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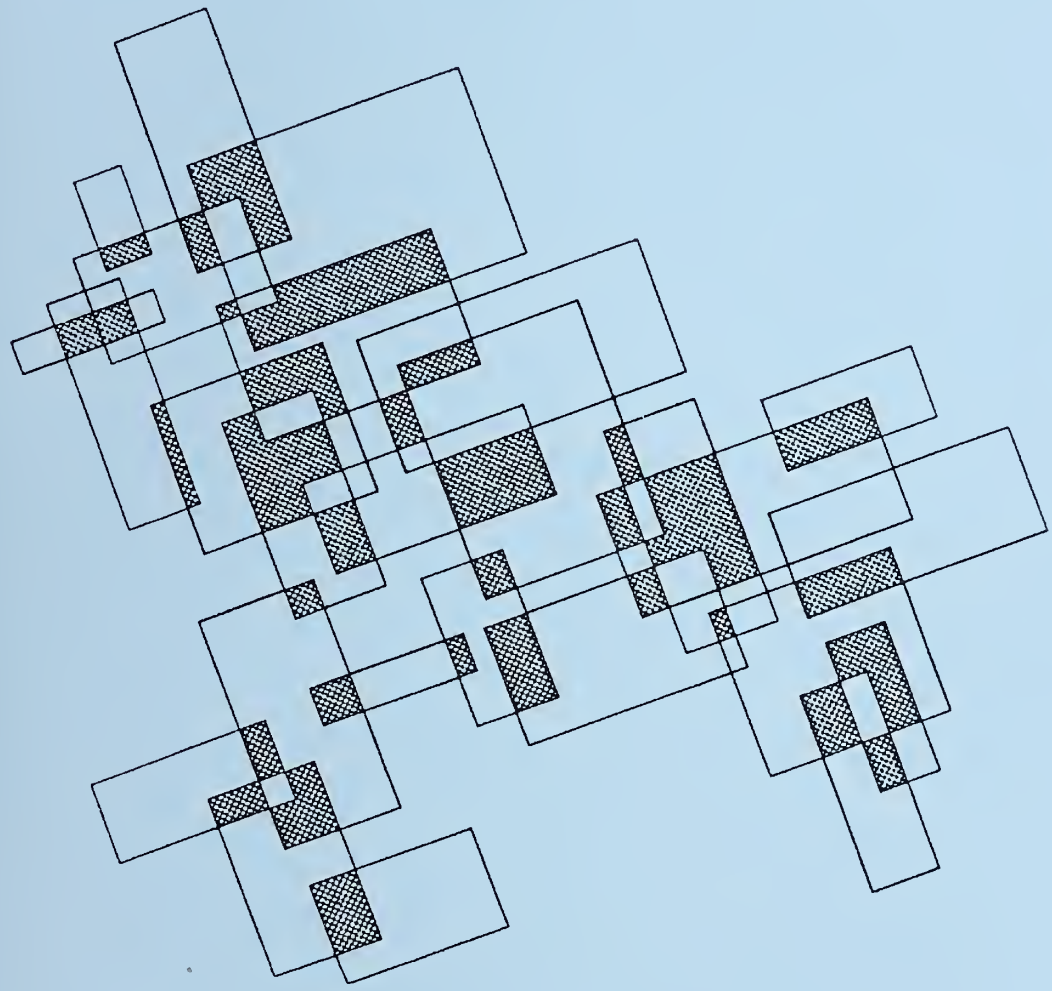
NIST Special Publication 500-254

Information Technology:

DVD-ROM Drive Compatibility Test

for DVD-R(General), DVD-RW, DVD+R, DVD+RW and DVD-RAM Discs (Phase 1).



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DVD-ROM Drive Compatibility Test
for DVD-R(General), DVD-RW, DVD+R, DVD+RW and DVD-RAM Discs (Phase 1).

Convergent Information Systems Division
Information Technology Laboratory
National Institute of Standards and Technology
Gaithersburg, MD 20890-8950

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U.S. Department of Commerce
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Arden L. Bement, Jr., Director

Reports on Information Technology

The Information Technology Laboratory (ITL) at the National Institute of Standards and Technology (NIST) stimulates U.S. economic growth and industrial competitiveness through technical leadership and collaborative research in critical infrastructure technology, including tests, test methods, reference data, and forward-looking standards, to advance the development and productive use of information technology. To overcome barriers to usability, scalability, interoperability, and security in information systems and networks, ITL programs focus on a broad range of networking, security, and advanced information technologies, as well as the mathematical, statistical, and computational sciences. This Special Publication 500-series reports on ITL's research in tests and test methods for information technology, and its collaborative activities with industry, government, and academic organizations.

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Preface

The Convergent Information Systems Division (CISD) of the Information Technology Laboratory (ITL) at the National Institute of Standards and Technology (NIST), in collaboration with the Optical Storage Technology Association (OSTA) and the DVD association (DVDA) has developed this plan to test the compatibility of DVD-ROM drives with various types of DVD media.

About the DVD Association (DVDA)
The DVDA is a nonprofit organization funded through membership dues and corporate sponsorships. Membership is open to all those connected in any way with the creation of DVD titles. The bulk of DVA members are developers that specialize in the creation of multimedia programs for training, education, presentations and entertainment using the DVD platform. The DVDA represents many of the most experienced producers of professional applications in the industry. For more information visit www.dvda.org

About the Optical Storage Technology Association (OSTA)
The Optical Storage Technology Association (OSTA) was incorporated as an international trade association in 1992 to promote the use of recordable optical technologies and products. The organization's membership includes optical product manufacturers and resellers from three continents, representing more than 85 percent of worldwide writable optical product shipments. They work to shape the future of the industry through regular meetings of DVD Compatibility, Commercial Systems Applications (CSA) Marketing, MPV, Planning and UDF committees. Interested companies worldwide are invited to join the organization and participate in its programs by contacting an OSTA representative at +1 (408) 253-3695, by fax +1 (408) 253-9938 or by addressing its Web site at www.osta.org.

