

DVD Does Not Stand For Digital Video Disc (Records Management)

DVD Does Not Stand For Digital Video Disc

(And Other Terms Useful for Discussing DVD Applications)

The DVD

The CD (Compact Disc) is over fifteen years old, an eternity for things digital. The DVD is designed to replace CDs. (By DVD committee decree, DVD does not stand for anything, not even Digital Versatile Disc.) Improvements to the CD have been technically possible for a long time. The impetus for making the change now is movies, replacing videotape. A DVD can be stamped out for less than a dollar. It replaces videotapes that cost more than twice as much per copy. CDs were for music; DVDs are for video.

DVDs in Document Management

While DVDs were not created for document management, they are useful for storing digital documents. DVDs can store from six to twenty-five times as many documents as a CD, depending on the DVD configuration. DVD readers cost ten times as much as CD readers today. DVD writers cost fifty times as much as CD writers today. DVD and CD costs should be about the same for disc media, readers, and writers in about two to three years.

Configurations

A CD has a capacity of 650 MegaBytes. Using the industry standard of 50 KiloBytes per scanned page, a CD can store about ten thousand scanned pages along with indexing overhead and possibly a document viewer. Ten thousand pages is about the number of pages stored in a standard four drawer file cabinet, or in four standard records storage cartons, or on eight linear feet of open shelving, or on four one hundred foot rolls of sixteen millimeter microfilm.

DVDs come in two sizes, the mini-CD size of 80 millimeters (mm) (about 3 1/2 inches) in diameter, and the standard CD size of 120 mm (just over 4 inches) in diameter. This section only describes the standard size DVDs. These DVDs look just like standard CDs.

DVDs have two useable sides. Each side can have two layers for a total of four layers per disc.

Turning Over Two-Sided DVDs

Currently, there are no DVD drives that have two heads, so DVDs that have information recorded on two sides must be turned over. This process is as difficult as inserting a different DVD, so the main reason to have two sided DVDs is to reduce the number of DVDs that have to be physically managed, not to increase the amount of information 'under-head' in the DVD disc reader. Two headed DVD drives are technically possible, and may eliminate the need to turn DVDs over (disc flipping).

DVD Types

DVDs come in ROM (Read Only Memory), WORM (Write Once Read Many), and RW (Read Write) versions. ROM is the format in which music and software CDs are sold. WORM is the format in which document management systems write documents to CDs. RW is a format that is rewritable (like magneto optical or phase change discs). RW discs have not been available in a standard format for CDs.

DVD ROM (Read Only Memory)

DVD ROMs can have one, two, three, or four readable layers. The top layer of each side of a disc can store 4.7 GigaBytes of documents, or about eighty thousand scanned pages and associated indexes, eight times the ten thousand scanned pages a CD can store. The top layer is translucent (see-through) so that the lower layer can be read. The translucency reduces the amount of data that can be read from the lower layer. The lower layer can store 3.8 GigaBytes of documents, or about sixty thousand scanned pages. A four layer DVD ROM can store 17 GigaBytes of documents, or about two hundred and eighty thousand pages per four layer DVD ROM. For estimating purposes, this can be rounded to a working figure of about one quarter million pages. DVD ROMs can only be used in document management if you plan to publish one thousand or more copies of your scanned documents; the way music or software is published.

DVD WORM (Write Once Read Many)

DVD WORMs can store 3.95 GigaBytes per layer. DVD WORMs can have two sides, but only one layer per side. DVD WORMs with two sides can store 7.9 GigaBytes per double-sided DVD WORM disc. For estimating purposes, the capacity of a double-sided DVD can be rounded to a working figure of about one hundred thousand pages (fifty thousand pages per side) or about the same capacity as 10 CDs.

DVD RW (Read Write)

DVD RWs can store 2.6 GigaBytes per layer, or about forty thousand pages per layer. DVD RWs can have two sides, but only one layer per side. DVD RWs with two sides can store 5.2 GigaBytes, or about eighty thousand pages per double sided DVD RW disc.

