Opti Drive Control manual
Version 1.70 – 3 July 2012

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Table of Contents

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.

A disc can be loaded or ejected automatically by pressing the load/eject button on the right side of the drive selector.

On the top left corner basic disc information is shown. Below that is a field where you can enter a label or you can let the program read the label from the disc by pressing the disc icon next to the label field or by enabling the 'read disc label automatically' option.

Below this field are the function buttons.

In the bottom left 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.
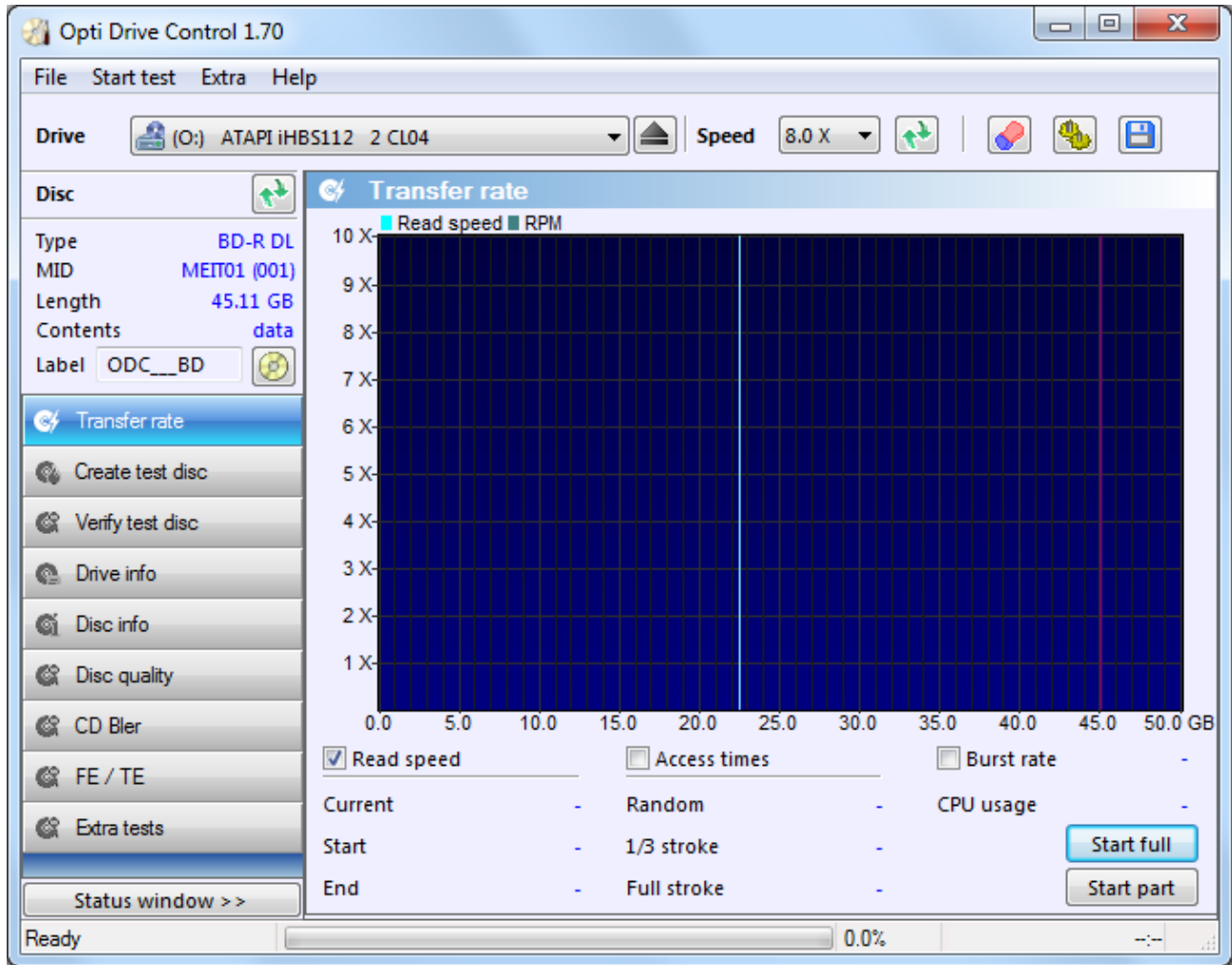
3.   User interface options

To change the appearance of the program a theme can be chosen in Options → User interface. Graph colors can be chosen separately.
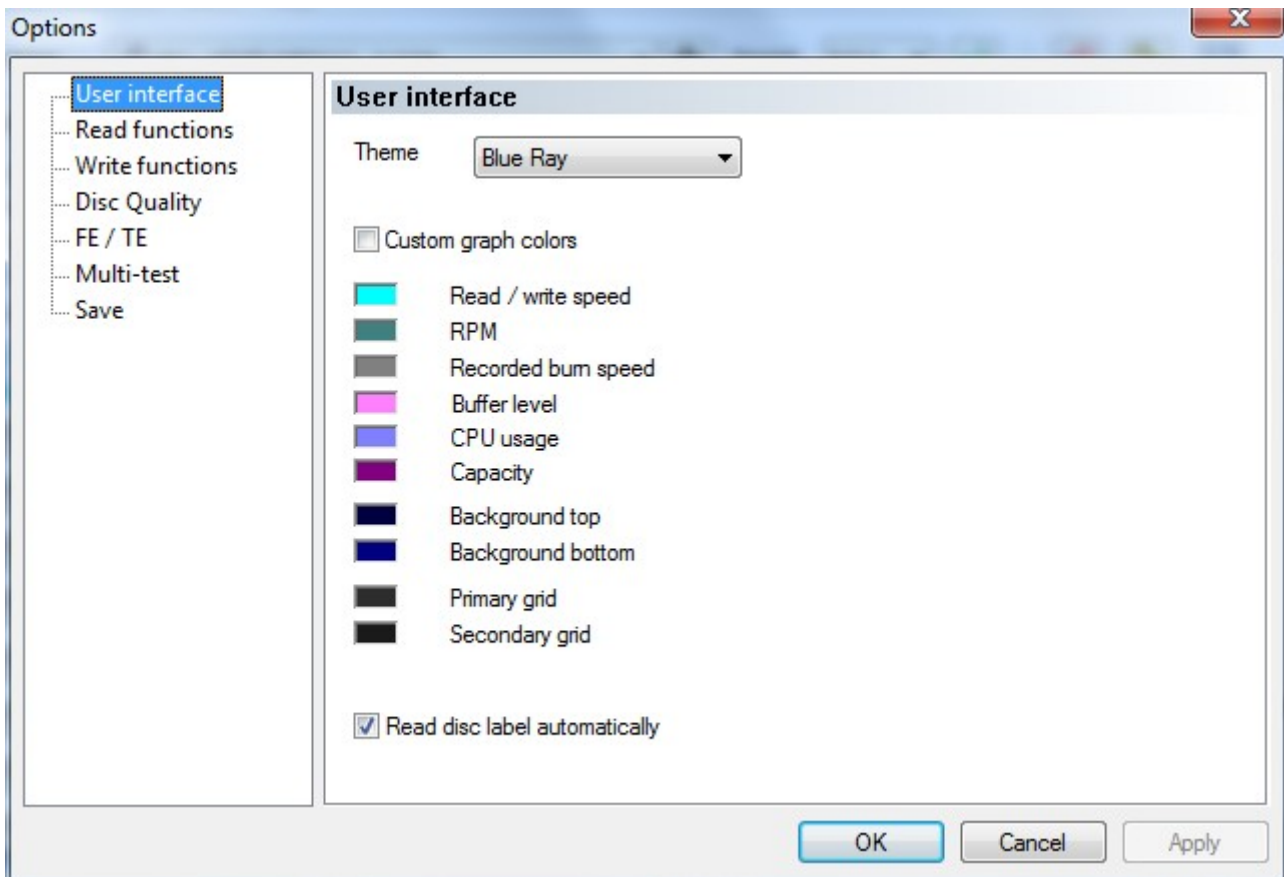
Read disc label automatically: by checking this option, the disc label will be read and shown each time a new disc is inserted or when the program starts.

Enabling this option will cause a small delay when starting the program and may cause long delays when a damaged disc is inserted.

The disc label can be read manually by pressing the disc button next to the label field.

The label can also be entered manually.

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.

By pressing the *start full* button the transfer rate test is performed on the entire surface, by pressing the *start part* button a window appears which allows you to choose the test range. The start and end positions can be specified in minutes (CDs), Megabyte (MB, for DVD and BD), and sectors (both decimal and hexadecimal).

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
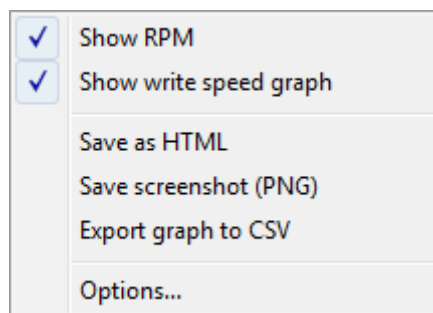
can be caused by limitations of the drive interface (USB for example) or by an incorrect DMA setting.

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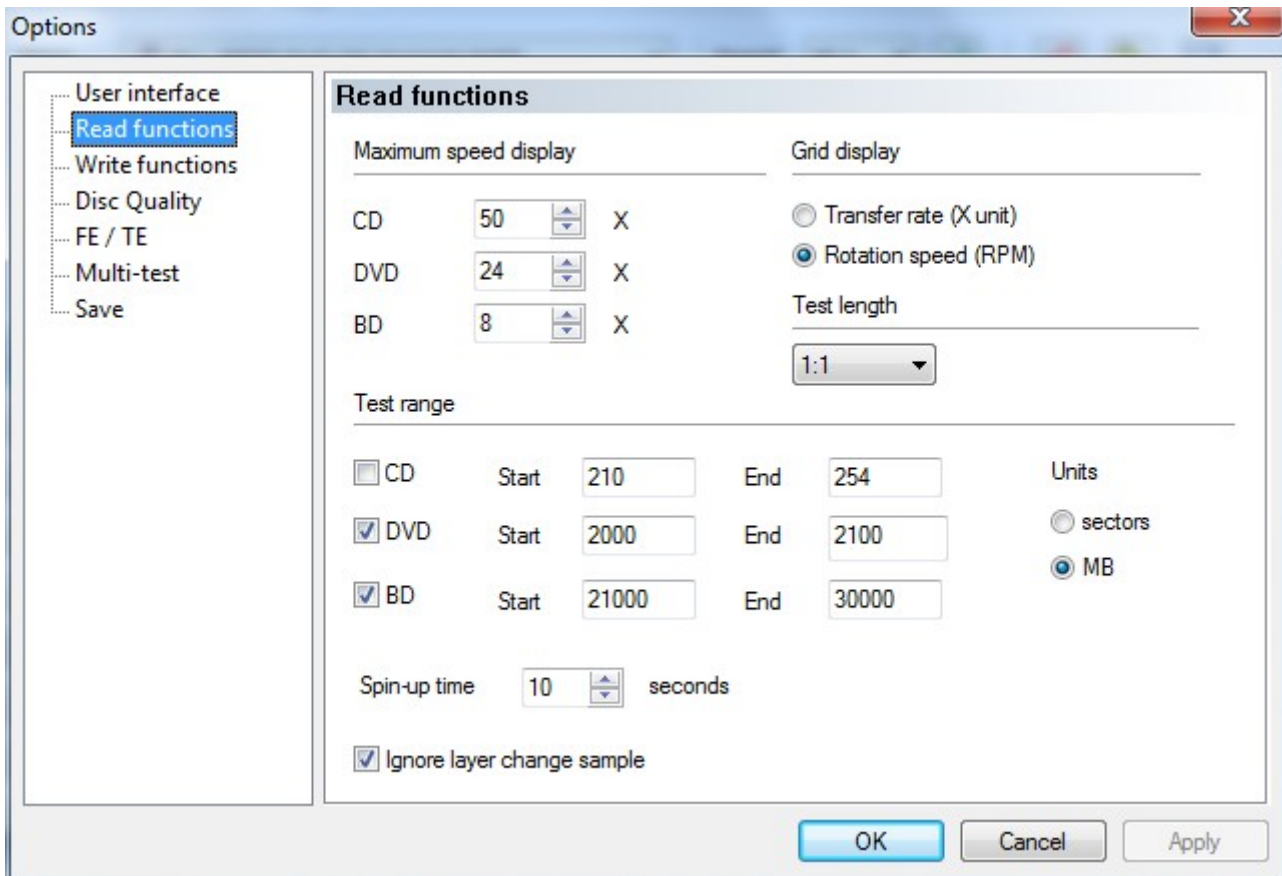
Maximum speed display: the is the maximum value the graph can show. This value has to be higher than the maximum speed of the drive to make sure the graph can be shown completely.