OSTA
Optical Storage
Technology Association

DVDA

The OSTA DVD Compatibility Committee:
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Oliver Slattery, Fred Byers (NIST),
Bob Zollo, Lee Prewitt (Software Architects Inc.),
Jim Taylor (Sonic Solutions, DVD Association),
Victor McCrary (Johns Hopkins University),
Dave Bunzel (Santa Clara Consulting, OSTA).

Acknowledgements:
The DVD compatibility committee would like to thank Ralph LaBarge and OSTA member manufacturers for their input to this document. Also Siva Srinivasan and Alexei Nikolaev of NIST for help developing the test software. Acknowledgment is also given to the NIST Convergent Information Systems Division (CISD) and ITL management for their support of this project.

1 Introduction:

This test procedure is test the compatibility of DVD-ROM drives with a selection of DVD writable media including DVD-R (for general), DVD-RW, DVD+R, DVD+RW and DVD-RAM.

As a follow-up to the DV magazine evaluation of recordable DVD compatibility with consumer electronics (CE) players, this test has been developed for computer based DVD drives. The same test discs that were used in the CE testing are used in this test. This testing procedure is valid for all computer based DVD drives, although only the most popular models are evaluated in this investigation.

Again the format for the testing is fairly simple, thus ensuring that the test methodology is available to users with non-technical backgrounds as well as more experienced users. Two DVD-Video disc images authored using Daikin Scenarist NT will be used as the original source material. One disc image will be used for full capacity (4.7 GB) media, and a second disc image will be used for limited capacity (DVD-RAM) media. The full capacity disc image is the "Naxos Musical Journey Saint-Saens & Bizet" title. The limited capacity disc image is "The Call" title. Both titles were released during 2001 by DVD International, and replicated by Panasonic Disc Services Corporation.

The test is designed to give the end user confidence in the playability of a particular brand of DVD writable media (including DVD-R (for general), DVD-RW, DVD+R, DVD+RW and DVD-RAM) with the DVD-ROM drive in their computer. This version of the test is specific to the DVD title (in this case "Naxos Musical Journey Saint-Saens & Bizet" and "The Call"), however, future versions of the test will be more accommodating to other titles such that the user will be able to test copies of any original DVD video with the original itself.

Testing will take place at the National Institute of Standards and Technology (NIST) in Gaithersburg, MD, and at Software Architects Inc. (SAI) in Bothell, WA.

2 Test Overview:

There are four principal parts to the test:

1st: Playability.
2nd: Byte to byte comparison of the recordable DVD and a DVD-ROM disc.
3rd: Data rate drop out test.
4th: Video and audio playback test.

The general method is as follows:

Insert the recordable test disc into the test drive and verify playability. If the disc is able to spin-up in the drive and play immediately, this part of the test passed. If the disc is unable to spin-up in the drive and play immediately, this part of the test failed. This disc/drive combination is questionable for any type of application and shall be considered 'FAILED'.

Perform byte for byte comparison and data rate test (in a single software test procedure). If there are no byte-to-byte differences as indicated in the results window of the test software, then the byte-to-byte part of this test passed. If there are any byte-to-byte differences in any chapters, then the byte-to-byte part of this test failed. A combination that has byte to byte differences is considered 'FAILED'. If there are no byte to byte differences (and the spin-up test passed), then this combination shall be considered 'PASSED'. The 'quality' of the pass will be decided based on the results of the data rate and visual test.

If there no data rate drops as indicated in the results window of the software, then the data rate part of this test has passed. If there are any chapters with some level of data rate, then the data rate part of this test has failed. This test is designed to detect moderate data rate drops and is an indication that the drive is having some level of difficulty reading the data. It does not necessarily guarantee video play back problems, but will indicate parts of the disc that are likely to experience video and audio drop outs.

Perform audible/visual and navigational test. If there are no audible, visual or navigational artifacts after the Visual/Navigational test, then the Visual/Navigational part of this test has passed. If there are any chapters with some level of audible, visual or navigational artifacts, then the Visual/Navigational part of this test has failed.

If there are no repeatable data rate drops and no audible, visual or navigational artifacts AND the spin-up and byte to byte tests passed, this drive combination shall be considered 'PASSED +". If there are any data rate drops or any audible, visual or navigational artifacts AND the spin-up and byte to byte tests passed, this disc/drive combination shall be considered 'PASSED -'.

Result summary:

Result number	Spin- up	Byte to byte result	Byte to byte result	Video/audio result	Overall Result
1	Failed	Any result	Any result	Any result	FAILED
2	Passed	Failed	Any result	Any result	FAILED
3	Passed	Passed	Failed	Any result	[illegible]
4	Passed	Passed	Any result	Failed	[illegible]
5	Passed	Passed	Passed	Passed	PASSED +

'Any result' means that the result of that particular test (either pass of fail) will not change the outcome of the overall result of the test.

3 System configuration:

In an effort to ensure the integrity of the results of this DVD compatibility investigation, all computer configurations should be the same. However, this test will be valid (with some exceptions) for most reasonable specifications. For this investigation, the DVD test shall be performed on a computer with the following specifications:

hp workstation xw4000 Convertible Minitower
hp workstation xw4000 Convertible Minitower,
Intel® Pentium® 4 Processor 2.40GHz/533,
256MB DDR/266 ECC (1X256),
ASUS GeForce V9280S graphics card,
40GB ATA/100 EIDE 7200rpm Hard Drive,
1.44MB Floppy Disk Drive,
HP GDR-8160B 16X DVD-ROM (reference drive),
Integrated Intel AC97 Audio,
Integrated Intel PRO/100 VM Network Connection,
PS/2 Scroll Mouse,
Easy Access Keyboard (PS/2, carbon),
Microsoft® Windows® 2000 Professional (SP 2).

plus
InterVideo WinDVD player,
Power DVD (comes with DVD drive).

The Convergent Information Systems Division (CISD) National Institute of Standards and Technology (NIST) will provide two identical test systems for the purpose of this testing. One of these systems will be on temporary loan from the CISD to Software Architects Inc. for the complete first phase of testing.

