

HD Tune Pro manual

version 4.50

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1. Introduction

HD Tune Pro is a hard disk utility which has the following functions:

- Benchmark: measures the low-level performance (read/write)
- File Benchmark: measures the file performance (read/write)
- Random Access: measures the random access performance (read/write)
- Extra Tests: includes several quick tests to show the most important performance parameters (read/write)
- Cache Test
- Info: shows detailed information
- Health: checks the health status by using SMART, data can be logged
- Error Scan: scans the surface for errors
- Erase: securely erases all data from the disk
- Disk Monitor: monitors disk access
- Folder View: shows disk space usage for each folder
- AAM: reduces noise or increases seek performance
- Temperature display

HD Tune Pro may also work with other storage devices such as memory cards, USB sticks, iPods, etc.

2. Before you get started

WARNING!

Hard disks and other storage media can fail at any time without any prior warning. Always make sure you have a backup of your important files especially if your hard disk is acting strangely.

Unit of storage capacity

There is a lot of confusion when it comes to showing the capacity of hard drives. Hard drive manufacturers use the SI notation where 1 KB equals 1000 bytes. Windows uses the binary notation where 1 KB equals to 1024 bytes.

Although generally HD Tune Pro uses the binary notation, for showing the hard drive capacity the SI notation is used. To differentiate with the binary notation, the first letter will be a non-capital letter.

Comparison tables

1 kB	1 000 bytes	0.98 KB
1 mB	1 000 000 bytes	0.95 MB
1 gB	1 000 000 000 bytes	0.93 GB
1 tB	1 000 000 000 000 bytes	0.91 TB

1 KB	1 024 bytes	1.02 kB
1 MB	1 048 576 bytes	1.05 mB
1 GB	1 073 741 824 bytes	1.07 gB
1 TB	1 099 511 627 776 bytes	1.10 tB

Short Stroke

Short stroking is a technique to maximize performance by only using a small part of the hard drive.

Hard drives are faster at the outer tracks because of the higher data density. A hard drive starts reading and writing at the outer tracks. Speed decreases when the read/write heads move towards the inner tracks.

By discarding the inner tracks the average speed will be higher. The seek times will also

improve (decrease) because the read/write heads don't have to move long distances.

It's important to note that short stroking will not make your hard drive faster. It will only instruct the operating system not to use the slow part of the drive.

The performance tests of HD Tune Pro include an option to specify the test capacity. This allows to test the performance when short stroking is used.

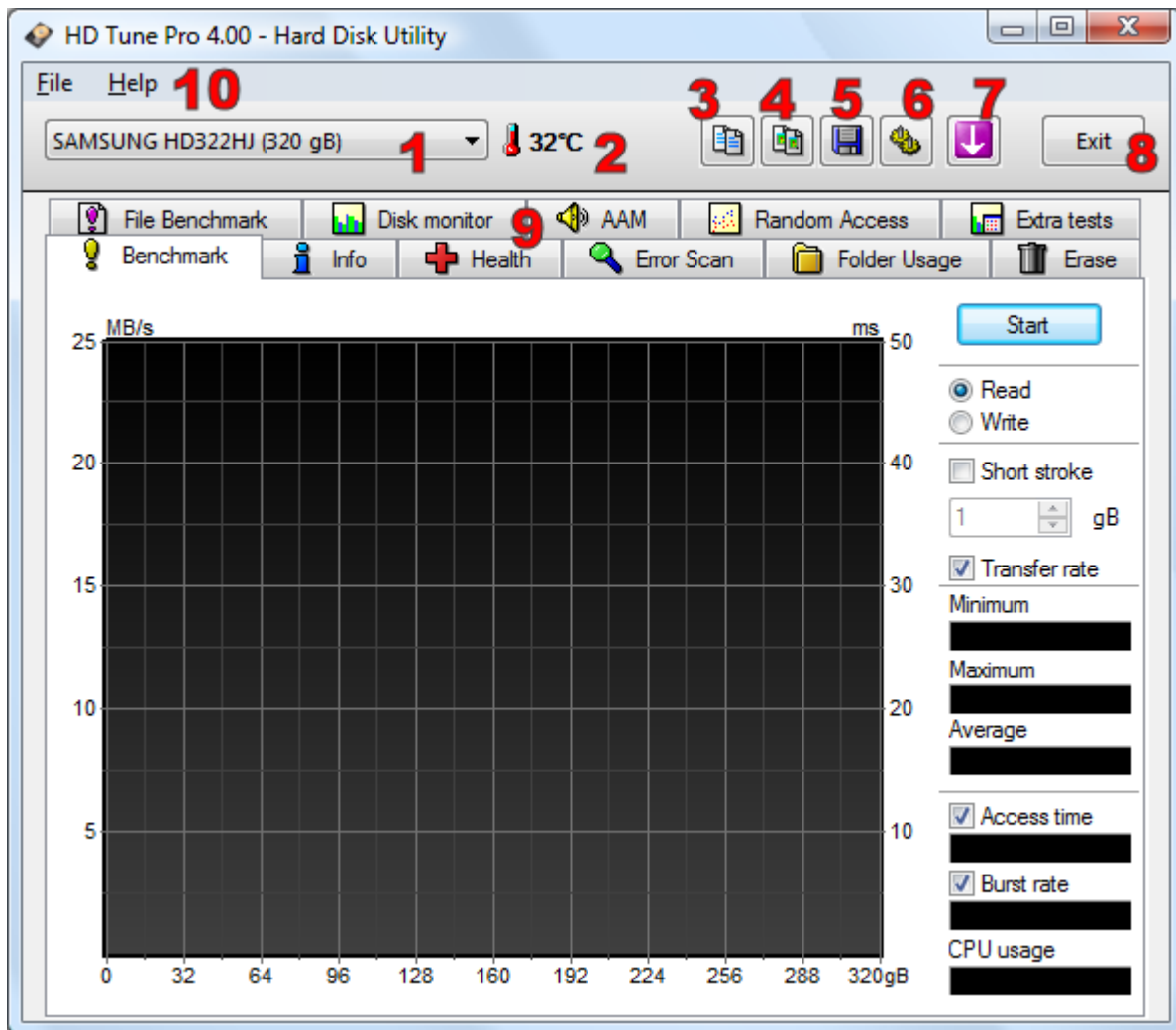
This option also allows for an easy comparison between drives with a different capacity. By setting the short stroke capacity to a value which is equal or lower than the capacity of the smallest hard drive you will get a fair comparison.

For example: suppose you have a 120 GB hard drive and you're using 100 GB for the operating system and applications. If you want to install the same operating system and applications on a new, larger drive and want to see how it compares with the old hard drive you can set the stroke capacity to 100 GB and test both hard drives.

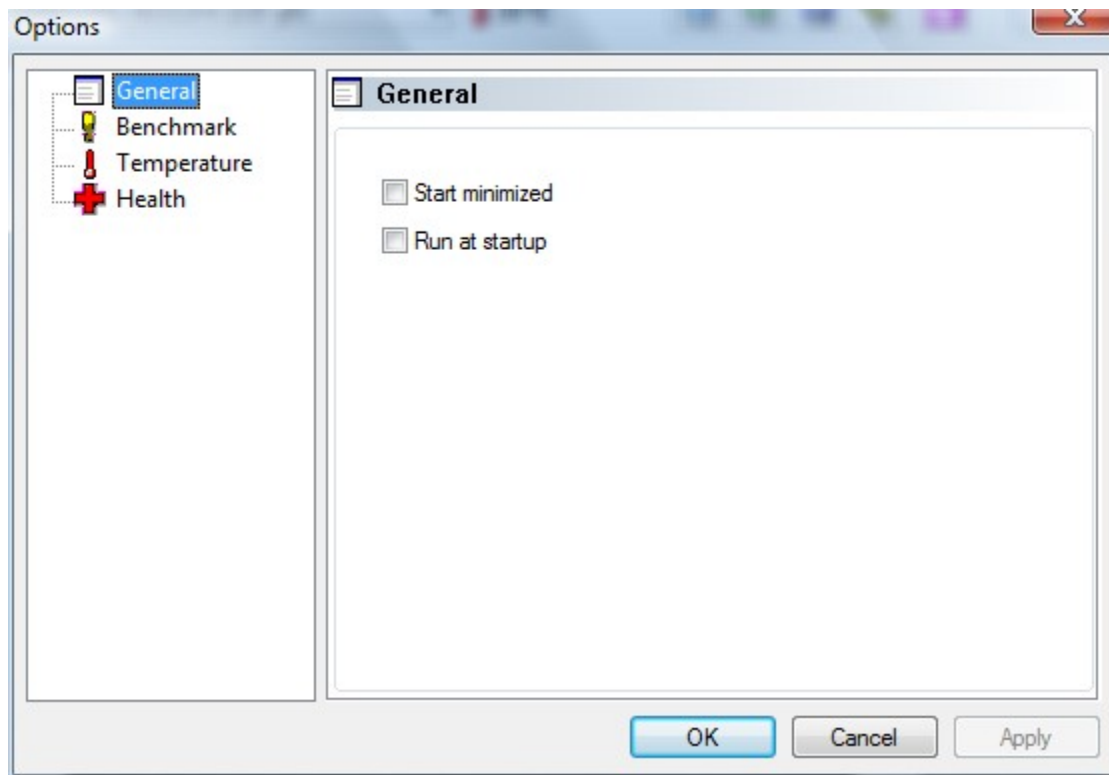
3. System requirements

- Windows 2000, Windows XP, Windows Vista, Windows 7, Windows 2003 Server with administrator rights
- 10 MB of free hard disk space

4. Usage



1. Select hard drive
2. Temperature display
3. Copy results or info to clipboard
4. Copy screenshot to clipboard
5. Save screenshot as png file
6. Options
7. Minimize to tray
8. Exit program
9. Select function
10. Menu

Available options:

Start minimized: minimizes the program to the taskbar.