Grid display: the speed indication can be set to either X (default) or RPM.

Test length: the test length can be specified to reduce the time to perform the transfer rate test. By default this is set to 1:1 which tests the entire disc. When set at 1:2 ½ of the disc is tested, when set at 1:3, 1/3 of the disc is tested, etc.

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.

Ignore layer change sample: Setting this option will ignore the value measured at the layer break when calculating the minimum or average value.
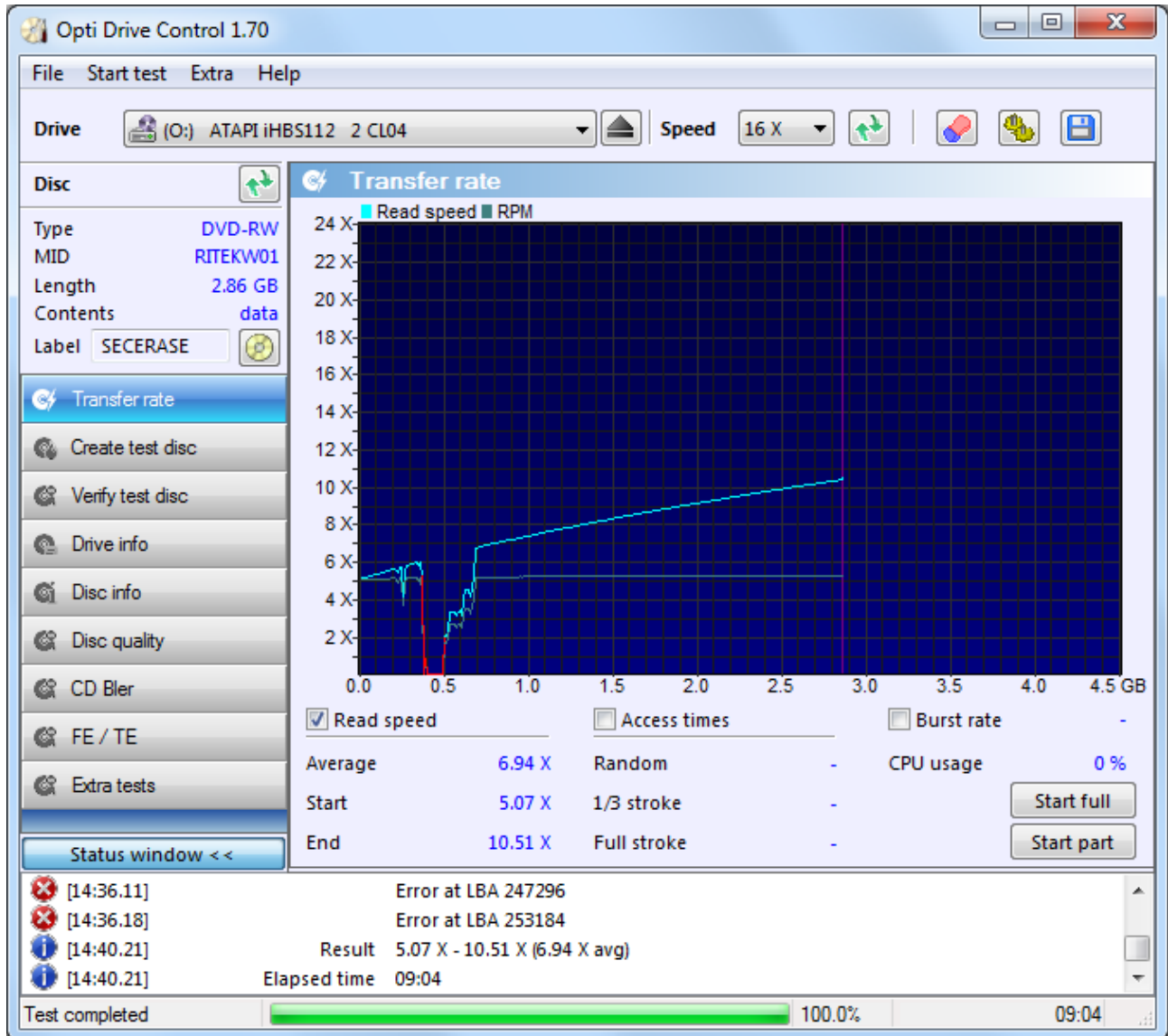
Screenshots
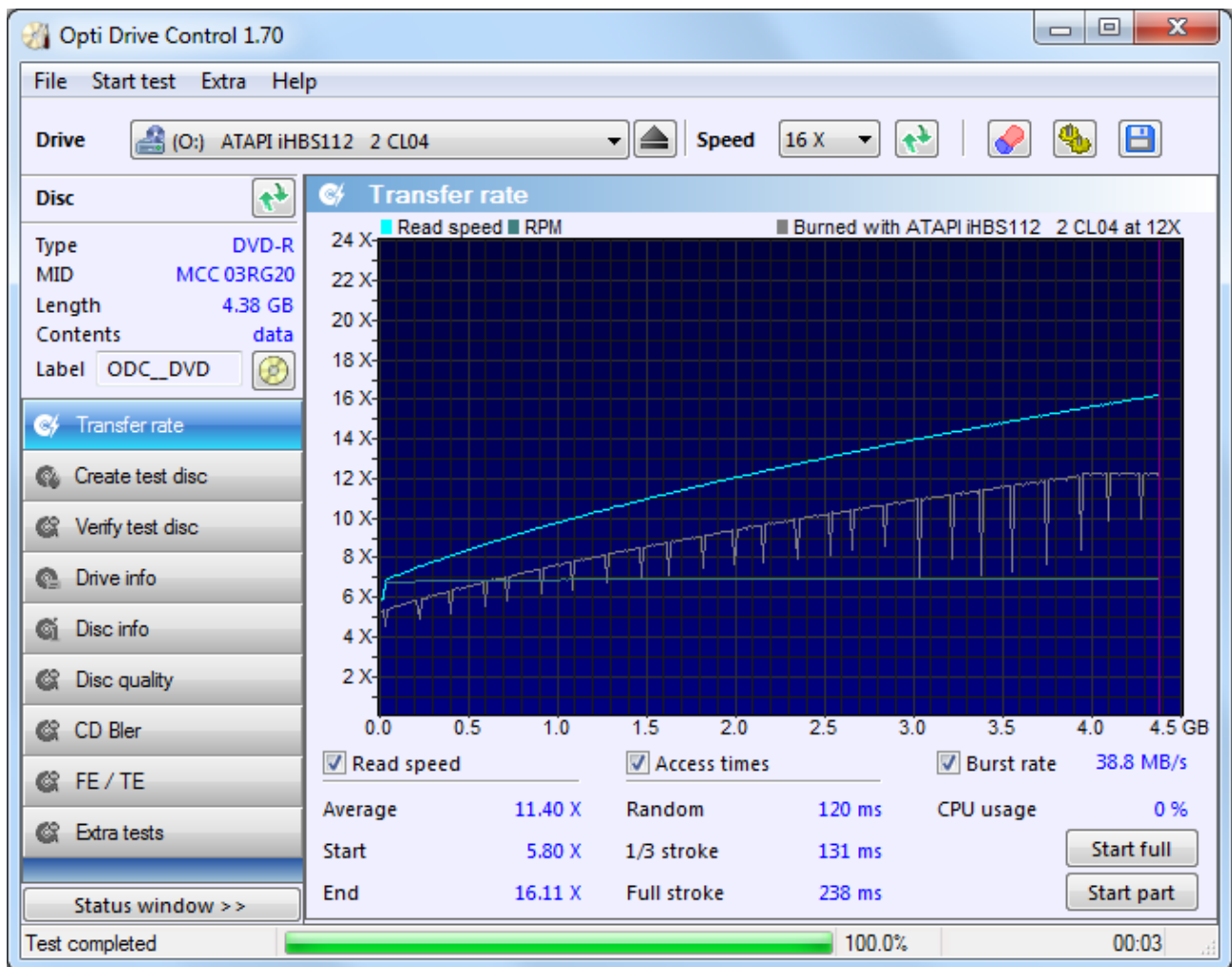
This is a typical result from the transfer rate test. The blue line shows the read speed, the green line shows the rotation speed in RPM.

The gray line shows the write speed graph which can be shown if the disc was created with Opt Drive Control.

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.

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.

Warning! The performance may be reduced a lot when using a Pioneer drive to create a disc. Therefore it's recommended to lower the buffer update frequency (available in write options) or to disable buffer level measurement if you're using a Pioneer drive.

