

Figure 3.1. Startup dialog

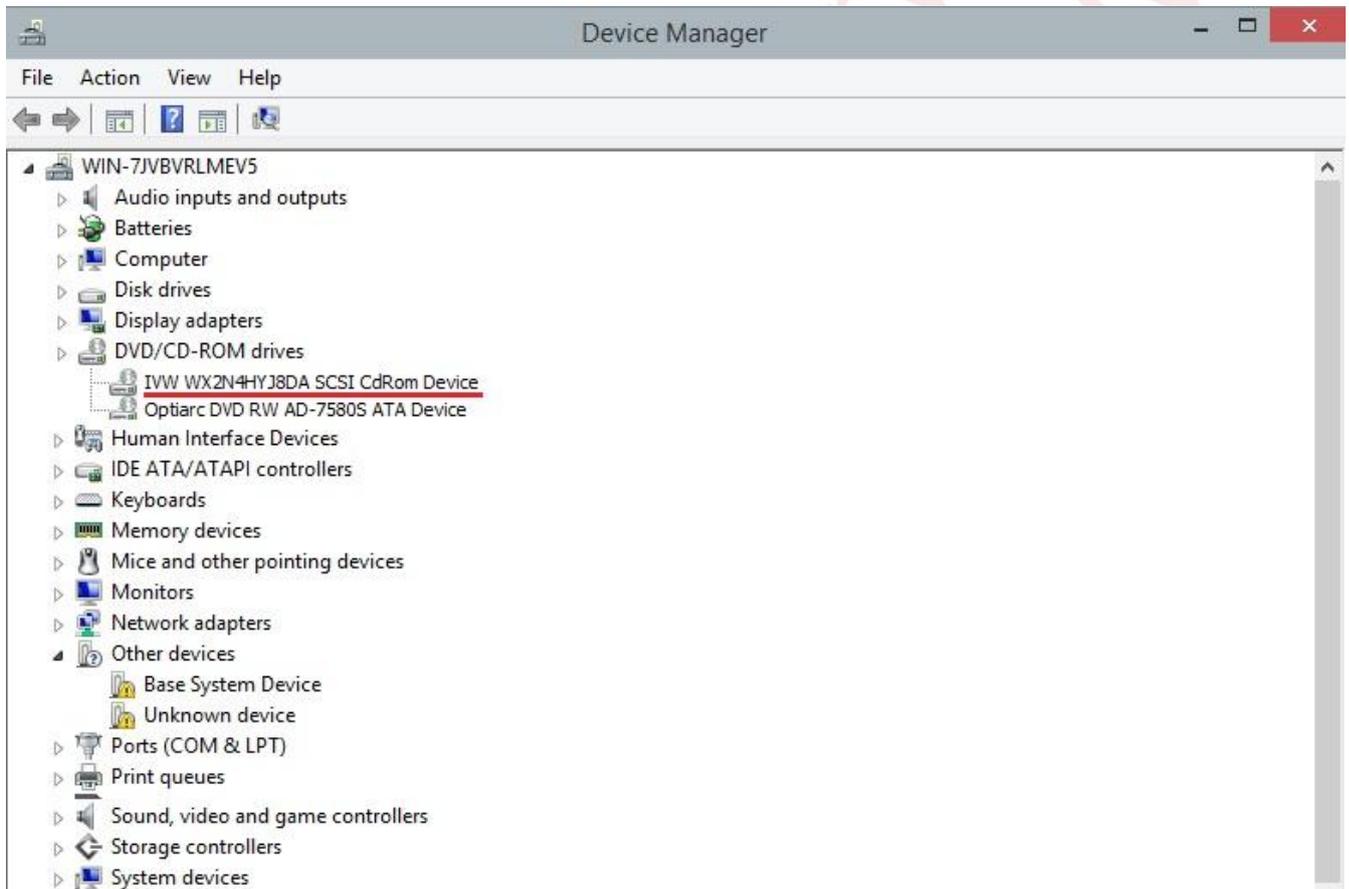


Figure 3.2. Device Manager with available disk drives and DVD/CD-ROM drives

Please keep in mind that although Windows Device Manager recognizes virtual drives (underlined in red) created in programs like Daemon Tools, Alcohol 120 or Nero, PC-3000 Disk Analyzer will not detect them, of course.

