

Opti Drive Control manual
Version 1.10 - 27 May 2009
copyright © 2009 by Erik Deppe

Table of Contents

1.Introduction.....	3
2.Usage.....	4
3.User interface options.....	5
4.Transfer rate.....	6
5.Create test disc.....	14
6.Verify test disc.....	18
7.Drive info.....	21
8.Disc info.....	23
9.Disc quality.....	26
10.CD Bler.....	36
11.Multi-test.....	40
12.Save options.....	41
13.Usage statistics.....	42
14.Contact information.....	43

1. Introduction

Opti Drive Control is a test and benchmark utility for optical drives. It can be used to verify the performance, quality and reliability of the burn and read functions of optical drives and discs.

2. Usage

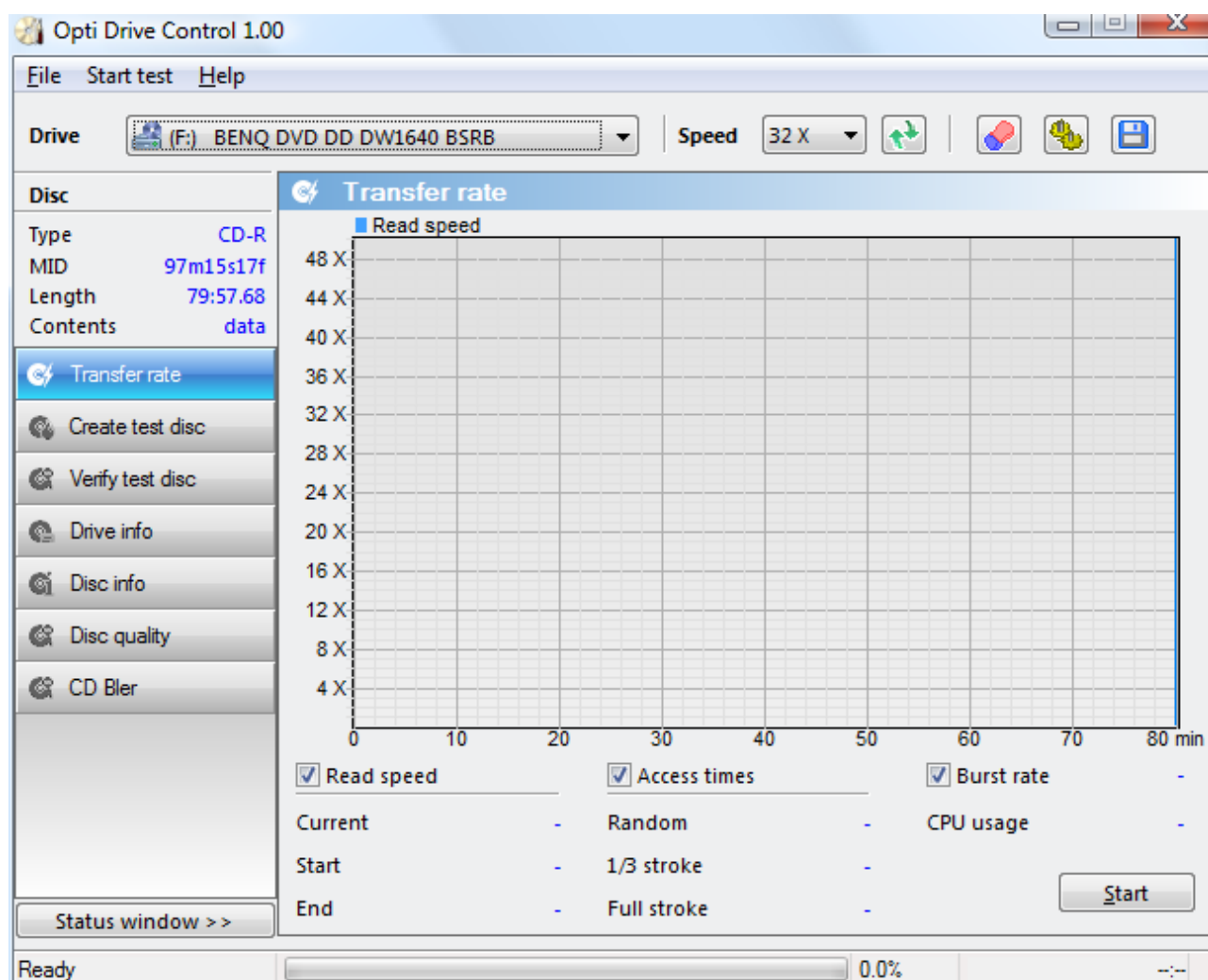
Using Opti Drive Control is easy. After starting Opti Drive Control the main screen shows up where you can select the drive, change the read speed and run a test from the left menu.

Next to the speed selector on top of the screen four buttons are available: the refresh button to refresh (re-detect) the read speed settings, the erase button to erase or format rewritable discs, the options button and the save screenshot button.

On the left top corner basic disc information is shown. Below that are the function buttons.

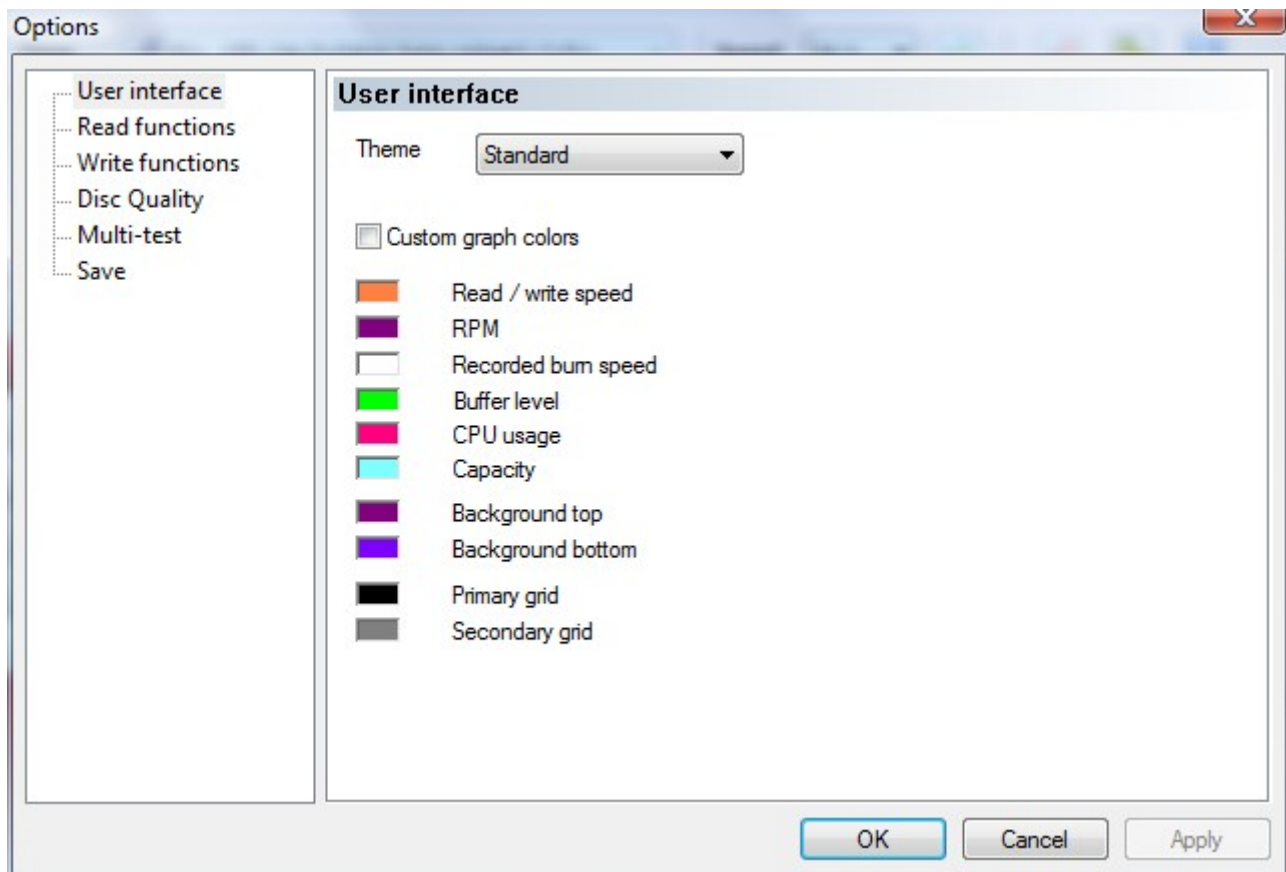
In the left bottom corner the status window button can be pressed to show a log of the executed functions.

The status bar shows the active status of the program, the current test progress and elapsed time.



3. User interface options

To change the appearance of the program a theme can be chosen in Options → User interface. Graph colors can be chosen separately.



4. Transfer rate

The transfer rate test measures four different parameters: read speed, access times, burst rate and CPU usage.

For this test an audio (CD) or data disc (CD, DVD or BD) is required.

To run the test enable or disable the specific test parameters and press the start button. The test can be canceled at any time by pressing the stop button.

Read speed

The contents of the disc is read and the read speed is shown both graphically and numerically. This allows you to see how well the drive performs and if it meets the manufacturer's specifications.

This function can also be used to determine the quality of the disc. Ideally the graph should show a smooth line.

If the read speed line shows downward spikes it means the drive has trouble reading the disc. The red areas show the locations where an uncorrectable read error occurred.

Access times

The access time is the time it takes the drive to locate and read a single sector on the disc and is measured in milliseconds. Low access times are an indication of good performance for reading smaller files.

The access times are measured at 100 locations on the disc surface with three different access patterns:

random: measured at random positions across the disc surface

1/3 stroke :measured from the first sector to the sector at 1/3 of the capacity

full stroke: measured from the first sector to the last sector on the disc

Burst rate

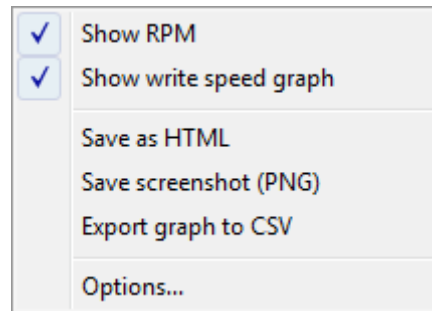
The burst rate is the highest possible speed at which data can be transferred to the drive. This speed should be higher than the maximum rated speed of the drive. For example, the burst rate of a 16 X DVD should be higher than 21 MB/s (16 X = 21 MB/s). A low burst rate can be caused by limitations of the drive interface (USB for example) or by an incorrect DMA setting.

CPU usage

The CPU usage is measured during the read test. This value should stay below 10%.
A higher value usually means the drive is not using DMA to transfer data.

Options

By right-clicking anywhere on the transfer rate screen you can call the options menu.



