
Contains information about test and each block with testing time more than 50 ms.

Pic.7 Report tab



Identity information

Report contains information about physical and logical parameters of HDD. Report can be saved in MHT file.

Pic.8 Identity information example for ATA/SATA HDD

Identify Info for ST3160812AS

Save to File | Print

HDDScan Identify Report

Model: ST3160812AS
Firmware: 3.AHL
Serial: 5LS6CTHB
LBA: 312581808

Report By: HDDScan for Windows version 3.0
Report Date: 6/12/2008 10:04:50 AM

Main Information

Name	Value
LBA Support	Yes
LBA28	268435455
LBA48	312581808
ATA Version	7
Logical Sector Size	512 bytes
Physical Sector Size	512 bytes
Cache size	8192 KB
ECC bytes	4
Nominal Form factor	Not Reported
RPM	Not Reported
Interface	SATA
Connected through	IDE-onboard controller

DMA Support

Name	Value
DMA Support	Yes
Multiword DMA 0	Supported
Multiword DMA 1	Supported
Multiword DMA 2	Supported
UDMA 0	Supported
UDMA 1	Supported
UDMA 2	Supported

Pic.9 Identity information example for SCSI HDD

Identify Info for SEAGATE ST3146807LW

Save to File | Print

HDDScan Identify Report

Model: SEAGATE ST3146807LW
Firmware: 0007
Serial: 3HY83T68
LBA: 286749488

Report By: HDDScan for Windows version 3.0
Report Date: 6/12/2008 10:04:11 AM

Main Information

Name	Value
Physical Tracks #	49855
Physical Heads #	8
RPM	10033
Physical Sector Size	512 bytes
Logical Sector Size	512 bytes
Cache Segments #	32
Cache Segment Size	0 bytes

