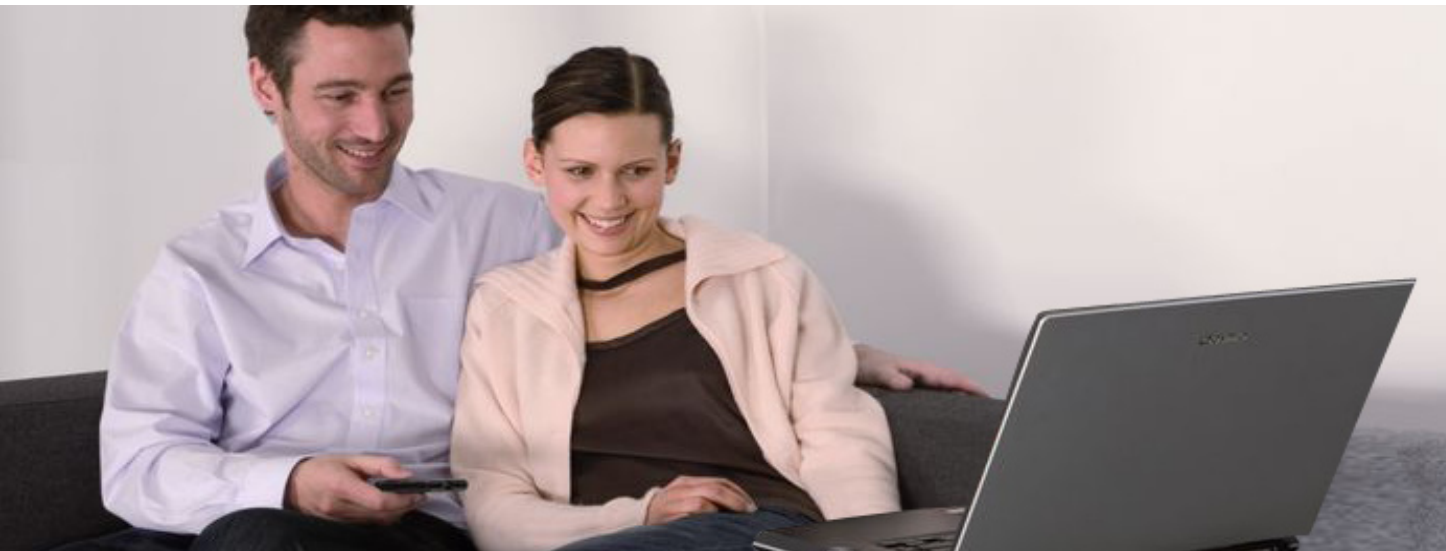




HOW DOES HD DVD WORK ?



HD DVD is the next-generation DVD standard for HD content and breakthrough entertainment. Capable of storing up to 45 GB of data, HD DVD unlocks the potential of HD movies, HD games and HD personal content storage. This Tech Insight explains how HD DVD works and describes its key features and benefits.



HOW DOES HD DVD WORK ?



INCREASING DEMAND FOR HD CONTENT

HD appeals to consumers who demand a greater level of detail and quality in film, games and other forms of digital entertainment. More scan lines, higher video resolutions and superior audio quality are among the features that set high-definition content apart from standard-definition content.

Here are some of the features that set HD content apart:

- Compared to the 525 scan lines required to build a standard definition image, one frame of a high definition image contains between 720 and 1080 scan lines.
- Support for enhanced video formats includes MPEG-2 SD/HD, H.264, VC-1.
- Support for high-quality audio formats includes PCM (Pulse Code Modulation), Dolby TrueHD (MLP), Dolby Digital +, DTS HD.

For the user or viewer of HD content, the result is a more thrilling experience. Images seem to leap through the screen and appear astonishingly lifelike.

Until recently, HD content was not available to consumers for movies or other kinds of content. The reason for this is simple: increased picture detail requires more storage space than a standard DVD can hold.

HD DVD refers to the next-generation DVD standard; this media type is designed to provide extended storage capabilities, enabling an entire HD movie and special features in HD to be stored on just one HD DVD disc.

STORAGE CAPACITY: DVD VERSUS HD DVD

Standard single-layer DVD has a capacity of only 4.7 GB or up to 2 hours of standard video content. Dual-layer DVD, with a storage capacity of up to 8.5GB, enables standard movies of up to 4 hours (240 minutes) in length to be played without disc-swapping.