Show RPM: shows the rotation speed on the graph

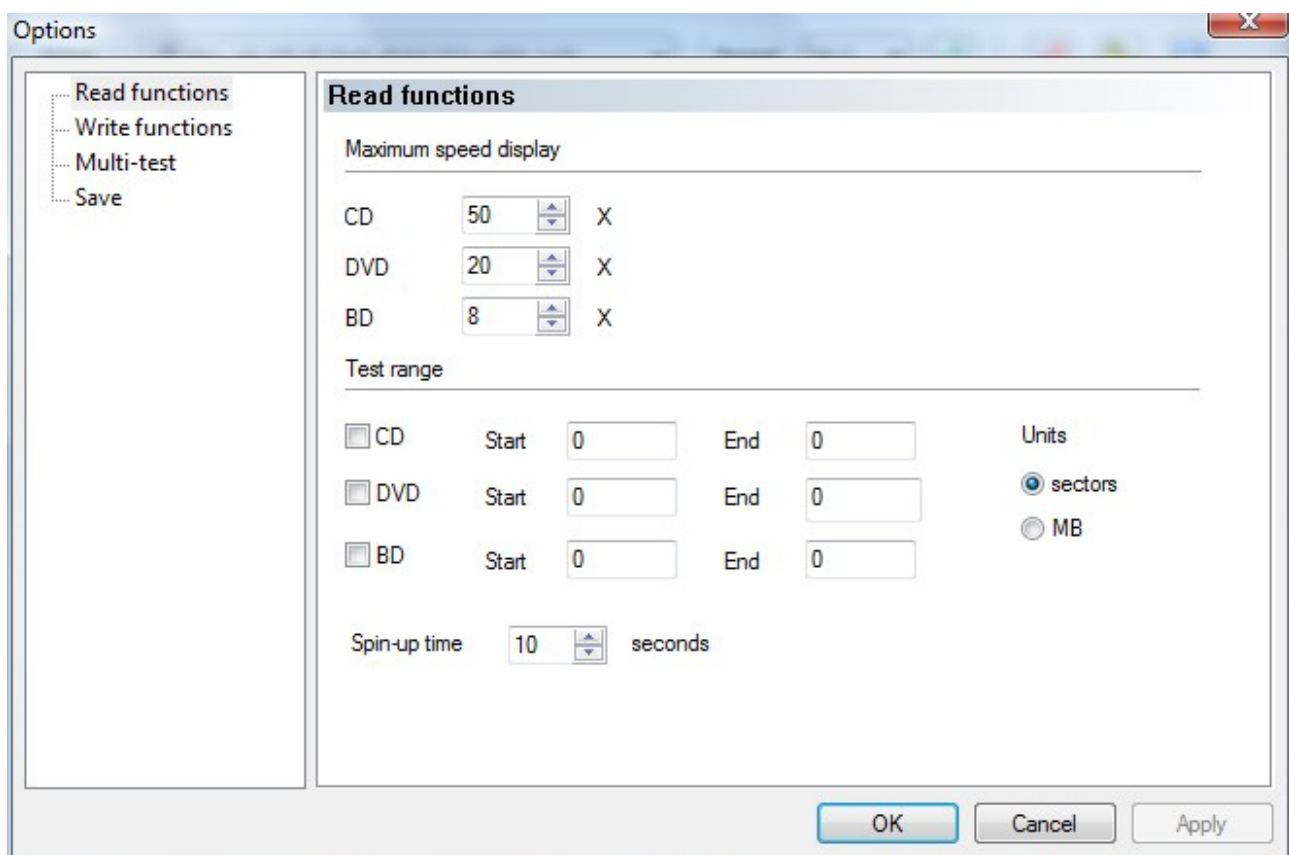
Show write speed graph: if the disc was created with this program the write transfer rate can be shown on the graph

Save as HTML: save test results and screenshot to HTML file

Save screenshot: save the screen to a PNG file

Export graph to CSV: export the data for the graph to a CSV file. With this file the graph can be regenerated and analyzed by a spreadsheet.

Options: brings up the options window:

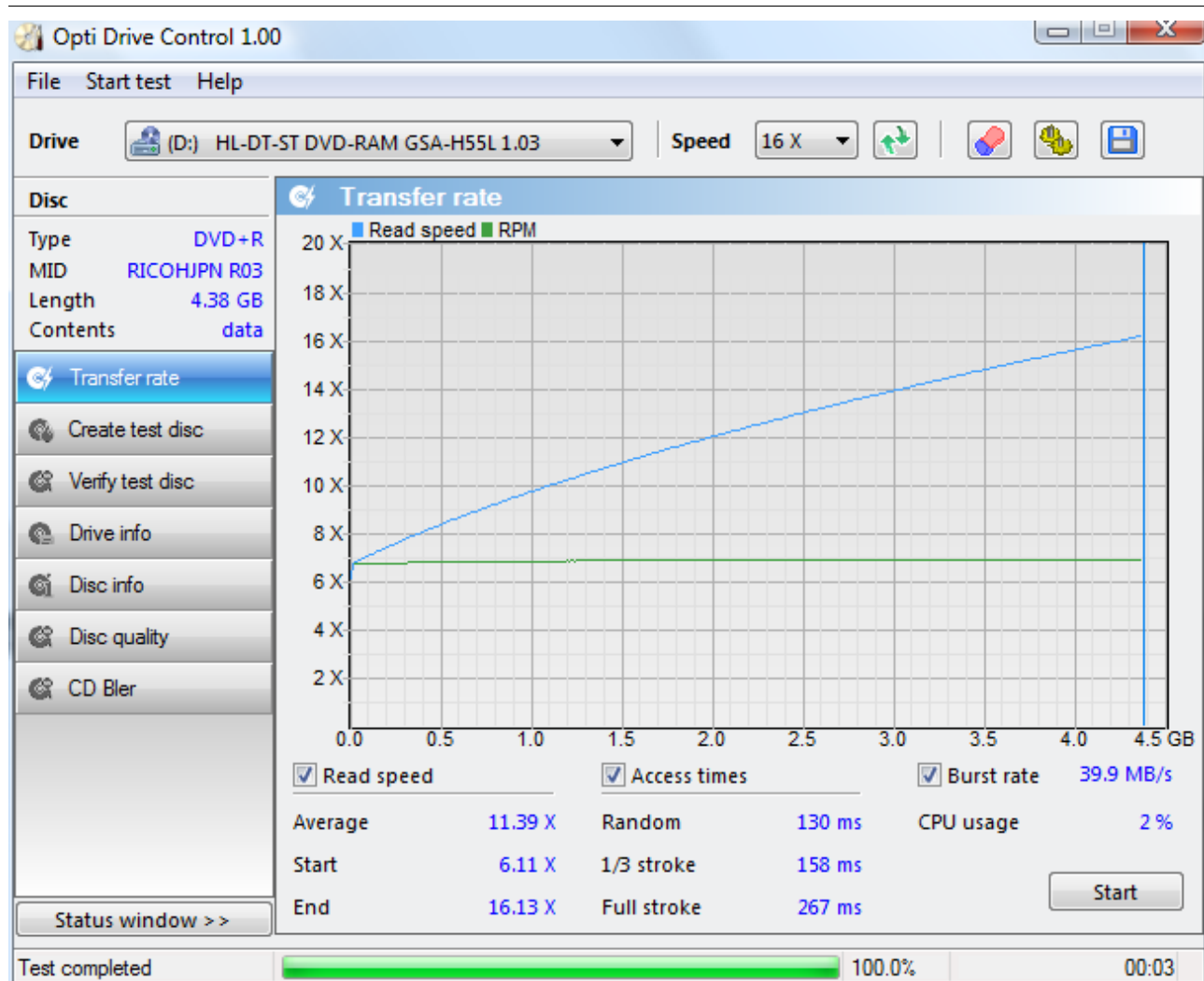


Maximum speed display: this is the maximum value the graph can show. This value has to be higher than the maximum speed of the drive to make sure the graph can be shown completely.

Test range: specify the range of the disc which will be tested. The start and end values can be set in either sectors or megabytes (MB).

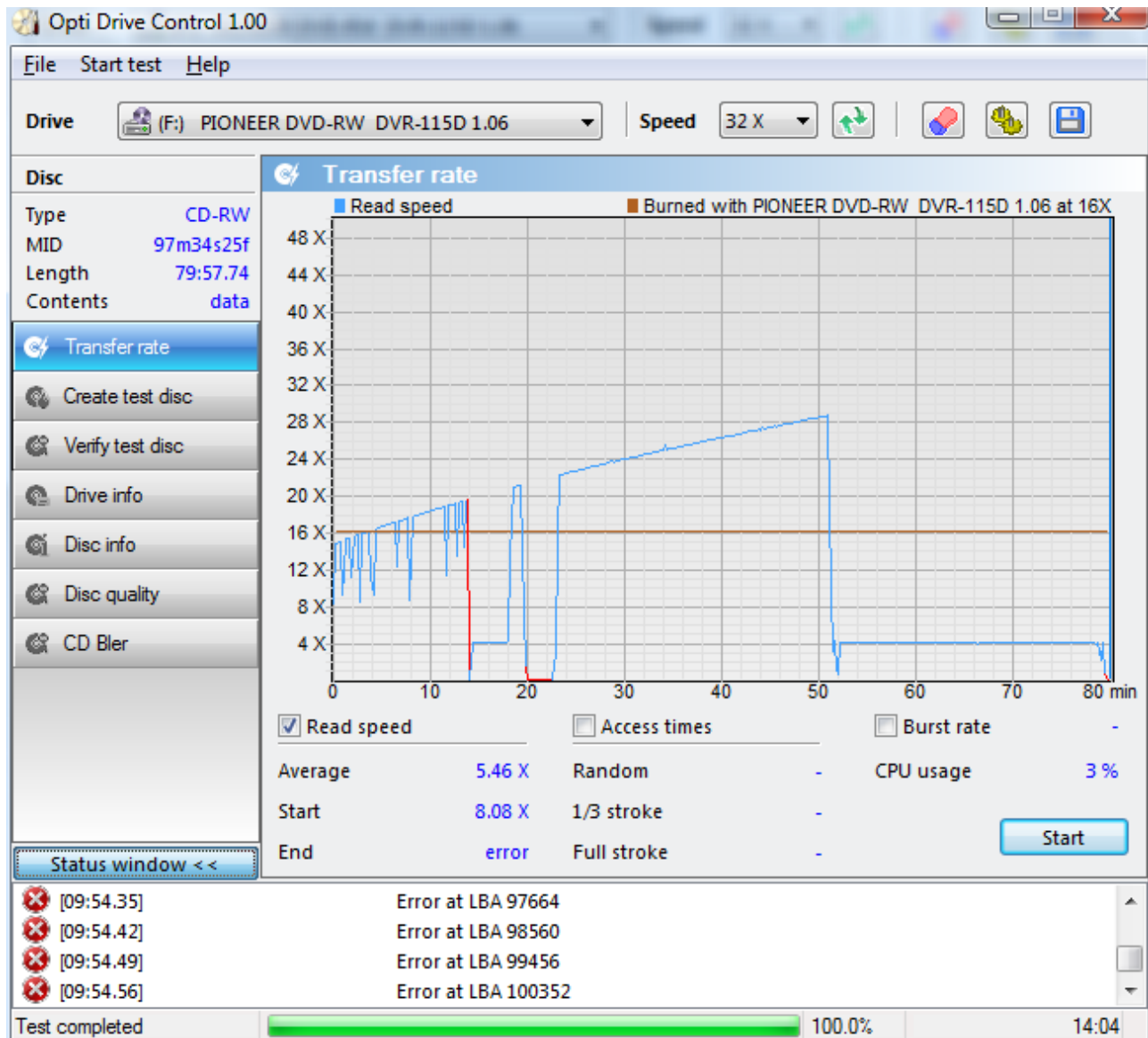
Spin-up time: optical drives require some time to reach the selected speed. By default Opti Drive Control spins up the drive for 10 seconds before running a read test.