4. Main window

The interface is plain and intuitively understandable. PC-3000 users are certain to notice the resemblance between the main window of PC-3000 Disk Analyzer and PC-3000 UDMA/Portable/SCSI utilities.

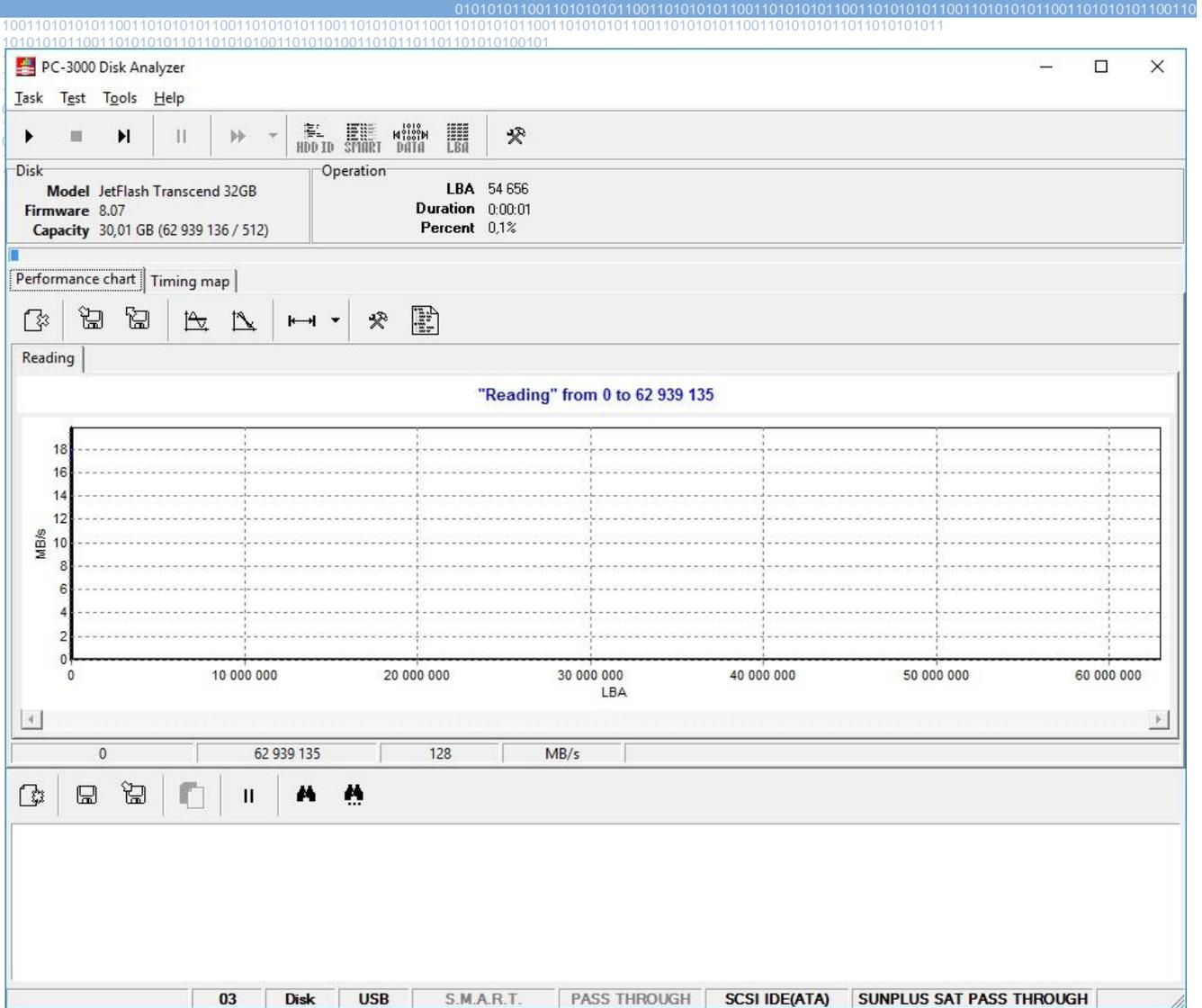


Figure 4.1. Main window

The main window of the program provides access to the following tabs:

- ◆ Task - (implemented incompletely yet, acts as an exit command in version 1.02).
- ◆ Test - initiates the read/write/verify test cycle for the selected drive.
- ◆ Tools - allows to start the 'Sector edit' or 'Defect list edit' tools, 'View S.M.A.R.T.', view 'Drive ID' or open the program 'Options'.
- ◆ Help - allows to open the 'PC-3000 Disk Analyzer help' or its 'About' dialog.