Compatibility

DVD readers can read CD ROMs. This means that DVD readers are backward compatible for music and software CDs. DVD readers can read some, but not all, CD WORMs. To avoid incompatibilities in the document management environment, it is best to plan to convert all CD WORMs to DVD WORMs before the last CD reader is decommissioned at a given document management site.

Colors

CD lasers are red. DVD lasers are orange. This difference in color is why DVD readers cannot read some CD WORM discs. There is also a blue light special under development, a DVD reader with a blue laser that can read DVD ROMs containing 40 GigaBytes or about one half million scanned pages.

Spatial Diversity

Storing digital document management system backups at more than one site (spatial diversity) reduces the need for impenetrable storage vaults. What is destroyed at one site can easily be recovered from any one of multiple other sites. DVDs are so inexpensive that many entire databases can be duplicated several times at an insignificant cost. DVDs are also very inexpensive to store because they take up so little room.

Support

DVDs is fully supported in Microsoft Windows 98 and in Microsoft Windows NT 5.0 which is planned for release in 1999.

DVD's Effect on PCs

DVDs will force all PCs and networks to support theater quality video and audio. Video and audio documents will be fully supported in digital form. These digital video and audio documents will be the documents of record that enter the document management system.

PCs with DVDs will become TVs with VCR functions. TVs with VCR functions will become PCs with DVDs. This will greatly expand the reach of computing, document management, and Microsoft.

When Are CDs Good Enough?

For many applications CDs are already so inexpensive that the increased efficiency of DVDs provide little or no advantage. In these cases, the switch to DVD will come when the world switches to DVDs. No one can afford to stay with 8 inch or 5 1/4 inch floppy disks because it is too expensive to use something that no one else uses.

Where the DVD is Essential

For some applications DVDs are essential. For example, in a legal case, where the discovered documents are scanned and placed on a single disc, disc swapping is necessary with CDs if more than about ten thousand pages are scanned. With a DVD, disc swapping does not become necessary unless more than about one hundred thousand pages are scanned. Disc flipping does not become necessary with DVDs unless more than about fifty thousand

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pages are scanned. Disc swapping and disc flipping are important considerations because the disc containing the documents is frequently placed in a notebook computer and used in court by a lawyer.

Many cases have more than ten thousand pages of discovered documents, but almost all cases have less than one hundred thousand pages of discovered documents. Therefore, the discovered document search application is feasible without disc swapping for almost all cases with DVDs, but is only feasible for some cases, or requires additional structuring of indexes, with CDs. The additional index structuring for CDs is necessary to group related documents on the same CD to reduce CD swapping. With DVDs, the additional index structuring is used to group related documents on the same side of a DVD when more than fifty thousand pages are scanned.

Will DVDs Take Over?

Yes. That is the plan, and in the near future, the technology will allow DVD discs and drives to be manufactured for about the same prices as CD discs and drives. With the two technologies at about the same price, and with DVDs handling many more types of material, the DVD will displace the CD. This has been the case with the multiple generations of floppy disks and the multiple generations of hard disks.

Can You Still Buy PCs with CD Drives?

It is already almost impossible to buy a PC with a CD readers. Most of the PC vendors have switched their products to DVD drives. PC buyers know that the difference between the price of a CD drive and a DVD drive (which will read CDs) is now less than the cost of installing a DVD drive in the future.

DVD Drives in Business Systems

DVDs are not being purchased for many business systems. This will provide considerable opportunity for upgrades when all software comes on a DVD with a video based tutorial on how to use the software. Everyone is willing to sit through a well made video. Few people are willing to read a computer manual.

To Stay Up-to-Date

Current DVD developments are posted at <http://www.VideoDiscovery.com/vdyweb/dvd/dvdfaq.html> by Jim Taylor, who wrote the book: DVD Demystified: The Guidebook for DVD-Video and DVD-ROM

Appendix: Summary

DVD ROM (Read Only Memory)

Maximum of two layers per side.