Screenshots



This is a typical result from the transfer rate test. The blue line shows the read speed, the green line shows the rotation speed in RPM.

The results clearly shows the drive has no problems reading the disc (nice smooth line) and meets the performance specification of 16X DVD read speed.



This screenshot shows the drive has a lot of trouble reading the disc. The drive slows down a lot, has to do many re-reads (visible as downward spikes) and cannot read certain parts of the disc (red lines).

The status window shows the exact positions where the errors occur.

The brown line is the write speed which is visible because the disc was created with Opti Drive Control. On top of the graph you can see that the disc was burned with a Pioneer drive at 16X.

5. Create test disc

The create test disc function burns an ISO9660 compliant disc which can be used for additional tests with Opti Drive Control.

A blank disc is required for this test.

An Opti Drive Control test disc contains three folders:

RESULTS: contains a binary file which includes the test information and results.

RNDTEST: contains 1000 files of different lengths. These files are used for the random verify test disc function (see 5. Verify test disc).

SEQTEST: contains a single file with a length equal to the capacity of the disc. This is a standard ISO file which can be used for recreating an exact duplicate of the test disc.

This file is also used for the sequential verify test disc function (see 5. Verify test disc).

The files are written with a specific data pattern which will be used for a very extensive data verification (see 5. Verify test disc).

To create the test disc insert a blank disc and press the start button. Press the stop button to cancel the test. Please note that canceling the test will result in an unusable disc!

The create test disc window also has a write speed selector so you can choose at which speed the disc is burned. The possible settings are detected by the program and depend on the drive and disc.

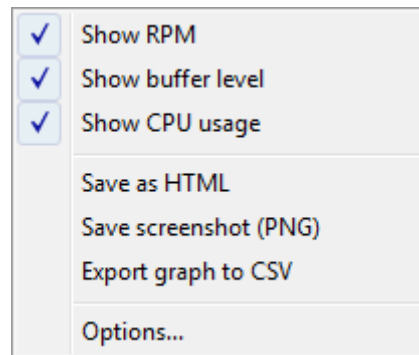
You can also choose to measure and show the drive's buffer level and CPU usage during the test. Please note that this may cause a small performance loss on certain systems.

Enable the test write option if you want to test the write speed without actually burning to the disc. Please note that this option may not be working on certain disc types with certain drives! For example, most drives cannot run a simulated burn on DVD+R media. It is not possible to detect this so you will not get a warning for this.

Note! With many drives the disc has to be ejected and re-inserted before it can be used.

Options

By right-clicking anywhere on the create test disc screen you can call the options menu.



Show RPM: shows the rotation speed on the graph

Show buffer level: if the buffer level checkbox was checked you can choose to show or hide the buffer level graph.

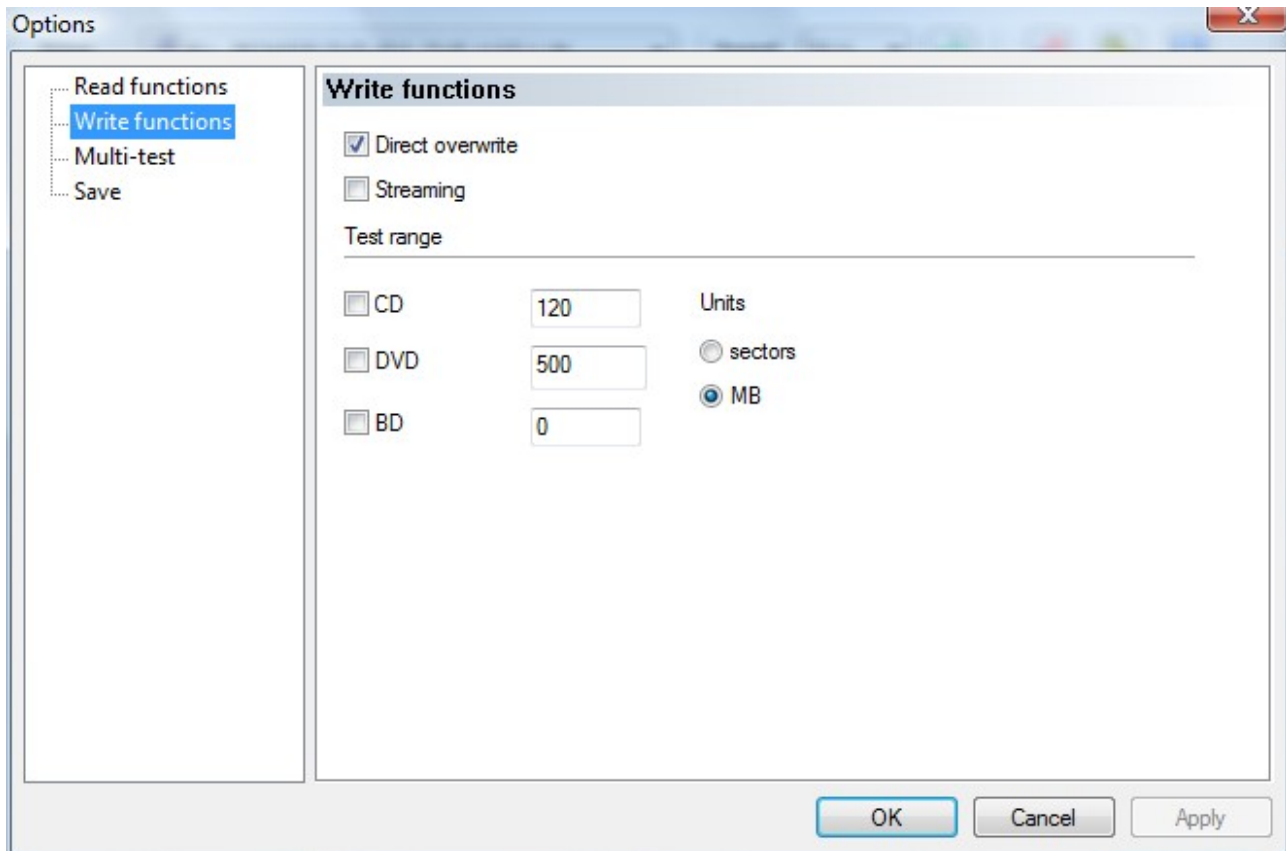
Show CPU usage: if the CPU usage checkbox was checked you can choose to show or hide the CPU usage graph.

Save as HTML: save test results and screenshot to HTML file

Save screenshot: save the screen to a PNG file

Export graph to CSV: export the data for the graph to a CSV file. With this file the graph can be regenerated and analyzed by a spreadsheet.

Options: brings up the options window:

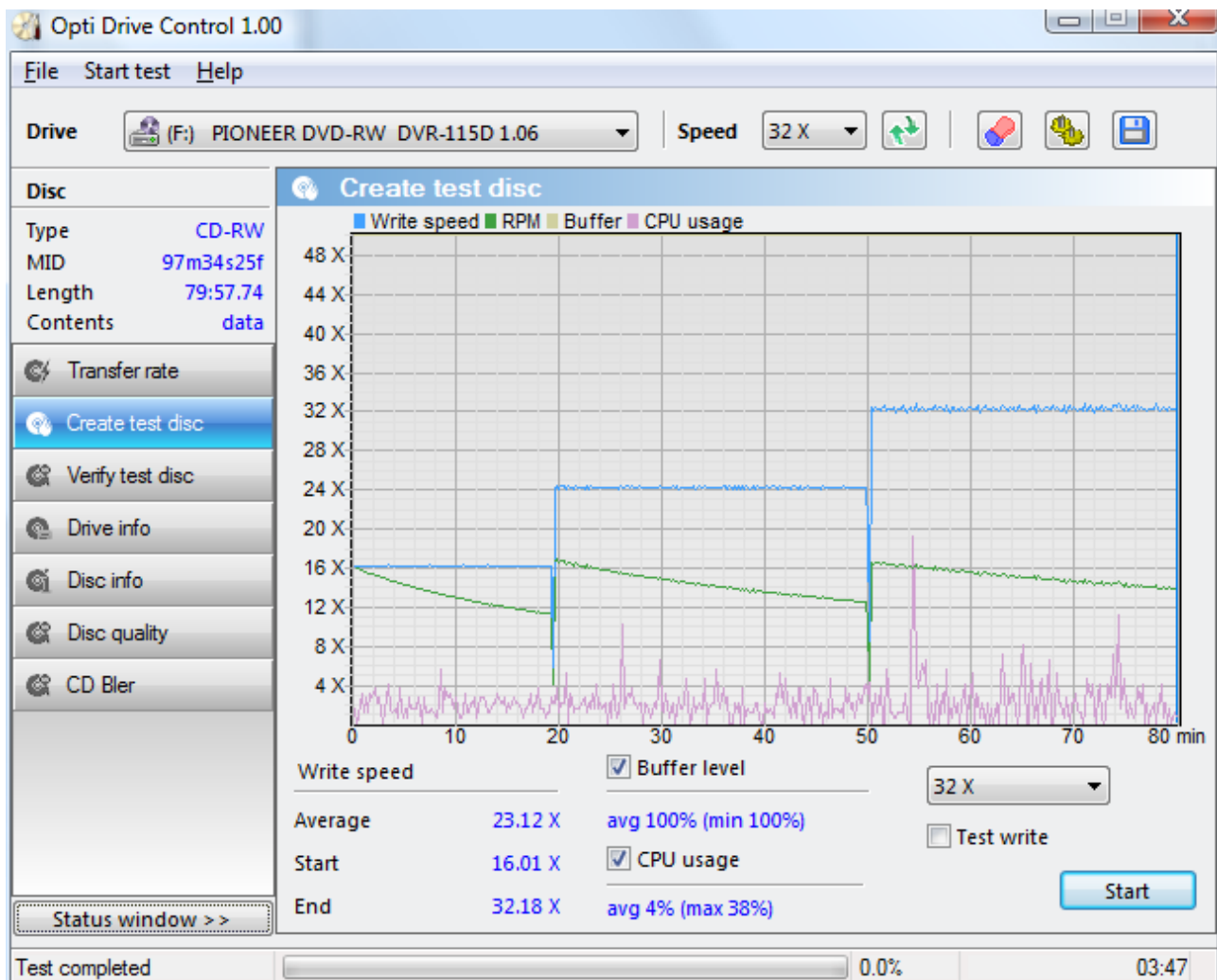


Direct overwrite: allows burning of test discs which are not empty without erasing them first. This options only works with DVD+RW, DVD-RAM and BD-RE discs.

Streaming: disables the automatic verify function of DVD-RAM and BD discs. By enabling this options those discs will be burned at a faster speed (about 2X faster) but this can cause reliability problems.

Test range: specify the range of the disc which will be tested. The end values can be set in either sectors or megabytes (MB).

Screenshots



The screenshot shows the write speed and the write strategy (Z-CLV).

The buffer level is at a constant 100% which is perfect. The CPU usage varies but it's low enough for burning without pauses.

6. Verify test disc

This is a very extensive verification function which requires a test disc created with Opti Drive Control.

To start the verification, select the random and/or sequential test and press the start button. Press the stop button to abort the test.

The random test will read and verify the 1000 small files which were burned with the create test disc function. The sequential test will test the big ISO file.