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.
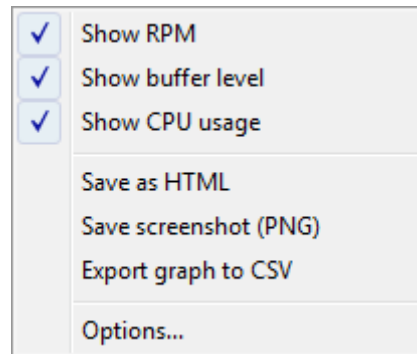
Show RPM: shows the rotation speed on the graph

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.
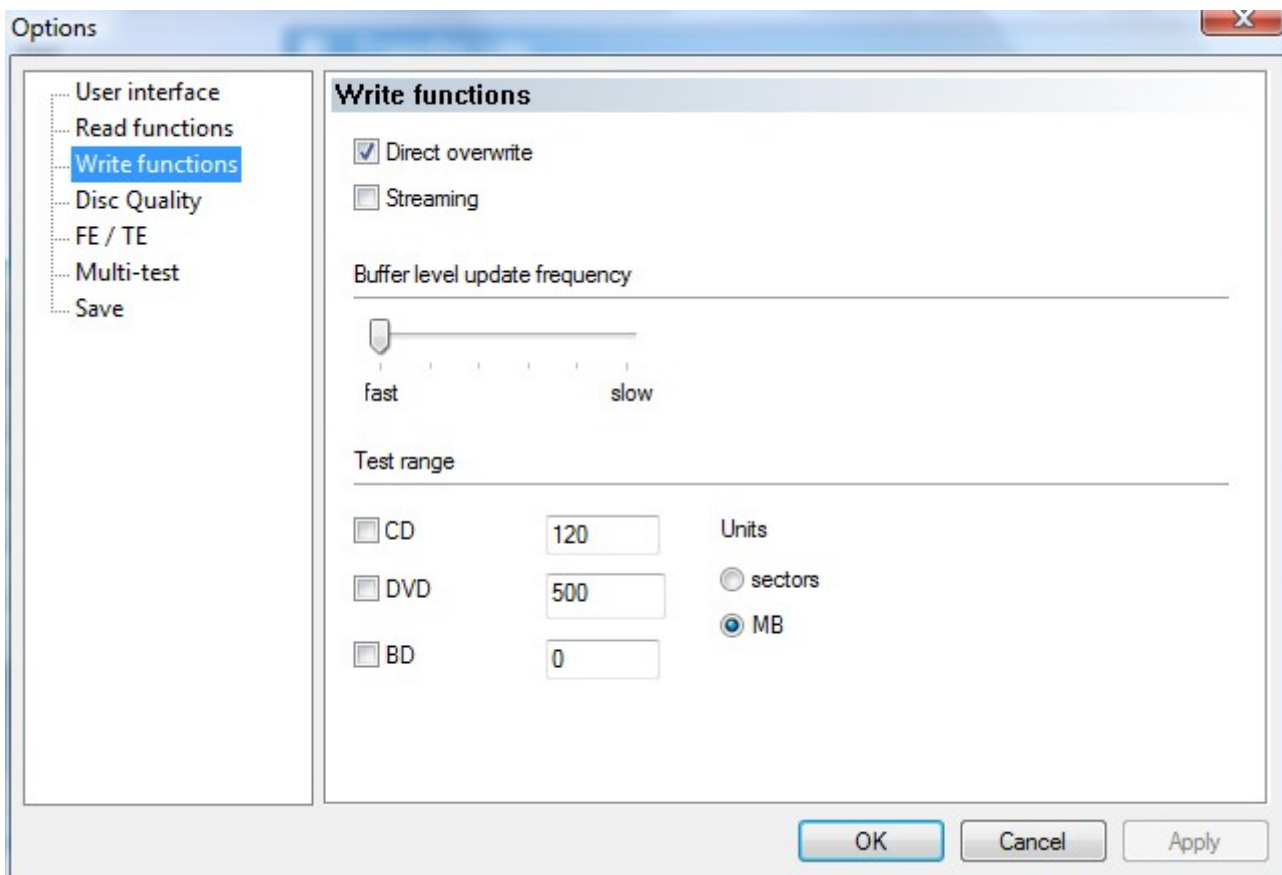
Options: brings up the options window:

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
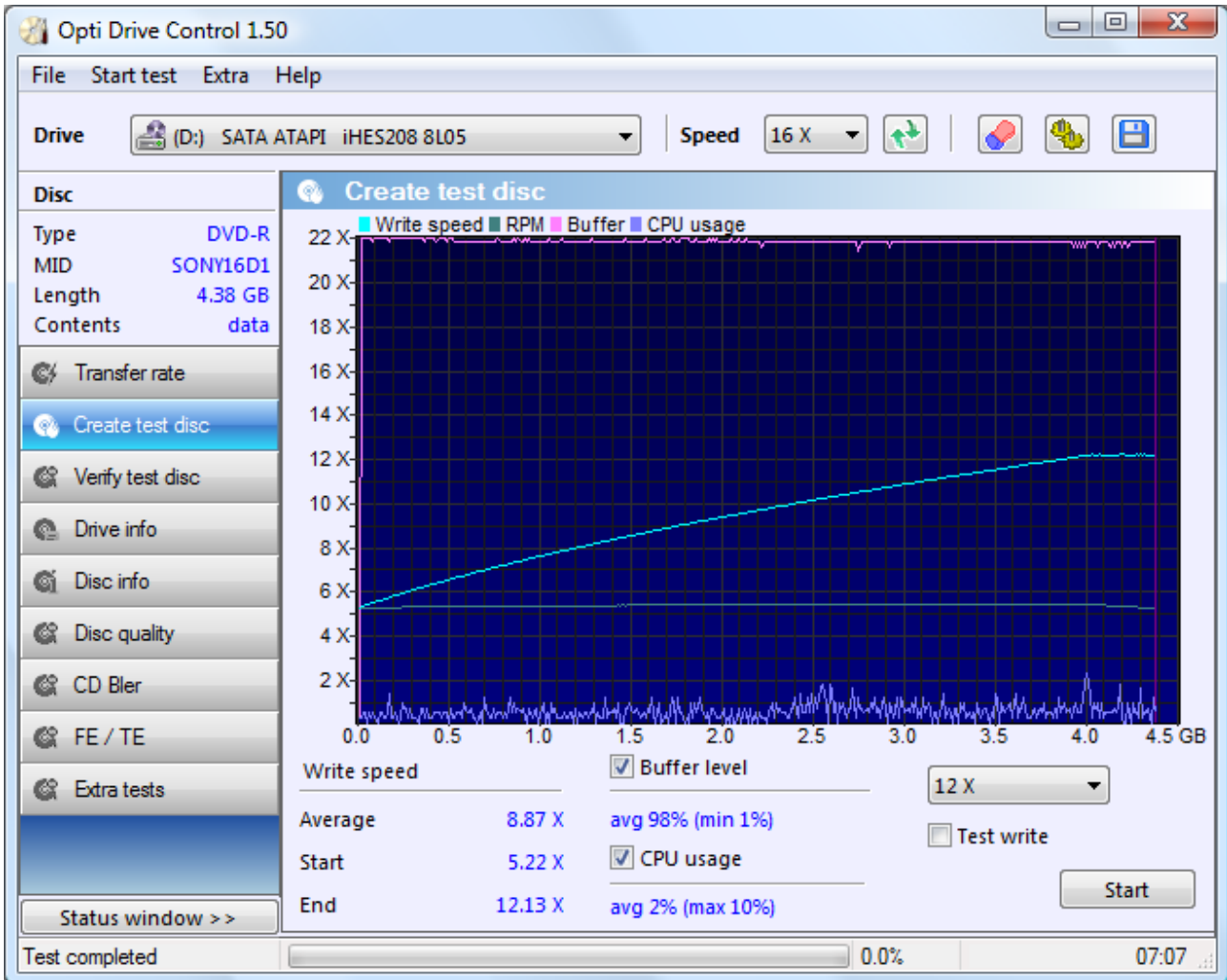
The screenshot shows the write speed and the write strategy (P-CAV).

The buffer level is at a constant 100% which is excellent. 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 file names 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.
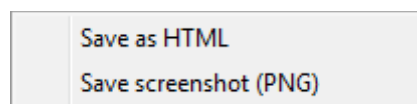
Save as HTML
Save screenshot (PNG)

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

Save screenshot: save the screen to a PNG file
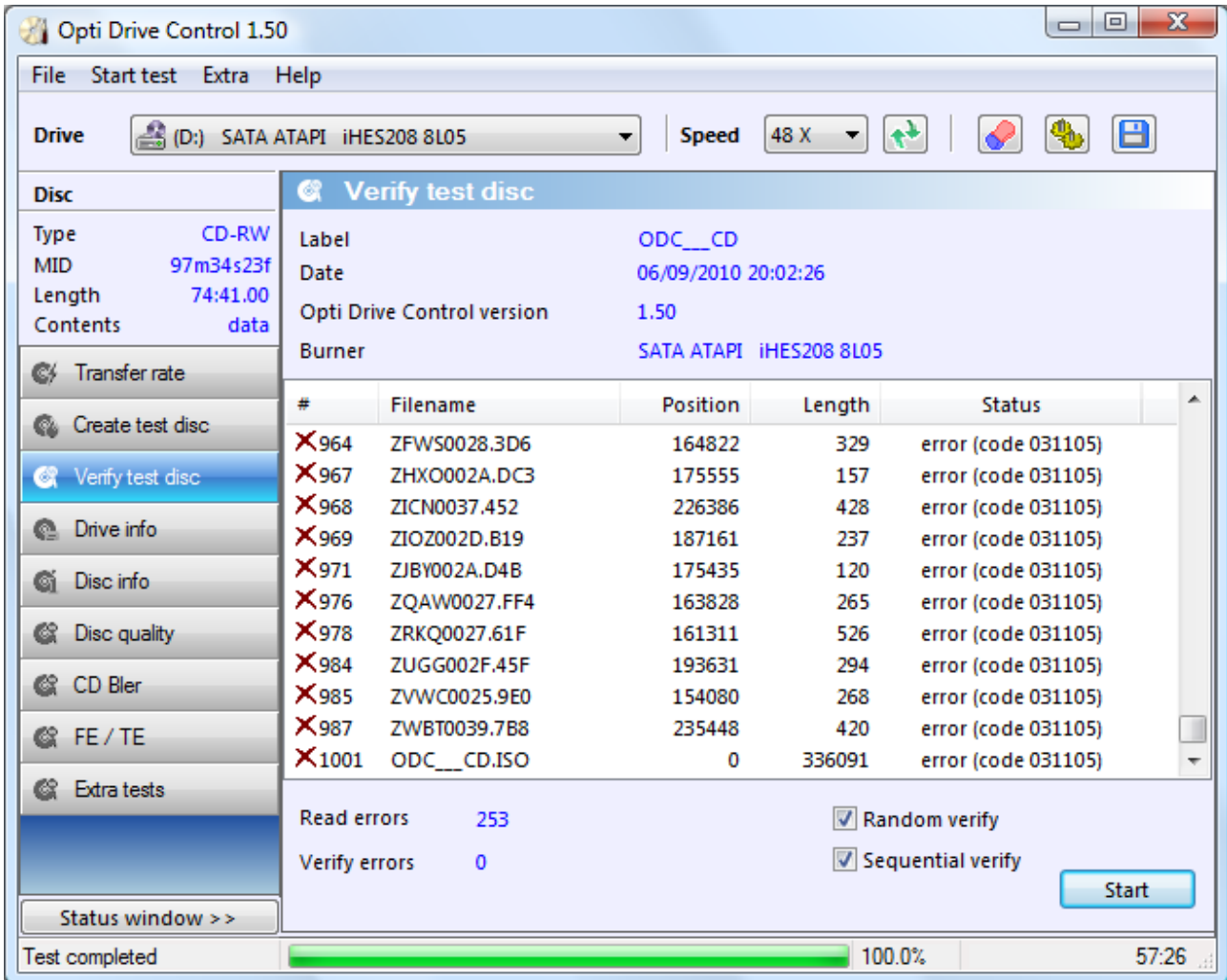
Screenshot

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 screenshot (PNG)

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

Save screenshot: save the screen to a PNG file

Screenshot

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.
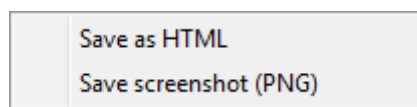
| Save as HTML |
| Save screenshot (PNG) |