Top layer: 4.7 GigaBytes
Bottom layer: 3.7 GigaBytes

Single sided (two layers): 8.5 GigaBytes
Double sided (two layers per side): 17 GigaBytes

DVD WORM (Write Once, Read Many)

Maximum of one layer per side.

Single sided (one layer): 3.95 GigaBytes
Double sided (one layer per side): 7.9 GigaBytes

DVD RW (Read Write, Rewritable)

Maximum of one layer per side.

Single sided (one layer): 2.6 GigaBytes
Double sided (one layer per side): 5.2 GigaBytes

Scanned Page Size (Industry Standard Estimates)

Bytes per 8 1/2 by 11 inch letter size page
(compressed): 50 KiloBytes
Compressed pages per GigaByte: 20,000

All disc capacities stated in pages include a conservative allowance for indexing and full text file overhead. All disc capacities stated in pages use conservatively rounded numbers to facilitate conservative estimation by administrative staff members.

Sidebar: Thousands of Seconds (KiloSeconds)

Why is it so hard to figure out how long it will take to process one thousand documents if each document takes fifty seconds to process? (The answer is fifty thousand seconds.) But, how many hours, minutes, and seconds is that? Blame the Babylonians! The Babylonians used 60 as a base rather than 10 (as we do) because 60 is divisible by so many numbers. Minutes that have 60 seconds and hours that have 60 minutes are easy to divide into halves, thirds, quarters, fifths, sixths, tenths, and twelfths, fifteenths, thirtieths, and sixtieths. But, those same sixty second minutes and sixty minute hours make it impossible to figure out how many hours, minutes, and seconds there are in fifty thousand seconds. The Babylonians did it to us long before computers gave us binary, octal, and hexadecimal arithmetic.

Note to Readers

Updates and More Detailed Descriptions

When using the information in this article, please check the website www.ArchiveBuilders.com for updates. The version number of this article is just before the page number below. The website also has articles that provide more details on some of the terms and concepts in this article.

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Please let us know how you like this paper, or if you had any questions. What would you like to see in the future? For more, and the most recent version of this article, please visit our web site at www.ArchiveBuilders.com.

Please send your comments via email to SteveGilheany@ArchiveBuilders.com. Tel: +1 310-937-7000. Fax: +1 310-937-7001. Also, please let us know where you saw this article.

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Note to Editors

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Steve Gilheany, BA in Computer Science, MBA, MLS Specialization in Information Science, CDIA (Certified Document Imaging System Architect), AIIM Maser, and AIIM Laureate, of Information Technologies, CRM (Certified Records Manager, ARMA) has seventeen years experience in document imaging and is a Sr. Systems Engineer at Archive Builders.

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Steve Gilheany is a Sr. Systems Engineer at Archive Builders. He has worked in digital document management and document imaging for seventeen years.

His experience in the application of document management and document imaging in industry includes: aerospace, banking, manufacturing, natural resources, petroleum refining, transportation, energy, federal, state, and local government, civil engineering, utilities, entertainment, commercial records centers, archives, non-profit development, education, and administrative, engineering, production, legal, and medical records management. At the same time, he has worked in product management for hypertext, for windows based user interface systems, for computer displays, for engineering drawing, letter size, microform, and color scanning, and for xerographic, photographic, newspaper, engineering drawing, and color printing.

In addition, he has nine years of experience in data center operations and database and computer communications systems design, programming, testing, and software configuration management. He has an MLS Specialization in Information Science and an MBA with a concentration in Computer and Information Systems from UCLA, a California Adult Education teaching credential, and a BA in Computer Science from the University of Wisconsin at Madison. His industry certifications include: the CDIA (Certified Document Imaging System Architect) and the AIIM Master, and AIIM Laureate, of Information Technologies (from AIIM International, the Association of Information and Image Management, www.AIIM.org), and the CRM (Certified Records Manager) (from the ICRM, the Institute of Certified Records Managers, an affiliate of ARMA International, the Association of Records Managers and Administrators, www.ARMA.org).

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