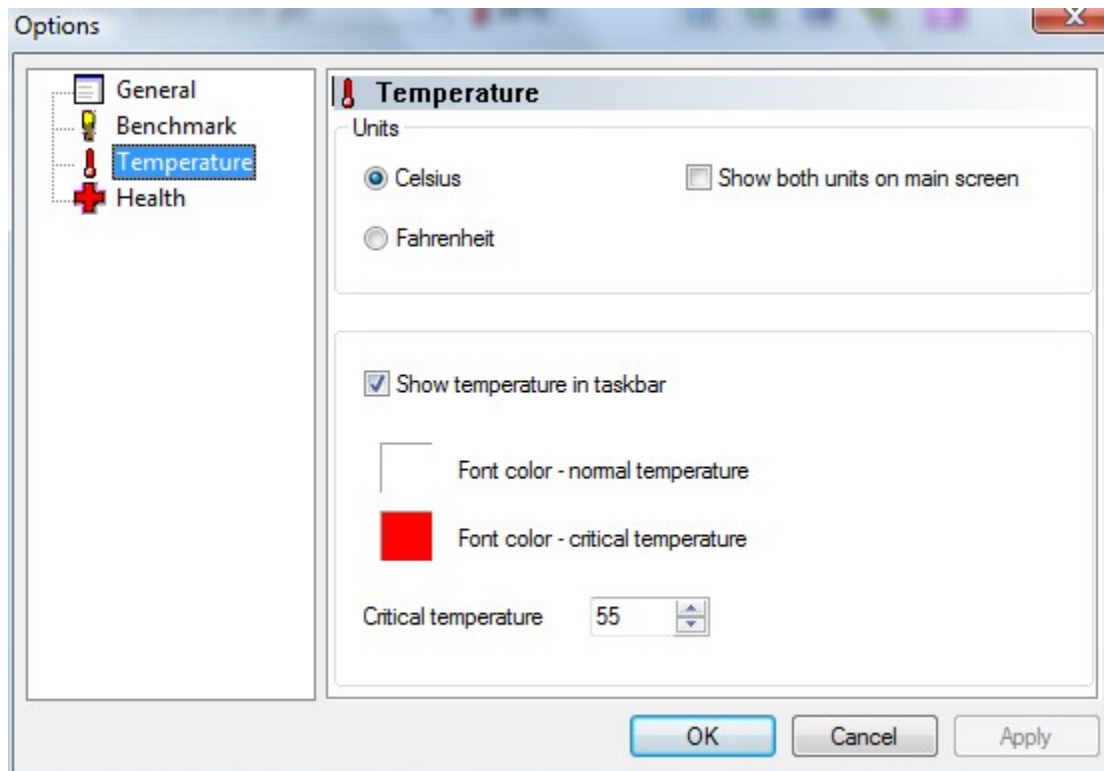
note: this function only works if the 'Show temperature in taskbar' option is enabled (available in temperature options).

Run at startup: automatically executes the program each times Windows starts.

5. Temperature display

The temperature can be shown in three places: on the main screen next to the drive selector, in the taskbar and on the health page.

Available options:



Units: select between Celsius and Fahrenheit.

Show both units on screen: temperature will be shown in both Celsius and Fahrenheit on the main screen.

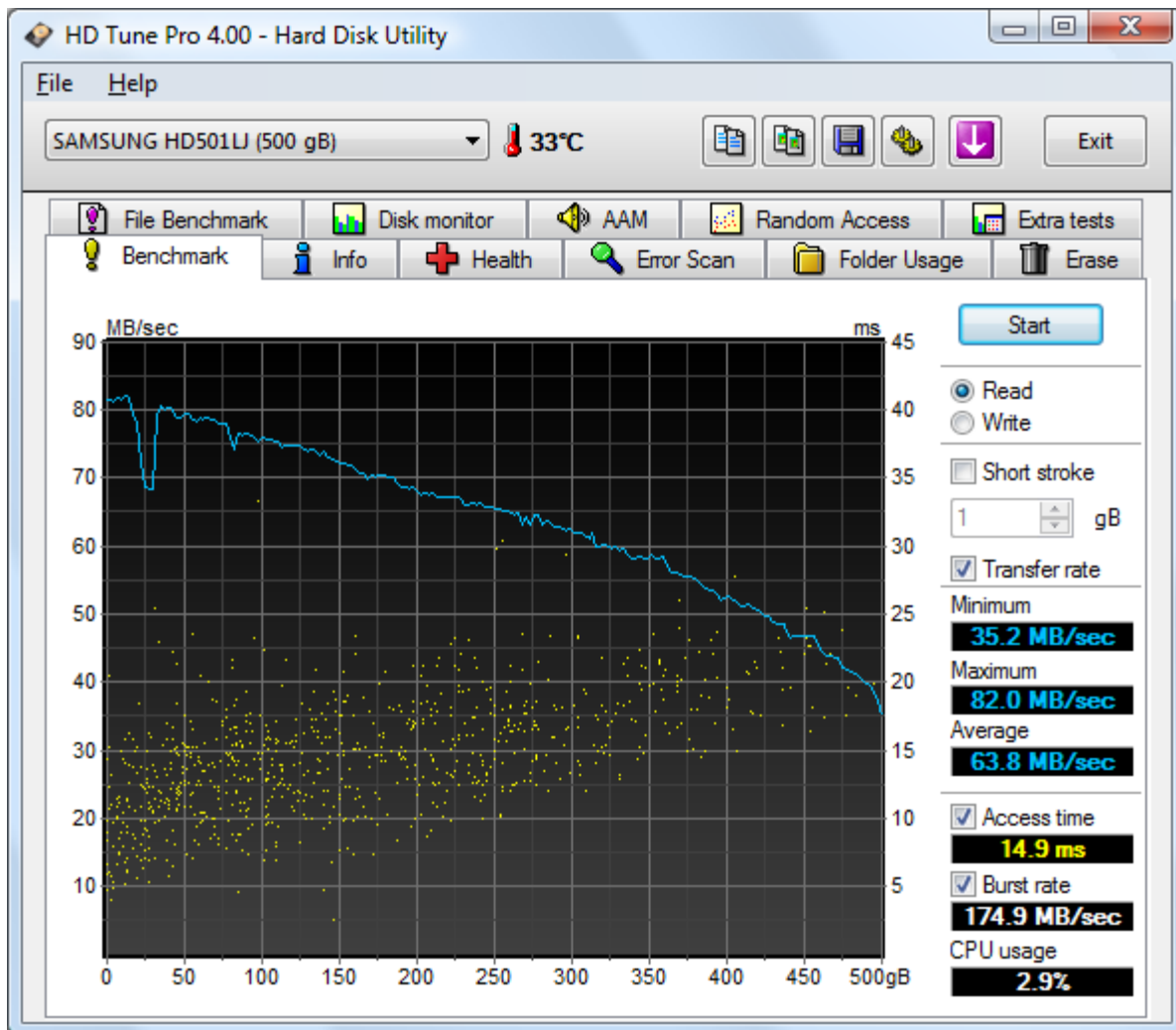
Show temperature in taskbar: temperature will be shown on the taskbar. If the temperature exceeds the specified limit a warning message will show up here.

Font color - normal temperature: color of the temperature display when the temperature is below the critical value.

Font color - critical temperature: color of the temperature display when the temperature is equal to or higher than the critical value.

Critical temperature: a warning will show up if the temperature equals or exceeds this value.

6. Benchmark



The benchmark function offers four different tests:

6.1. Transfer rate

The data transfer rate is measured across the entire disk surface (default) or across the selected capacity (short stroke option).

The X-axis shows the position in gigabytes (GB). The Y-axis shows the transfer speed in megabytes per second (MB/s).

Both read and write transfer rate can be measured. To prevent accidental data loss, the write test can only be performed on a disk with no partitions.

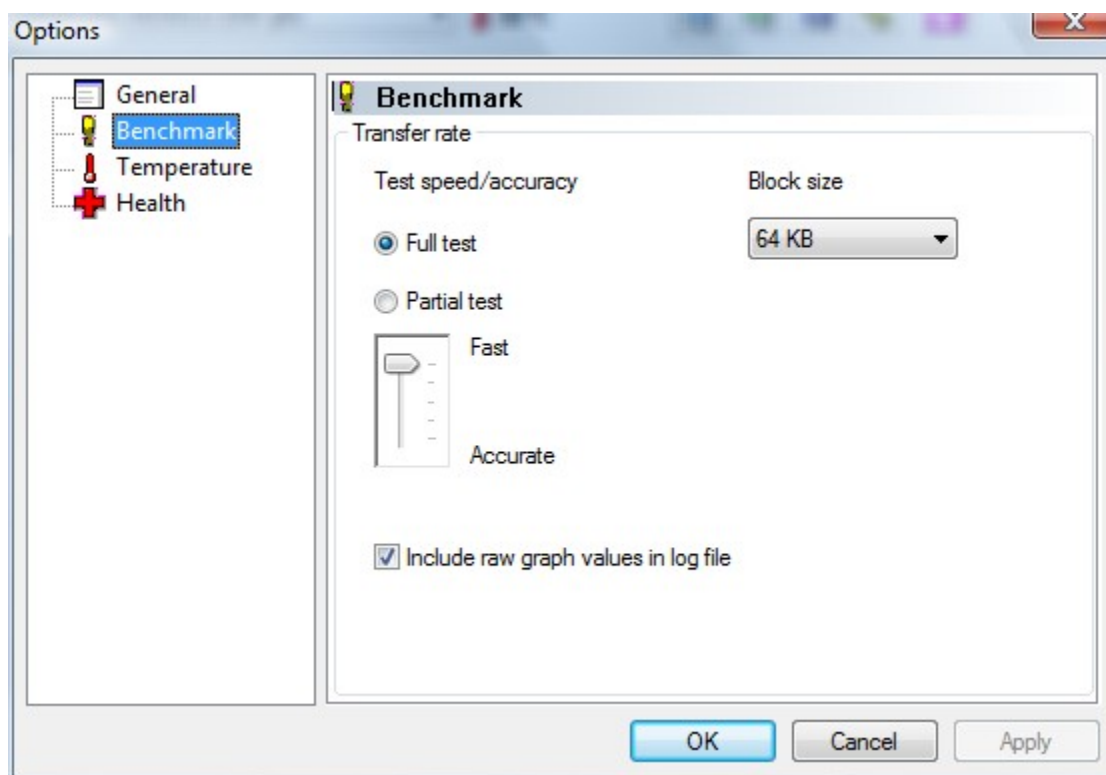
To remove all partitions go to **Control Panel -> Administrative Tools -> Computer Management -> Disk Management**, right-click on the partitions on the hard disk you want to test and select delete partition.