4 Test preparation and notes:

The software used in this test procedure is based on the Advanced SCSI Programming Interface (ASPI), and therefore requires that an ASPI layer be installed to properly run the test program. The required ASPI layers are supplied to the test centers directly and available to others from the Adaptec website. See Appendix I and follow the directions to install the ASPI layer on the test computer.

Install the NIST DVD compatibility test software and place an executable on the desktop of the computer. This DVD compatibility test software will be provided directly to the test centers and available to others on the NIST website. Details on running this test software are described in Appendix II. For questions regarding this software, please contact Oliver Slattery at the following email address: ollie@nist.gov

The test procedure requires that InterVideo WinDVD be installed on each test machine. This is a computer program that acts as a DVD 'player'. It includes many (if not all) of the features of most consumer electronics based DVD players. Among its features are 'Next Chapter', 'Title' and 'Menu', all of which will be used in the course of this test process. To access these features, click on the WinDVD icon on the desktop and right-click on the viewing window of the player. Another feature of WinDVD that will be used in this test process are the player settings 'Auto play' and 'Source' selections. These selections essentially allow the user to select which drive (should there be more than one) that the DVD player plays on insertion of a DVD disc. To access these selections, right-click on the viewing window of the player and select 'Setup' and then 'Preferences'.

Identify the drive letter associated with the reference drive and the test drive. This can be done by inserting a DVD into any one drive and seeing which drive letter (in 'My Computer') corresponds to that drive. The drive letters for both the reference drive and test drive should not be changed once initially established.

In preparation for the test procedure, it will be necessary to select the test drive as the 'Default DVD Drive' and to select the 'Auto play' option. To do this, click on the WinDVD icon to open the player. Once the player is open, right click on the viewing window of the player and select 'Setup' and then 'Preferences'. Select as the 'Source', the letter associated with the test drive. Select the 'Auto play' option in 'Source Configuration' also.

DVD-RAM media capacity is slightly less than the other recordable media and therefore requires a different reference disc than the other types of recordable media such as DVD-R (general), DVD-RW, DVD+R and DVD+RW. The NIST test software will automatically detect if the test and reference disc are the correct title.

IF the test disc is a DVD-ROM, DVD-R (General), DVD-RW, DVD+R or DVD+RW disc, use the "Saint Saens and Bizet" DVD-ROM disc as the reference disc. IF the test disc is a DVD-RAM disc, use the "The Call" DVD-ROM disc as the reference disc.

Test Data Sheet –Part 1 should be filled out for each test drive. IF the test disc is a DVD-R (General), DVD-RW, DVD+R or DVD+RW disc, please use the 'Test Data Sheet (Full Capacity) – Part 2'. IF the test disc is a DVD-RAM disc, please use the 'Test Data Sheet (Limited Capacity) – Part 2'.

For this initial test phase, all test systems will be fully prepared as described here at the NIST test facility in Gaithersburg, MD.

5 Definitions:

Reference drive: This is a DVD-ROM drive that will read data from a reference DVD-ROM disc. The reference drive/disc combination is what the test drive/disc combination will be compared to in the byte-to-byte comparison. The DVD-ROM drive and DVD-ROM disc are chosen such that the testers can be sure that the byte data read from the reference drive/disc combination is accurate. It is suggested that for this test, the following test drive be used:
Toshiba DVD-ROM SD-R1202.

Test drive: This drive will be tested to ensure that it can play a number of different types of DVD recordable discs. It may be a DVD-ROM drive or some type of recordable DVD drive.

Reference disc: This is a DVD-ROM disc that will be used with the reference DVD-ROM drive such that the testers can be sure that the byte data read from the reference drive/disc combination is accurate. In this case, the reference disc is a DVD video version of "Naxos Musical Journey Saint-Saens & Bizet" for the full capacity test and a DVD video version of "The Call" for the limited version test.

Test disc: This disc can be of any of the following DVD disc types: DVD-ROM, DVD-R, DVD-RW, DVD+R or DVD+RW. This disc will be tested in the test drive to ensure that the test drive/disc combination can successfully read the data contained on the disc.

Byte-to-byte comparison: The byte data from selected sectors as read by the reference drive/disc combination are compared to the byte data from the same selected sectors as read from the test drive/disc combination.

Data rate drops: The inability of the drive to quickly read the data on the disc may require the drive to perform more than the usual error correction and retrys and may result in incidences where there is a delay in retrieving the data to perform the test procedure. (Note: This does not necessarily mean that there will be byte-to-byte differences, but it just takes longer for the drive to figure out the correct data on the disc).

Video/audio artifacts: Visual or audible (or both) break-ups that appear upon playback of the video sequence.

Autoplay: Where, upon insertion of the disc into the appropriate drive, the DVD player on the computer (in this case – WinDVD) will open automatically and start to play the title.

Full capacity test disc: A test disc that contains 4.7GBs of data. Media in this category are DVD-R (for general use), DVD-RW, DVD+R and DVD+RW.

Limited capacity test disc: A test disc that contains less than the 4.7GBs of data. Media in this category is DVD-RAM.

6.1 Test Procedure

Step 1: Drive Installation and Check.

Step 1.1: Power down the computer.

Step 1.2: Set the 'Reference Drive' to 'Master' and the 'Test Drive' to 'Slave'.

Using the IDE select jumper (back of DVD drive), set the 'Reference Drive' as the 'Master'. 'MA' indicates the 'Master' setting on the IDE select jumper. The 'Test Drive' should be set to 'Slave' in the same manner. 'SL' indicates the 'Slave' setting on the IDE select jumper. The See the installation manual for the reference and test-drives for further details. Using the secondary IDE cable (i.e. not connected to the Hard Drive) to connect both drives to the computer mother drive. For consistency for the test facilities, it is recommended that the master (i.e. reference drive) is the last drive in the IDE cable chain. It is also recommended that the master drive (i.e. the Reference drive) is placed on the top most PCI slot.

Step 1.2: Install test DVD drive into computer.

Using basic tools and screws (generally supplied with the DVD drive), install the test drive into the second PCI slot of the computer. Be careful to ensure that all connections (including IDE, power and audio cables) are fully and correctly attached. Make sure that all screws are screwed on and fully (but not overly) tightened. Turn on the computer.