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

Save screenshot: save the screen to a PNG file

Screenshot
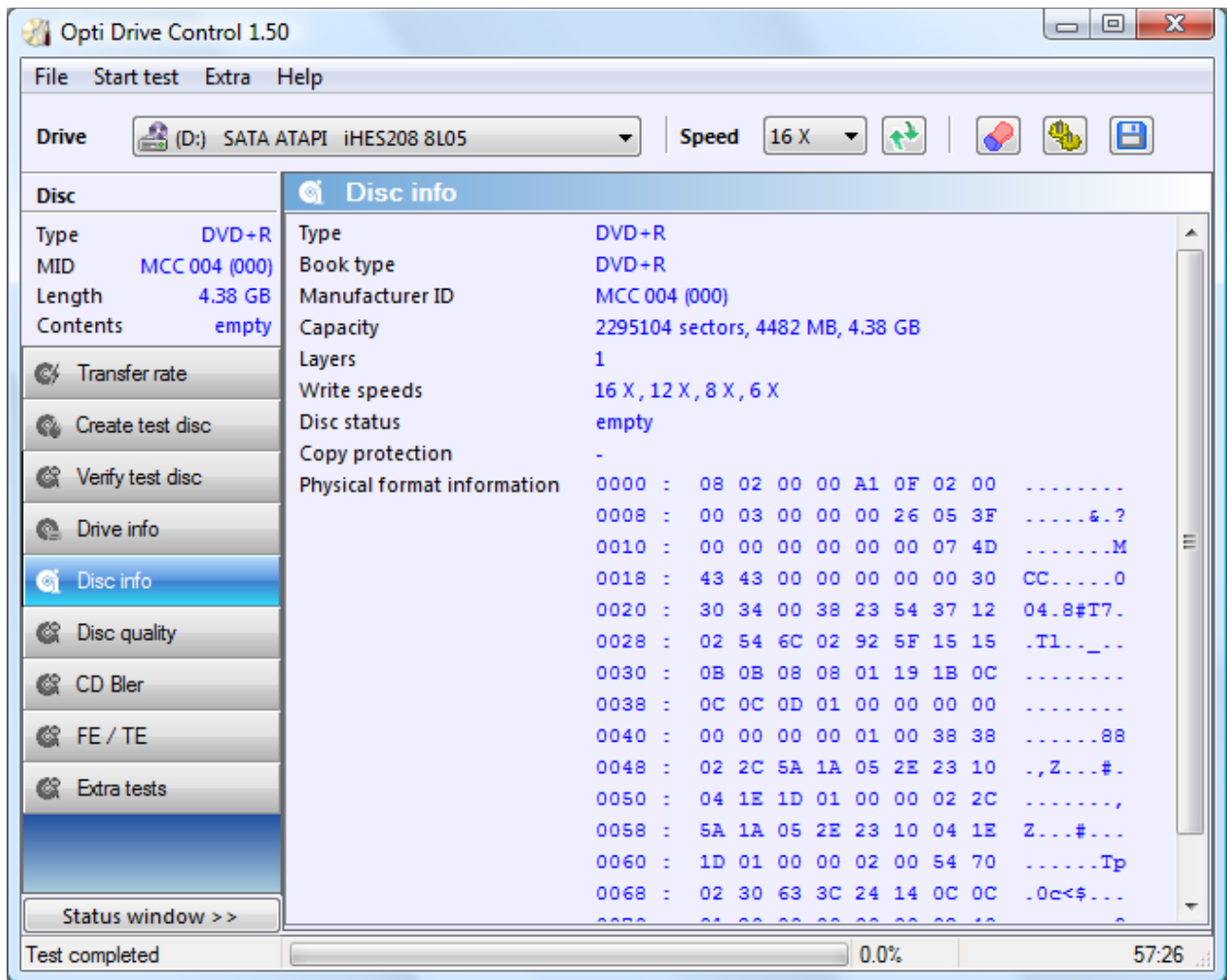
9.   Disc quality

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

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

By pressing the *start full* button the entire disc is scanned, by pressing the *start part* button a window appears which allow you to choose the test range. The start and end positions can be specified in minutes (CDs), Megabyte (MB, for DVD and BD), and sectors (both decimal and hexadecimal).

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

The jitter checkbox either enables or disables jitter measurement. This option is only available for scanning DVDs with LiteOn drives.

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.

POF (Parity Outer Failure): uncorrectable column. When a PO failure occurs the drive will re-read and may slow down but when this fails a read error occurs.

Jitter: DC jitter

PIEs are measured in intervals of 8 ECC blocks (PIE Sum 8, 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.

For BDs the following parameters are measured:

LDC (Long Distance Code): number of parity errors on LDC codewords per ECC block (32 sectors)

BIS (Burst Indication Subcode): number of parity errors on BIS codewords per ECC block (32 sectors)

On a good disc the average LDC should stay below 13 and BIS should stay below 15.

Note: this function is not supported by all drives. In general LiteOn, BenQ, Pioneer, Samsung and Optiarc/Nec drives are supported. Some Plextor drives are also supported. LG drives are not supported. Testing BD media currently only works with the LiteOn DH-4O1S , iHES106 and iHES208 and other BD drives with a Mediatek chipset.

Options

By right-clicking anywhere on the disc quality screen you can call the options menu.
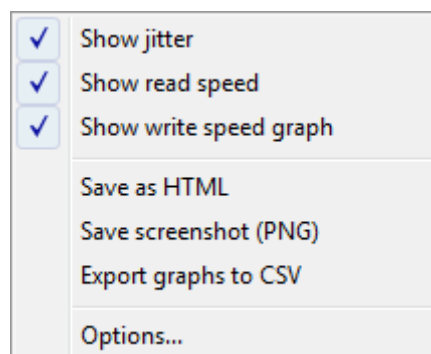
Show jitter: shows jitter line on the bottom graph if the drive can reports jitter

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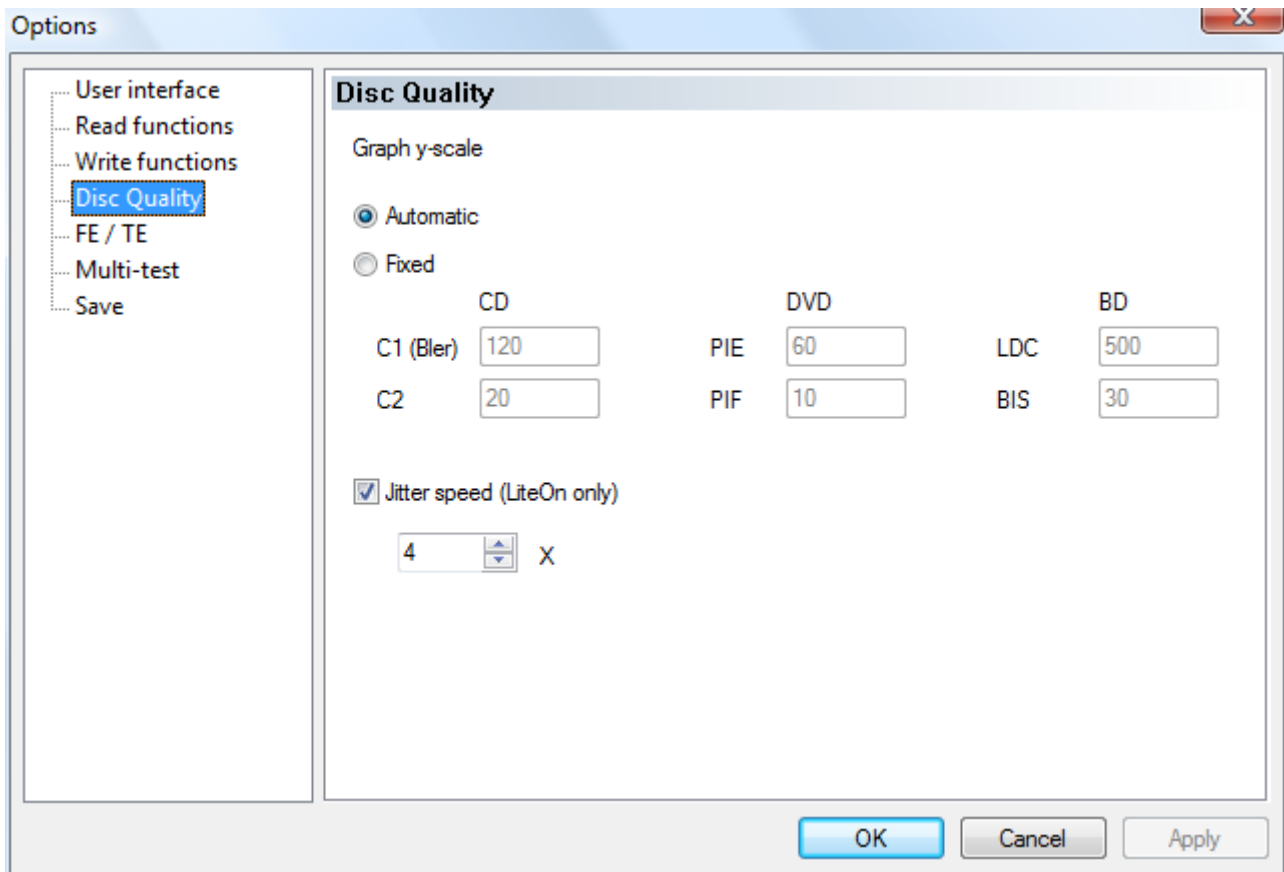
In the options screen the y-scale of the graphs can be set to automatic or a fixed scale which can be defined for CDs , DVDs and BDs separately.