A newly bought hard disk usually doesn't have any partitions yet so this step is not necessary to run the write test.

Note: *the data density at the outer tracks of a hard drive is higher than at the inner tracks. Reading or writing at the outer tracks will be done at a higher speed because the rotation speed is constant.*

A hard drive starts reading and writing at the outer tracks and moves to the inner tracks. This can be seen in the transfer rate graph where the speed is the highest at the start of the test and decreases towards the end of the test.

Available options:



Test speed/accuracy: the full test will read or write every sector on the disk. This will give the most accurate results but the test time will be very long. By choosing the partial test the transfer speed is sampled across the disk surface. The test time and accuracy can be chosen by moving the slider.

Block size: block size which is used during the transfer rate test.

Lower values may give lower test results. The default and recommended value is 64 KB.

Include raw graph values in log file: by enabling this option the graph values will be saved in the log file which can be imported in a spreadsheet.

6.2. Access time

The average access time is measured and displayed in milliseconds (ms). The measured access times are shown on the graph as the yellow dots.

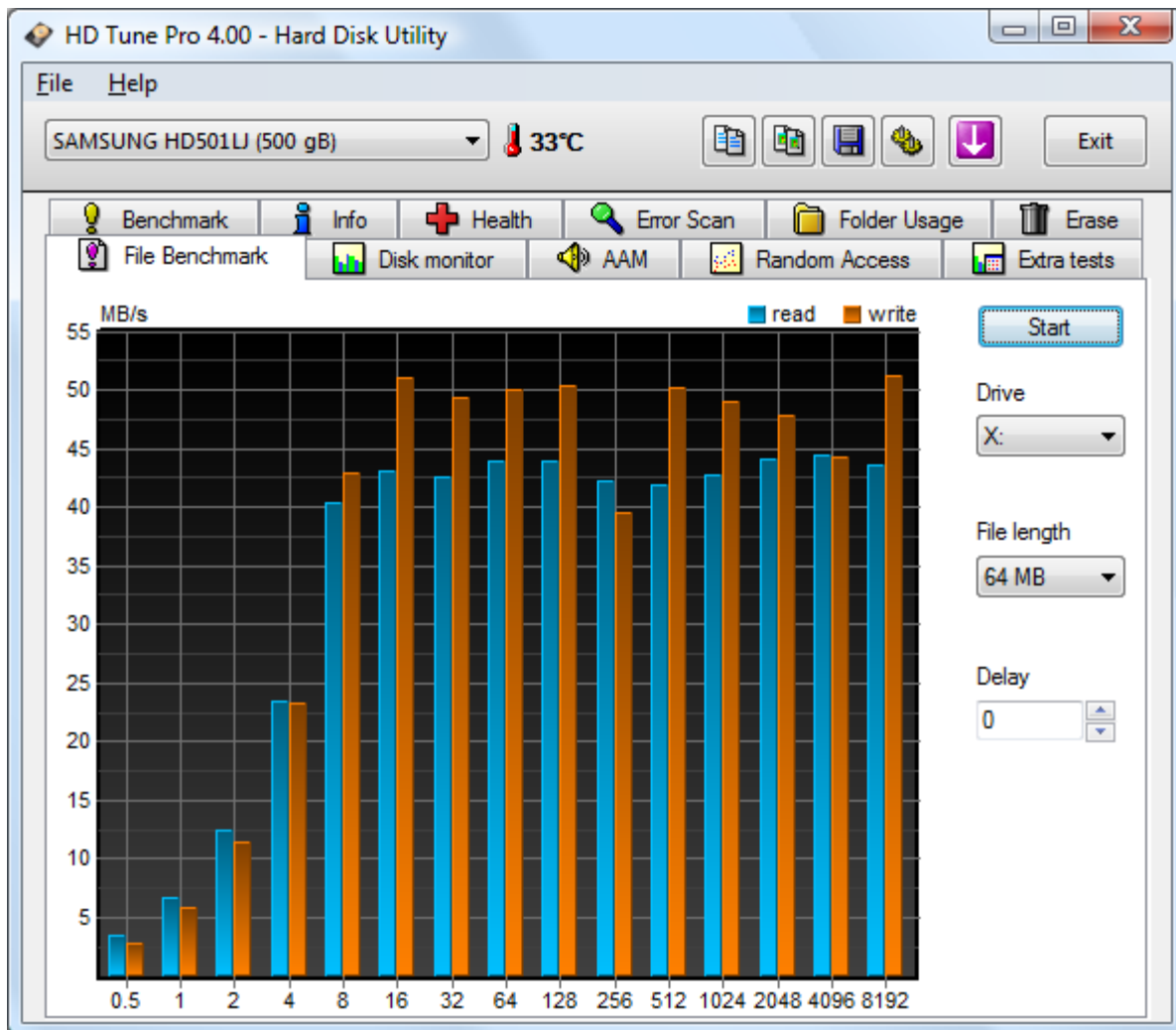
6.3. Burst rate

The burst rate is the highest speed (in megabytes per second) at which data can be transferred from the drive interface (IDE, SATA, USB,...) to the operating system.

6.4. CPU usage

The CPU usage shows how much CPU time (in %) the system needs to read data from the hard disk.

7. File benchmark

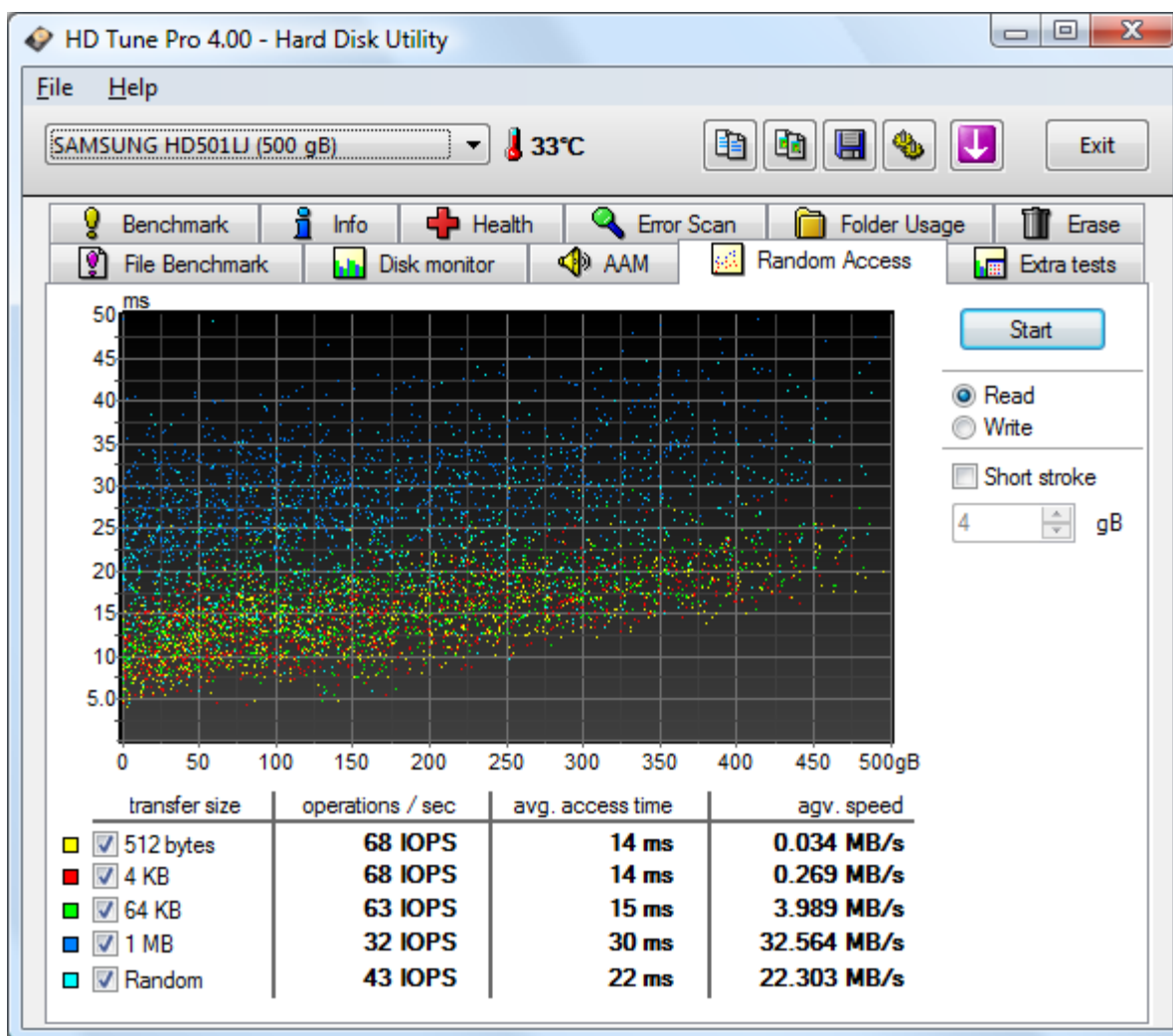


The file benchmark measures the performance for reading and writing files to the selected hard disk partition with different block sizes ranging from 0.5 KB to 8192 KB (x-axis). The length of the test files can be set. For accurate results a large size is recommended. If the file length is too small the hard disk may be able to cache the entire file. In that case the cache speed will be measured instead of the hard disk throughput.