Step 1.3: Verify that both DVD drives are detected by the operating system.

Open 'My Computer' and verify that there are two CD-ROM drives (both the reference and test) in this folder. Fill in test data sheet – Result 1.

Step 1.4: Note the drive letter associated with each drive.

Step 1.5: Verify that the test drive is set for autoplay.

Confirm that the test drive is set as the default drive and the autoplay feature in WinDVD is activated. See 'Test preparation and notes' for further details.

From 'Test preparation and notes': In preparation for the test procedure, it will be necessary to select the test drive as the 'Default DVD Drive' and to select the 'Auto play' option. To do this, click on the WinDVD icon to open the player. Once the player is open, right click on the viewing window of the player and select 'Setup' and then 'Preferences'. Select as the 'Source', the letter associated with the test drive. Select the 'Auto play' option in 'Source Configuration' also.

Step 1.6: Ensure calibration and ensure the absence of bus contention.

Perform Steps 2 – 4 as described below using a "Saint Saens and Bizet" DVD-ROM disc as a reference disc and <u>another</u> "Saint Saens and Bizet" DVD-ROM disc as a test disc. Repeat 'Step 3' three times. Fill in test data sheet – Result 2.

Continue to Step 2 for the entire set of test discs.

Step 2: Autoplay test.

Step 2.1: Insert DVD test disc into test drive and confirm autoplay.

Confirm that the FBI warning plays automatically and immediately once the DVD is inserted. Fill in test data sheet – Result 3.

Note: The test drive will be preset to the default drive and the autoplay feature in WinDVD will be activated as described in the system preparation. See 'Test preparation and notes' for further details.

Step 3: Byte to Byte comparison and Data Rate test.

Step 3.1: Insert the reference DVD-ROM disc into the reference drive and the writable DVD test disc into the test drive.

IF the test disc is a DVD-ROM, DVD-R (General), DVD-RW, DVD+R or DVD+RW disc, use the "Saint Saens and Bizet" DVD-ROM disc as the reference disc.

IF the test disc is a DVD-RAM disc, use the "The Call" DVD-ROM disc as the reference disc.

Note: The NIST test software will not allow a "Saint Saens and Bizet" DVD-ROM disc to be used as a reference disc for a test with "The Call' DVD-RAM disc as a test disc and visa versa.

Step 3.2: Open NIST test software.

Open the NIST Byte-to-Byte comparison software. Details on how to operate this program will follow. See Appendix II.

Step 3.3: Select the 'Reference Drive' and the 'Test drive'.

Confirm that the reference drive and test drive are detected and displayed in the 'Reference Drive' and 'Test Drive' box respectively. If the wrong drives are selected, press 'Select Reference Drive' to select the reference drive and 'Select Test Drive' to select the test drive.

Step 3.4: Select the length of the test you wish to perform.

The default selection is approximately 10 seconds (~14MB or 6925 sectors) of video data per chapter and is called the 'Quick Test (10 seconds /chapter)'. There are a number of options in this case. You can select the 'Quick Test (10 seconds /chapter)', the 'Medium Test (20 seconds/chapter)' or the 'Long Test (60 seconds /chapter)' from the preset test lengths drop down menu. Otherwise, you can select the manual length test where you can enter the number of sectors per chapter to test. To pass this test, the default is required.

Step 3.5: Press 'Start Test' to perform the test.

Once the test has started, it must be allowed to finish completely. The length of time the test will take will vary depending on the quality of the media and the compatibility of the drive/media combination. A perfect test (no byte-to-byte difference and no data rate drops) will take about 2 minutes. If the drive has difficulty in reading the data from the disc, it will continue to try and therefore the test may take a very long time.

If you need to stop the test, you should do so by the Windows Task Manager (by pressing Ctrl + Alt + Delete together). However, the drives will be in a locked state and you will need to run the 'NIST Unlock Drives.exe' program to unlock and reset the drives.

Note: The test results will provide information on the byte-to-byte comparison of the test by the number of byte-to-byte differences per chapter. It will also indicate which chapters that experienced any data rate drops. For the "Saint Saens and Bizet" test disc, there are 22 chapters. For the "The Call" test disc, there are 10 chapters.

Step 3.6: Fill in the data test sheet – Results 4 and 5.

Step 4: Visual/Navigation test.

Step 4.1: Open WinDVD and set the 'autoplay' selection to the 'Test drive'.

It is necessary to identify which drive letter represents the reference drive and which represents the test drive as described in the system preparation section of this document. Right-click on the viewing window of the player and select 'Setup' and in 'Source Configuration', check the 'Autoplay' box and select the test drive letter as the 'Source'.

Step 4.2: Insert test DVD test disc into test drive and confirm autoplay.

IF the test disc is a DVD-ROM, DVD-R (General), DVD-RW, DVD+R or DVD+RW disc (i.e. "Saint Saens and Bizet"), confirm that the following sequence is played:

FBI warning for approximately 6 seconds.
DVD International Logo for about 30 seconds.
Saint-Saens and Bizet title screen for approximately 10 seconds.

IF the test disc is a DVD-RAM disc (i.e. "The Call"), confirm that the following sequence is played:

FBI warning for approximately 6 seconds.
DVD International Logo for about 30 seconds.
MorningStar Trilogy clip for approximately 30 seconds.

Note: It will be necessary to eject and re-insert the DVD test disc into the test drive to confirm autoplay.

Fill in test data sheet – Result 6.

Step 4.3: Confirm playing of first chapter of the DVD test disc in the test drive.

Confirm that the test drive plays the first chapter on the DVD test disc. Fill in test data sheet – Result 7.

Step 4.4: Visually inspect each chapter of the test disc.

Right-click on the viewing window of WinDVD and select 'Next Chapter' to visually inspect each chapter. Watch approximately 10 seconds of these chapters and watch for any video or audio artifacts. Record any such artifacts. Fill in test data sheet – Result 8.

For the "Saint Saens and Bizet" test disc, there are 22 chapters. For the "The Call" test disc, there are 10 chapters.