Screenshots
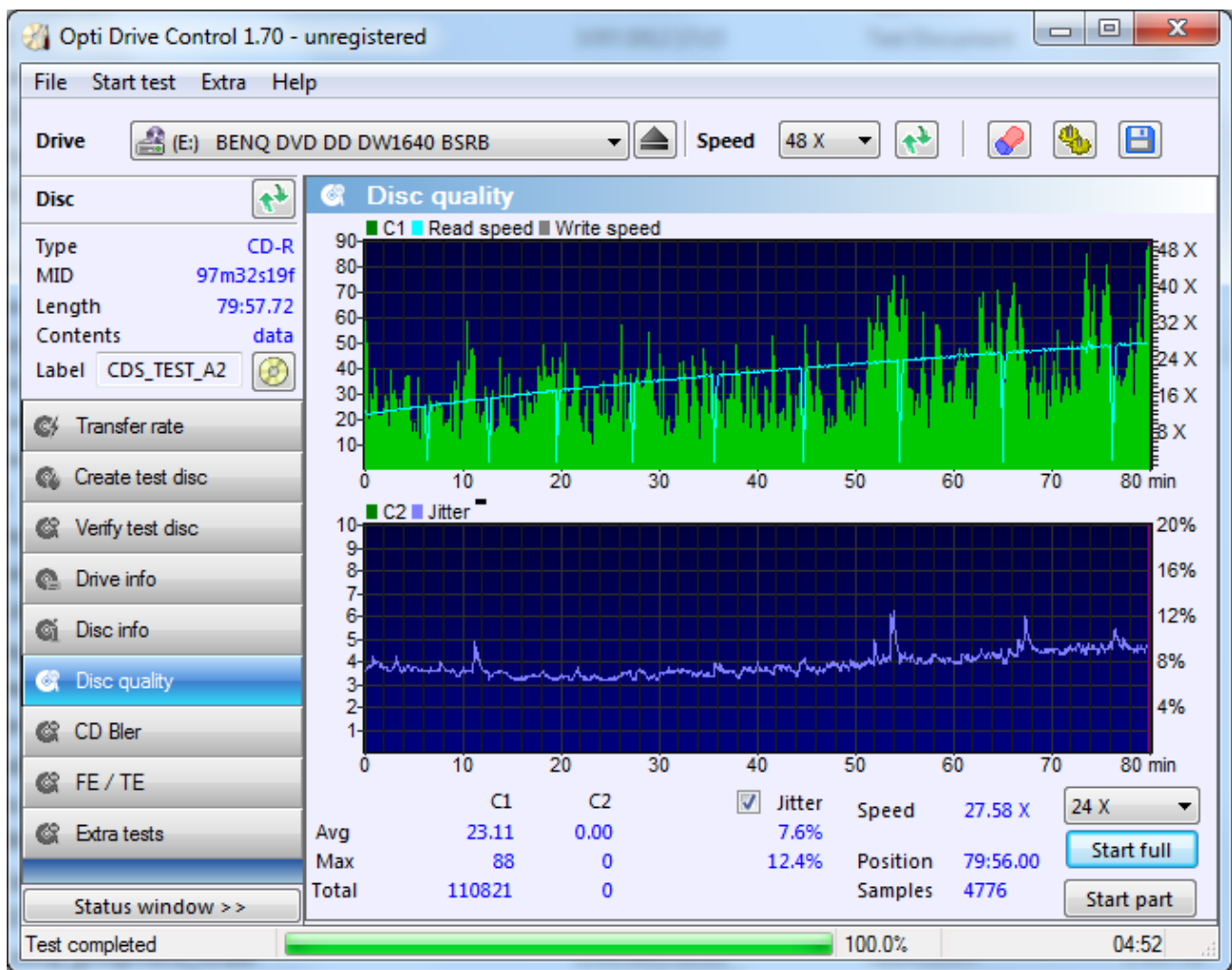
This is a good result because the number of C1 errors are low and there are no C2 errors.
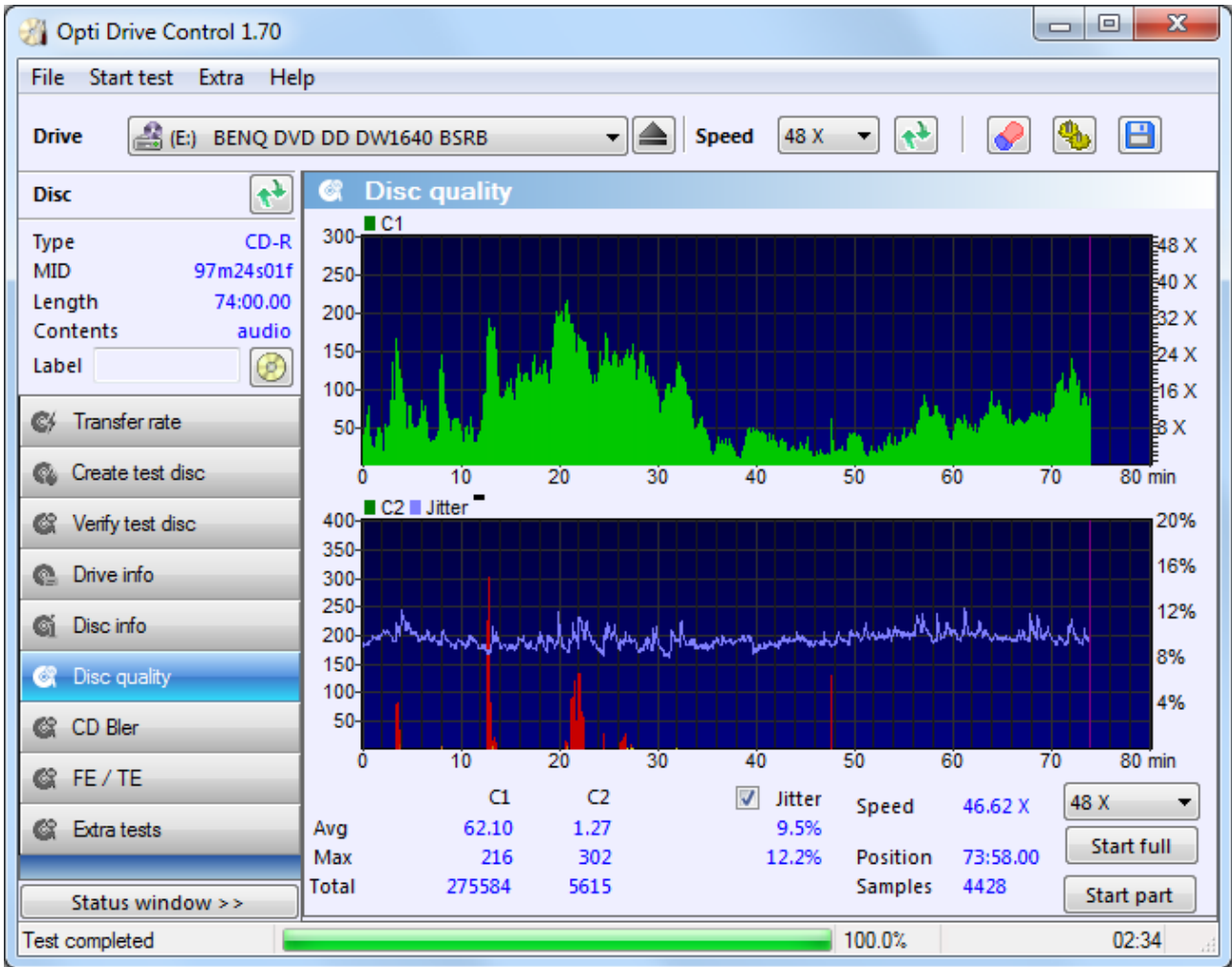
This is a scan of a low quality CD. There are several areas with C2 errors.
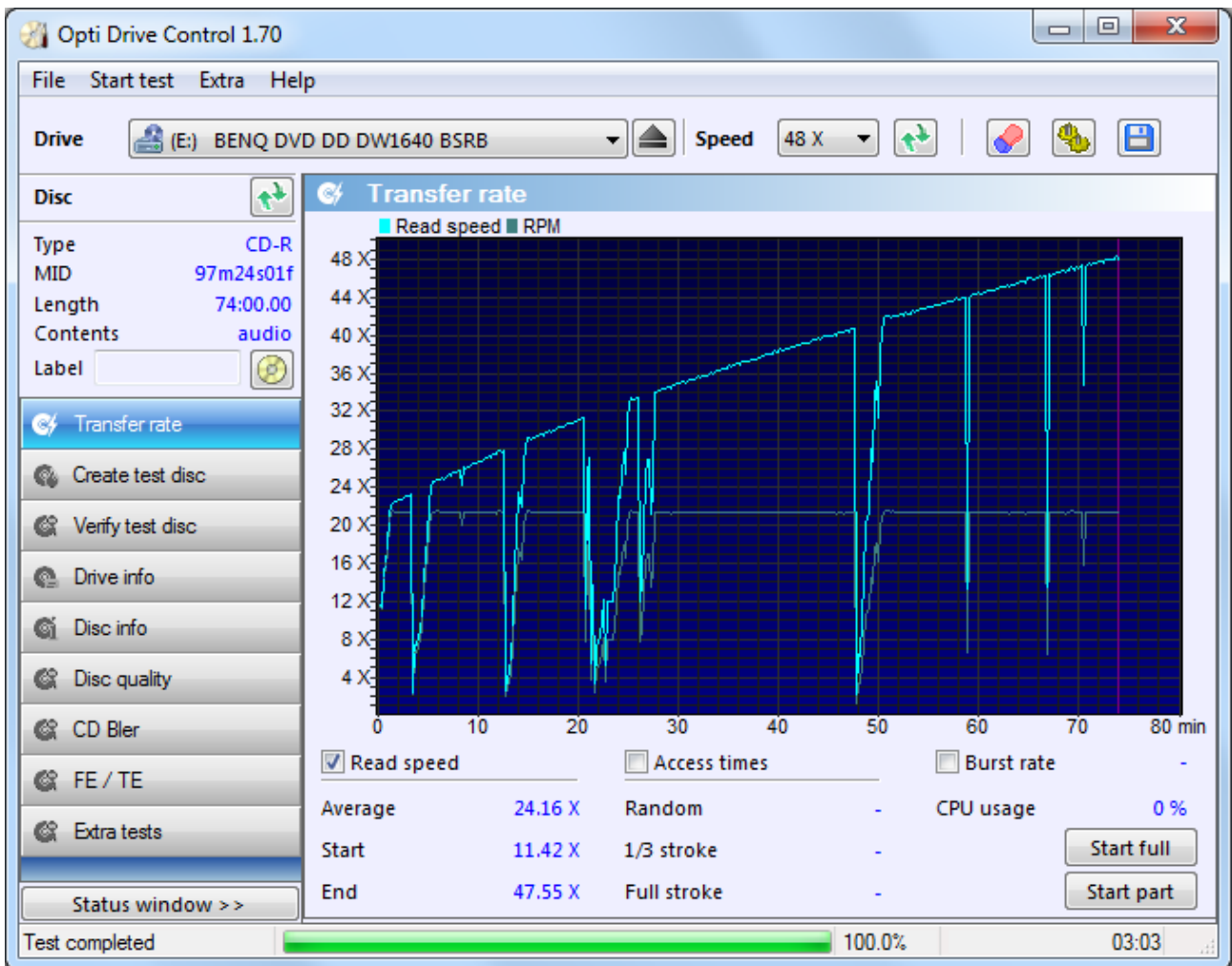
The transfer rate test shows how this results in poor readability of the disc. There are many slowdowns where the C2 errors were found.
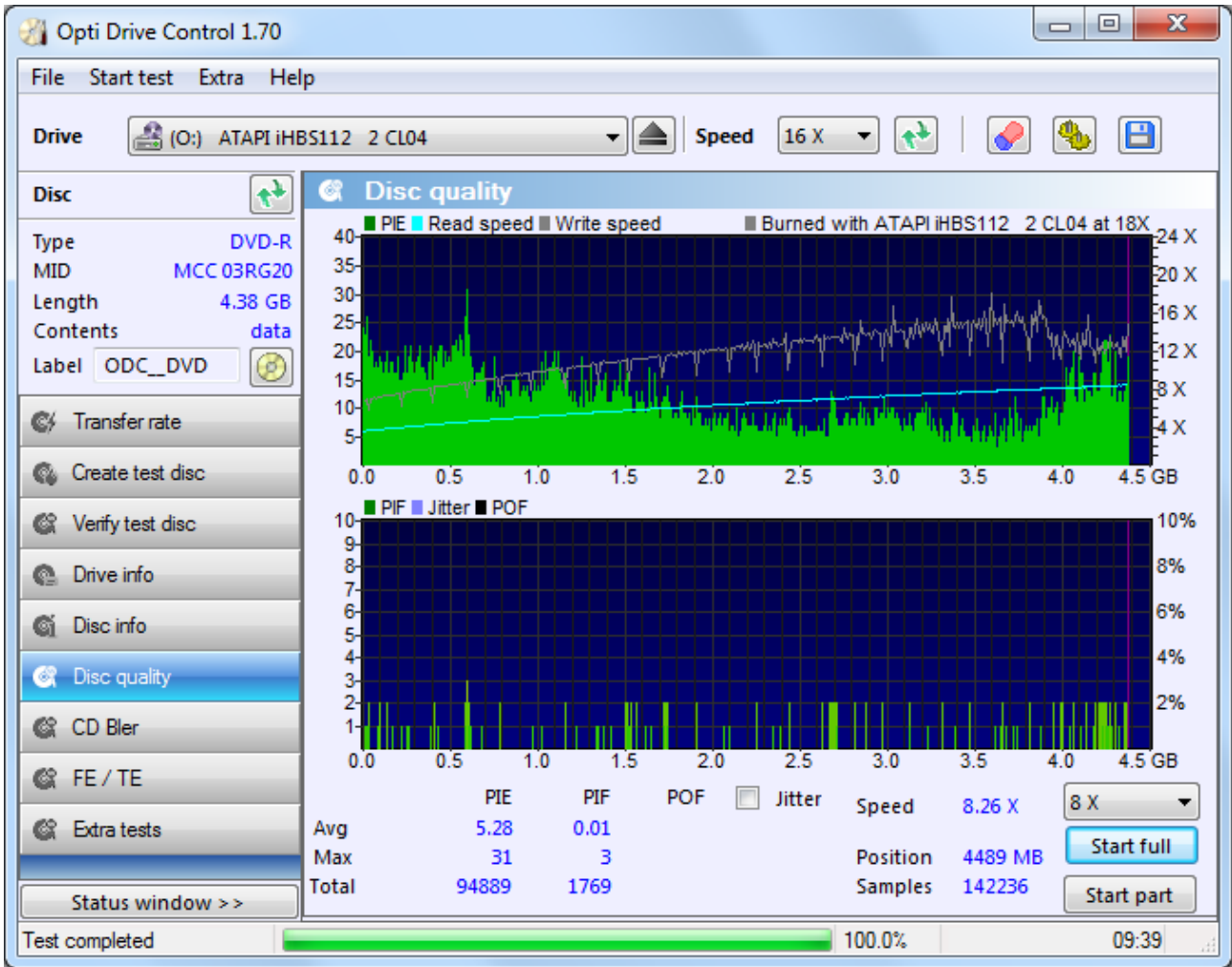
This result is excellent. The number of PI and PIF errors are low.