On some configurations it may be necessary to add a delay between the write and read test to make sure all data is written to the disk before the read test is executed.

This test is non-destructive but requires a partition with a drive letter associated.

8. Random access



The Random Access test measures the performance of random read or write operations. The amount of data which will be read varies from 512 bytes to 1 MB. The random test uses transfer size between 512 bytes and 1 MB. You can choose which tests will be performed by clicking on the checkboxes next to the transfer size.

Results are shown in three different units:

Operations per seconds (IOPS): number of completed read or write requests per second. Higher is better.

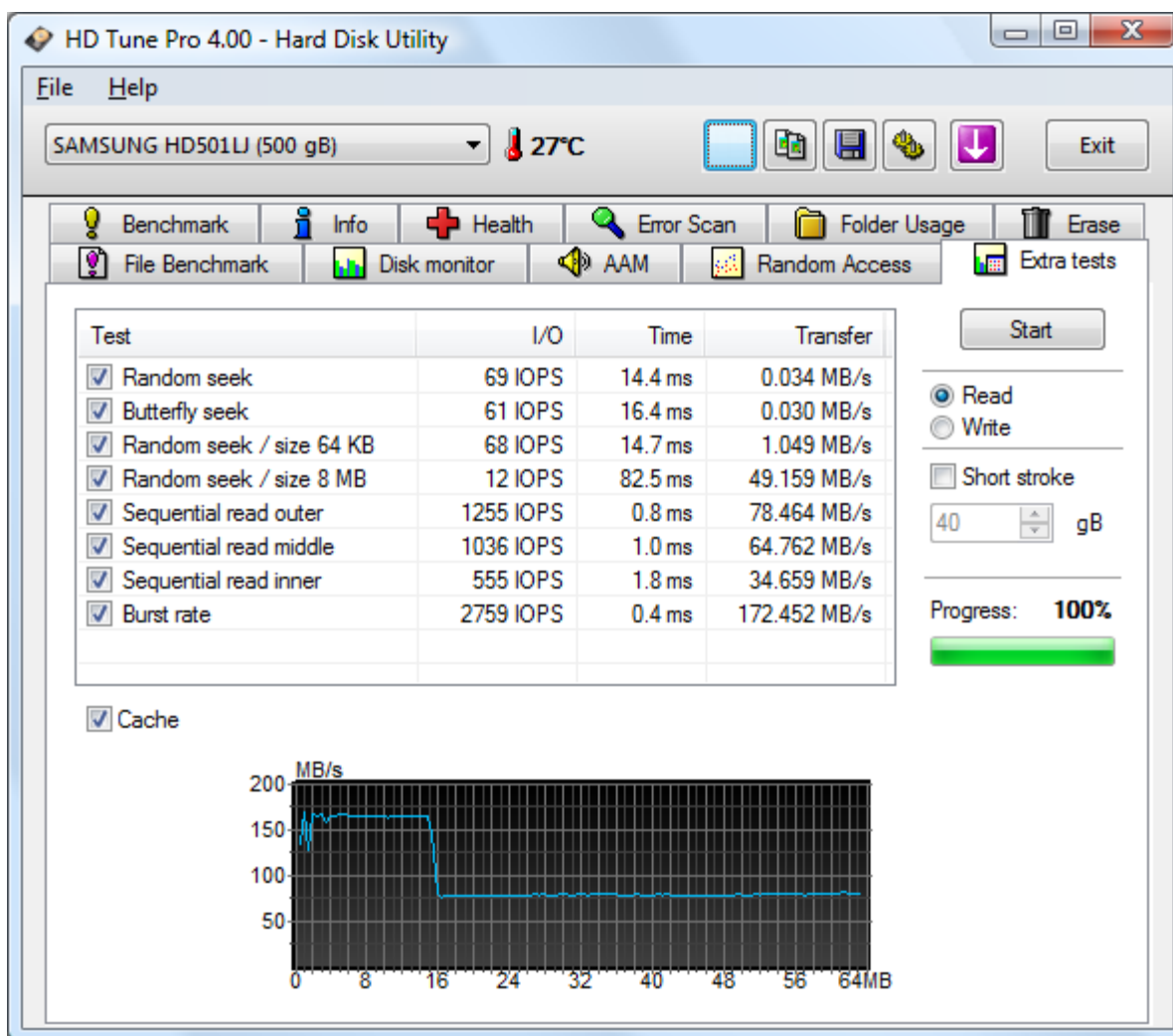
Avg. access time (in milliseconds or ms): average amount of time it takes to perform a single read or write operation. Lower is better.

Avg. speed (in megabytes per second or MB/s): average transfer speed for a completed read or write operation. Higher is better.

This test is a low level test and can only be performed on a drive with no partitions (see the benchmark topic for more information).

The random access performance can be measured on a partial section of the hard drive by setting the short stroke options.

9. Extra tests



The extra test tab offers a variety of small tests which can be used to quickly determine the most important performance parameters of the hard drive. Short stroke options are available for a partial test.

Explanation of the extra tests:

Random seek: performs random seek operations across the disk surface

Butterfly seek: performs seek operations moving from the outer tracks to the inner tracks and back

Random seek / size 64 KB: performs random read/write seek operations with a random block size (max. 64 KB).

Random seek / size 8 MB: performs random read/write seek operations with a random block size (max. 8 MB)

Sequential seek outer: measures the transfer rate at the outer tracks

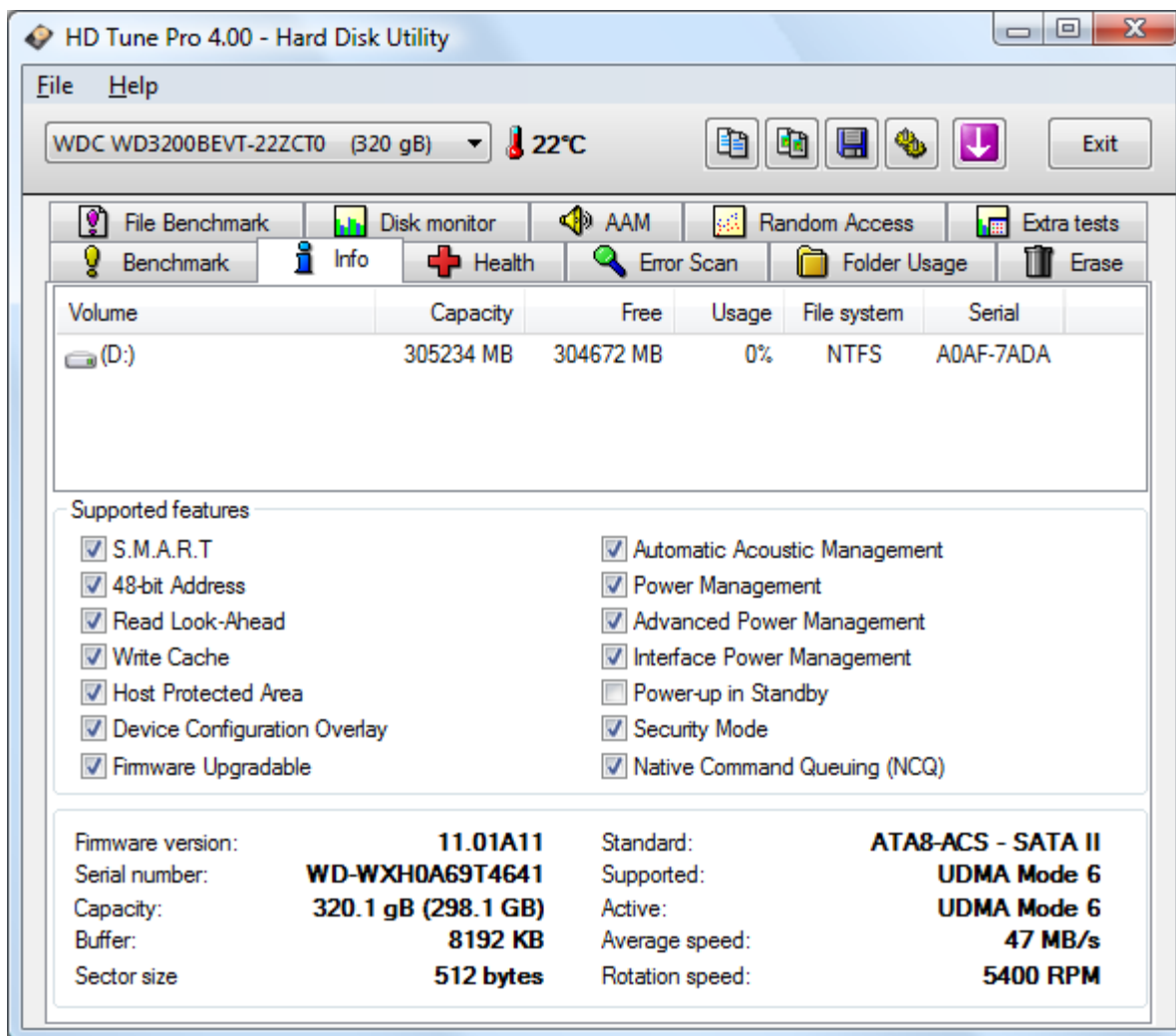
Sequential seek middle: measures the transfer rate at the center of the drive

Sequential seek inner: measures the transfer rate at the inner tracks

Burst rate: measures the highest possible transfer speed between the drive and the interface

Cache test: measures the transfer speed from the buffer of the drive and shows it graphically. Usually the buffer capacity of the drive can be determined by checking the position where the speed drops sharply. The screenshot shows a buffer capacity of 16 MB.