The contents of the big file and the 1000 small files overlap so if both the random and sequential tests are enabled the disc contents is actually verified twice.

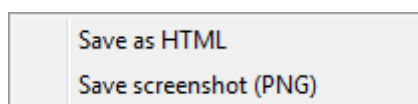
The filenames consist of four random characters followed by seven hexadecimal digits which is the first sector position of the file.

The test results for each file are shown in the list box. The position shows the start sector of where the file is burned on the disc. The length shows the file size in sectors (one sector is 2048 bytes). The list can be sorted by pressing on the column headers.

On top of the screen basic information of the test disc is displayed: the disc label, the date and time of when the disc was burned, the program version and the name and firmware version of the drive which was used to burn the disc.

Options

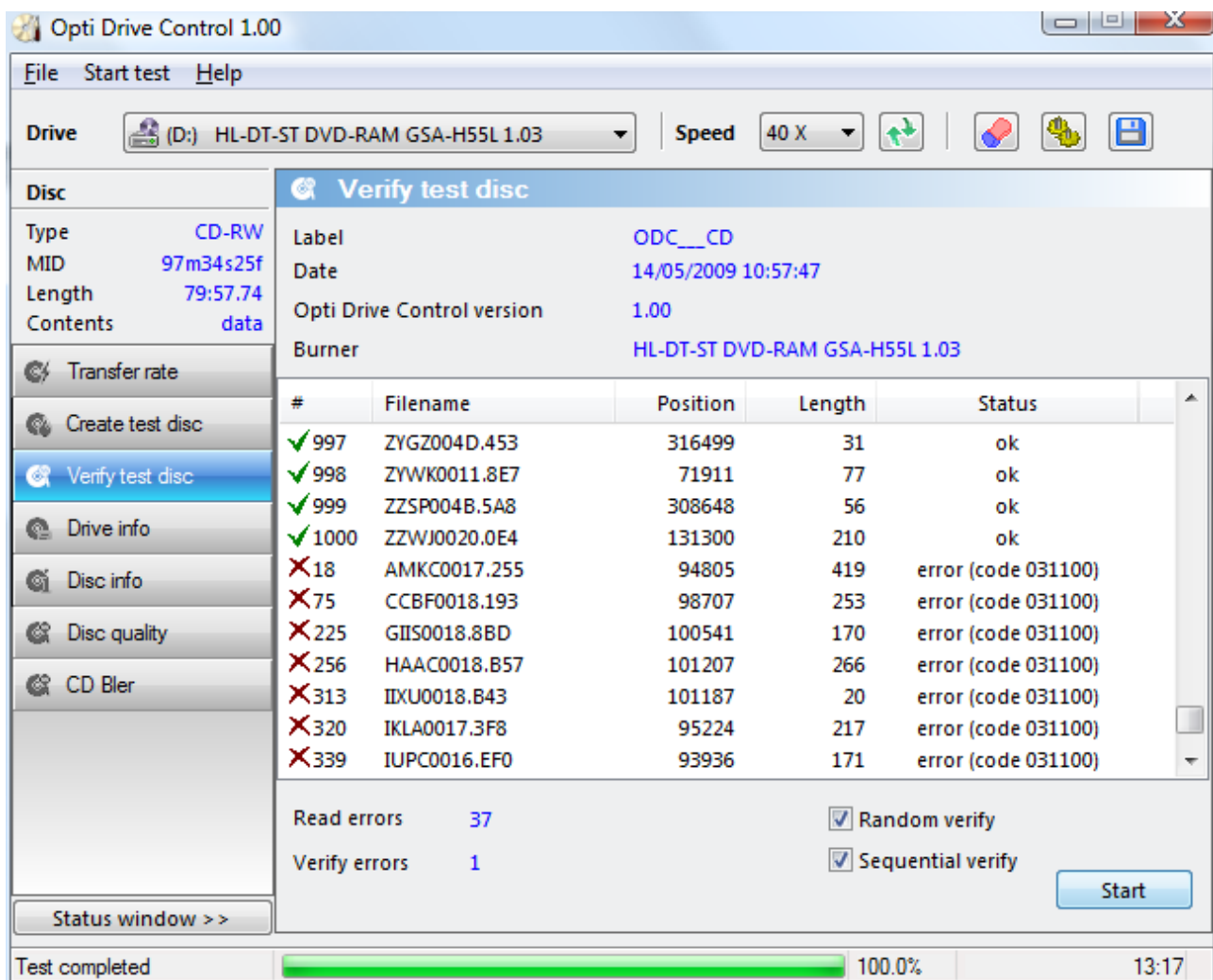
By right-clicking anywhere on the verify test disc screen you can call the options menu.



Save as HTML: save test results and screenshot to HTML file

Save screenshot: save the screen to a PNG file

Screenshot



The screenshot shows there are problems with this disc. By sorting on the status it's easy to see that most errors occur at around the same position.

7. Drive info

This function shows detailed information about the drive.

The information is divided in several sections:

General: shows basic drive information such as the drive name, firmware version, serial number and buffer length.

Speed settings for current media: shows the possible read and write speeds for the inserted disc. These values depend on the drive, disc type and disc manufacturer.

The results may not be valid if no disc is inserted.

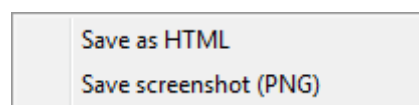
Region control: this will shows which region DVDs can be played and how many times the region settings can be changed.

Copy protection / data security: shows supported copy protection / data security schemes

Disc types: shows which disc types can be read and/or burned.

Options

By right-clicking anywhere on the drive info screen you can call the options menu.



Save as HTML: save test results and screenshot to HTML file

Save screenshot: save the screen to a PNG file

Screenshot

Opti Drive Control 1.00

File Start test Help

Drive (F:) PIONEER DVD-RW DVR-115D 1.06 Speed 16 X

Disc

Type DVD-R
MID MCC 03RG20
Length 4.38 GB
Contents empty

Transfer rate
Create test disc
Verify test disc
Drive info
Disc info
Disc quality
CD Bler

Status window >>

Drive info

General

Vendor PIONEER
Product DVD-RW DVR-115D
Firmware version 1.06
Buffer length 2000 KB
Serial number GJDP010389WL
Extra information 07/09/12 PIONEER

Speed settings for current media

Write 20 X, 16 X, 12 X, 8 X, 6 X, 4 X
Read 16 X

Region control

RPC scheme RPC II
Regions
Vendor resets remaining 4
User changes remaining 5

Copy protection / data security

CSS ✓ VCPS ✗
CPRM ✓ SecurDisc ✗
AACs ✗

Disc types

	read	write
CD-R	✓	✓
CD-RW	✓	✓
DVD-ROM	✓	
DVD-RAM	✗	✗
DVD-R	✓	✓
DVD-RW	✓	✓
DVD-R DL	✓	✓
DVD-RW DL	✗	✗
DVD-R DL LJR	✓	✓
DVD-Download	✗	✗
DVD+R	✓	✓
DVD+RW	✓	✓
DVD+R DL	✓	✓
DVD+RW DL	✗	✗
BD-ROM	✗	
BD-R	✗	✗
BD-RE	✗	✗
BD-R DL	✗	✗
BD-RE DL	✗	✗

Test completed 0.0% 13:17

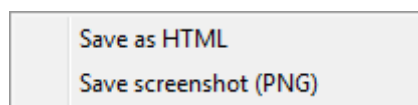
8. Disc info

This functions shows detailed disc information.

Information includes the disc type, book type, disc manufacturer, number of layers, capacity, supported write speeds, disc status, copy protection, the recorder which was used to burn the disc (only with DVD-R discs) and a binary data dump of this information.

Options

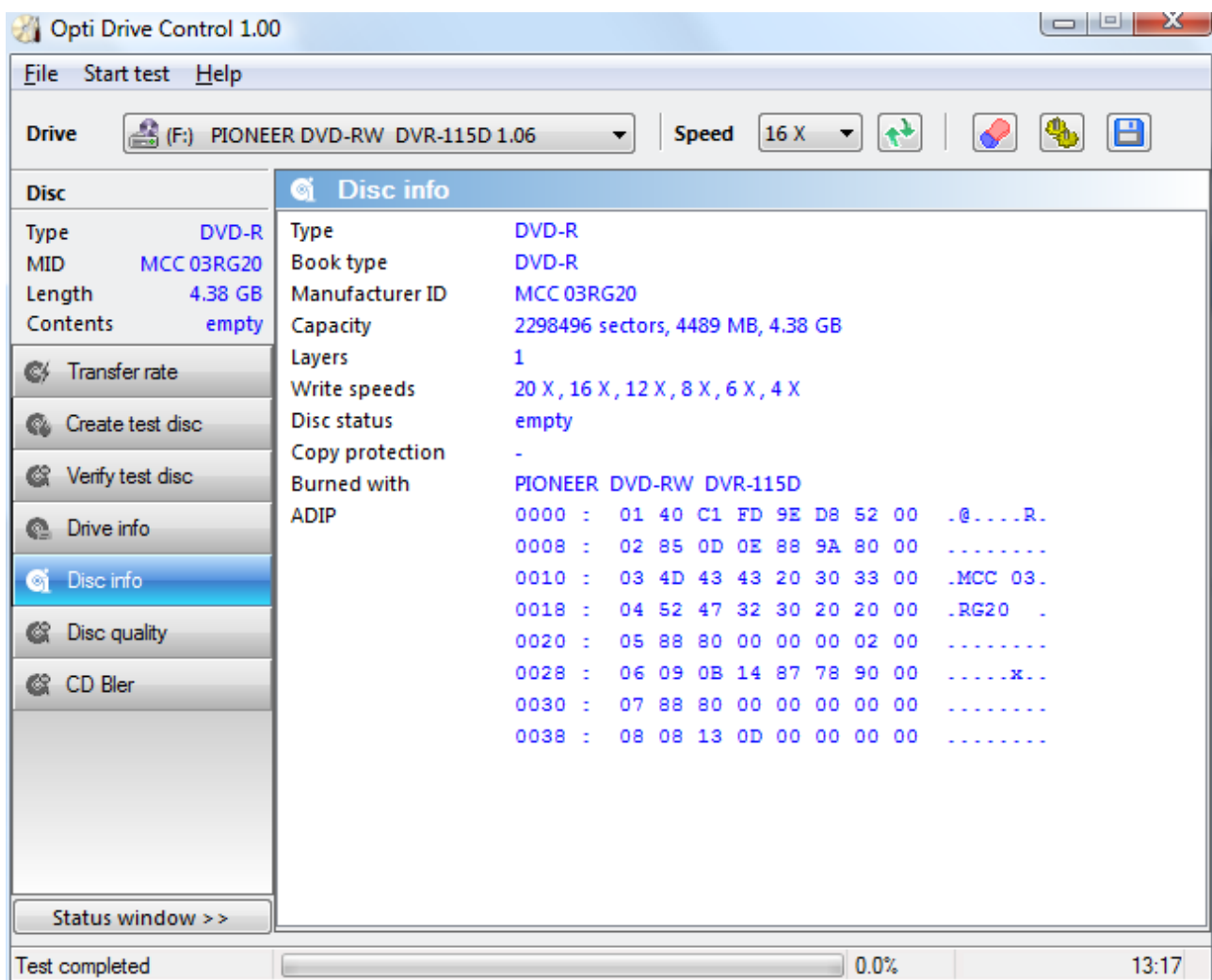
By right-clicking anywhere on the disc info screen you can call the options menu.