The disc can be read at full speed without any slowdowns.
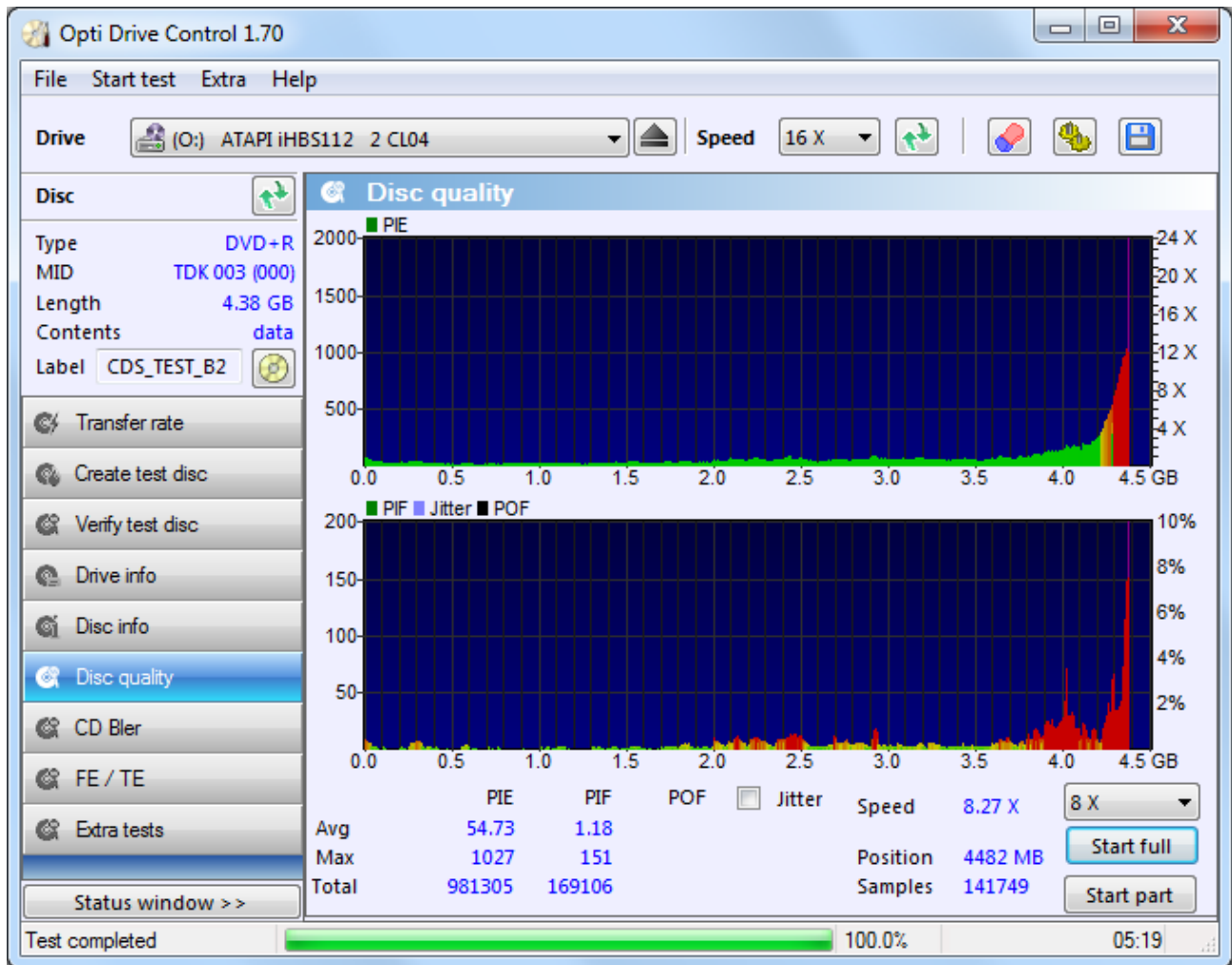
This is a bad result. Most red areas are unreadable, the other red areas can only be read at a very low speed and after several retries.

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.

By pressing the *start full* button the entire disc is scanned, by pressing the *start part* button a window appears which allow you to choose the test range. The start and end positions can be specified in minutes (CDs), Megabyte (MB, for DVD and BD), and sectors (both decimal and hexadecimal).

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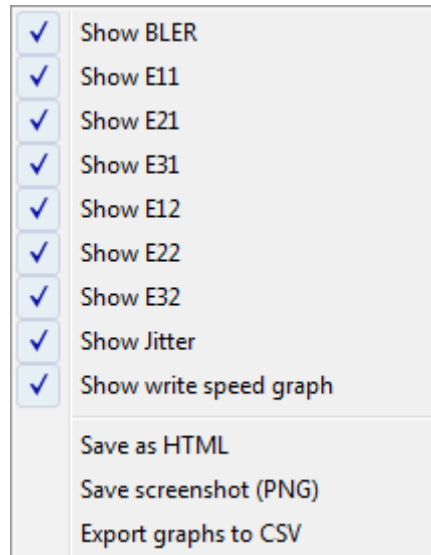
Show BLER, E11, E21, E31, E12, E22, E32: shows specified error parameter