The test control toolbar below allows to start, pause, resume or complete the current operation.



Figure 4.2. Test control toolbar

Next to the test control toolbar there is another toolbar duplicating the tools from the corresponding menu tab.



Figure 4.3. Toolbar

The following section contains the panes of brief information about the drive being tested and current results of the test:

Disk		Operation	
Model	JetFlash Transcend 32GB	LBA	54 656
Firmware	8.07	Duration	0:00:01
Capacity	30,01 GB (62 939 136 / 512)	Percent	0,1%

Figure 4.4. Disk and Operation panes

The progress indicator for the current test is displayed below the Disk and Operation panes. It is integrated with the 'Performance chart' and 'Timing map' tabs (which may also contain additional toolbars).



Figure 4.5.

Bottom line of the main window displays the parameters of the selected drive:

- ◆ current operation;
- ◆ number of the device (2);
- ◆ device type (Disk);
- ◆ the interface used to connect the device (USB);
- ◆ S.M.A.R.T. availability (grayed out if the feature is not supported);
- ◆ IDE PASS THROUGH IOCTL availability;
- ◆ SCSI ATA Translation availability.

03	Disk	USB	S.M.A.R.T.	PASS THROUGH	SCSI IDE(ATA)	SUNPLUS SAT PASS THROUGH
----	------	-----	------------	--------------	---------------	--------------------------

Figure 4.6. Information line

The options tab allows you to modify the colors of various menus, graphs and charts, etc. It can be opened from the corresponding tab ('Tools -> Options') or by clicking its icon in the main window:



Figure 4.7. The Tools icon

4.1. The Test tab

The tab allows to start a verification, writing or reading test.

When a reading or verification test is selected, you can specify its parameters in a step-by-step sequence:

- ◆ Step 1: during this step you can define the range of sectors, which will be tested.
- ◆ Step 2: the program will prompt you to choose one of three available tests (in this case, reading or verification).
- ◆ Step 3: once you select the LBA-based sector reading test, the program will offer to copy data sector-by-sector from the drive being tested to another drive.
- ◆ Step 4: PC-3000 Disc Analyzer will display an offer to select its next step in case of an error:
 1. Terminate process.
 2. Skip the addresses where the error has been encountered.
 3. Save the defects as a defect list file (.lba) for further analysis in PC-3000 UDMA or PC-3000 Portable.

Problems on HDD surface are always accompanied with a drop in reading/writing performance in the range of addresses corresponding to the affected area. While running a test, PC-3000 Disk Analyzer constantly measures the performance of the drive reflecting the results in the performance chart and timing map. Relative changes (decrease) in the performance become obvious immediately.

Please note that the graph reflects performance of the program and not just the drive being tested. Consequently, the graph shape may be affected by all kinds of events in the operating system. Thus, when the progress slows down, for example, because the operating system starts some process, the program's performance also decreases and the graph reflects that at once. Besides, such "additional" speed drops can be caused by OS attempts to access a drive resulting in slower performance as shown in the graph.

The issue requires special attention from the users of laptops running Windows Vista or Windows 7. These operating systems feature a lot of mechanisms extending battery life; as a result, the OS may deliberately switch a drive to slower operation if a laptop is in maximum power saving mode or if it enters the sleep mode. In that case the activity of the drive being tested will be minimized, and the graph will reflect that: the range of sectors read in the sleep mode will be recognized by the program as sectors read "with slowing down" or even "with error".

If you notice a considerable performance decrease, stop scanning, identify the range of sectors where performance drop is noticeable and start the reading cycle again having configured it specifically for the range of sectors demonstrating problems.