Save as HTML: save test results and screenshot to HTML file

Save screenshot: save the screen to a PNG file

Screenshot



9. Disc quality

This function will scan the disc and report error parameters. It requires a burned CD or DVD.

To start scanning select the scanning speed and press the start button. The test can be canceled by pressing the stop button.

The scanning speed can have a big influence on the test results. In general lower speeds will result in fewer errors.

The type of error parameters which are reported depend on the disc type.

For CDs the following parameters are measured:

C1: total number of errors at the C1 stage

C2: number of uncorrectable errors at the C2 stage.

Jitter: DC jitter

The errors are measured and shown for every second (75 sectors). The number of C1 errors should be as low as possible and a good disc should not have any uncorrectable C2 errors.

The error data is shown with a color pattern where green areas are an indication of good quality and yellow to red areas are indications of problem areas.

For DVDs the following parameters are measured:

PIE (Parity Inner Error): number of lines with one to five errors

PIF (Parity Inner Failure): number of lines with more than five errors, these errors are uncorrectable at the PI stage and passed to the PO (Parity Outer) stage.

Jitter: DC jitter

PIEs are measured in intervals of 8 ECC blocks (128 sectors), PIFs are measured in 1 ECC block intervals or for some drives (namely older BenQ drives) in 8 ECC block intervals.

The number of PIEs should stay below 280 and the number of PIFs should stay below 4 (1 ECC interval) or 15 (8 ECC interval).

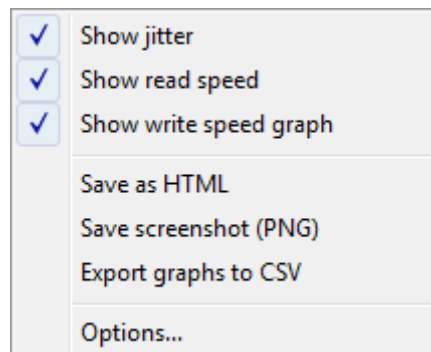
The error data is shown with a color pattern where green areas are an indication of good quality and yellow to red areas are indications of problem areas.

The recommended scan speed for DVDs is either 4X or 8X.

Note: this function is not supported by all drives. In general LiteOn, BenQ, Samsung and Optiarc/Nec drives are supported. Some Plextor drives are also supported. Pioneer and LG drives are not supported.

Options

By right-clicking anywhere on the disc quality screen you can call the options menu.



Show jitter: shows jitter line on the bottom graph if the drive can reports jitter

Show read speed: shows scan speed line on top graph

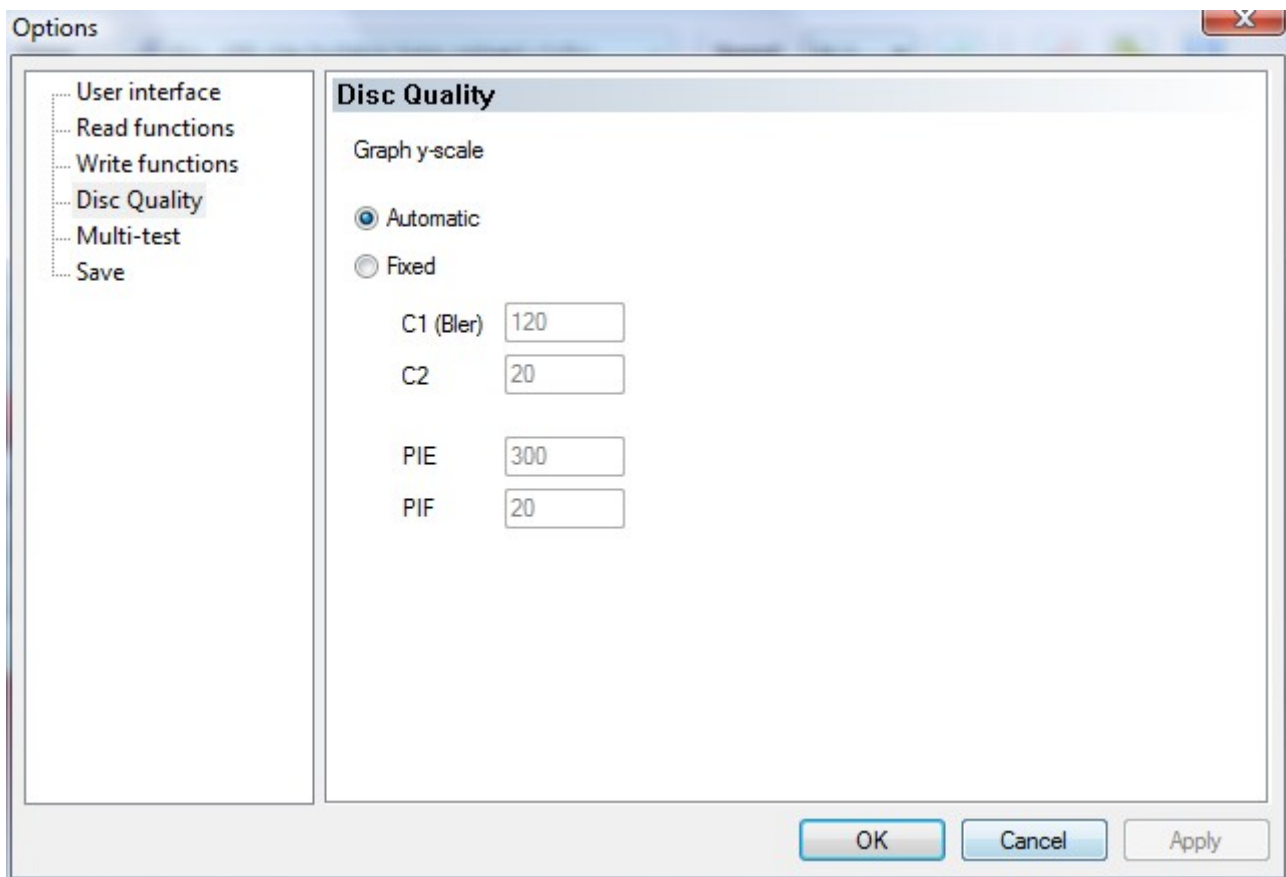
Show write speed graph: if the disc was created with this program the write transfer rate can be shown on the graph

Save as HTML: save test results and screenshot to HTML file

Save screenshot: save the screen to a PNG file

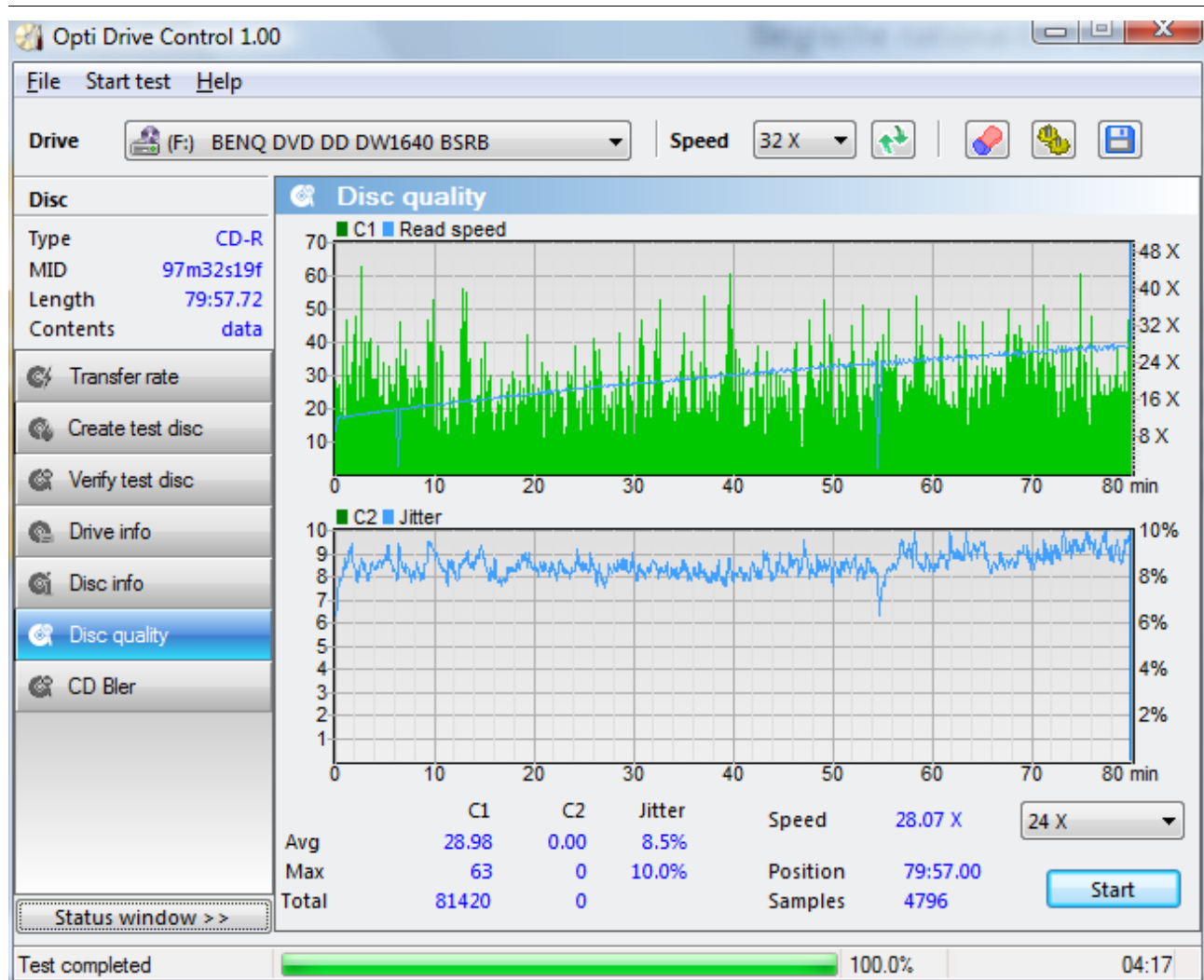
Export graph to CSV: export the data for the graph to a CSV file. With this file the graph can be regenerated and analyzed by a spreadsheet.