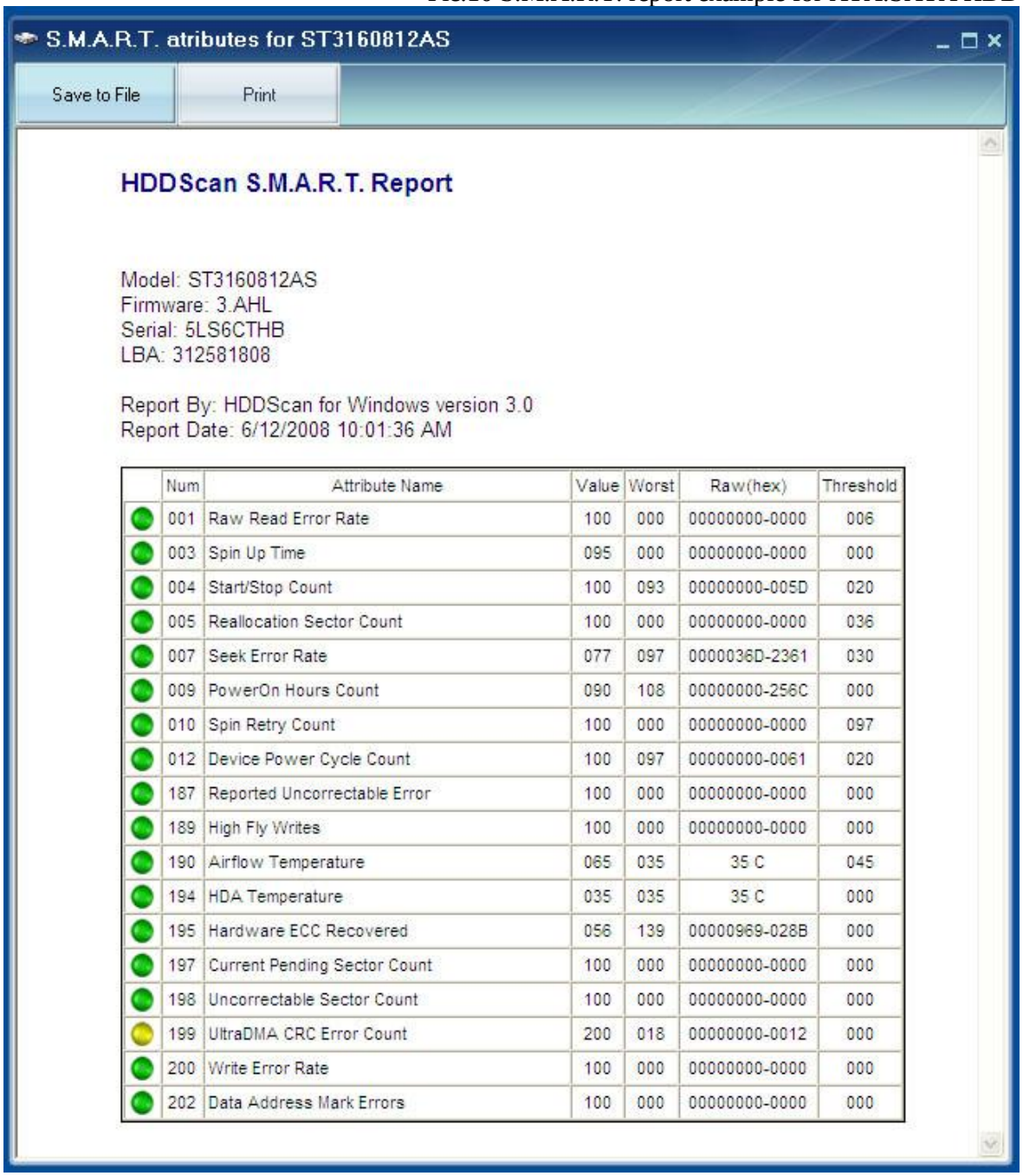
Features Support

Name	Value
Write Cache	Enabled
Read Cache	Enabled
Read Look Ahead	Enabled
Automatic Read Reallocation	Enabled
Automatic Write Reallocation	Enabled
ECC correction	Enabled
Read Retry Count	11
Write Retry Count	5
Recovery Time Limit	65535 ms

S.M.A.R.T. report:

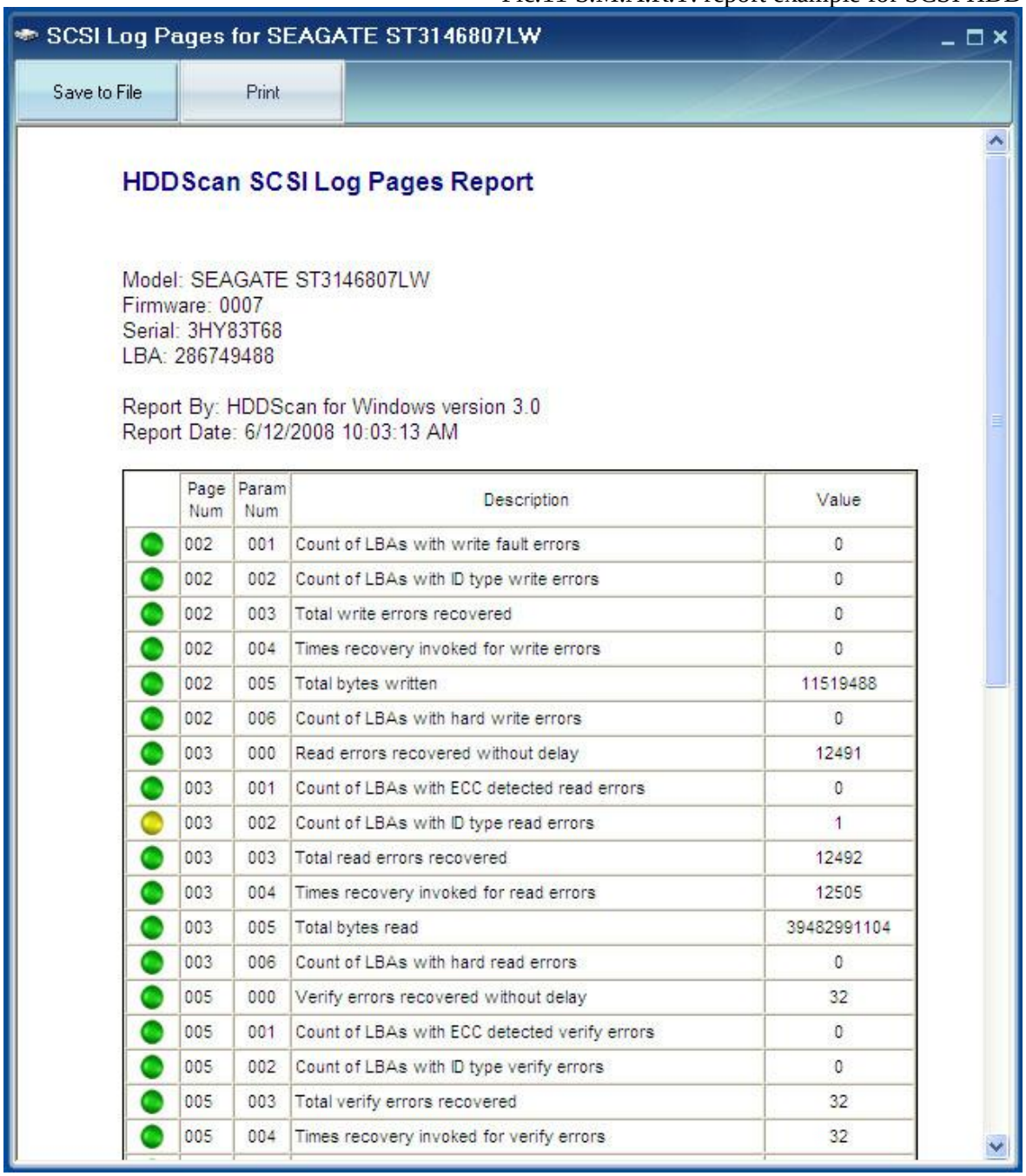
Report contains information about HDD's performance and "health" described in attributes. Green icon means – attribute values are normal. Yellow icon marks important attributes which may indicate HDD's malfunction. Red icon shows abnormal attribute values.
Report can be saved as MHT file.

Pic.10 S.M.A.R.T. report example for ATA.SATA HDD



	Num	Attribute Name	Value	Worst	Raw(hex)	Threshold
●	001	Raw Read Error Rate	100	000	00000000-0000	006
●	003	Spin Up Time	095	000	00000000-0000	000
●	004	Start/Stop Count	100	093	00000000-005D	020
●	005	Reallocation Sector Count	100	000	00000000-0000	036
●	007	Seek Error Rate	077	097	0000036D-2361	030
●	009	PowerOn Hours Count	090	108	00000000-256C	000
●	010	Spin Retry Count	100	000	00000000-0000	097
●	012	Device Power Cycle Count	100	097	00000000-0061	020
●	187	Reported Uncorrectable Error	100	000	00000000-0000	000
●	189	High Fly Writes	100	000	00000000-0000	000
●	190	Airflow Temperature	065	035	35 C	045
●	194	HDA Temperature	035	035	35 C	000
●	195	Hardware ECC Recovered	056	139	00000969-028B	000
●	197	Current Pending Sector Count	100	000	00000000-0000	000
●	198	Uncorrectable Sector Count	100	000	00000000-0000	000
●	199	UltraDMA CRC Error Count	200	018	00000000-0012	000
●	200	Write Error Rate	100	000	00000000-0000	000
●	202	Data Address Mark Errors	100	000	00000000-0000	000

Pic.11 S.M.A.R.T. report example for SCSI HDD



	Page Num	Param Num	Description	Value
●	002	001	Count of LBAs with write fault errors	0
●	002	002	Count of LBAs with ID type write errors	0
●	002	003	Total write errors recovered	0
●	002	004	Times recovery invoked for write errors	0
●	002	005	Total bytes written	11519488
●	002	006	Count of LBAs with hard write errors	0
●	003	000	Read errors recovered without delay	12491
●	003	001	Count of LBAs with ECC detected read errors	0
●	003	002	Count of LBAs with ID type read errors	1
●	003	003	Total read errors recovered	12492
●	003	004	Times recovery invoked for read errors	12505
●	003	005	Total bytes read	39482991104
●	003	006	Count of LBAs with hard read errors	0
●	005	000	Verify errors recovered without delay	32
●	005	001	Count of LBAs with ECC detected verify errors	0
●	005	002	Count of LBAs with ID type verify errors	0
●	005	003	Total verify errors recovered	32
●	005	004	Times recovery invoked for verify errors	32