A sample situation:

While a 500 Gb Western Digital HDD was being tested, the laptop running PC-3000 Disk Analyser was accidentally switched to sleep mode. Upon test completion the following graph was produced:

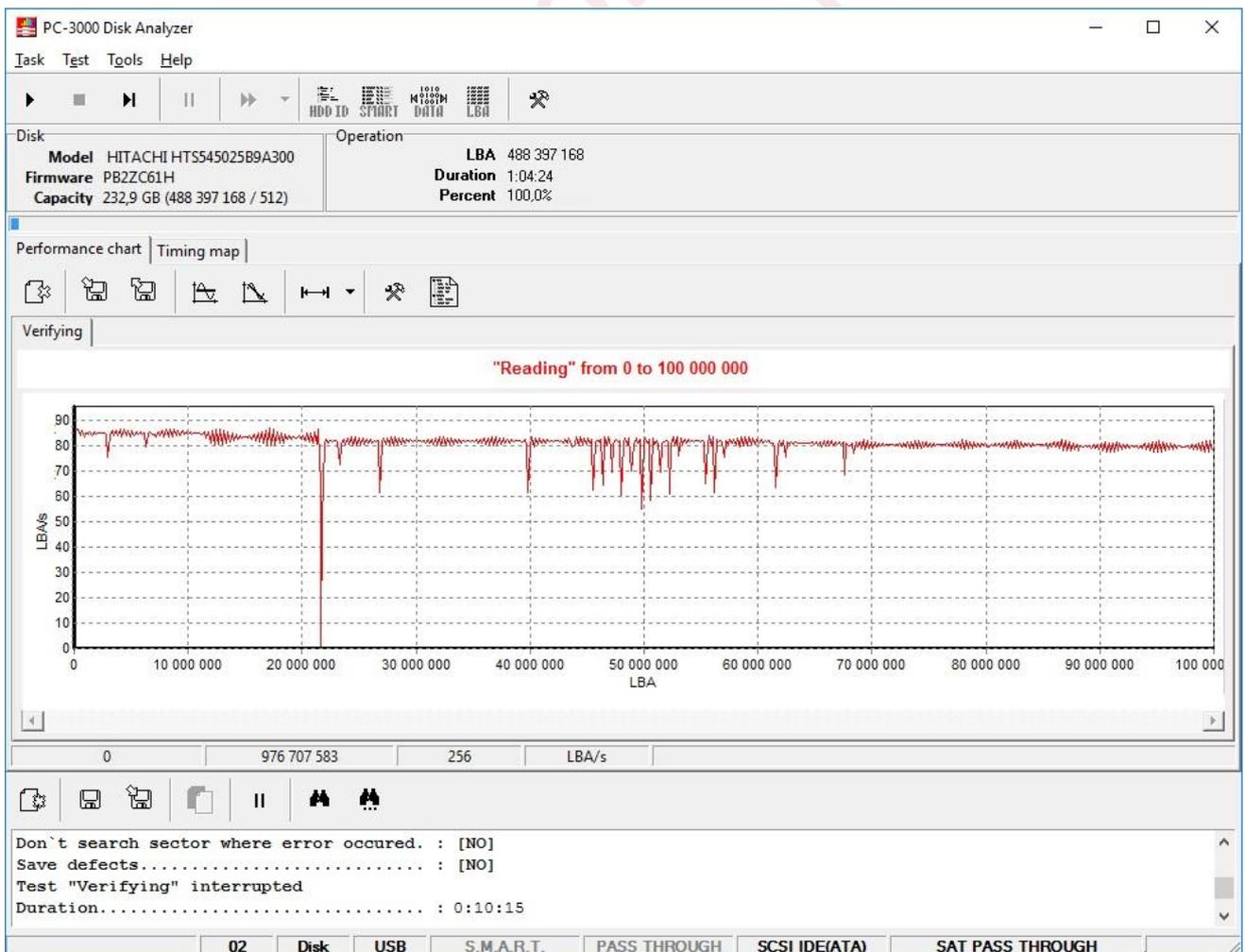


Figure 4.10. Reading test graph

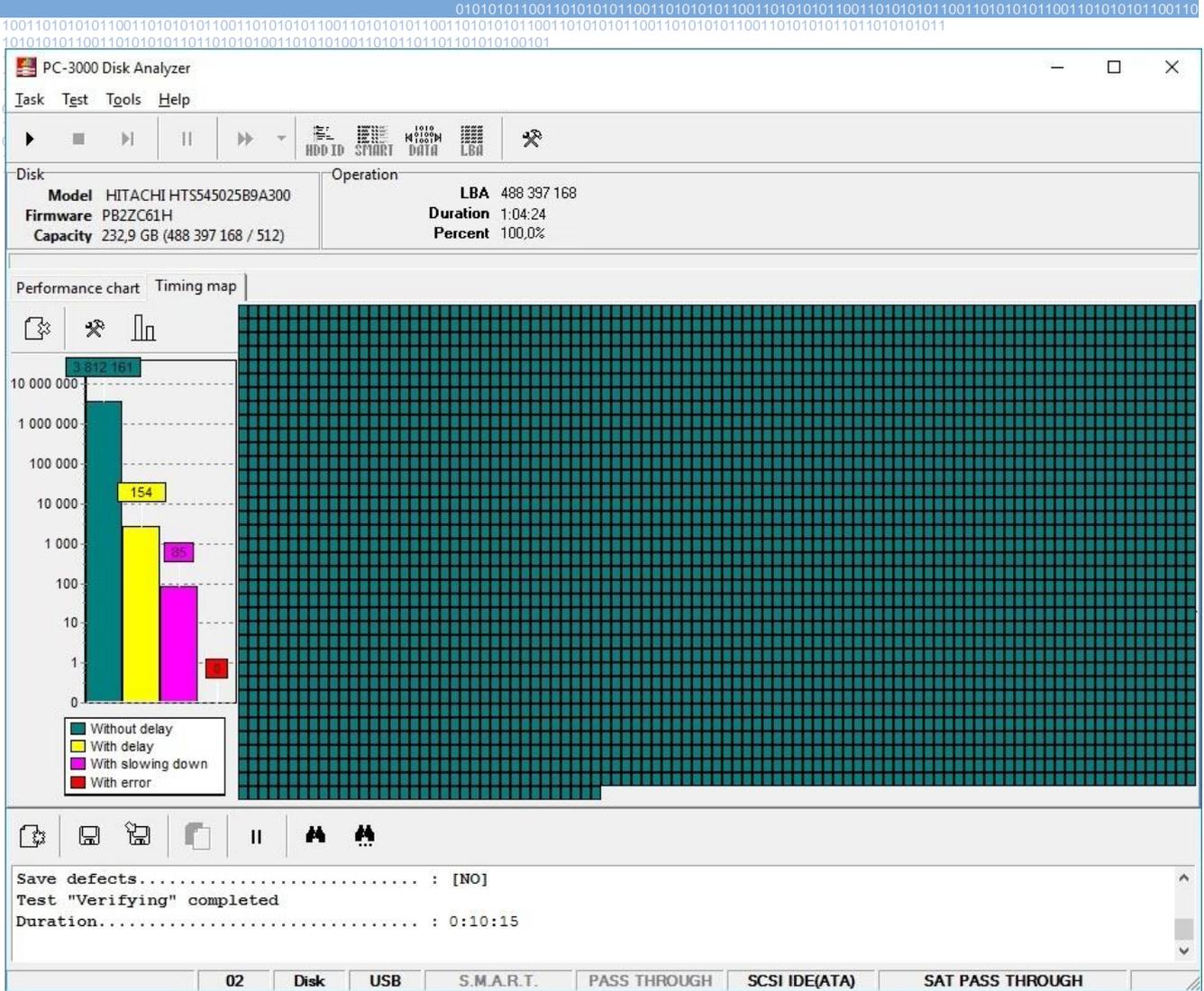


Figure 4.11. Reading test timing map

1. Obviously, performance decreased sharply within a small range at approximately 22 000 000 LBA, the program revealed several dozens of sectors with delays and slowdowns.
2. Moreover, delays are noticeable in a larger range approximately from LBA 44 000 000 to 58 000 000.

A repeated reading test of the suspicious sectors reveals that the delays have been caused by OS activity. The first occasion reflected HDD slowing down due to OS switch to sleep mode.

4.2. The Tools tab

4.2.1. Viewing the HDD identification data

HDD identification data (HDD ID) represent the response returned by a drive after the ID reading command (0xEC). HDD ID format and field values are described in the ATA Specification.

To view HDD ID, you need to invoke the command with the corresponding toolbar button or select the 'Tools -> Drive ID' command from the menu.

