

BLU-RAY DISC v/s HD-DVD

Abstract:

BLU-RAY is the next generation optical disc format for high definition video and high-density data storage, the drive and media form factor is identical to the HD-DVD format.

Various formats of HD-DVD technology are still fighting for dominance, but the battle for the next generation of media may have already been won. Blu-ray, backed by Sony and the host of other companies, has both momentum and technical excellence on its side.

Blu-ray discs are a major technology break-through for the optical storage environment. Besides the high density, the major technology step for the Blu-ray media is the hard coating which protects the media surface against scratches and contaminants. Blu-ray media provides the opportunity for every economical and secure mass storage with support from all major media vendors.

The need for this new technology was high definition which provided high clarity of resolution and sound features like digital rights management and on guard providing great level of encryption and security flourishes the use of Blu-ray disc to a greater extent. Real or not, the biggest knock against Blu-ray is that the discs initially, at least will be more costly to produce than HD DVD media (Sony claims otherwise). Until recently, the other knock was that unlike DVD-HD, the Blu-ray spec did not include support for more advanced video compression.

Keywords: *Capacity Codecs, Mandatory Codecs, audio and video decoder, HDMM, AACs, Betamax analogy*

Conclusion: We have two great high capacity optical formats for the future which correspond to two different manufacturer strategies. HD-DVD is clearly an evolution of the DVD format and a cheaper solution, both for disc manufactures and customers. With its improved codecs, it seems good enough to fill current HD-TV needs. Blu-ray features superior data density and offers a more innovative approach, which would seem to support a longer time.

Introduction

In case you're new to the whole next-generation DVD discussion, Blu-ray and HDDVD are two competing high-capacity disc technologies backed by various consumer electronics and computer manufacturers.

Both formats use blue laser technology, which has a shorter wavelength than red, allowing it to read the smaller digital data "spots" packed a lot more densely onto a standard-size disc. HD DVD is capable of holding 30GB or a full-length high-definition movie, plus extras, on a prerecorded double-layer disc (compare that to today's limit of 9GB for standard double-layer DVDs). Blu-ray will go up to 50GB at launch, and Sony is reportedly working on a quad-layer 100GB disc

A couple of expensive Blu-ray players/recorders, the Sony BDZ-S77 and the Panasonic DMR-E700BD (around US\$2,000), have already been released in Japan. But expect the war to touch off on these shores at the end of 2005 or in early 2006 and for it to really heat up when Sony launches its PlayStation 3, rumoured to include Blu-ray support. Before I give my take on whether you should stop buying DVDs and which format will win, here's a brief description of each, with their potential advantages and disadvantages.

TECHNICAL DETAILS:-

| | | Blu-ray Disc | HD DVD | |
|---|------------------------------|----------------------------------|------------------------|------------------------|
| Laser wavelength | | 405 nm (blue-violet laser) | | |
| Numerical aperture | | 0.85 | 0.65 | |
| Storage capacity per layer (single side) | | 25 GB | 15 GB | |
| Maximum | | 50 GB | 30 GB | |
| Mandatory Video codecs | | H.264/MPEG-4 AVC / VC-1 / MPEG-2 | | |
| Audio codecs | Lossy | Dolby Digital | Mandatory @ 640 Kbit/s | Mandatory @ 504 Kbit/s |
| | | DTS | Mandatory @ 1.5 Mbit/s | |
| | | Dolby Digital Plus | Optional @ 1.7 Mbit/s | Mandatory @ 3.0 Mbit/s |
| | lossless | DTS-HD Resolution High | Optional @ 6.0 Mbit/s | Optional @ 3.0 Mbit/s |
| | | Linear PCM | | |
| | | Dolby TrueHD | Optional | Mandatory |
| | DTS-HD Master Audio | Optional | | |
| Maximum bitrate | Raw data transfer | 53.95 Mbit/s | 36.55 Mbit/s | |
| | Audio+Video+Subtitles | 48.0 Mbit/s | 30.24 Mbit/s | |
| | Video | 40.0 Mbit/s | 29.4 Mbit/s | |
| Secondary video decoder (PiP) | | Mandatory for View players | Bonus Mandatory | |
| Secondary audio decoder | | Mandatory for View players | Bonus Mandatory | |

| | |
|-----------------------------------|--|
| Interactivity | BDMV and Blu-ray Disc Standard Content and Java Advanced Content |
| Internet support | Optional (BD-Live Mandatory) players only) |
| Video resolution (maximum) | 1920×1080 |
| Frame rates | 24/25p, 50/60i 24/25/30p, 50/60i |
| Digital Rights Management | AACS-128bit / BD+ / AACS-128bit ROM-Mark |
| Region codes | 3 Regions Region free |
| Hardcoating of disc | Mandatory |

Advantages and Disadvantages of Blu-ray disc:-

Advantages:

Getting the early start, Blu-ray has enjoyed more mindshare than HD DVD, as well as a conglomerate of powerful backers that rivals President Bush's "coalition of the willing" in size and scope. Technologically, the biggest edge Blu-ray appears to have over HD DVD is that it offers 30 per cent more capacity and is designed for recording high-def video. Rewritable BD-RW discs, with similar features to Panasonic's current DVD-RAM discs, can play back content while recording to the disc at the same time. Also, Sony owns Columbia Pictures and recently bought MGM, which gives it a leg up on releasing content. And PlayStation 3 certainly will carry a huge chunk of clout in the marketplace.