10. Info



The first part of the screen shows detailed information about each partition on the hard disk.

The second part shows which features are supported.

The third part shows basic information:

Firmware version

Serial number

Capacity as it is marketed by the manufacturer; defining 1 KB as 1000 bytes. The capacity between braces is the capacity as shown by Windows defining 1 KB as 1024 bytes.

Buffer size: buffer capacity of the drive. Note: due to limitations of the (S)ATA specifications only buffer capacities below 32 MB are reported. To determine the actual usable buffer capacity the cache test from the extra tests tab can be used.

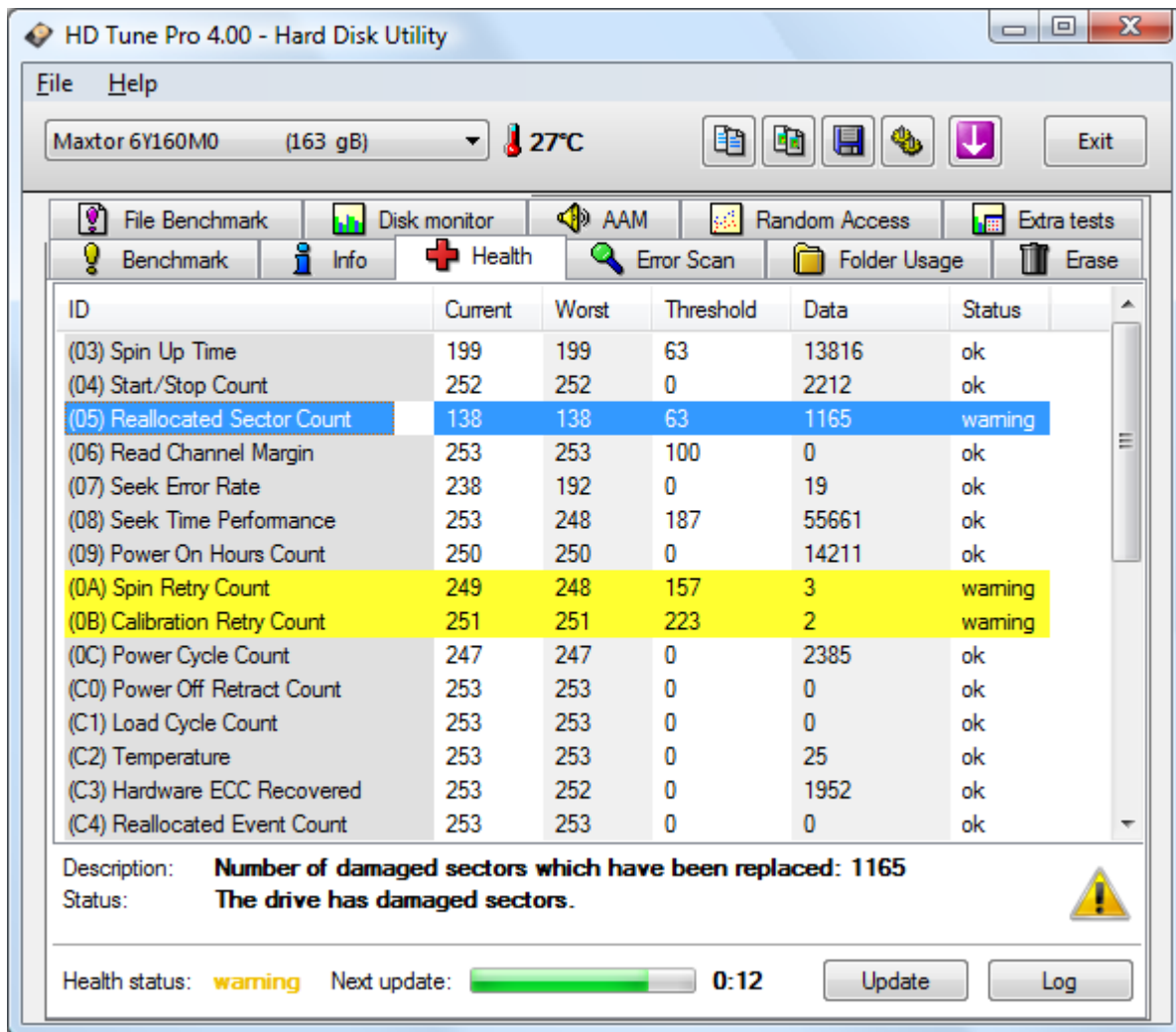
Interface standard

Maximum transfer mode and active transfer mode

Average speed: average read/write speed across the entire drive capacity.

Rotation speed: rotation speed in revolutions per minute (rpm)

11. Health



This function uses S.M.A.R.T. (Self-Monitoring Analysis and Reporting Technology) to get information about the health of the hard disk.

The table shows the following parameters:

ID: parameter which is being measured

Current: current value

Worst: the worst value which has been recorded since the hard disk was first used

Threshold: the value of any of the parameters should never get below the threshold

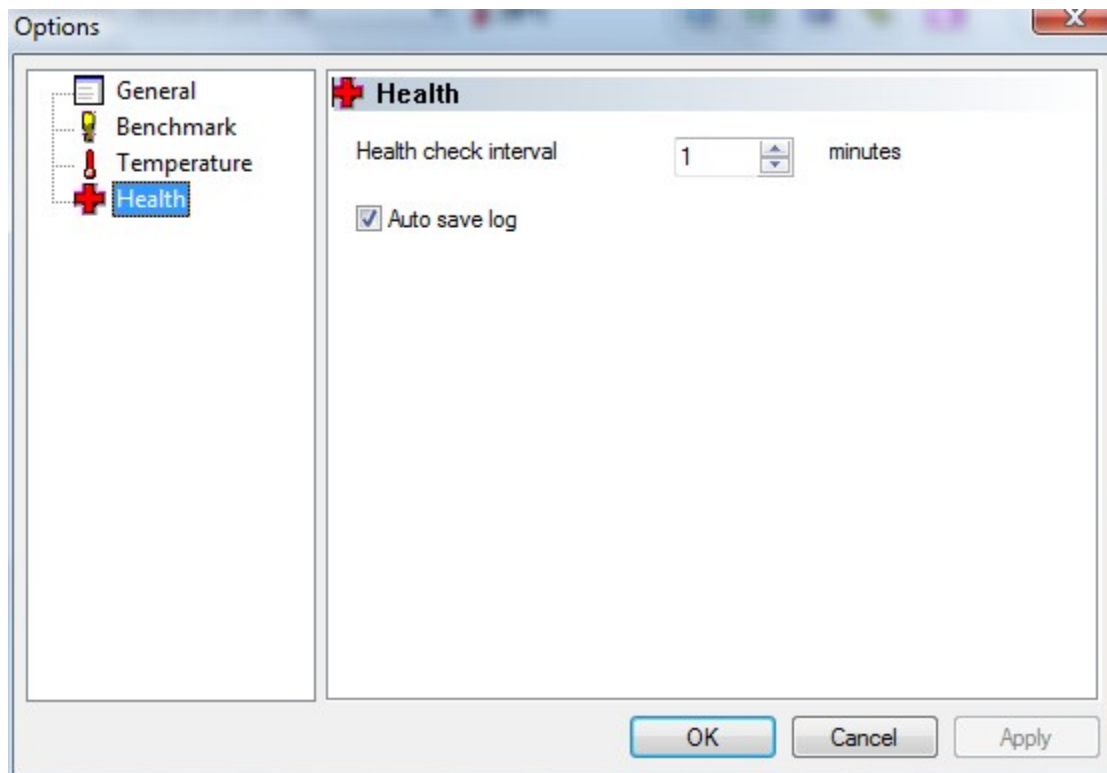
Data: shows the usable data which belongs to the ID

Status: status of the parameter (OK or failed)

Click on a list entry to get detailed information about the selected parameter as well as the status and possible reason for failure.

The progress bar shows when the next update of the status will occur. The status can be manually updated by pressing the update button.

Available options:



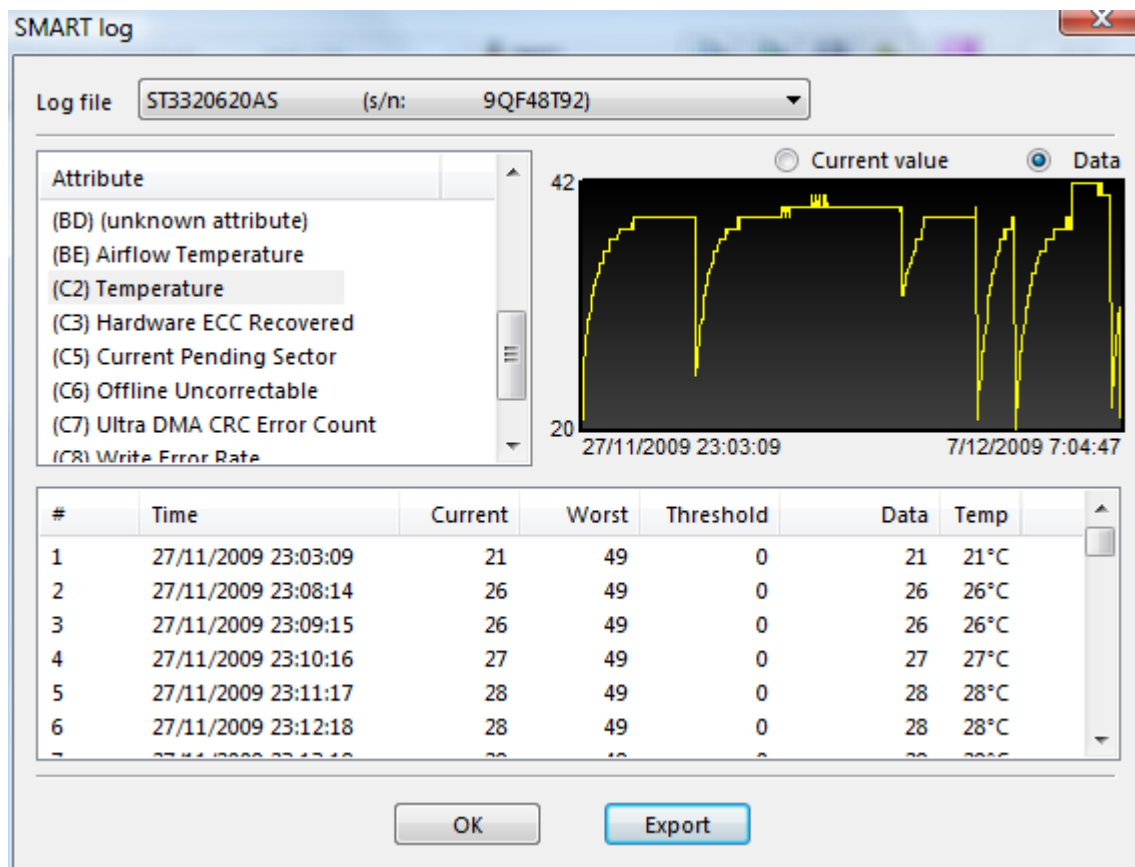
Health check interval: time in minutes between status updates.