Temperature monitor:

Monitor allows evaluating HDD's temperature. Temperature is indicated on the Task bar and in an information window. Pic.12 shows temperature for two drives.

Pic.12 Temperature monitors on the Task bar

For ATA/SATA/USB/FireWire drives the information widow shows two values. The second value is shown on the Task bar.
The first value indicates temperature from Airflow Temperature attribute; the second value indicates temperature from HDA Temperature attribute.

Pic.13 Temperature monitor for ATA/SATA HDD

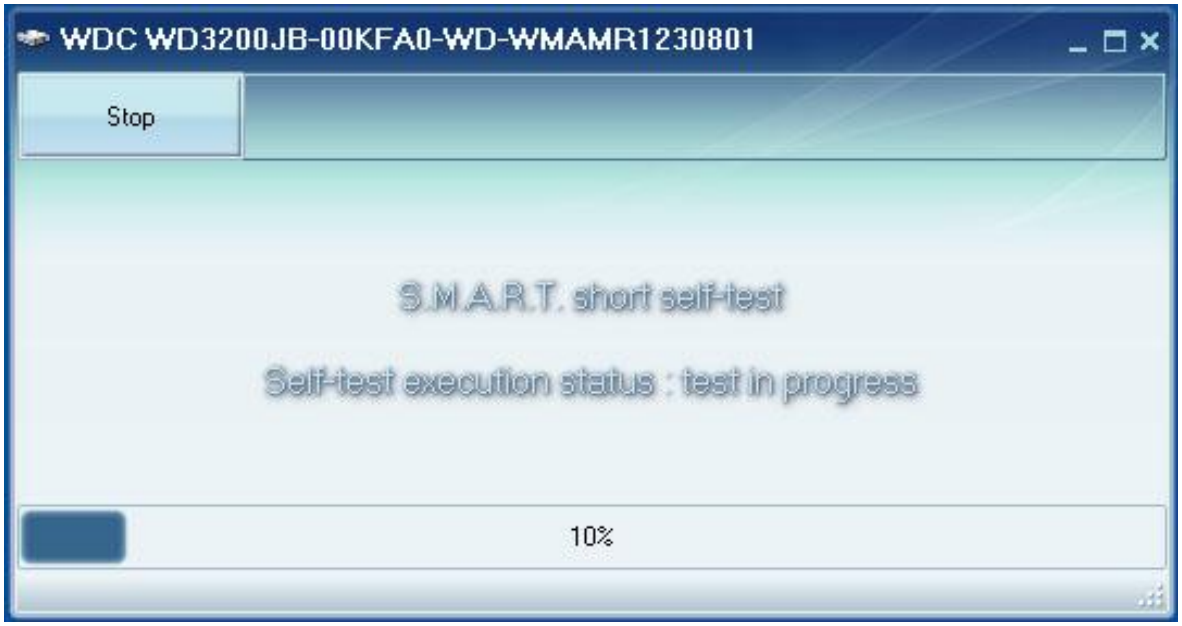
For SCSI drives the information window shows two values. The second value is shown on the Task bar.
The first value indicates maximum allowed temperature for HDD; the second value indicates current temperature.

Pic.14 Temperature monitor for SCSI HDD

S.M.A.R.T. tests

The program allows running three kinds of tests
1. Short test – lasts about 1-2 minutes. The test inspects drive's main schemas, scans small part of drive's surface and checks sectors from the Pending-list (such sectors may have read errors). This test recommended for quick drive testing.
2. Extended test – lasts 0.5-2 hours. The test inspects drive's main schemas and scans the whole drive's surface.
3. Conveyance test – usually lasts several minutes. The test inspects drive's main schemas and logs which may indicate inaccurate transportation or storing.