HDD ID contains parameters in binary and text format. The program displays them using different icons depending on the parameter type and status:

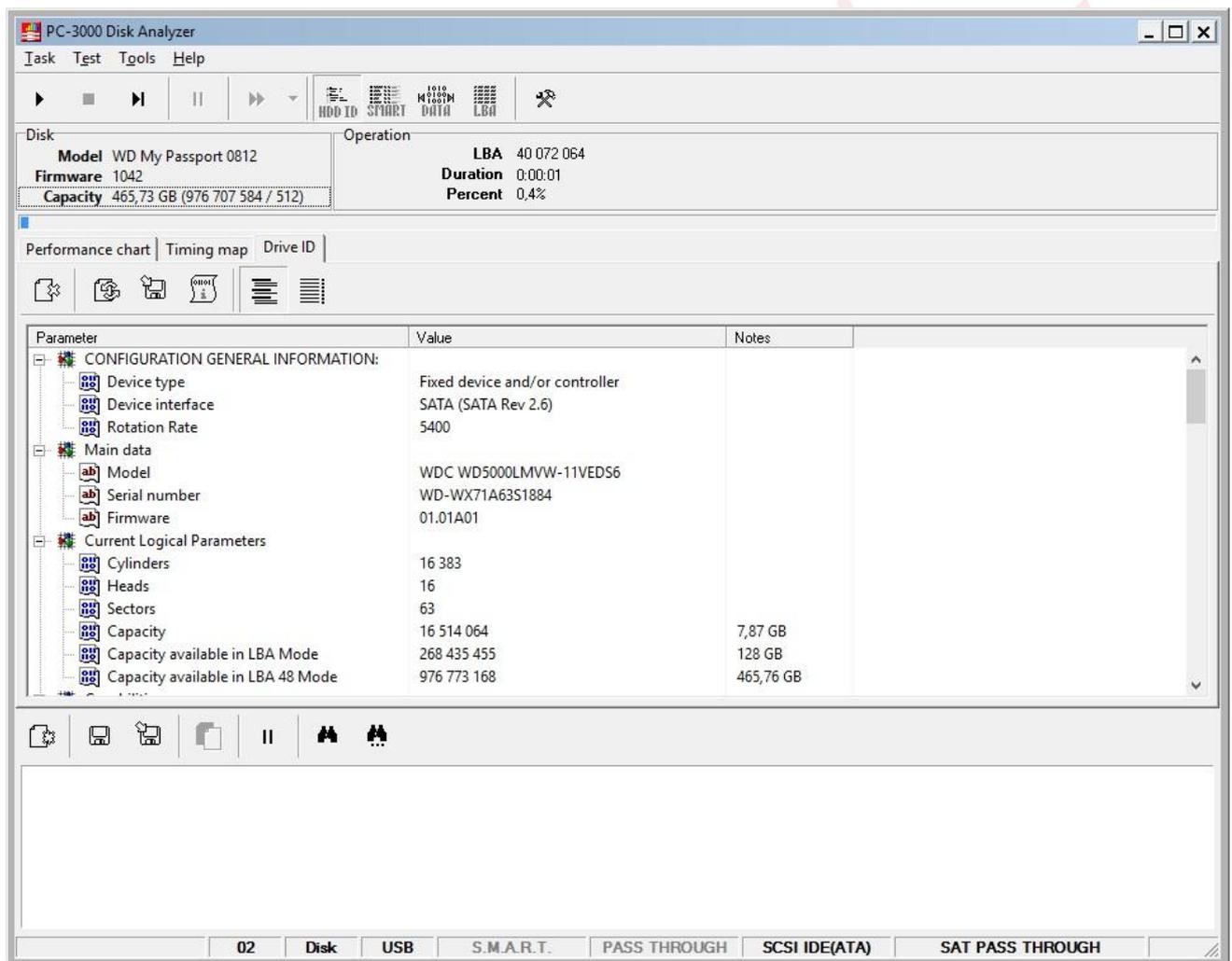


Figure 4.16. HDD ID viewing

HDD ID viewing is only available if the method used to connect the HDD allows reading of its ID.

4.2.2. View S.M.A.R.T.

S.M.A.R.T. (Self-Monitoring Analysis and Reporting Technology) is a drive self-testing technology developed by HDD manufacturers to ensure higher reliability of data storage. S.M.A.R.T. means that a drive internally monitors its operability thus being able to warn the user in advance about its pre-fail condition. Moreover, ATA Specification provides for some additional functionality of the S.M.A.R.T. subsystem, such as logging of HDD errors and execution of Offline diagnostics code (including logging of the results).