Step 4.5: Confirm navigation to the title menu.

Right-click on the viewing window, select from the 'Menu' button the 'Title Menu'. Confirm that the title menu appears in the viewing window. Fill in test data sheet – Result 9.

Step 4.6: Confirm playing of the title menu segments.

Position the mouse over and click on the 'Video Essentials' segment and confirm that this segment starts to play. Watch for and record any visual or audible artifacts. Fill in test data sheet – Result 10.

Step 4.7: Stop the WinDVD player.

Right-click on the viewing screen of the player and select stop. Confirm that the DVD stops playing. Fill in test data sheet – Result 11.

Replace the test disc and repeat steps 2 – 4 for each test disc.

Note:
Confirm that the test data sheet is completely filled out before moving on to the next disc.

Test Data Sheet – Part 1.

Sections A – D should be filled only once per drive. Sections E – G should be filled once per test disc.

Section A: Test Information:

Test Facility:	**Date:**
Reference Drive:	**Disc Title:** Saint-Saens and Bizet and The Call

Section B: Test Drive Information:

Test Drive Make:	**Test Drive Model:**
Test Drive Type:	**Disc Title:** Saint-Saens and Bizet and The Call

Section C: Installation of drive:

Result 1	Pass/Fail	Comments

Section D: Drive Calibration (Result 2):

Chapter #	Byte-Byte (Pass/Fail)			Comments	Data Rate (Pass/Fail)			Comments	Visual / Audible	Comments
Chapter 1										
Chapter 2										
Chapter 3										
Chapter 4										
Chapter 5										
Chapter 6										
Chapter 7										
Chapter 8										
Chapter 9										
Chapter 10										
Chapter 11										
Chapter 12										
Chapter 13										
Chapter 14										
Chapter 15										
Chapter 16										
Chapter 17										
Chapter 18										
Chapter 19										
Chapter 20										
Chapter 21										
Chapter 22										
Video Essentials										

Continue to Data Test Sheet – Part 2. If the test disc is DVD-R (General), DVD-RW, DVD+R or DVD+RW, please use the 'Full Capacity' data test sheet. If the test disc is DVD-RAM, please use the 'Limited Capacity' data test sheet.

Test Data Sheet (Full Capacity) – Part 2
(Each test disc).

Drive	Disc #	Reference Disc Title
		Saint Sens and Bizet

Section E: Autoplay test:

Result 3	Pass/Fail	Comments

Section F: Byte-to-Byte test (Result 4) and Data Rate test (Result 5):

Chapter #	Result 4: (Pass/Fail)	Comment	Result 5: (Pass/Fail)	Comments
Chapter 1				
Chapter 2				
Chapter 3				
Chapter 4				
Chapter 5				
Chapter 6				
Chapter 7				
Chapter 8				
Chapter 9				
Chapter 10				
Chapter 11				
Chapter 12				
Chapter 13				
Chapter 14				
Chapter 15				
Chapter 16				
Chapter 17				
Chapter 18				
Chapter 19				
Chapter 20				
Chapter 21				
Chapter 22				
Video Essentials				

Section G: Visual/Navigation test:

Result #	Pass/Fail	Comments
Result 6		
Result 7		
Chapter Number	**Result 8 (Pass/Fail)**	**Comment**
Chapter 1		
Chapter 2		
Chapter 3		
Chapter 4		
Chapter 5		
Chapter 6		
Chapter 7		
Chapter 8		
Chapter 9		
Chapter 10		
Chapter 11		
Chapter 12		
Chapter 13		
Chapter 14		
Chapter 15		
Chapter 16		
Chapter 17		
Chapter 18		
Chapter 19		
Chapter 20		
Chapter 21		
Chapter 22		
Video Essentials		
Result 9		
Result 10		
Result 11		

Test Data Sheet (Limited Capacity) – Part 2
(Each test disc).

Drive	Disc #	Reference Disc Title
		The Call

Section E: Autoplay test:

Result 3	Pass/Fail	Comments

Section F: Byte-to-Byte test (Result 4) and Data Rate test (Result 5):

Chapter #	Result 4: (Pass/Fail)	Comment	Result 5: (Pass/Fail)	Comments
Chapter 1				
Chapter 2				
Chapter 3				
Chapter 4				
Chapter 5				
Chapter 6				
Chapter 7				
Chapter 8				
Chapter 9				
Chapter 10				
Video Essentials				

Section G: Visual/Navigation test:

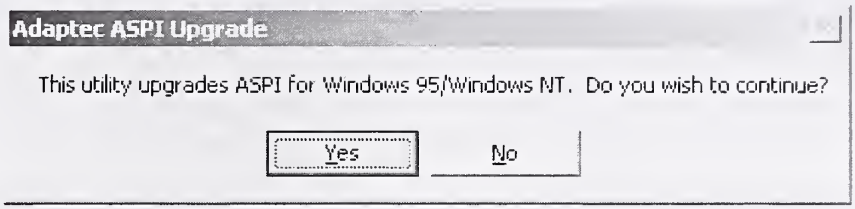
Result #	Pass/Fail	Comments
Result 6		
Result 7		
Chapter Number	**Result 8 (Pass/Fail)**	**Comment**
Chapter 1		
Chapter 2		
Chapter 3		
Chapter 4		
Chapter 5		
Chapter 6		
Chapter 7		
Chapter 8		
Chapter 9		
Chapter 10		
Video Essentials		
Result 9		
Result 10		
Result 11		

Appendix I:

Installing the required ASPI layer

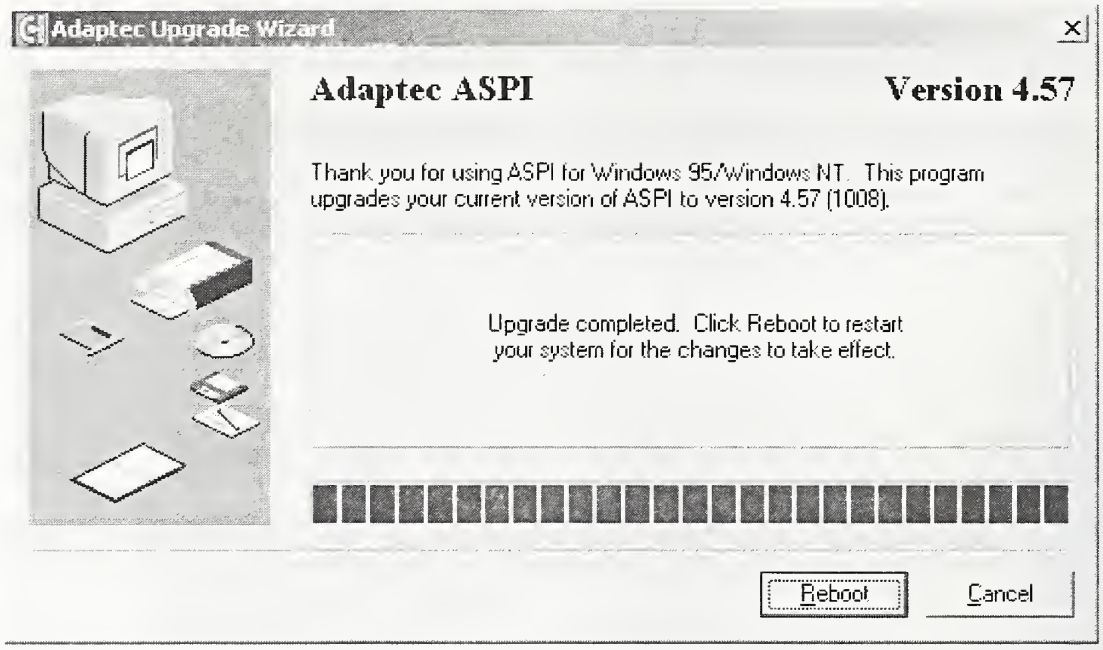
You will need to install two executables in order to ensure that your system can perform the DVD compatibility test on your system. Please note that this will require that you restart your system twice. These installations should not effect the operation of your system. Both of these executables are included in the DVD Compatibility test package in Install_ASPI.zip. Unzip this file and click on the aspiinst.exe icon as shown in the following figure:

Once you click on this icon, the following Adaptec message box appears:



Click 'Yes' to continue and the following Adaptec installation wizard window will appear:

Click 'Upgrade' to begin as instructed and the following reboot request will appear:



Click 'Reboot' as instructed. Once your system has restarted you will need to reopen the Install_ASPI folder and repeat the installation for the aspi32.exe icon shown below:

aspi32.exe

Following the second reboot of your system, you should NOW be ready to perform the DVD compatibility test as normal.

Appendix II:

NIST Byte-to-Byte Test for DVD

Before Starting :-

The test package contains a number of files that are important to successfully perform the test and to help recover from aborted tests. Two of these files are shown below:

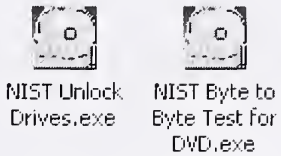


Fig 1: The test icons

The 'NST Byte to Byte Test for DVD.exe' will start the test window and is described in detail below. The 'NIST Unlock Drives.exe' will unlock the test and reference drives should you need to abort the test.

The Test :-

The 'NIST Byte-to-Byte Test for DVD' performs two functions as part of the DVD compatibility testing for DVD-ROM computer drives. Firstly, it compares the byte data from a DVD-ROM disc (referred to as the 'Reference Disc') to the byte data from a writable (either DVD-R, DVD-RW, DVD+R or DVD+RW) DVD disc (referred to as the 'Test Disc'). Secondly, it alerts any serious drop in data rate from the Test Disc to the cache of the drive reading the Test Disc (referred to as the 'Test Drive'). A good quality disc been read by a good quality drive should have both perfect byte data as well as little or no data rate drops.

To open the 'NIST Byte-to-Byte Test for DVD', click on the icon shown in Fig 1. Once you click on this icon, the main test window will appear as follows:

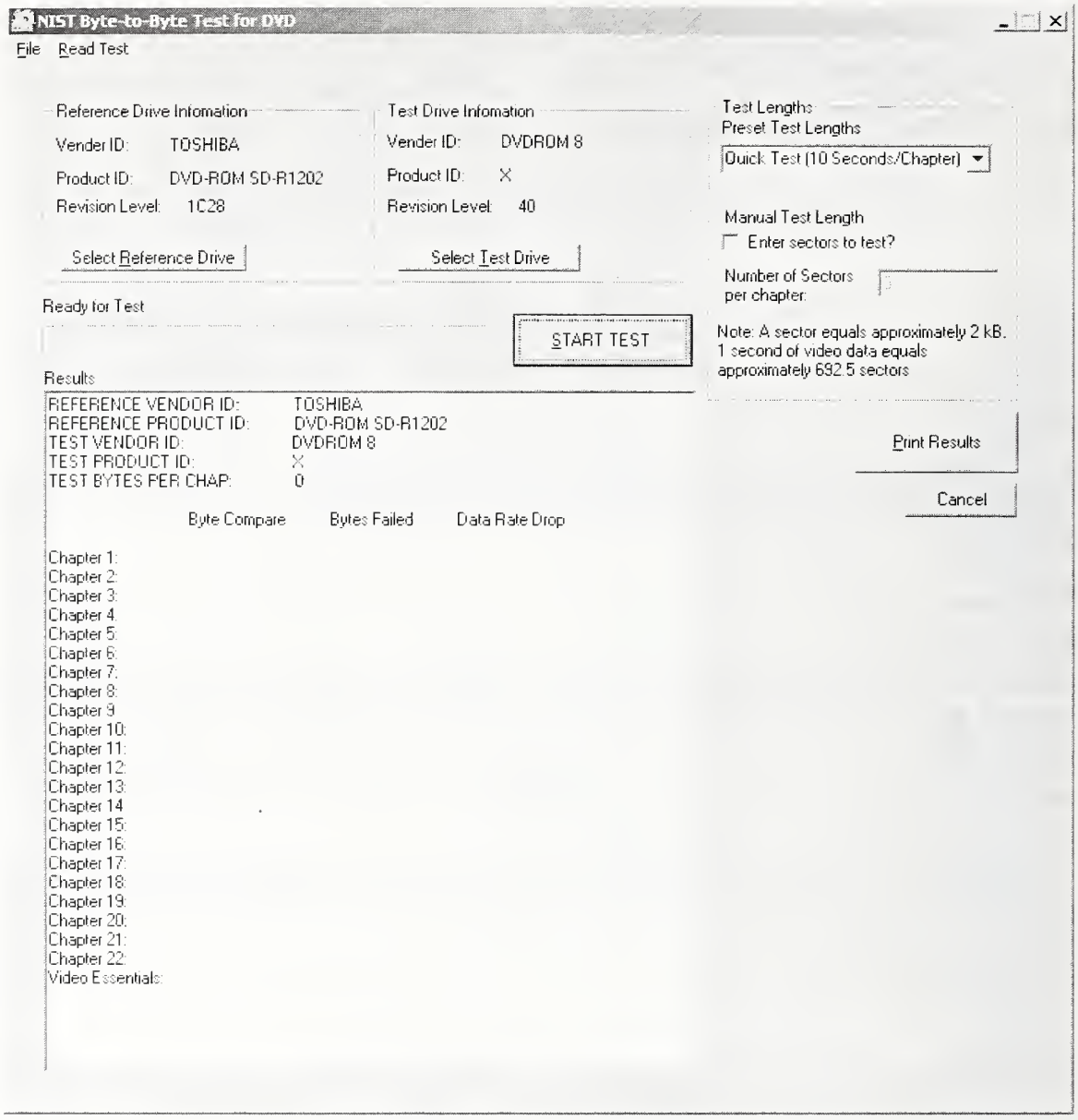


Fig 2: The 'NIST Byte-to-Byte Test for DVD' start window

You will now need to confirm that the DVD drive shown in the Reference Drive Information is the 'Reference Drive' you wish to use for the testing. Likewise, you need to confirm that the DVD drive shown in the Test Drive Information is the 'Test Drive' you wish to use for the testing. If either of these drives are not the required drives to be used in the test, you can press the 'Select Reference Drive' or the 'Select Test Drive' to change the drive selection as shown in Fig 3.

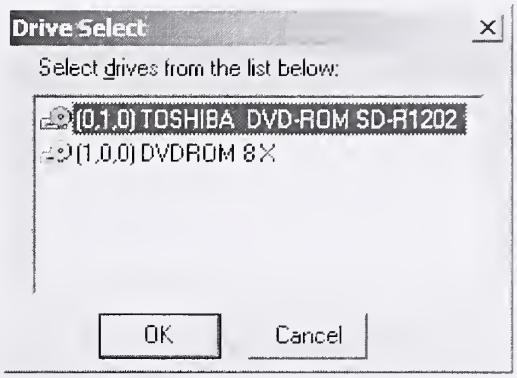


Fig 3: The drive select window.

You can choose any of the drives in the Drive Select window to be either the 'Reference Drive' or the 'Test Drive'. Once you have selected the Reference and Test drives, you can change the test length. The default test length is 6925 sectors or approximately 10 seconds of video data at a bitrate of 14MB- 15MB per second. This test length is termed "Quick Test (10 seconds/chapter)". However, the test length is set in sectors and therefore the time approximation may vary depending on the bitrate at various points on the disc. It is possible to change the test length from the default to twice the default (13850 Sectors) and is termed "Medium Test (20 seconds/chapter)" or to six times the default (41550 sectors) and is termed "Long Test (60 seconds/chapter). To change the length of the test, simply click on the pull down selection in the 'Test Length' area of the test interface and select the desired length, as shown in Fig. 4 below.

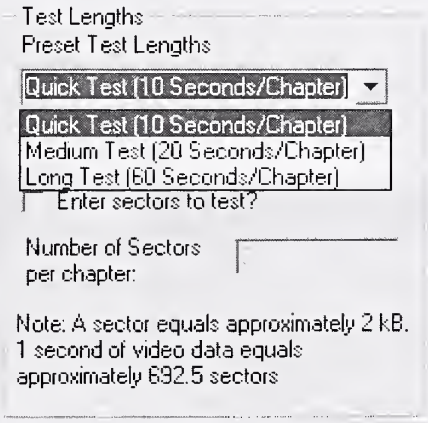


Fig 4: The selection of the test length.

It is also possible to select a manual length of the test by checking the 'Manual Test Length' box and entering the number of sectors you wish to test in the provided area. In the case where a manual value is entered, and where that value is greater than the number of sectors in the chapter, the test will automatically 'cap' the test length at any one chapter to the length of that chapter. This will prevent repeat testing of the same sectors and will also prevent the test attempting to read sectors that out of range or not even existent on the disc.

The Test process:-

Once the test has been set up, you can press the 'Start' button to begin the byte to byte comparison and data rate testing. The first action of the test code is to ensure that there are reference and test disc in the drives. You will receive a message alerting you to this and you will need to confirm for both the test and reference drives as shown below:

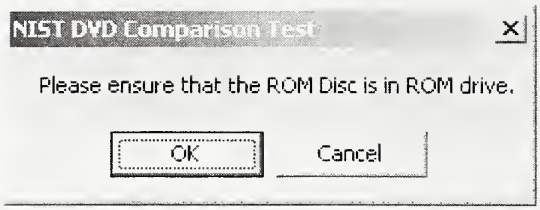


Fig 5: Ensuring the discs are inserted.

If both disc are in place, the test will commence automatically. If, however, there is no disc in either drive or the drive is cannot detect the disc, the following message will appear:

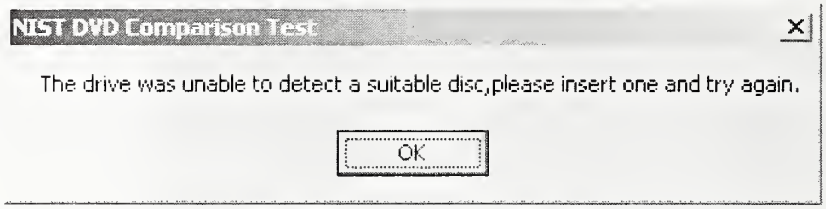


Fig 6: Alert that the drive was unable to find the disc.