Auto save log: saves the health status to a log file

Log

By pressing the log button a new screen will pop up which shows a history of the S.M.A.R.T. status.

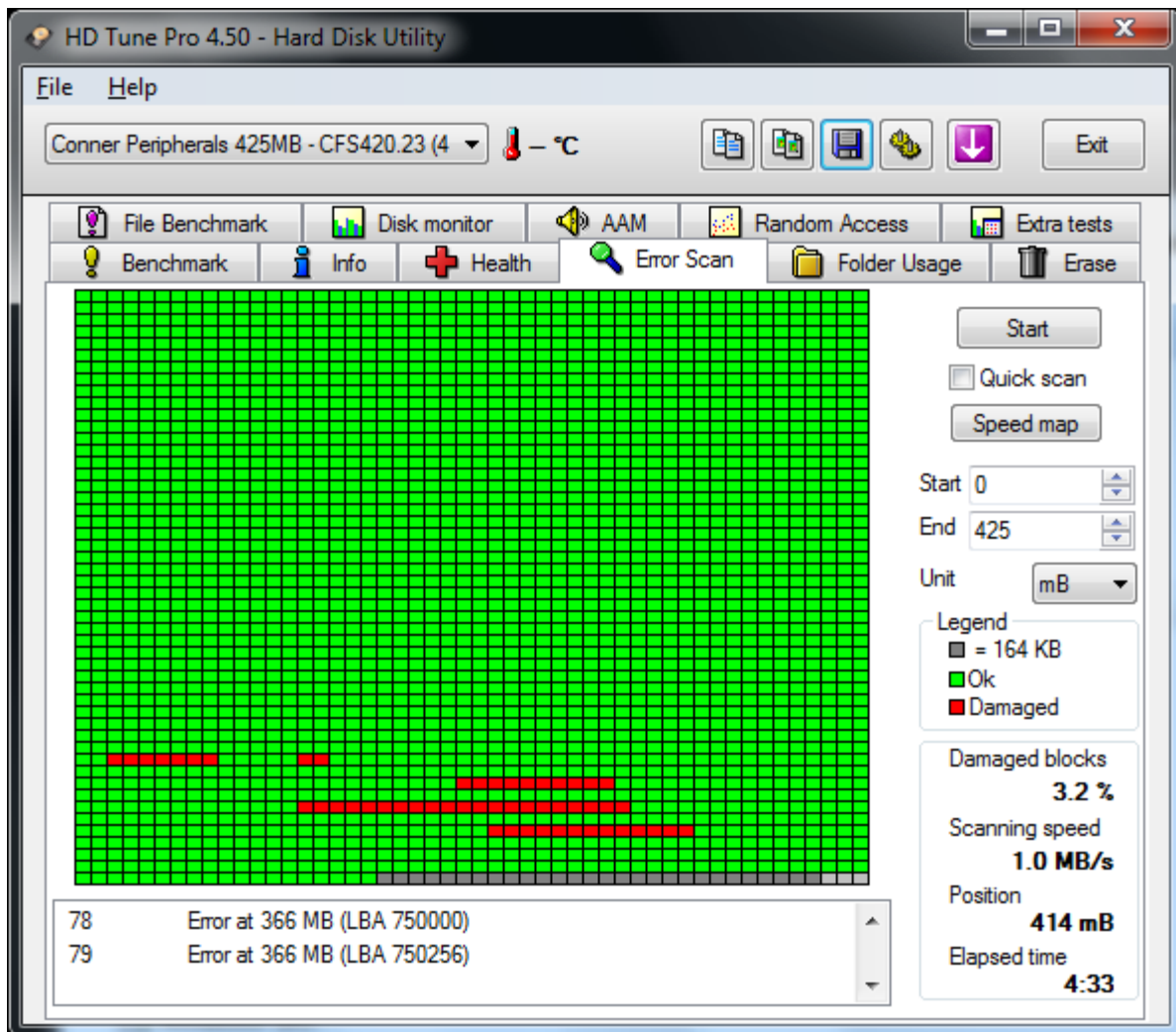
Note: the 'Auto save log' option must be enabled for this function!



If you have multiple hard drives you can select the log file you want to inspect. Select an attribute to view its history. This will be shown graphically and numerically. You can choose between the current value or the data field which may be more useful.

The log data can be exported to a text file which can be opened by a spreadsheet for further analysis.

12. Error scan



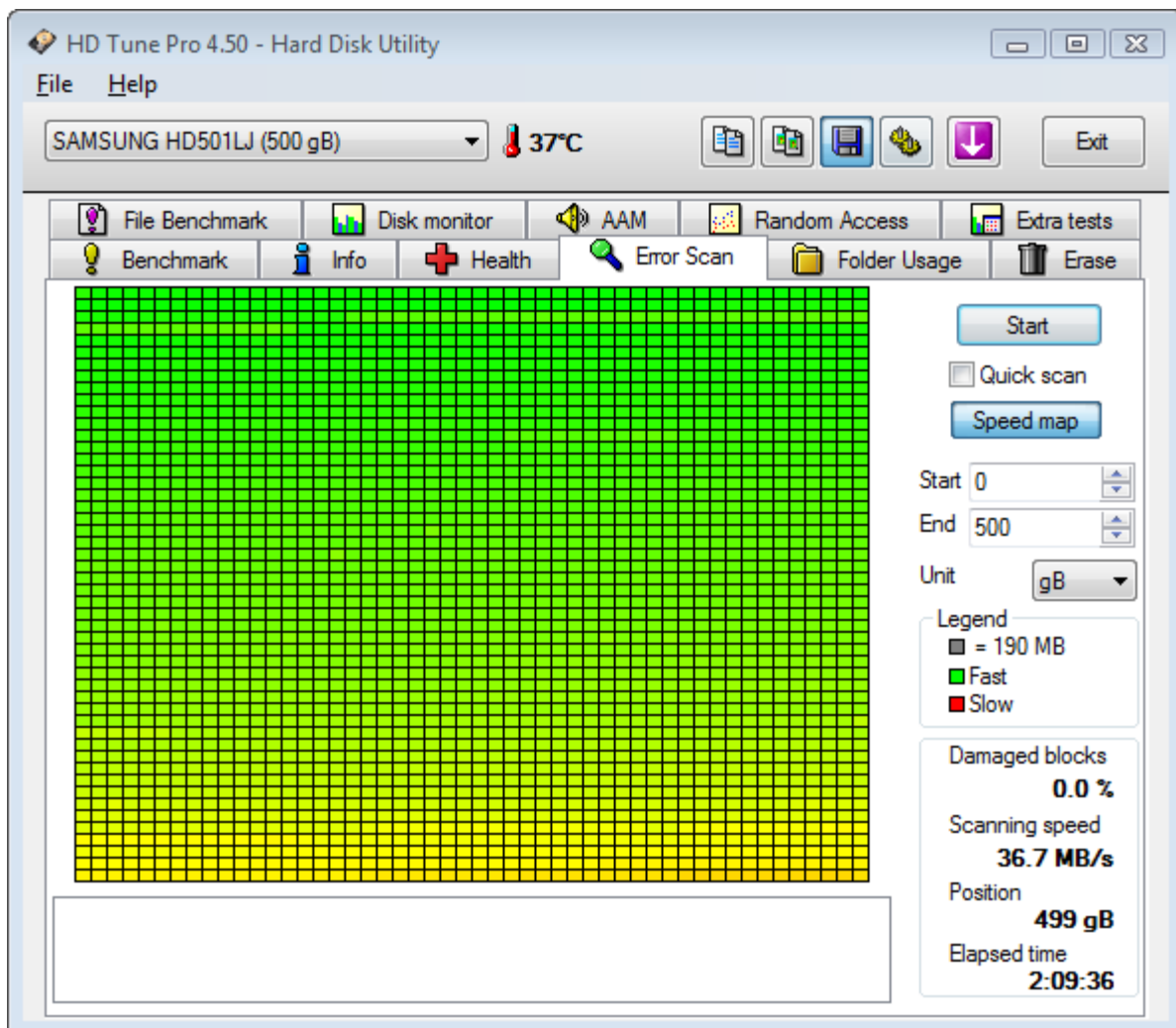
The Error Scan scans the entire disk surface for errors. Defects will show up as red blocks. The exact location of these defects are shown in the list below the graph.

This test only performs read operations and is nondestructive.