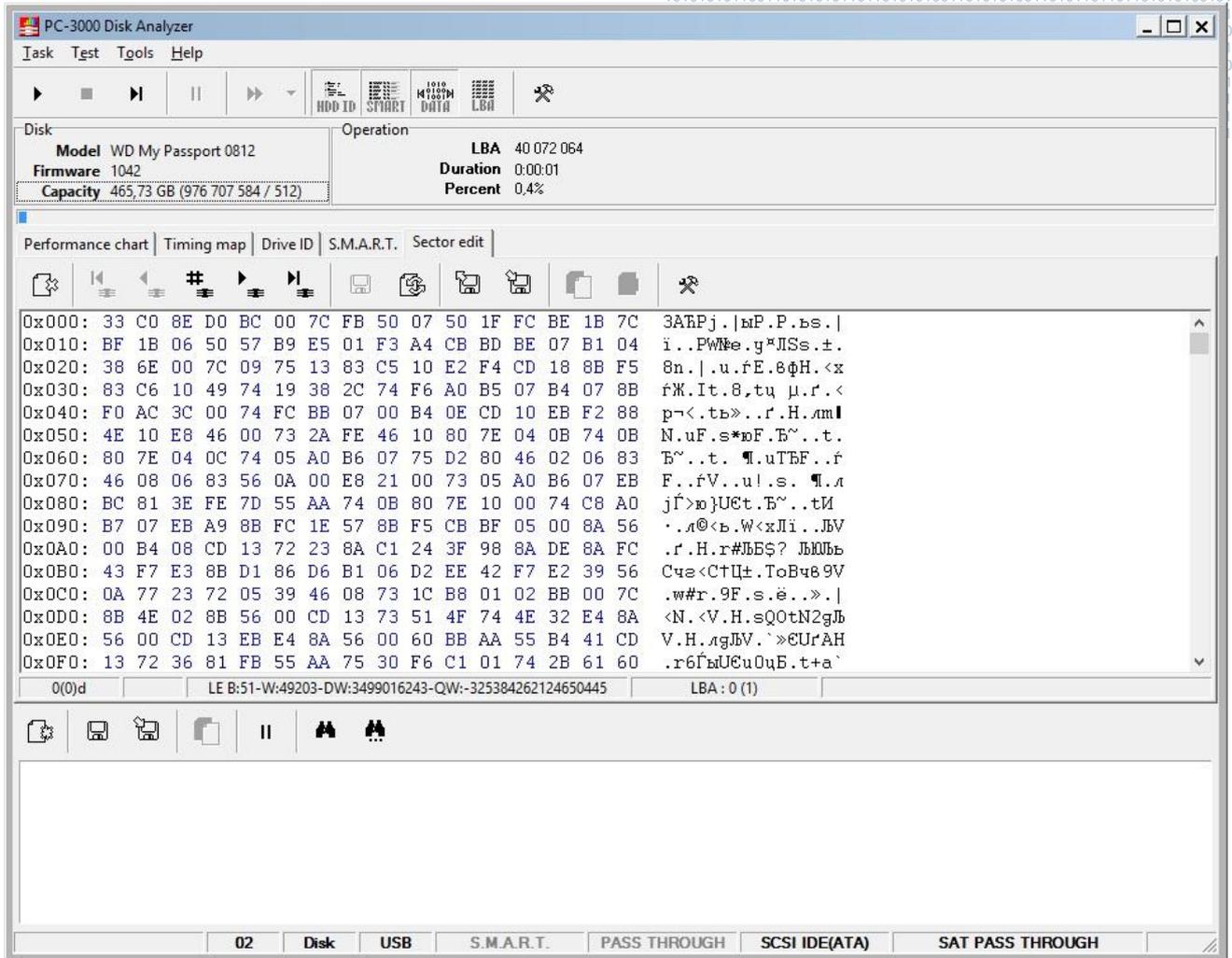


Figure 4.18. Sector editor

4.2.4. Defect list editor

A defect list is a universal format used in all the PC-3000 products for storage of defects revealed by testing or hidden in G- and P-List.

Defects found by PC-3000 Disk Analyzer while scanning can be reassigned later using specialized utilities of PC-3000 suites.

