

SMS

application solutions for the enterprise



Which DVD Format Is Best for You?

By Dawn S. Wortman

Part of the appeal of DVD is the versatility of the technology. There is a DVD format to fit virtually every computer-storage, professional, and consumer-recording application, from broadcast production to data backup to personal digital video recording. With all of this versatility has come a level of confusion over the variety of DVD recordable and rewritable formats in terms of affordability, compatibility, performance, and longevity.

With DVD, there is no one-size-fits-all format. Each DVD media format addresses specific customers and applications. This article will attempt to clarify the confusion

Currently, there are eight formats in the DVD family, all based on a set of international standard specifications: DVD-ROM, DVD Video, and DVD Audio, which are read-only formats of pre-recorded content; DVD-R and DVD+R, write-once formats;

DVD-RAM, a rewritable format for both A/V and computer applications that allows data to be rewritten about 100,000 times; and DVD-RW and DVD+RW, rewritable formats for A/V and data applications that also allow discs to be rewritten up to 1,000 times.

MEDIA FORMAT SUMMARY

Each DVD media format has a specific fit within the DVD hierarchy. Some offer higher levels of compatibility,

others include performance or longevity advantages. Here is an overview of the DVD recordable and rewritable media formats.

DVD-R

The “R” in DVD-R stands for recordable or, simply put, “write one time.” DVD-R is the next generation of CD-R. Think of it as the larger-capacity brother of CD-R. DVD-R is a write-once, single-sided optical disc. It has the same physical size as a CD-R (12cm), but has higher data and track densities that give it about seven times the storage capacity of a standard 650MB CD-R.

DVD-R’s current capacity is 4.7GB with a single-sided disc and 9.4GB using a double-sided disc. DVD-R is very similar to CD-R in that both use a dye-based material and lasers to write and store their data. Both are permanent, write-once formats. CD-R and DVD-R also share another important feature—compatibility. Like the read compatibility for CD-R provided by CD-ROM drives, DVD-R can be read back in most DVD-ROM drives or video players in the market, making it an ideal solution for high-capacity data, video, or audio distribution.

There are two types of DVD-R media: DVD-R for authoring and DVD-R for general use. DVD-R authoring media contains a unique feature important to the professional user—cutting master format or CMF. This enables authoring media to be used for mastering purposes when submitting a title for replication. This can save the creator valuable time and effort in the authoring process. When recording, both discs must be written in their respective drives, (authoring media in an authoring drive and general media in a general drive). Once

recorded, DVD-R authoring discs and general discs can be played in any DVD player or computer drive.

DVD-RW

DVD-RW is one of the two re-writable formats endorsed by the DVD Forum, along with DVD-RAM. It has a capacity of 4.7GB, is recorded sequentially like a CD-R, but unlike a CD-R, it can be overwritten 1,000 times using phase-change material instead of organic-dye material. DVD-RW has a data storage life of at least 30 years. It is basically the rewritable cousin of the DVD-R format from Pioneer. DVD-RW is very similar to CD-RW, just like DVD-R is similar to CD-R. DVD-RW discs can be read in DVD-ROM and DVD Video players. DVD-RW can also be used as an authoring tool for DVD titles.

DVD-RAM

DVD-RAM is a high-performance, rewritable/rerecordable, optical disc that enables information to be read, written, erased, and rewritten again. It acts similar to a floppy disc, where programs can be run from it, data can be stored, or files can be written and deleted. Current DVD-RAM capacity is 4.7GB for a single-sided disc and 9.4GB for a double-sided disc. First-generation capacity was 2.6GB for a single-sided disc and 5.2GB for a double-sided disc.

DVD-RAM is differentiated from other DVD formats by several design features. First, DVD-RAM media is random access like a hard disk. This enables DVD-RAM to retrieve data faster than the other available formats (current DVD RAM transfer rate is 22.16Mbps, twice the standard DVD speed). Second, DVD RAM discs can be rewritten up to 100,000 times. Finally, DVD-RAM boasts a sophisticat-

ed ECC error correction scheme that makes it ideal for data applications.

Recently, smaller-sized DVD-RAM and DVD-R discs were developed for video camcorder applications. The DVD-RAM video camcorder disc is a 2.8GB mini-sized DVD (8cm) with a recording capacity of 60 minutes. A standard-sized DVD-RAM disc is 12cm and has a recording capacity of 120 minutes using standard-quality recording. The 1.5GB mini DVD-R disc provide 30 minutes of recording time. These mini DVD discs are used in Hitachi’s new DVD camcorder and can be played back in Hitachi, Panasonic, Toshiba, and several other brands of DVD video players.

DVD+R

DVD+R is the write-once version of the DVD+RW format that has been developed in cooperation by Hewlett-Packard, Mitsubishi Chemical, Philips, Ricoh, Sony, and Yamaha. It currently has a single-sided capacity of 4.7GB and is capable of storing up to 2 hours of MPEG-2 video.

DVD+R and DVD-R share similarities in that they are both write-once formats with single-sided capacities of 4.7GB, both need finalization after recording, and both can be used for either data storage or video applications. The major difference is that they are not interchangeable when it comes to recording. Because each format writes information to its corresponding disc differently, DVD+R discs must be recorded in a +R computer drive or video recorder, and DVD-R discs must be recorded in a –R computer drive or video recorder. Once recorded, they share similar playback compatibility, and both will play back

in a majority of existing DVD-Video players. Another difference is that DVD-R consists of various formats (general and authoring), sizes (3.95GB and 4.7GB), and versions (1.0, 1.9, 2.0). With DVD+R, there is only a single format.