It is necessary to insert a disc at this point if there and try again. If there is already a disc in the drive, but the drive is not detecting the disc, it is recommended that you eject and insert the disc a number of times to see if the drive can detect the disc (and this should be noted in the results data sheet).

Once both drives have detected both the reference and test discs, the test will begin and the progress window will indicate the progress of each chapter. The results will be updated automatically after every chapter as shown in Fig 7 below:

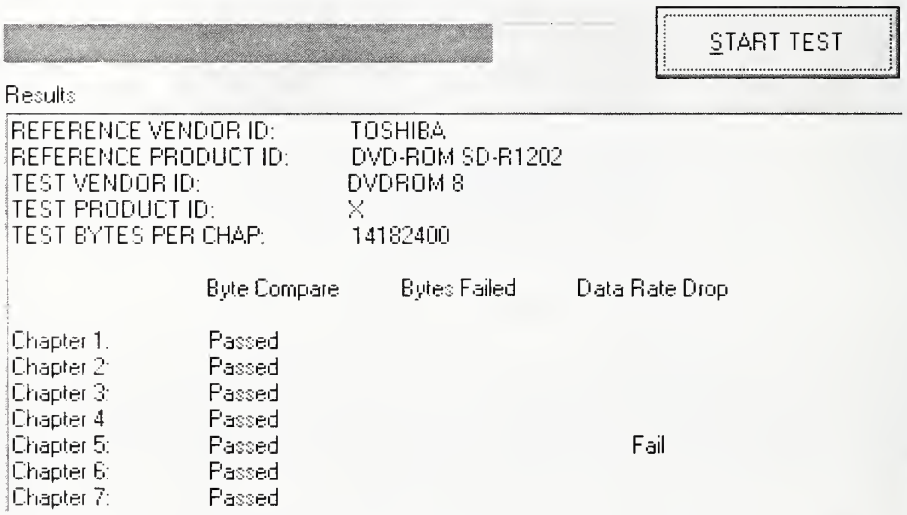


Fig 7: Progress bar for each chapter and results.

If there are no byte to byte differences detected and no serious data rate drops, the results will show that the 'Byte Compare' portion of the test 'Passed' for all chapters and will not show any indication of 'Bytes Failed' or 'Data Rate Drop'. If there are no byte to byte differences but with some data rate drops, the test will show that the 'Byte Compare' portion of the test 'Passed' for all chapters and the 'Data Rate Drop' has a 'Fail' under its column. If there are byte to byte differences, the 'Byte Compare' portion of the test 'Failed' for the chapters in which differences

were detected and will indicate the number of bytes in the tested portion of the chapter that failed. The results box will give the summary of the results for each test disc to be noted in the results data sheet.

Once the test is complete, there will be an alert as to the overall result of the test. For example, if the 'Byte Compare' of the test disc passed but there were indications of data rate drop, the following alert will appear at the end of the test:

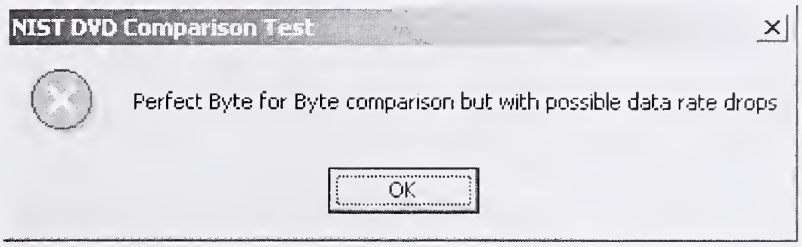


Fig 8: Alert indicating of the overall test result.

You will then be given the option to save the results as either a text file or as a word file. You can also print the test results sheet directly from the test window by pressing the 'Print results' button of the window.

Aborting the test :-

Aborting the test should be necessary if a drive is unable to read the data from the disc and the progress is exceptionally slow and therefore not worth completing. This can be done using the windows task manager (by pressing Ctrl + Alt + Delete together), highlighting the 'NIST Byte-to-Byte Test for DVD' listing and selecting 'End Task'. However, by aborting in the middle of the test will leave the drives locked. To unlock the drives, click on the 'NIST Unlock Drives.exe' icon and click the 'Unlock Drives' button (Fig. 9 below) to unlock the drives and start another test.

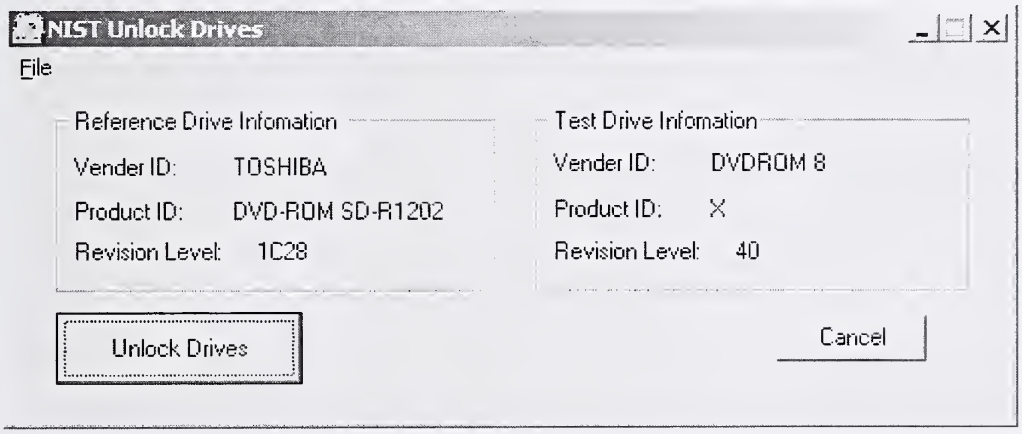


Fig 9: Unlocking the drives.