Options: brings up the options window:

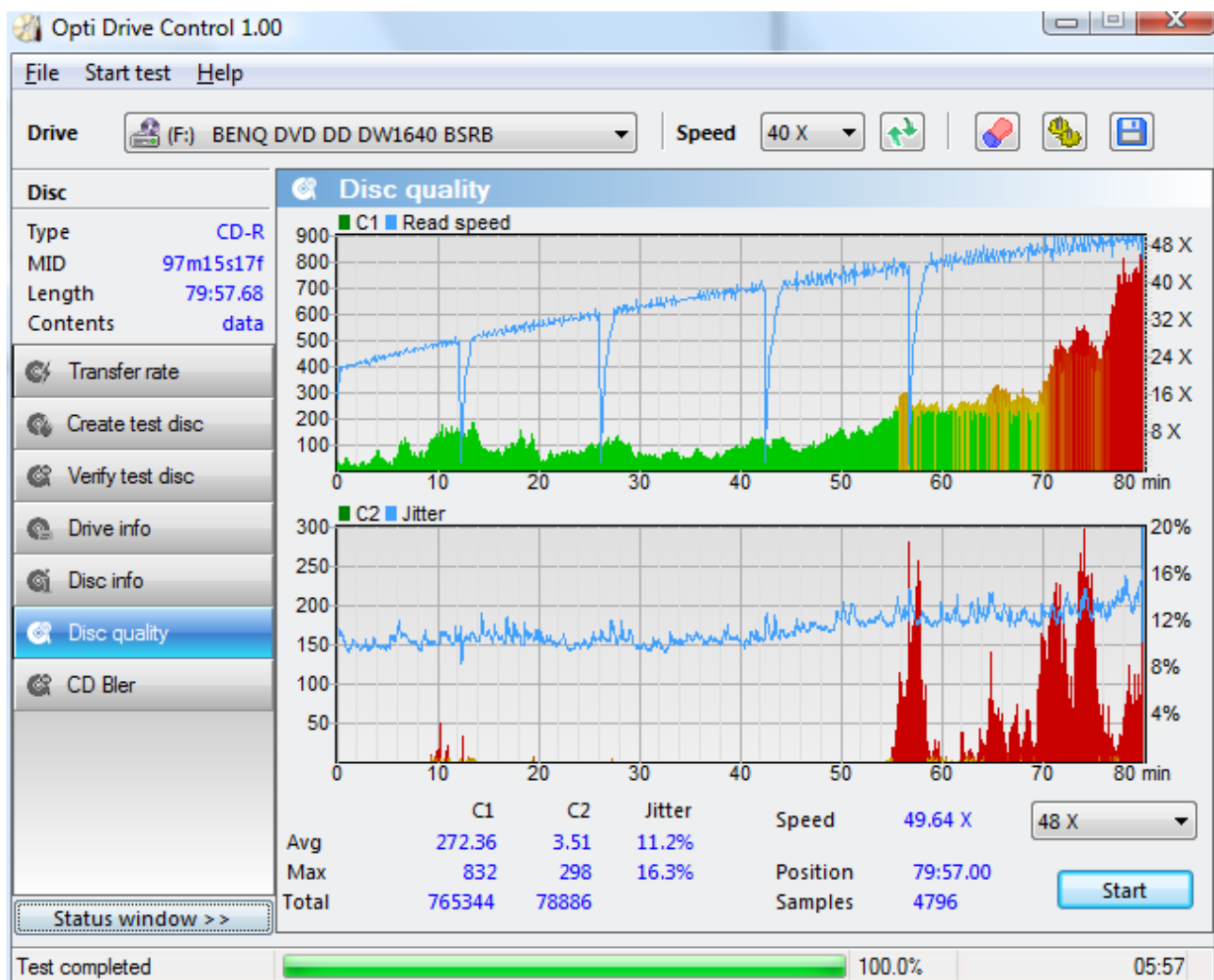


In the options screen the y-scale of the graphs can be set to automatic or a fixed scale which can be defined for CDs and DVDs separately.

Screenshots

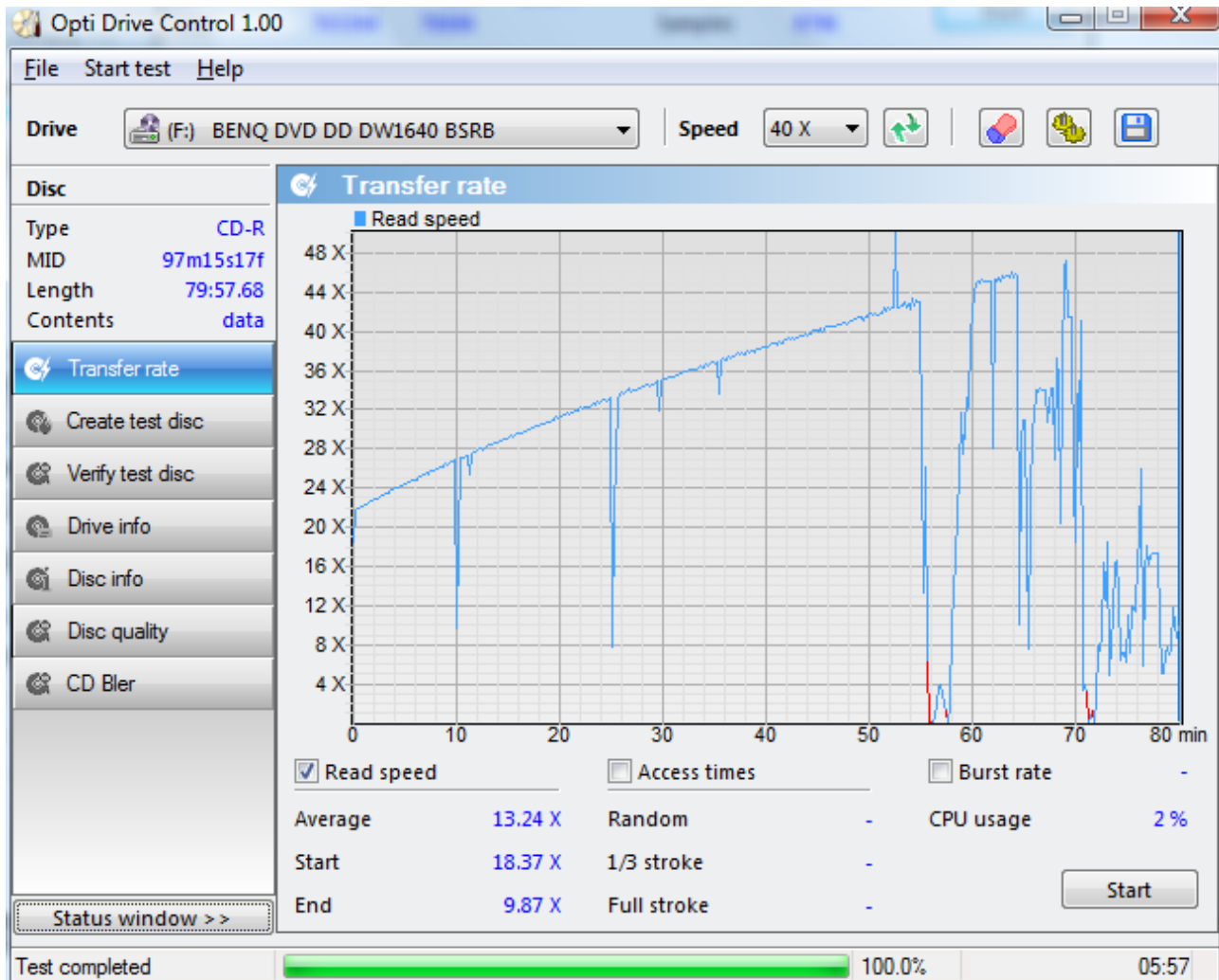


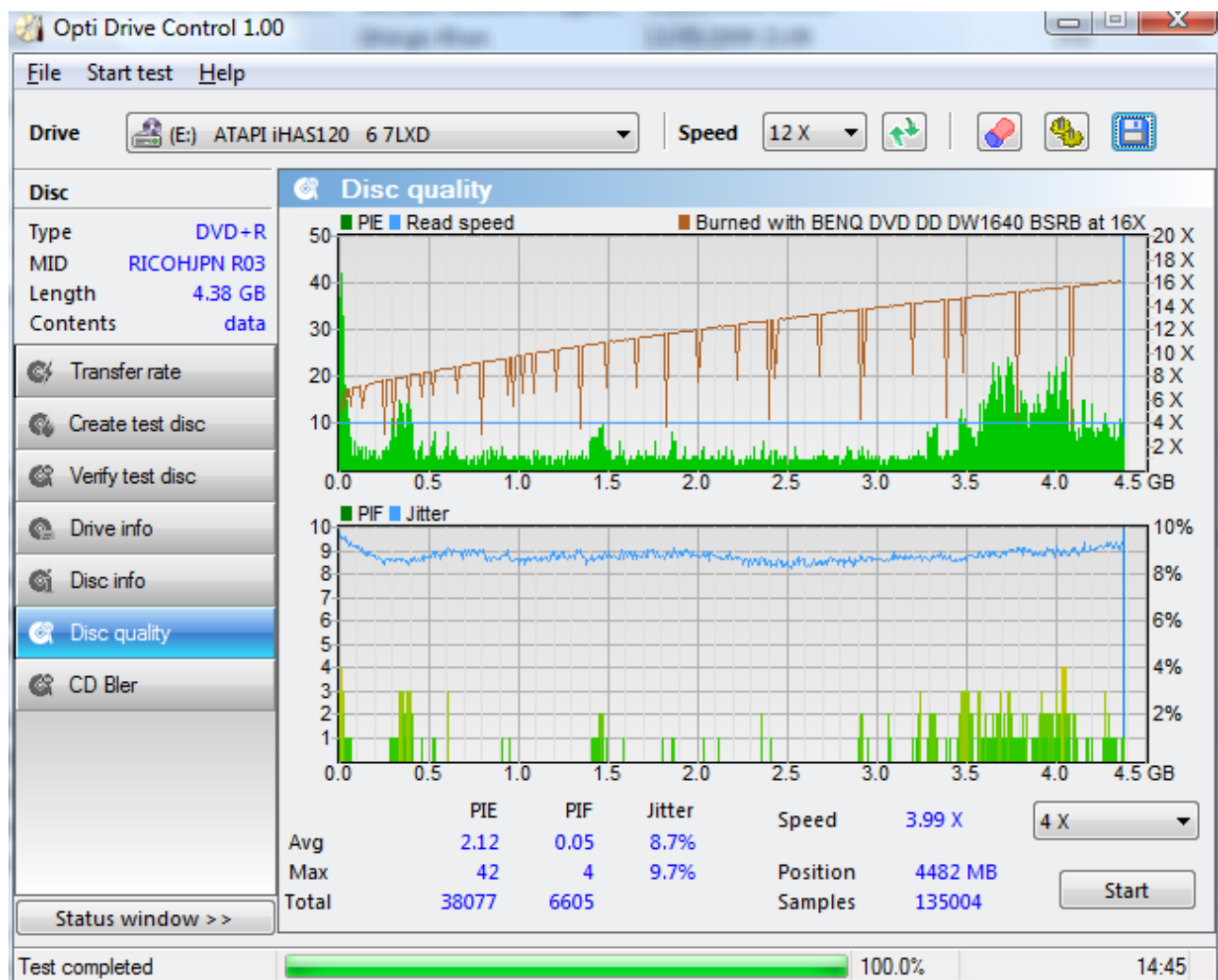
This is a good result because the number of C1 errors are low and there are no C2 errors.