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
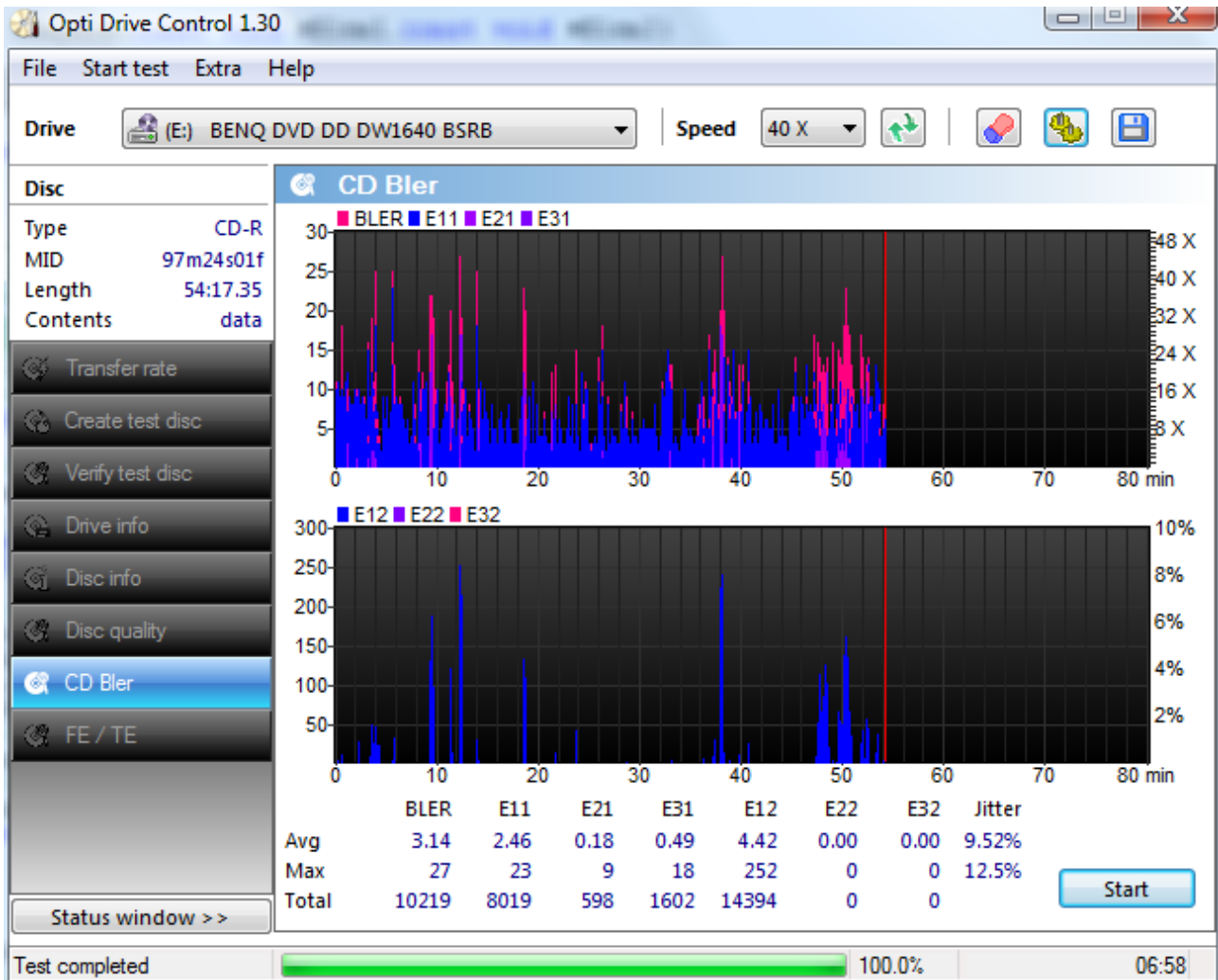
This is a good result: low BLER and no E22 or E32 errors.
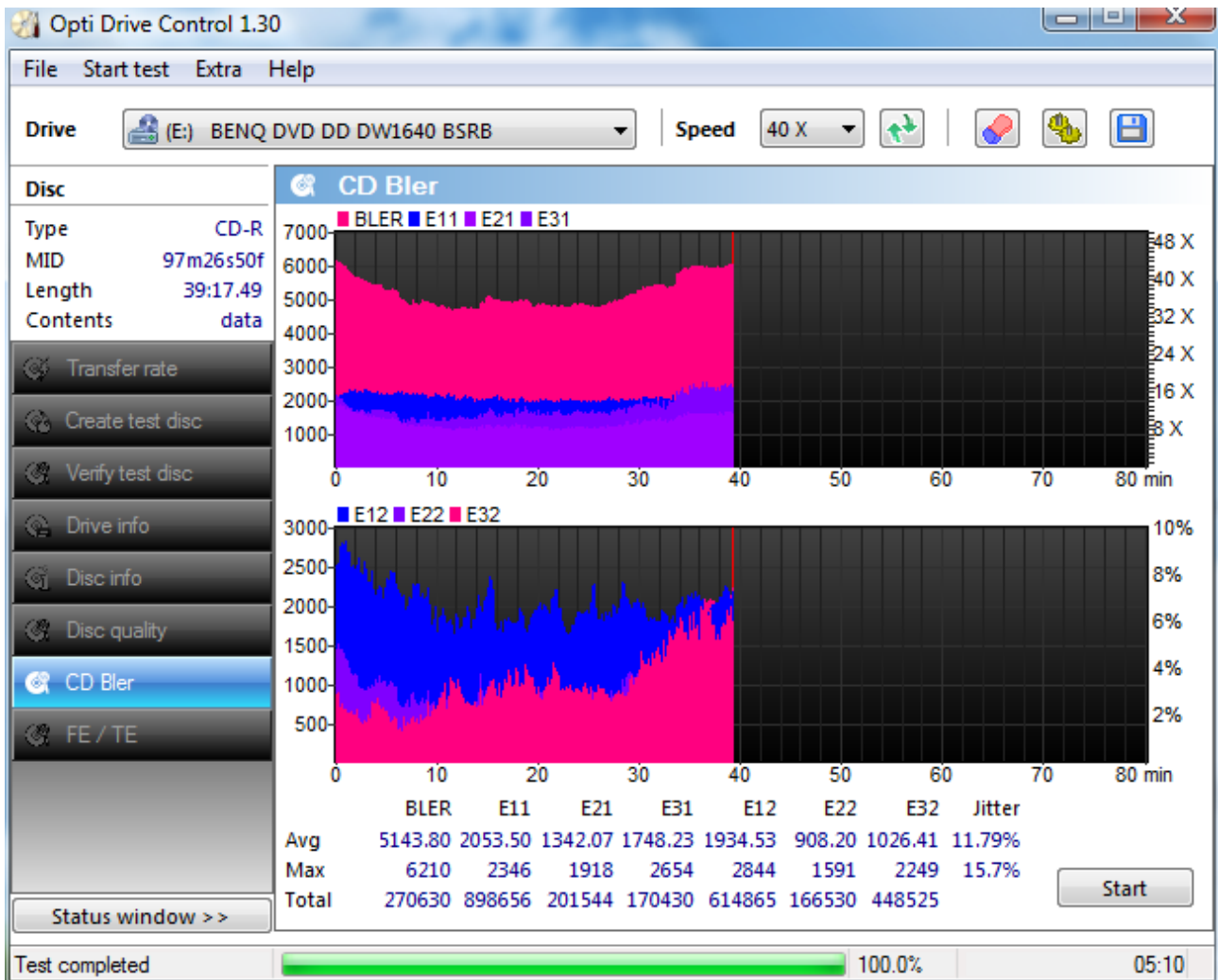
This is a very poor result. BLER exceeds 220 and there are many E22 and E32 errors.

The disc is unreadable.

11.   FE / TE test

The FE / TE test measures the Focus Errors (FE) and Tracking Errors (TE) on a blank or data CD, DVD or BD at various speeds.

To start the test select the speed settings and press the start button. The test can be stopped at any time by pressing the stop button.

By pressing the *start full* button the entire disc is scanned, by pressing the *start part* button a window appears which allow you to choose the test range. The start and end positions can be specified in minutes (CDs), Megabyte (MB, for DVD and BD), and sectors (both decimal and hexadecimal).

The focus and tracking errors are shown for each selected speed setting both graphically and numerically. By comparing those errors the optimum burn speed can be determined.

Focus errors: indication of how well the laser can focus on the disc.

Tracking errors: indication of how well the laser can follow the spiral track of the disc.

Supported drives: all BenQ drives with a Nexperia chipset (ie. DW1620, DW1650, DW1655), all LiteOn with a Mediatek chipset and most Plextor drives (PX-712, PX-716, PX-880SA,…).

Note: because of a hardware limitation Plextor drives can only perform this test at the maximum speed when testing DVDs.

Options

By right-clicking anywhere on the disc info screen you can call the options menu.
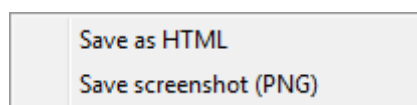
Save as HTML
Save screenshot (PNG)

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

Save screenshot: save the screen to a PNG file

Screenshot
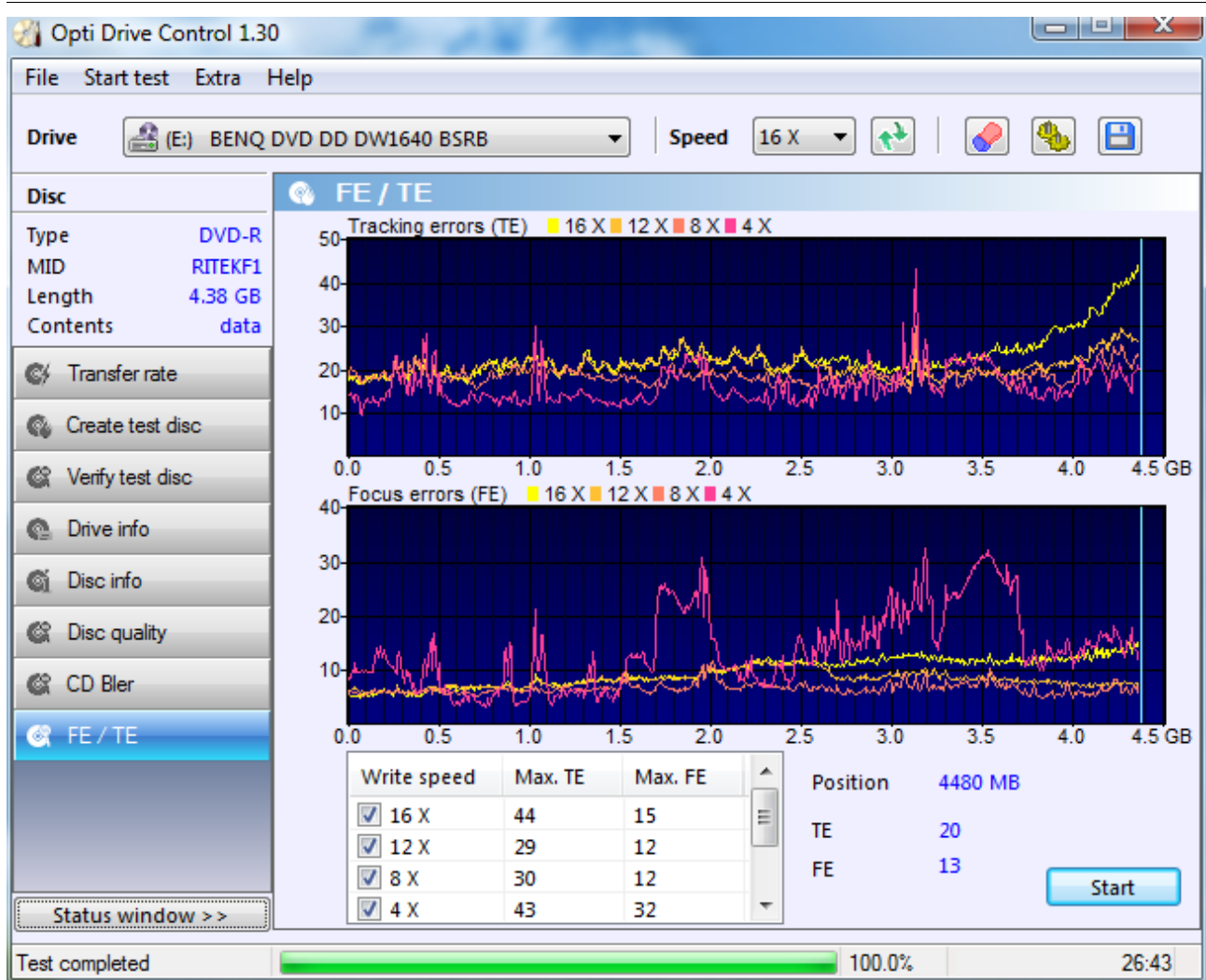
The best burn speed for this disc is 8x. At 4x the number of tracking errors are lower but the number of focus errors are much higher.

12.   Extra tests

This function offers a collection of read / seek and other tests.

Tests include:

Read / seek tests

Funnel seek: seek times are measured in a funnel pattern

Random seek: seek times are measured in a random pattern

Random transfer / seek: random blocks between 2 KB and 64 KB are measured on random positions

Transfer inner: transfer rate is measured on the inner part of the disc

Transfer middle: transfer rate is measured on the middle part of the disc

Transfer outer: transfer rate is measured on the outer part of the disc

Layer change time: time to jump from the first to the second layer is measured. If this time is high it may cause a visible pause when playing a DVD Video

Miscellaneous tests

Spinup time: time required to spin up the drive

Spindown time: time required to spin down the drive from full speed to a standstill

Eject time: time required to eject the disc. The disc is stopped before the test is run.