By comparison, HD DVD offers significantly greater storage capacity. An HD DVD is comprised of up to three layers. Each layer can hold 15 GB of high definition content for a maximum capacity of up to 45 GB. For HD content, up to 12 hours of HD content can be stored on just one HD DVD triple-layer disc.

For HD movie lovers, this means there is enough room for HD special features. A particularly interesting feature of HD DVD is its support for iHD or interactive HD. One example of the kind of interactivity provided by this feature is the overlaying of video on top of the movie being played. Standard DVDs often include audio commentary provided by the director, actors, producer(s) and other technical experts. On an HD DVD disc, video commentaries can be played so that the viewer may more fully enjoy information about the movie-making process. HD DVD is clearly the superior media choice for high-definition content.

HOW DOES HD DVD WORK ?



COMPARISON OF DVD AND HD DVD CAPACITY

Disc Type	Standard DVD	HD DVD ROM (Read only)	Disc playing times (examples)
Capacity Single-sided, single-layer	4.7 GB	15 GB	4 hours HD Video
Capacity Single-sided, dual-layer	8.5 GB	30 GB	8 hours HD Video
Capacity Single-sided, triple-layer	Not applicable	45 GB	12 hours HD Video

HOW HD DVD WORKS

HD DVD shares the same basic disc structure of DVD with its back-to-back bonding of two 120 mm diameter substrates, each 0.6 mm thick. Like DVD technology, HD DVD stores information as a series of microscopic pits arranged in a long spiral on the disc. Data is written on a layer 0.6 mm from the surface. This means that HD DVD discs can be created using the same manufacturing methods as are currently used for DVD technology.

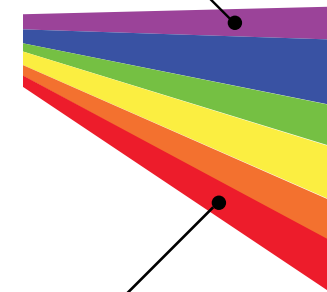
Consequently, HD DVD is compatible with DVD, which means that a HD DVD drive can also read DVDs. So what sets HD DVD apart from DVD? The answer is simple.

Unlike DVD, which relies on red laser technology, HD DVD uses blue laser technology to enable extended storage capacity. With a shorter wavelength of 405 nanometers (compared to 650 nanometers for DVD), blue laser technology allows for more data to be stored on an HD DVD disc.

Shorter wavelengths are important because they suffer less diffraction, which enables a tight focus on the read-write surface. Think of it as the difference between writing with

a magic marker and using a fine-tipped ballpoint pen. HD DVD represents the thin, precise, clear writing capabilities of the fine-tipped pen. As a result, the blue laser technology allows more data to be written and stored on a disc of the same diameter as today's standard DVD.

HD DVD laser light 405 nm



- Violet ≈ 400 nanometers
- Indigo ≈ 445 nanometers
- Blue ≈ 475 nanometers
- Green ≈ 510 nanometers
- Yellow ≈ 570 nanometers
- Orange ≈ 590 nanometers
- Red ≈ 650 nanometers

DVD laser light 650 nm

HOW DOES HD DVD WORK ?



WHERE IS HD DVD HEADED?

Today, HD DVD ROM players are available, enabling HD enthusiasts to view or playback HD content. For gamers and movie enthusiasts, it is exciting news.

The next step is to introduce the ability to write HD DVD discs. This innovation will allow users to burn content to discs. For those who want to create their own HD content, build personal collections of HD content or simply enjoy extended storage capacity for data backup, this future development represents an important breakthrough.

As HDTV and HD content via broadband connectivity continue to enjoy increasing popularity, there will be more available HD content to record and playback. Users will be able to customize the HD entertainment experience.

HD DVD FEATURES AND BENEFITS

Feature	Benefit
Enhanced storage capacity	Delivers HD content with its superior image and sound quality
Data is written at 0.6 mm from the disc surface	HD DVD discs are scratch resistant
Similar to DVD disc structure	Backwards compatible to DVD so that users can continue to view DVD movies or use other DVD content with an HD DVD player
No need for expensive new equipment to manufacture HD DVD	Less expensive purchase price than competing technologies
HD DVD is available	First-to-market advantage for HD DVD; HD DVD movies have been available since April 2006
Support iHD	New interactive special features on HD DVD
Future support for writing HD content	Ability to create personal HD content collections as well as backup; more data on a single disc