Since DVD+R was released as an enhancement to the original

speed of the disc remains constant, regardless of where the data is physically being recorded to the disc. This constant rotation speed of the disc enables fast random access, making DVD+RW suitable for random data recording. With CLV recording, the speed of the disc decreases as data is being written to it. The data is written to the disc in a spiral fashion, begin-

ing at the center hub and spiraling outward towards the edge of the disc. By slowing the rotation speed of the disc as the data is being written to it further and further from the center, a constant data transfer rate is maintained. This constant transfer rate makes DVD+RW suitable for real-time video recording, too.

“To a large extent, the choice of which DVD format to use is an application-centric decision. Considerations such as the cost of the media, hardware compatibility requirements, whether the application environment requires rewritable media, and performance demands all factor into the DVD-media-format decision.”

DVD+RW specification, there are some early drives that do not support the write-once format. The first generation of DVD+RW PC drives (manufactured before April, 2002) will not record to DVD+R discs. The first generation of DVD+RW video recorders will record to DVD+R discs, but a firmware upgrade is required.

DVD+RW

DVD+RW is a rewritable/rerecordable DVD format that has been developed in cooperation by Hewlett-Packard, Mitsubishi Chemical, Philips, Ricoh, Sony, and Yamaha, the primary supporting companies of the DVD+RW Alliance. It currently has a single-sided capacity of 4.7GB and a double-sided capacity of 9.4GB on a 12cm disc.

The DVD+RW format can record either sequentially or randomly because it supports both CAV (constant angular velocity) and CLV (constant linear velocity) recording. With CAV recording, the

APPLICATIONS OVERVIEW

To a large extent, the choice of which DVD format to use is an application-centric decision. Considerations such as the cost of the media, hardware compatibility requirements, whether the application environment requires rewritable media, and performance demands all factor into the DVD-media-format decision.

The write-once formats—DVD-R and DVD+R—are, of course, attractive for archival and other long-term storage applications. With the combination of high capacity, low media cost of less than \$5 per disc, and broad compati-

bility, write-once DVD formats are gaining popularity in diverse applications areas such as medical images (CAT scans, X-rays etc.), archival and long-term storage of data, short-run distribution of software, bank statements and credit card reports, training, advertising and marketing tools, and data conversion from older outdated formats to DVD. These DVD formats are also winning converts in consumer applications both inhome computer use for backup and data portability, and digital-video environments, including transferring home videos from tape to DVD, replacing VCRs with DVD video recorders, and computer-based digital-video production using digital camcorders and associated editing and authoring applications.

DVD+RW has the unique capability to support sequential recording—the preferred method for video/multimedia applications—and random-access recording, which is better suited for data storage applications with a higher data rate, providing a universal platform for both data and video/multimedia applications. DVD+RW supports the Universal Disc Format, allowing drag-and-drop operations for easy data backup or transfer, and making DVD+RW systems highly compatible with CD-based systems. DVD+RW

discs do not need to be finalized before playback. While recording, the process can be stopped at any time and the disc can be removed and played in a DVD-Video player.

In the DVD+RW Video format, recording is done at a constant bit rate; therefore it needs to be paused and continued frequently. This would normally result in a "linking loss" between the points where the recording stopped and where it resumed, and this linking loss could create a problem during playback. The reader or player would not be able to seamlessly bridge (or link) the gap between those two points, making the disc incompatible with read-only devices like DVD-Video players and DVD-ROM drives. With its "lossless linking" technology, DVD+RW is the only rewritable DVD format that is capable of pausing and resuming the recording process without any linking loss. This feature is not only an advantage for random data recording, but it also makes the format very suitable for video applications. Due to lossless linking, discs can be edited without having to rerecord

the entire content. Pieces can be added or deleted with absolutely no linking loss.

DVD-RAM was originally created for data storage applications, and this is where the technology shines. The durability and high number of rewrites (up to 100,000 times) make it the perfect solution for multifunction jukeboxes providing high-capacity, online storage for document imaging and full-motion video. Because of DVD-RAM's speed and error-correction technology, these discs are also suited for backup and archiving. DVD-RAM also provides videographers with a solution for storing DV and analog productions that is more cost-effective than hard disk and higher-quality, more durable and versatile than videotape. DVD-RAM is currently being utilized in hospitals and radiology labs to store X-rays, CAT scans, and other large image files. This provides medical professionals with a reliable, low-cost means of storing test results digitally so they can be easily accessed and shared with others.

DVD technology truly does offer something for everyone. The broad

range of recordable and rewritable formats makes selecting the right DVD solution a bit of a challenge. But adopting an application-focused approach to selecting the best DVD format for the job will ensure the right choice. ■

Dawn S. Wortman is senior marketing manager at Maxell Corporation of America (Newark, N.J.)

www.maxell.com



Reprinted by permission from the publisher of Storage Management Solutions Magazine®, Volume 7, Issue 4.

For FREE subscription information, please call 310/276-9500 or reply via the World Wide Web at <http://www.wmpi.com>.

©2002 West World Productions, Inc.

maxell
Expanding Memory & Mobility ▶