Load time: time required to close the tray

Recognition time: time required to recognize the disc contents after the disc is loaded

Screenshot

Opti Drive Control 1.40			
File **Start test** **Extra** **Help**			

Drive (D:) ATAPI iHES208 2 8L05 ▼ | **Speed** 16 X ▼

Disc

Type	DVD-ROM
MID	(000)
Length	7.67 GB
Contents	data

- Transfer rate
- Create test disc
- Verify test disc
- Drive info
- Disc info
- Disc quality
- CD Bler
- FE / TE
- Extra tests

Status window > >

Extra tests

Read / seek tests

☑ Funnel seek	125.4 ms	15.95 KB/s	
☑ Random seek	102.8 ms	19.45 KB/s	
☑ Random transfer/seek	108.5 ms	289.15 KB/s	
☑ Transfer inner	5.08 X	7427 rpm	
☑ Transfer middle	9.25 X	7537 rpm	
☑ Transfer outer	12.05 X	7557 rpm	
☑ Layer change time	46.6 ms		

Miscellaneous tests

☑ Spinup time	2.17 sec	
☑ Spindown time	3.33 sec	
☑ Eject time	2.12 sec	
☑ Load time	1.42 sec	
☑ Recognition time	10.55 sec	

Start

Test completed — 100.0% — 01:31

13.   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.
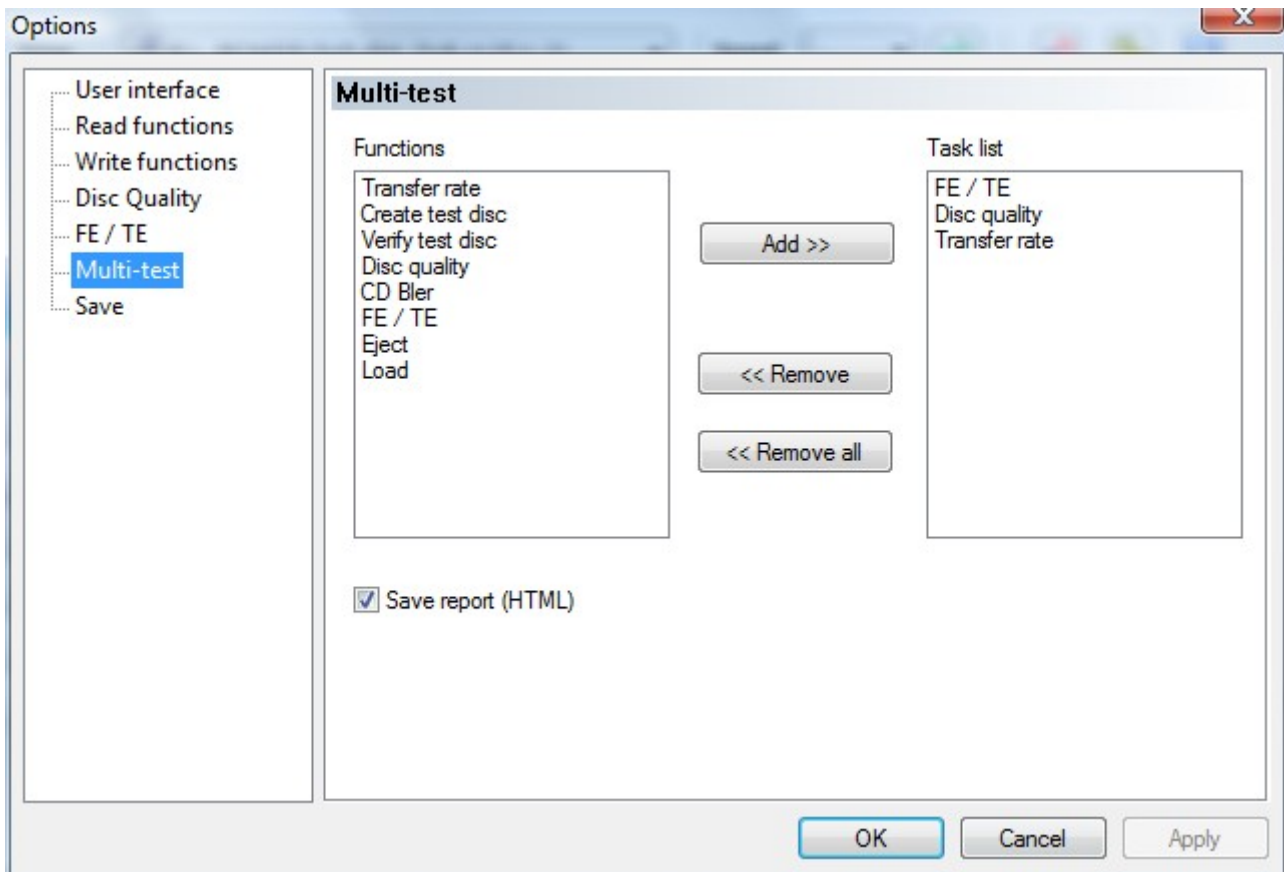
Then select multi-test from the start test menu.

14.   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.

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

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

Automatically export to CSV / HTML file: the test results including error messages are saved to a CSV / HTML file after each test is run. The tests to which this option applies can be selected separately as well as the file name / filter for each test type.

Add header data (CSV and HTML): by checking this option, the label will be saved and in case of the transfer rate test, the test length will be saved as well.

By clicking on the question mark button, a preview of the generated folder file name is shown.

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

Function window only: a screenshot of the function window only (without the title bar) is saved.

Options

User interface
Read functions
Write functions
Disc Quality
FE / TE
Multi-test
Save

Save

☑ Open file dialog

Path   X:\temp

☑ Replace spaces by underscores

Pattern codes
%N: drive name   %I: disc type   %D: date   %F: function
%V: firmware version   %M: disc ID   %T: time   \: folder

Screenshot (PNG)

Folder / file name pattern

%N\%F_%D   [?]

☐ Automatically save screenshot after each test   ☐ function window only

CSV / HTML

Automatically export to: ☐ CSV file   ☐ HTML file
                             Folder / file name pattern

☐ Transfer rate   %F_%D   [?]

☐ Disc quality test   %F_%D   [?]

☐ CD Bler   %F   [?]

☐ FE/TE   %F   [?]

☐ Add header data

ⓘ **Folder / file name preview**   ✕
X:\temp\Transfer_rate_07-juli-2012.csv

[OK]   [Cancel]   [Apply]

15.   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.

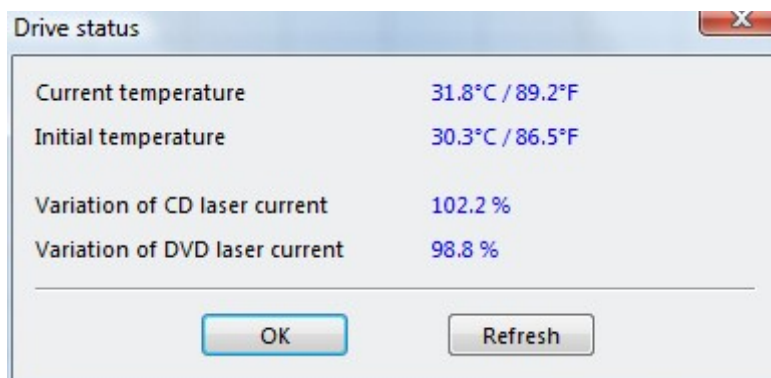| Usage statistics					
Total read time		12:01:13			
Total burn time		2:15:08			
Total burned discs		50			
Drive	**Disc type**	**Read time**	**Write time**	**Discs burned**	
ATAPI iHAS120 6	CD	0:01:24	0:00:00	0	
	DVD	1:05:59	0:00:00	0	
	BD	0:00:00	0:00:00	0	
BENQ DVD DD DW1640	CD	2:47:18	0:14:29	5	
	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

16.   Drive status

The drive status is an advanced function which only works with particular drives.

With the current version only Pioneer drives are supported.

The drive status can be called from the extra menu.

Following information is shown:

Current temperature, initial temperature, variation of laser current (CD and DVD).

| Drive status	
Current temperature	31.8°C / 89.2°F
Initial temperature	30.3°C / 86.5°F
Variation of CD laser current	102.2 %
Variation of DVD laser current	98.8 %
OK	Refresh

17. Opening test results files

By selecting the open function from the file menu you can open saved test results from Opti Drive Control and ImgBurn.

Opti Drive Control files are automatically saved on the test discs which are made with the create test disc function. They are stored in the RESULTS folder.

If the ImgBurn file contains write speed information you can copy the graph to the main screen ('Use results' button), similar to the write speed graph which is generated by Opti Drive Control. This will only work if the disc types from the inserted disc and ImgBurn file match.

You can save a screenshot by pressing the disc icon.
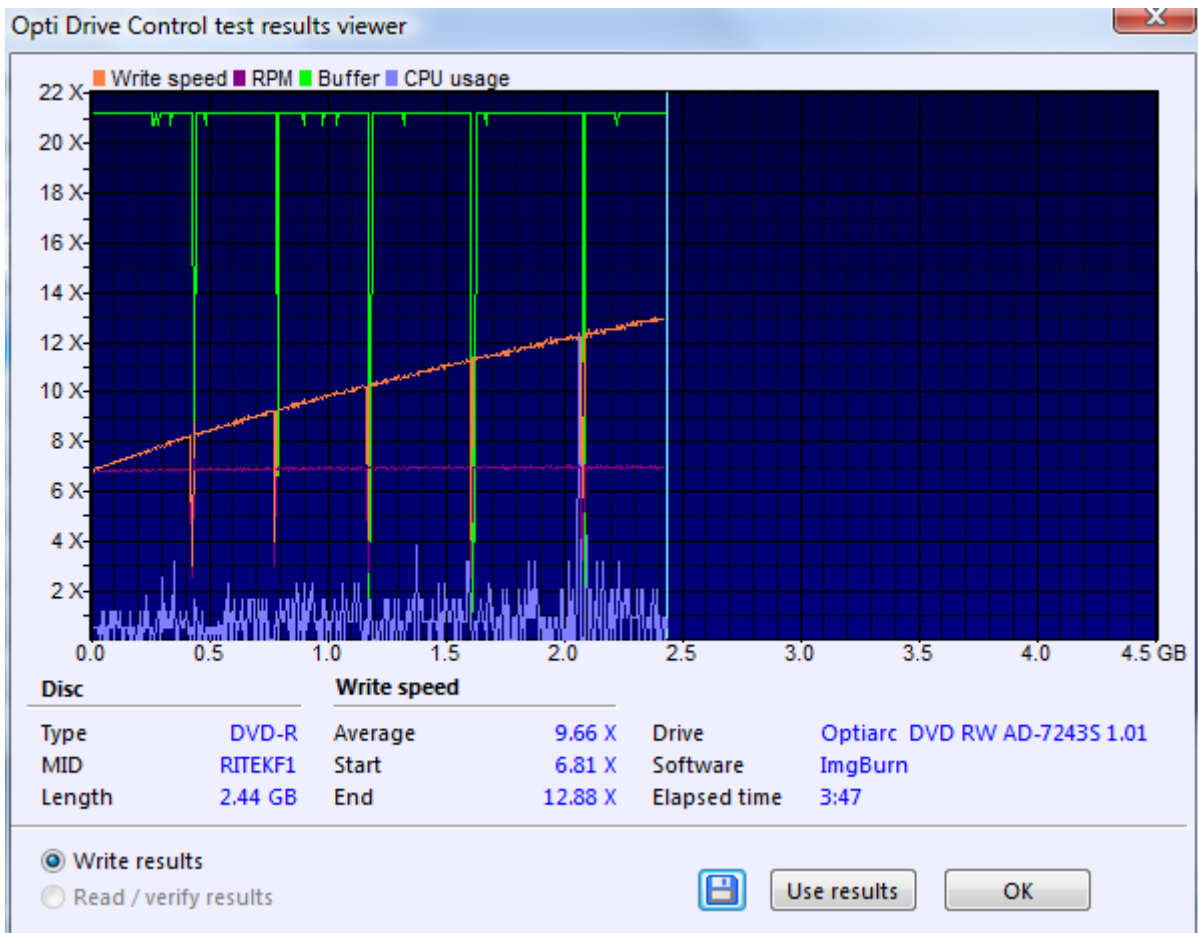
18.   Contact information

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

mailto:support@optidrivecontrol.com