Pic.15 S.M.A.R.T. test information window



Additional features:

The program allows changing some parameters for ATA/SATA/USB/FireWire HDD.

1. AAM – this function changes drive's acoustic. If this function is enabled drive's noise may be decreased by smoothing HSA's seek operations. HDD could lose some performance.
2. APM – this function allows power savings by temporary decreasing spindle's rotation speed (including complete stop) when drive is in idle.
3. PM – this function allows setting spin-down timer. If drive is in idle spindle will be stopped after the time set in the timer. If any program requests HDD access timer will be reset and spindle will spin up.
4. The program can also start or stop spindle immediately. If any program requests HDD access drive's spindle will spin up.

Pic.16 Features window for ATA/SATA HDD

The program can show defect-lists and start or stop spindle for SCSI drives.

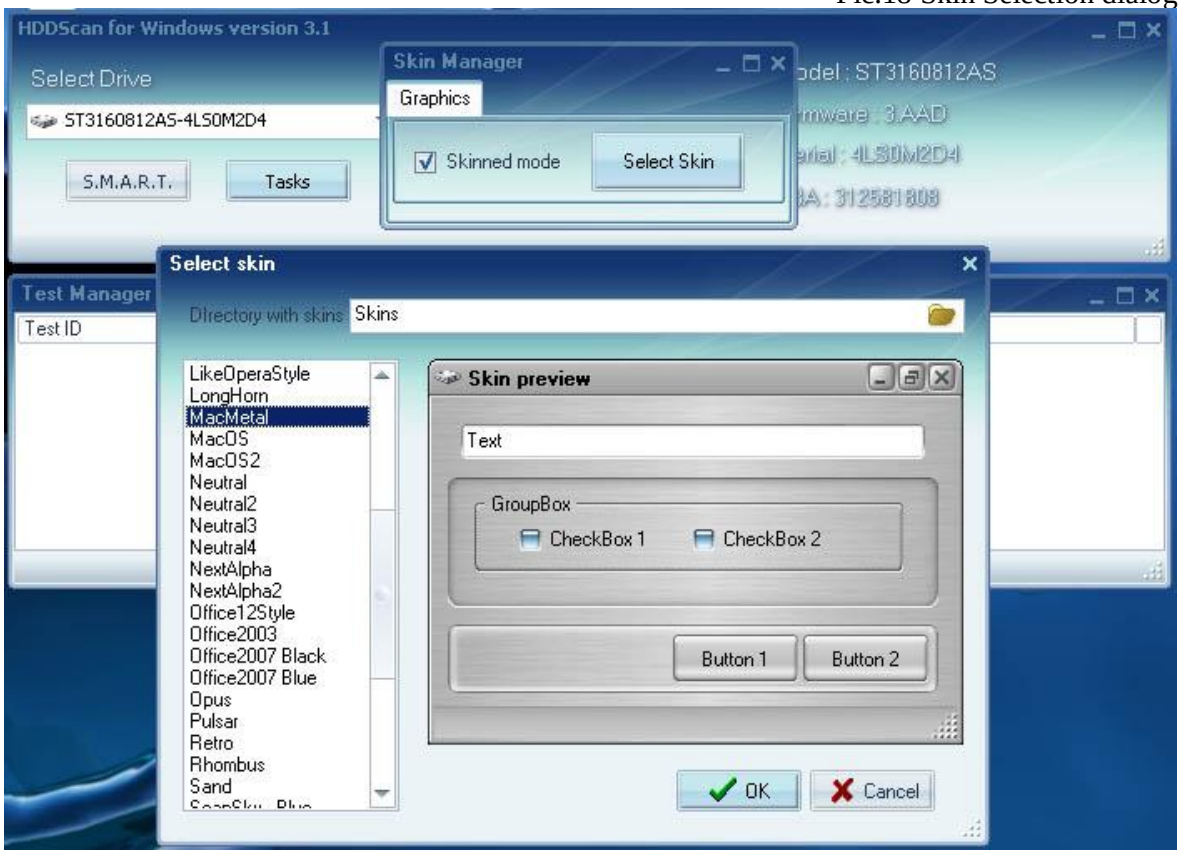
Pic.17 Features window for SCSI HDD

Skin usage

Program uses AlphaSkins component which allows user selecting new skins for application. You can download skins from here - http://www.alphaskins.com/asdwnld.php
You can find a manual how to create your own skin on that site too.

