

# **BLU - RAY DISC**



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## **ABSTRACT**

*The modern world of technology could not have come about except for the development of the computer. Many people believe that storage is the most important feature in a PC. For these reasons computer storage systems have grown in capacity and speed at about the same rate as processors. Today, optical systems are the most popular alternatives to magnetic storage systems. The most widely used optical systems are CDs and DVDs.*

*Because of the continuing demand for greater storage capacity, hardware manufacturers are always searching for alternative storage media. This led to the introduction of Blu-ray Disc (BD).*

*The aim of this paper is to study the advantages of the Blu-ray Disc over the DVDs and other optical systems.*

*With their high storage capacity, Blu-ray discs can hold and play back large quantities of high-definition video and audio, as well as photos, data and other digital content.*

*In this paper, a detailed comparison is made between Blu-ray Disc and DVDs based on their working, writing, capacity, compatibility and other parameters.*

## **INTRODUCTION:**

In 1997, a new technology emerged that brought digital sound and video into homes all over the world. It was called *DVD*, and it revolutionized the movie industry. The industry is set for yet another revolution with the introduction of Blu-ray Discs (BD). The format offers more than five times the storage capacity of traditional DVDs and can hold up to 25GB on a single-layer disc and 50GB on a dual-layer disc.

The name Blu-ray is derived from the underlying technology, which utilizes a blue-violet laser to read and write data.

The Blu-ray Disc format was developed by the Blu-ray Disc Association (BDA), a group of leading consumer electronics, personal computer and media manufacturers, with more than 180 member companies from all over the world. The Board of Directors currently consists of

Apple Computer, Inc.  
Dell Inc.  
Hitachi.  
LG Electronics Inc.  
Samsung Electronics Ltd  
Sony Co Ltd etc.

## **BD FORMATS:**

Blu-ray plans to provide a wide range of formats including ROM/R/RW. The following formats are part of the **BD specifications**:

**BD-ROM (read-only)** - for distribution of HD movies, games, software, etc.  
**BD-R (recordable)** - for HD video recording and PC data storage.  
**BD-RW (rewritable)** - for HD video recording and PC data storage.

## **WORKING AND WRITING:**

Blu-ray discs not only have more storage capacity than traditional DVDs, but they also offer a new level of interactivity. Users will be able to connect to the Internet and instantly download subtitles and other interactive movie features.

Discs store digitally encoded video and audio information in pits -- spiral grooves that run from the center of the disc to its edges. A laser reads the other side of these pits -- the bumps -- to play the movie or program that is stored on the DVD. The more data that is contained on a disc, the smaller and more closely packed the pits must be. The smaller the pits the more precise the reading laser must be. Blu-ray uses a blue laser. A blue laser has a shorter wavelength (405 nanometers) than a red laser (650 nanometers). The smaller beam

focuses more precisely, enabling it to read information recorded in pits that are only 0.15 microns ( $\mu\text{m}$ ) (1 micron =  $10^{-6}$  meters) long -- this is more than twice as small as the pits on a DVD. Plus, Blu-ray has reduced the track pitch from 0.74 microns to 0.32 microns. The smaller pits, smaller beam and shorter track pitches together enable a single-layer Blu-ray disc to hold more than 25 GB of information -- about five times the amount of information that can be stored on a DVD.

## CAPACITY:



A single-layer disc can hold 25GB and a dual-layer disc can hold 50GB data and over 9 hours of high-definition (HD) video on a 50GB disc and about 23 hours of standard-definition (SD) video on a 50GB disc.

To ensure that the Blu-ray Disc format is easily extendable it also includes support for multi-layer discs, which should allow the storage capacity to be increased to 100GB-200GB (25GB per layer) in the future simply by adding more layers to the discs. Sony has announced that layering a disc beyond dual layering is possible, allowing up to a 200GB capacity on a Blu-Ray disc with 8 layers.

## COMPATIBILITY

Backwards compatibility with DVD was one of the primary arguments HD DVD had against Blu-Ray, but as recent developments have suggested, that doesn't really apply anymore. In fact, just this past week, we reported on the "BD/CD Dual Format Disc," which is a disc

containing both Blu-Ray and CD data layers.

## SPEED

Blu-ray has a higher data transfer rate -- 36 Mbps (megabits per second) -- than today's DVDs, which transfer at 10 Mbps. A Blu-ray disc can record 25 GB of material in just over an hour and a half. Blu-ray also has the potential for much higher speeds, as a result of the larger numerical aperture (NA) adopted by Blu-ray Disc. The large NA value effectively means that Blu-ray will require less recording power and lower disc rotation speed than DVD and HD-DVD to achieve the same data transfer rate.

## COST

Blu-ray Discs cost ranges around 100 to 500 rupees from place to place.

## DIFFERENCES

Parameters	Blu-ray	DVD
Storage capacity	25GB (single-layer) 50GB (dual-layer)	4.7GB (single-layer) 8.5GB (dual-layer)
Laser wavelength	405nm (blue laser)	650nm (red laser)
Numerical aperture (NA)	0.85	0.60
Disc diameter	120mm	120mm
Disc thickness	1.2mm	1.2mm
Protection layer	0.1mm	0.6mm
Hard coating	Yes	No
Track pitch	0.32 $\mu\text{m}$	0.74 $\mu\text{m}$

Data transfer rate (data)	36.0Mbps (1x) 54.0Mbps	11.08Mbps (1x) 10.08Mbps
Data transfer rate (video/audio)	(1.5x)	(<1x)

- automatically search for an empty space on the disc to avoid recording over a program
- access the Web to download subtitles and other extra features

## AVAILABILITY IN THE MARKET



Blu-ray recorders have been available in Japan for some time, where more consumers have access to HDTV than in the United States. Outside of Japan, however, it has been a bit of a waiting game. The PlayStation 3 is also Blu-ray compatible, and movies are available in the format. Just as with most new technologies, Blu-ray equipment will be pricey at first. In 2003, Sony released its first Blu-ray recorder in Japan with a price tag of around \$3,000. Of course, prices will drop as the format gains popularity. Even when the new video standard begins to replace current technologies, consumers won't have to throw away their DVDs, but they will need to invest in a new player. The industry is planning to market backward-compatible drives with both blue and red lasers, which will be able to play traditional DVDs and CDs as well as Blu-ray discs.

## ADVANTAGES

- record high-definition television (HDTV) without any quality loss
- instantly skip to any spot on the disc
- record one program while watching another on the disc
- create play lists
- edit or reorder programs recorded on the disc

## DISADVANTAGES

- Initially the cost will be very high
- Requires retooling of production lines. Upgrade costs might be passed onto consumers.

## APPLICATIONS

- Compatibility
- Stand-alone recorders and game controllers
- PC data storage

## CONCLUSION

- The World market has already experienced the revolution in Digital storage discs.
- By the time Mass production of Blu-ray gadgets begin its cost will fall way below DVDs
- Blu-ray recorders will be CD/DVD/BD supporting
- PCs with BD-ROM, BD-RW, BD-R will be soon marketed by HP & Dell.
- All in all, be ready to witness the REVOLUTION in Digital storage Discs.

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