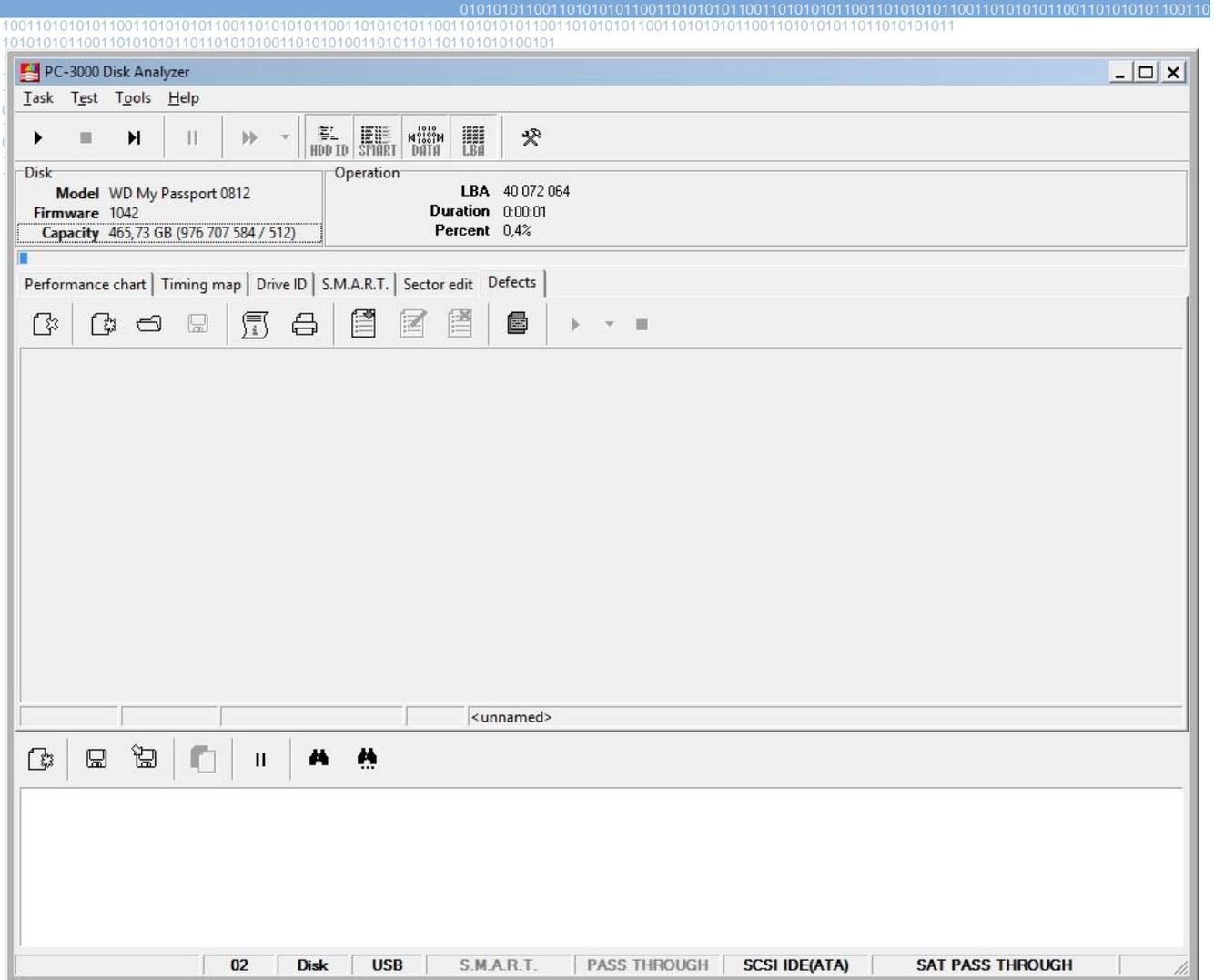


Figure 4.19. Defect list editor

4.3. The Help tab

This menu allows to open the 'About' dialog.

5. Potential issues

You may encounter certain issues while using PC-3000 Disk Analyzer. The main of them are as follows:

1. When the program starts for the first time in Windows Vista Windows 7, the startup dialog with an offer to choose the device for testing may contain an empty list of connected drives. Such behaviour is caused by some peculiarities in the operating system, in particular, its UAC (User Account Control) security settings; therefore, PC-3000 Disk Analyzer should be started using administrator credentials or after lowering the security level in the Control Panel.
2. When viewing of S.M.A.R.T. is selected, some values in the displayed list of drive attributes may appear invalid. For example, the reading of internal HDD temperature sensor or spin-up time may be incorrect. This discrepancy is caused by S.M.A.R.T. specifics because the program retrieves service data of the device and attempts to convert them into meaningful information about the drive's parameters. Consequently, some data may be erroneously decrypted by the program.