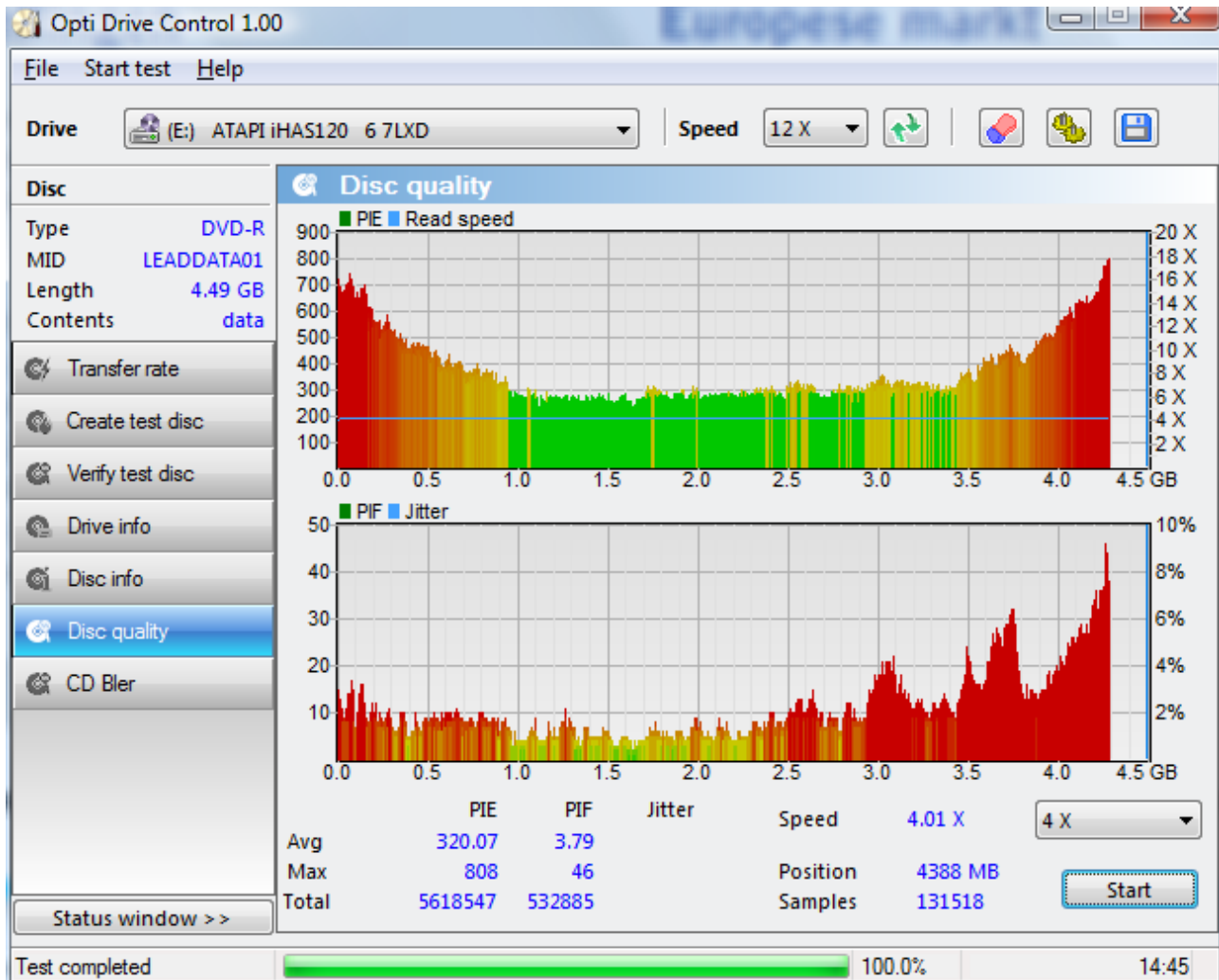
This is a scan of a low quality CD. There are some C2 errors at the 10 minute mark and a lot of C2 errors from the 55 minute mark.

The transfer rate test shows how this results in poor readability of the disc. There are many slowdowns and several read errors at the locations where many C2 errors were found.





Although this result is not too bad there are two possible problem areas: at the start and just after the 4GB mark.



This is a very bad result. Most red areas are unreadable, the other red areas can only be read at a very low speed and after several retries.

To prevent such a result the burn speed should be lowered or a different disc brand should be used.

10. CD Bler

The CD Bler test is similar to the disc quality test but it shows more information and only works with CDs.

To start scanning press the start button. The scan speed is the same as the selected scan speed from the disc quality test. To cancel the test press the stop button.

The CD Bler test measures following error parameters:

C1 errors:

BLER: block error rate: this is the sum of all C1 errors

E11: one error corrected at the C1 stage

E21: two errors corrected at the C1 stage

E31: three or more errors at the C1 stage. These frames are uncorrectable at the C1 stage and are passed to the C2 stage.

C2 errors:

E12: one error corrected at the C2 stage

E22: two errors corrected at the C2 stage

E32: three or more error detected at the C2 stage. These errors are uncorrectable.

Jitter: DC jitter

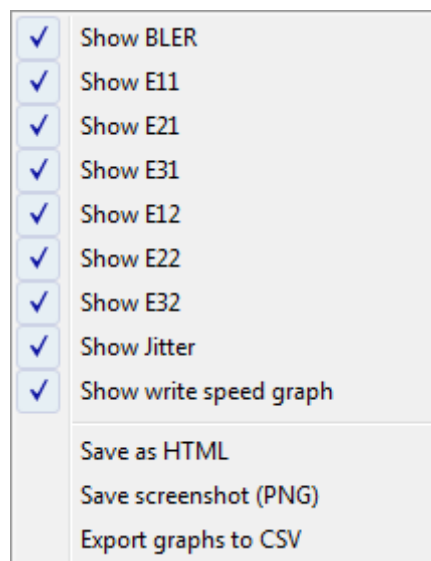
On a good disc BLER should not exceed 220 and there should be no E22 or E32 errors.

Note: Only certain BenQ and Plextor drives support this function.

For example: BenQ DW1620, DW1640, DW1650, DW1655, Plextor PX-716

Options

By right-clicking anywhere on the CD bler screen you can call the options menu.



Show BLER, E11, E21, E31, E12, E22, E32: shows specified error parameter

Show jitter: shows jitter line on the bottom graph if the drive can reports jitter

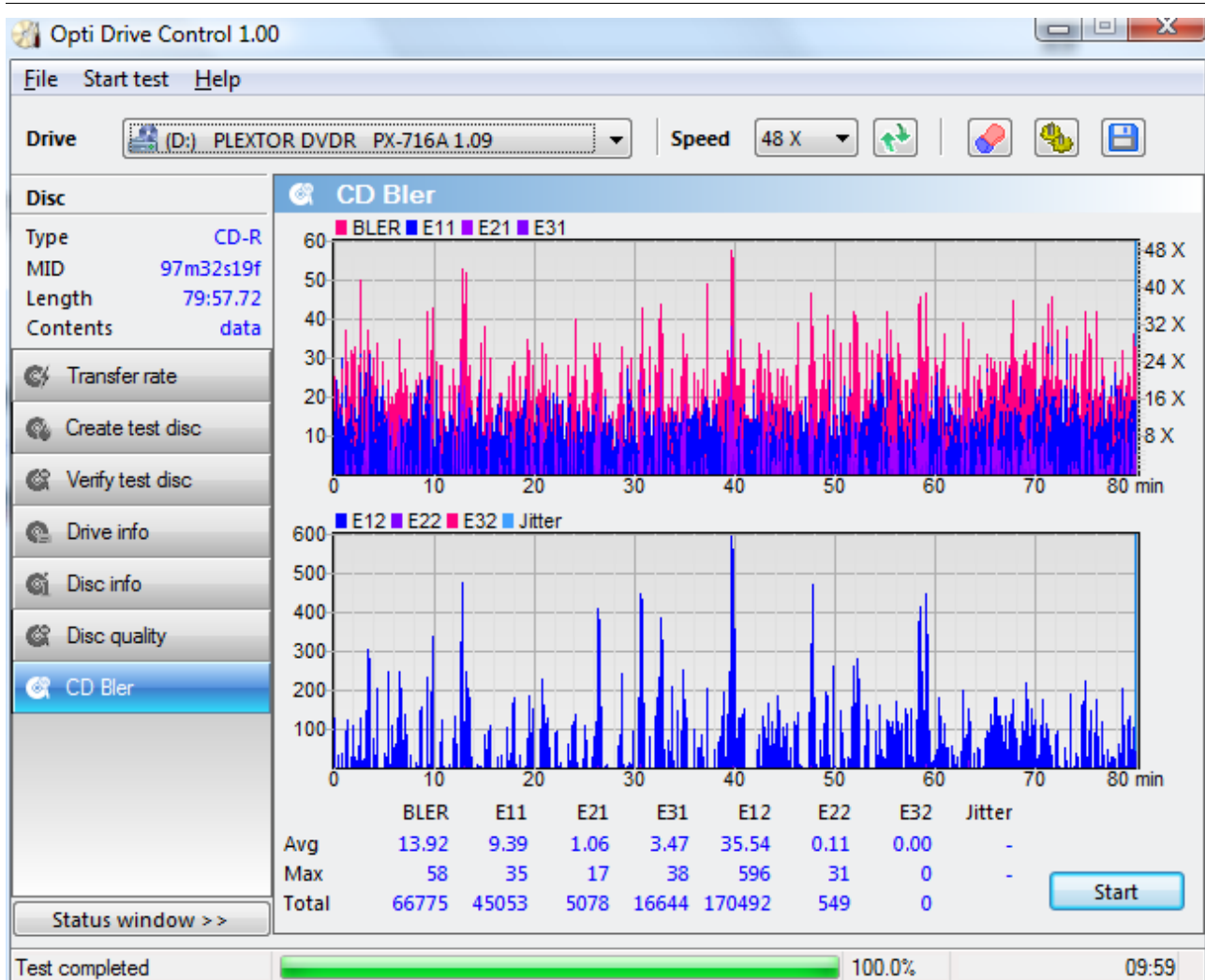
Show write speed graph: if the disc was created with this program the write transfer rate can be shown on the graph