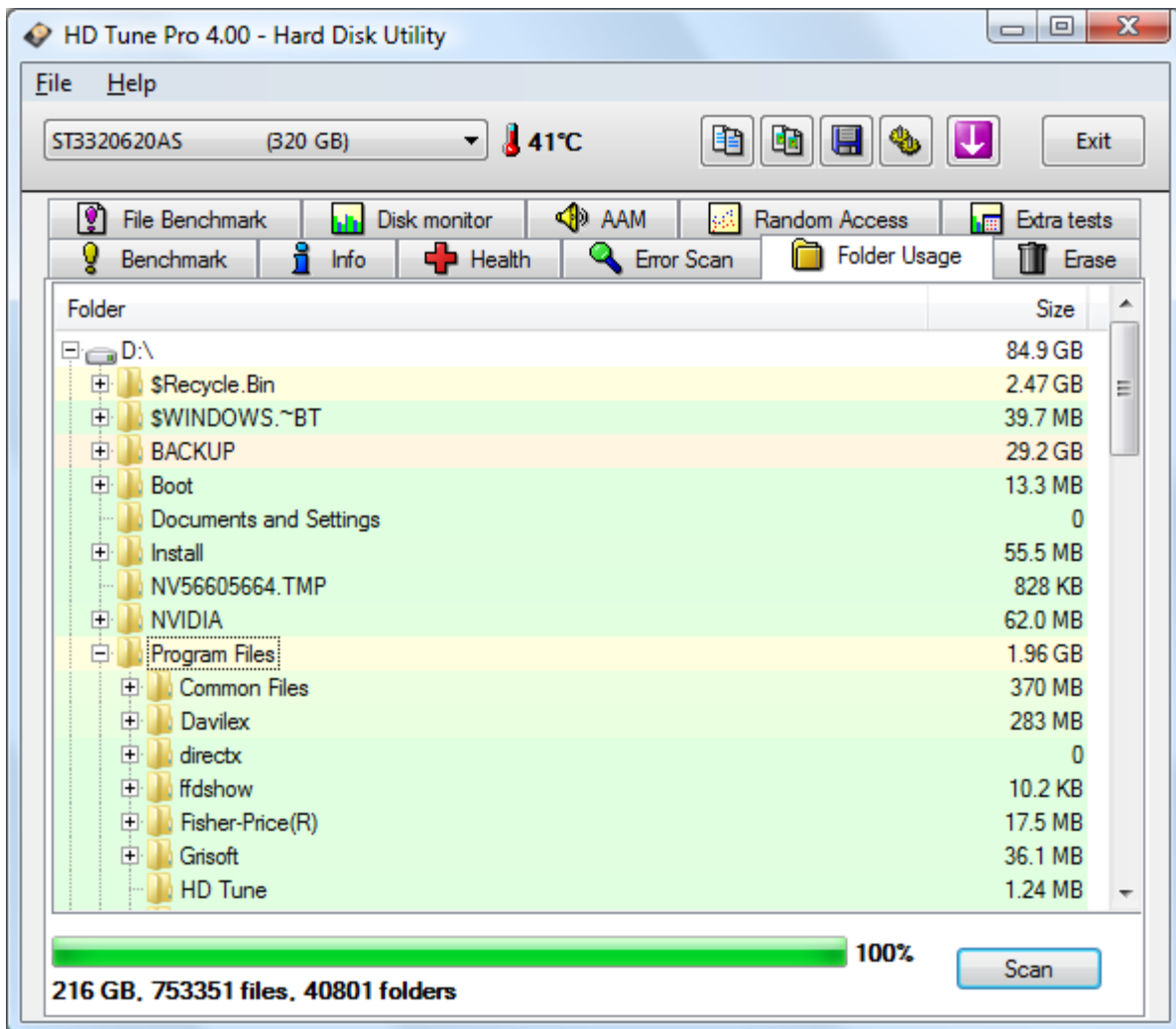
For a short test the quick scan option can be set. With this option enabled only certain parts across the disk surface will be tested.

By pressing the 'Speed map' button after the test has completed you can see the read performance across the disk.

The highest performance will be shown as green blocks, slower performance is shown in a yellow color and very slow performance is shown as red blocks.



13. Folder usage



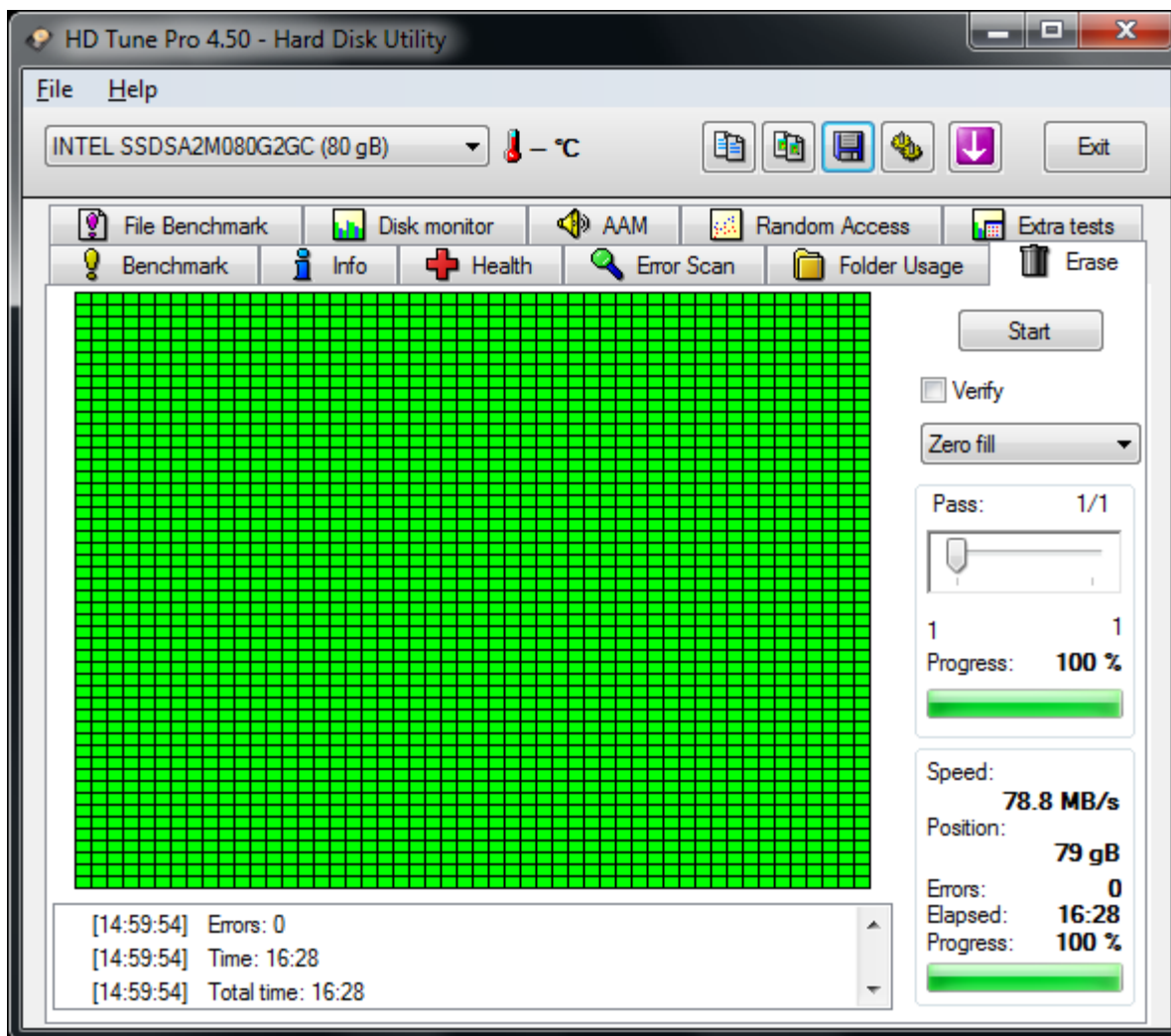
With this function you can easily see how much space each folder on the hard disk is using. Each line in the folder list is colored according to the disk space.

Green = low disk space usage

Yellow = average disk space usage

Red = high disk space usage

14. Erase



When files are deleted from a hard disk, the data is not actually erased. Only the references to those files are deleted.

By using recovery software it will be possible to recover many or all files after the files have been deleted or even after a full format. So if you sell, return or give away your hard disk someone may be able to recover sensitive data from the disk.

The erase function securely erases the disc by overwriting the entire contents of the disk with a specified pattern.

There are four different delete methods:

Zero fill (1 pass), random fill (1 pass), DoD 5220.22M (7 passes), Guttman (35 passes).

The zero and random fill should be sufficient for most purposes. For more securely deleting data you can use the other two methods.

Completely erasing the hard disk may take several hours. If you're using one of the multi-pass delete methods you can select at which pass the erasing should begin.

During the erase process write errors will be reported in a similar way as in the Error Scan function.