Create Skins subdirectory in the directory where HDDScan.exe file is located. Download and copy skins to that subdirectory. Open Skin Selection dialog. Press Select Skin button and choose desired skin. Program will create main.ini file that file will store information about current skin. If you delete main.ini file program will use default internal skin – WLM. Skinned mode checkbox can disable or enable skin usage (enabled by default)

Pic.18 Skin Selection dialog



Appendix A: USB/FireWire HDD

If USB/FireWire HDD is supported by the program, tests, S.M.A.R.T. capabilities and additional features may be executed on the drive.
If USB/FireWire HDD is no supported by the program, only tests can be executed.

USB/FireWire HDDs supported by the program:

Storage device	Controller chip
StarTeck IDECase35U2	Cypress CY7C68001
WD Passpopt	Initio INIC-1610L
Iomega PB-10391	Unknown
Seagate ST9000U2 (PN: 9W3638-556)	Cypress CY7C68300B
Seagate External Drive (PN: 9W286D)	Cypress CY7C68300B
Seagate FreeAgentPro	Oxford
CASE SWEXX ST010	Cypress AT2LP RC7
Vantec CB-ISATAU2 (adapter)	JMicron JM20337
Beyond Micro Mobile Disk 3.5" 120GB	Prolific PL3507 (supported only USB)
Maxtor Personal Storage 3100	Prolific PL2507
Maxtor Personal Storage (USB2120NEP001)	In-System ISD300A
	SunPlus SPIF215A

USB/FireWire HDDs which probably supported by the program:

Storage device	Controller chip
AGEStar IUB3A	Cypress
AGEStar ICB3RA	Cypress
AGEStar IUB3A4	Cypress
AGEStar IUB5A	Cypress
AGEStar IUB5P	Cypress
AGEStar IUB5S	Cypress
AGEStar NUB3AR	Cypress
AGEStar IBP2A2	Cypress
AGEStar SCB3AH	JMicron JM2033x
AGEStar SCB3AHR	JMicron JM2033x
AGEStar CCB3A	JMicron JM2033x
AGEStar CCB3AT	JMicron JM2033x
AGEStar IUB2A3	JMicron JM2033x
AGEStar SCBP	JMicron JM2033x
AGEStar FUBCP	JMicron JM2033x
Noontec SU25	Prolific PL2507
Transcend TS80GHDC2	Prolific PL3507
Transcend TS40GHDC2	Prolific PL3507
I-O Data HDP-U series	Unknown
I-O Data HDC-U series	Unknown
Enermax Vanguard EB206U-B	Unknown
Thermaltake Max4 A2295	Unknown
Spire GigaPod SP222	Unknown
Cooler Master - RX-3SB	Unknown
MegaDrive200	Unknown
RaidSonic Icy Box IB-250U	Unknown

USB/FireWire HDDs not supported by the program:

Storage device	Controller chip
Matrix	Genesis Logic GL811E
Pine	Genesis Logic GL811E
Iomega LDHD250-U	Cypress CY7C68300A
Iomega DHD160-U	Prolific PL-2507 (modified firmware)
Iomega	Prolific PL-3507 (modified firmware)
Maxtor Personal Storage 3200	Prolific PL-3507 (modified firmware)
Maxtor One-Touch	Cypress CY7C68013
Seagate Pocket HDD	Unknown
Seagate External Drive (PN-9W2063)	Cypress CY7C68013
SympleTech SympleDrive 9000-40479-002	CY7C68300A
	Myson Century CS8818
	Myson Century CS8813