Save as HTML: save test results and screenshot to HTML file

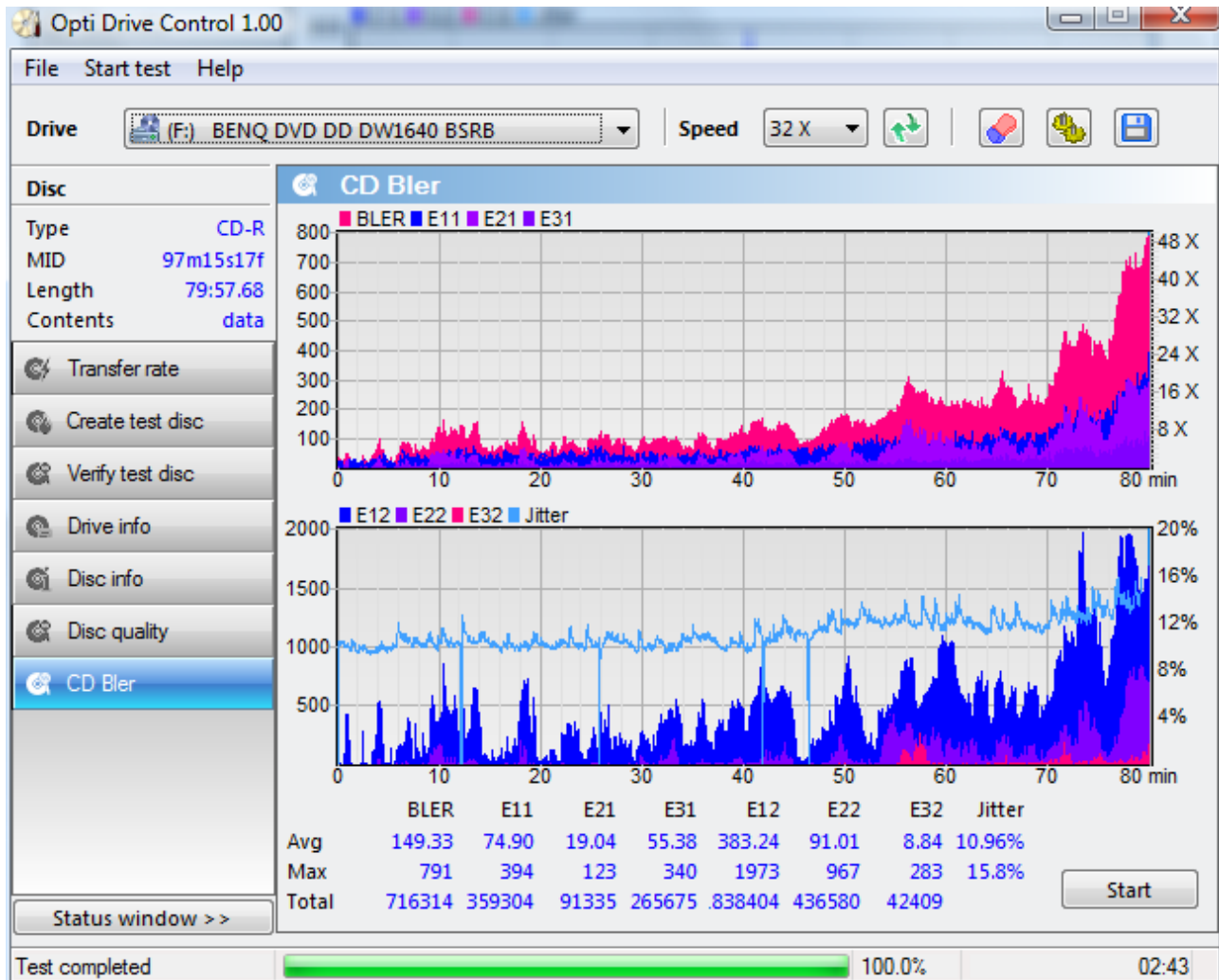
Save screenshot: save the screen to a PNG file

Export graph to CSV: export the data for the graph to a CSV file. With this file the graph can be regenerated and analyzed by a spreadsheet.

Screenshots



This is a good result: low BLER and no E22 or E32 errors.

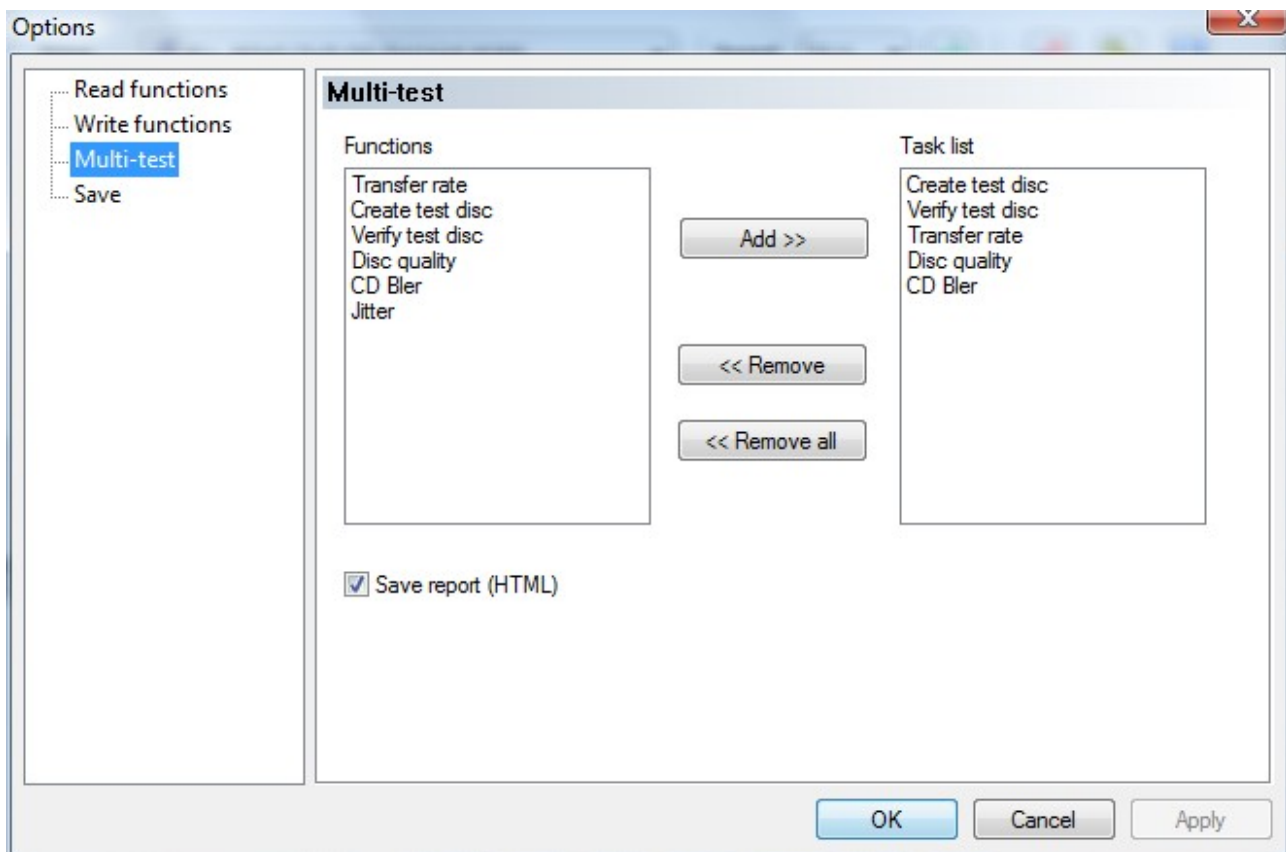


This is a very poor result. BLER exceeds 220 and there are many E22 and E32 errors.

11. Multi-test

With the multi-test function all tests can be executed sequentially without user intervention. A detailed test report can be created after all tests have completed.

To start the multi-test go to options → multi-test and add the tests in the order you want to execute them.



Then select multi-test from the start test menu.

12. Save options

Opti Drive Control offers several save functions.

From the options screen you can choose the destination folder and file name which can be generated by specifying certain parameters.

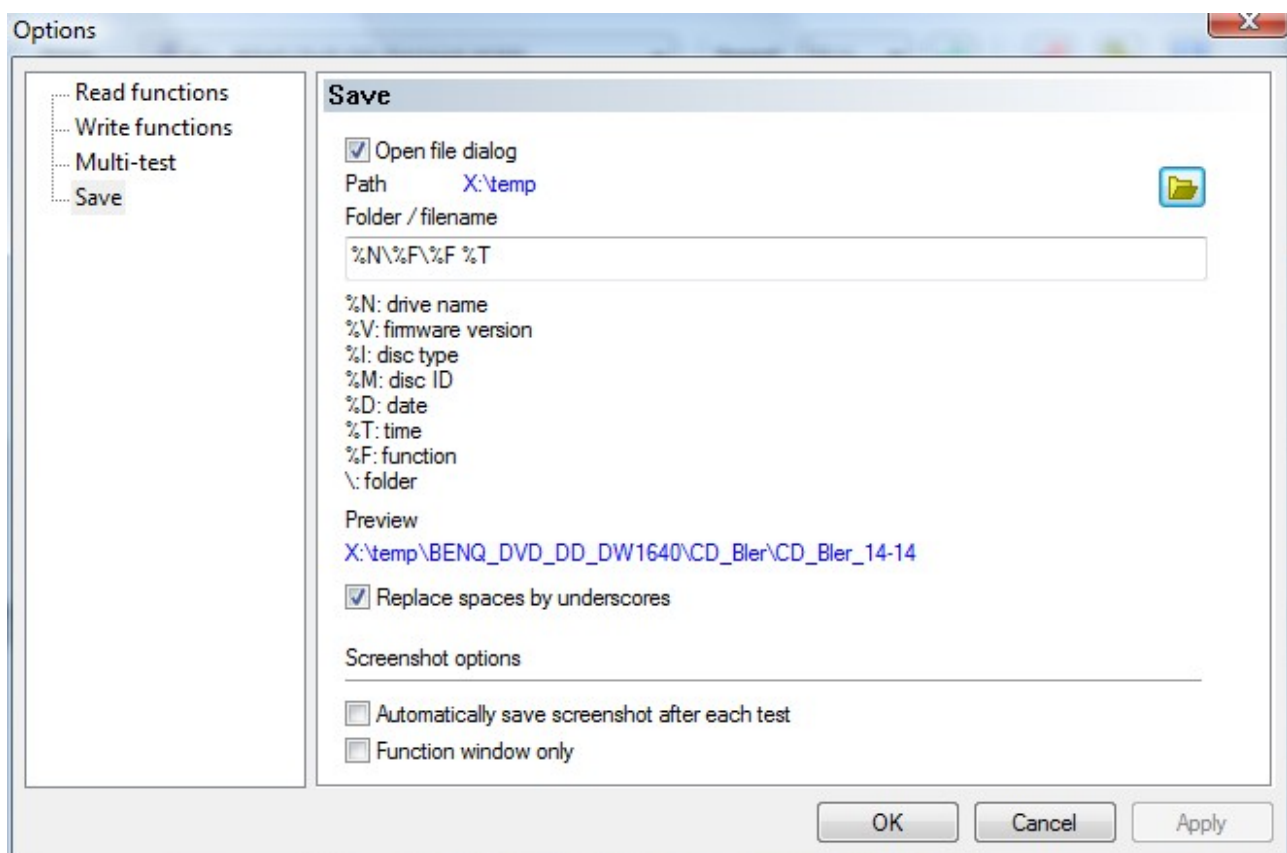
Open file dialog: opens the file dialog each time you want to save a file. There you can choose the folder and file name or just accept the folder and file name which are specified in the save options screen.

The save folder can be chosen by pressing the folder button or it can be typed in together with the file name.

Replace spaces by underscores: all spaces in the folder and file name will be replaced by an underscore ('_').

Automatically save screenshot after each test: this option may be handy if you want to save the test results from all your tests.

Function window only: a screenshot of only the function window is saved.



13. Usage statistics

Usage statistics can be called from the help menu.

This feature shows the read and write time in hours:minutes:seconds formats for each drive and in total.

Usage statistics

Total read time12:01:13

Total burn time2:15:08

Total burned discs50

Drive	Disc type	Read time	Write time	Discs burned
ATAPI iHAS120 6	CD	0:01:24	0:00:00	0
	DVD	1:05:59	0:00:00	0
	BD	0:00:00	0:00:00	0
BENQ DVD DD DW1640	CD	2:47:18	0:14:29	5
	DVD	2:24:00	0:09:40	2
	BD	0:00:00	0:00:00	0
HL-DT-ST DVD-RAM GSA-H55L	CD	0:13:41	0:04:55	2
	DVD	0:06:36	0:44:47	10
	BD	0:00:00	0:00:00	0
LITE-ON DVDRW SHW-160H6S	CD	0:00:00	0:02:44	1
	DVD	2:01:00	0:00:00	0
	BD	0:00:00	0:00:00	0

OK

14. Contact information

The following email address can be used for all technical and non-technical questions.

<mailto:support@optidrivecontrol.com>