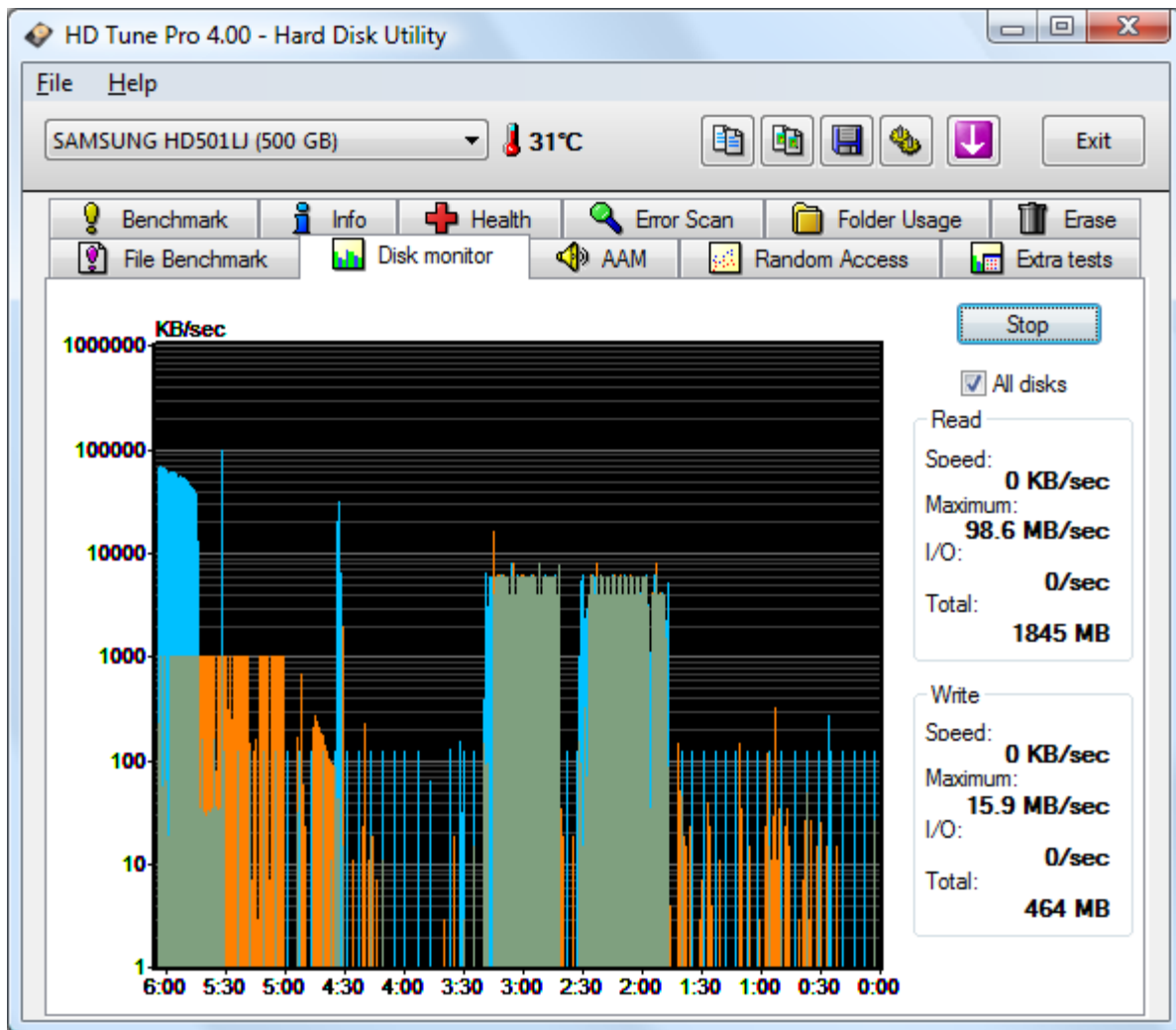
To prevent accidental data loss, the write test can only be performed on a disk with no partitions (see the benchmark topic for more information).

By clicking the verify option the erased disk will be read and the contents will be verified.

A green block shows the sector is readable and contains the expected data (ie. all 0's for the Zero Fill method).

A red block indicates the sector is either unreadable or the data does not match the expected data.

15. Disk Monitor

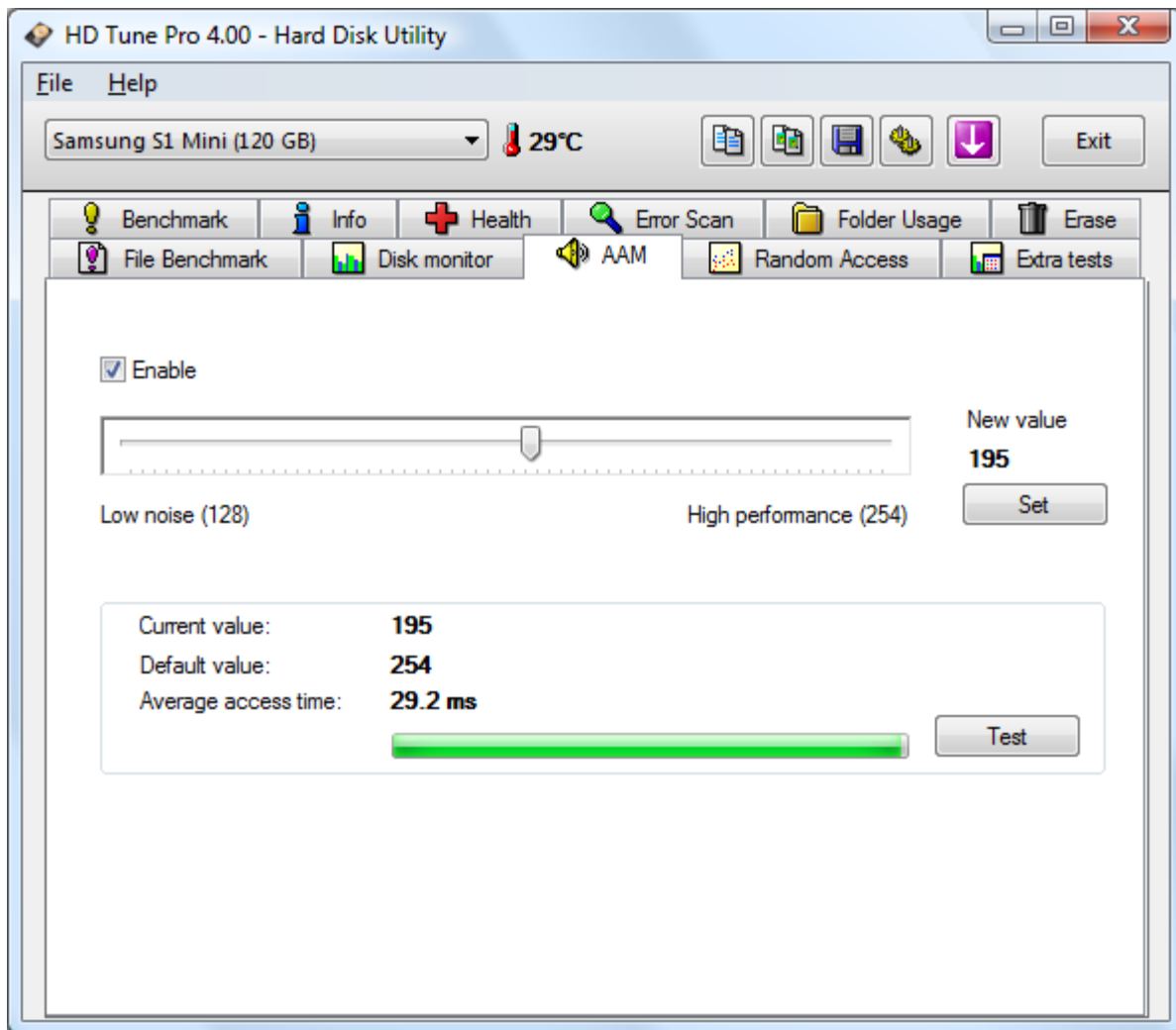


The Disk Monitor function monitors the disk activity from the selected disk or from all disks.

The current and maximum read and write speeds are shown, as well as the current number of I/O operations.

You can choose to monitor the disk activity of the selected drive or all connected drives.

16. AAM



AAM or Automatic Acoustic Management allows you to reduce the seek noise or to increase the seek performance.

Possible values are between 128 and 254 where 254 gives you the highest performance but also more noise while a value of 128 gives you less noise but lower performance.

To change the AAM settings move the slider and press the Set button.

The effect of the new setting can be tested by pressing the Test button.

17. Save options

The save options apply to the screenshot save function. To change the save settings go to the Options menu and click on the Save entry.

Ask for file name and location:

When this option is checked you can manually specify the destination folder and filename.

When this option is enabled the two options below are ignored.

Path: click on the folder button to select the destination folder.

Folder / filename:

Specify the filter to generate the folder and filename.

If the folder does not exist it will be created.

%N: drive name / model

%S: drive serial number

%F: function

%I: I/O function (read or write)

%D: date

%T: time

\: folder

Replace spaces with underscores: check this option to replace all spaces with underscores (_)

Automatically save screenshot after each test: when this option is checked a screenshot with test results is saved automatically saved to the specified folder.

This option applies to the following functions: Benchmark, File benchmark, Random Access, Extra Tests, Error Scan and Erase.

18. Command line parameters

The following command line parameters can be used:

/DISK:x

Selects hard disk

x = disk number (0 = first disk)

/FUNCTION:x

Selects function

Possible values:

Benchmark, Info, Errorscan, Health, Folderusage, Erase, Filebenchmark, Diskmonitor, AAM, Accesstest, Extratests.

/QUICKSCAN

Quick scan will be performed with the Error Scan function.

Used in combination with /FUNCTION>ErrorScan.

/LOG:x

Saves information or test results to the specified file

x = full path to file.

/START

Starts selected function automatically

Can be used for Benchmark, Error Scan, Disk Monitor and File Benchmark

/WRITE

Selects the write test. If omitted the read test will be executed.

Can be used for Benchmark, Access Test and Extra Tests.

/MINIMIZE

Minimizes the program

/QUIT

Quits the program after the specified task has been executed

Parameters are not case sensitive.

Examples:

```
/DISK:1 /FUNCTION:benchmark /START /LOG:c:\benchmark.txt
```

This command line performs the benchmark functions on the second disk and saves the results to the file c:\benchmark.txt

```
/FUNCTION:info /LOG:c:\info.txt /QUIT
```

This command line saves the information from the Info tab to the file c:\info.txt and then exits the program.

No disk is specified so the information will be gathered from the first disk.

19. Contact information

Support and sales questions: support@hdtune.com

For the latest information and program updates please visit <http://www.hdtune.com>