Disadvantages:

Real or not, the biggest knock against Blu-ray is that the discs -- initially, at least -- will be more costly to produce than HD DVD media (Sony claims otherwise). Until recently, the other knock was that unlike DVD-HD, the Blu-ray spec did not include support for more advanced video compression codecs such as MPEG-4 AVC and Microsoft's VC-1, in addition to the MPEG-2 codec. But the Blu-ray Group recently announced support for those codecs, so they're now on even ground on that front

Advantages and disadvantages of HD-DVD:-

Fight song: "We're evolutionary, not revolutionary"

Advantages:

The name itself, HD DVD, is far more consumer-friendly than Blu-ray. HD DVDs carry the same basic structure as current DVDs, so converting existing DVD manufacturing lines into HD DVD lines is supposedly simple and cost effective. Memory-Tech, a leading Japanese manufacturer of optical media, stated that producing HD DVD discs would initially cost only 10 per cent more than for existing DVDs and that it could quickly bring the cost down to match that of standard DVD.

Disadvantages:

HD DVD simply can't boast the same storage capacity as Blu-ray. It's confusing, but it appears that the rewritable HD DVD-RW will go up 32GB, while the recordable HD DVD-R discs will only be single layer (15GB). The other downside is that with Sony holding the rights to Columbia Pictures and MGM movie and television libraries, there will probably be a hole in HD DVD's content offering -- don't expect to see MGM/UA's James Bond movies on HD DVD, for example

Outlook: Too close to call:

Blu-ray had the early lead, but HD DVD has been making inroads, garnering support from major studios Warner, Paramount, Universal, and New Line Cinema, who've decided to play it safe and back both formats. From a marketing standpoint, HD DVD appears to be positioning itself as the more practical high-def DVD solution, an extension of the format rather than a leap beyond it. The Blu-ray group, for better or worse, is taking the bait and campaigning on technological superiority. Unfortunately, as a result, the press has jumped on the whole VHS vs. Betamax analogy -- you know, the old "the best technology doesn't always win" story, which doesn't help Sony.

Personally, I think a better analogy is the whole SACD vs. DVD-Audio fiasco -- you

know, the war that no one seems to care about and no one's winning. In other words, Vince, hold onto your DVD collection; you have time. There are all kinds of copy-protection details to iron out, lots of politics, and some prices that need to drop a zero

(people are just starting to buy DVD recorders, for crying out loud). Me, I'm ball parking the end of 2006 before anything interesting really starts to happen in the high-def disc arena. Until then, put in a well-transferred DVD and sit a little farther back from your TV. It all looks like HD from the other side of the room.

Interactivity:-

Both Blu-ray Disc and HD DVD have two main options for interactivity (on-screen menus, bonus features, etc.), one of which is relatively basic whilst the other is more advanced.

Blu-ray's basic mode is known as HDMV or BDMV ("High Definition Movie Mode" or "Blu-ray Disc Movie Mode"), whilst HD DVD's is known as "Standard Content". Both offer modest upgrades from standard DVD, such as the use of more buttons on-screen, a larger colour palette, and expanded (but still very limited) programming environment. BDMV is more powerful than Standard Content, and has been used on many Blu-ray disc titles, whereas Standard Content has been used sparingly on high-profile HD DVDs. Like the disc formats themselves, HD DVD's Standard Content is a small delta on standard DVD's sub picture technology, whilst Blu-ray's BDMV is completely new. This makes transitioning from standard DVD to Standard Content HD DVD relatively simple -- for example, Apple's DVD Studio Pro has supported authoring Standard Content since version 4.0.3. For more advanced interactivity, Blu-ray disc supports BD-J, whilst HD DVD supports Advanced Content. Virtually all HD DVD discs have been released with Advanced Content interactivity, whereas fewer titles support BD-J.

Disc construction:-



Blu-ray Discs contain their data relatively close to the surface (less than 0.1 mm) which combined with the smaller spot size presents a problem when the surface is scratched as data would be destroyed. To overcome this, TDK, Sony, and Panasonic each have developed a proprietary scratch resistant surface coating. TDK trademarked theirs as Durabis, which has withstood direct abrasion by steel wool and marring with markers in

tests. At this point only TDK recordable 25GB Blu-ray discs and DVD-R discs use the Durabis coating.

HD DVD uses traditional material and has the same scratch and surface characteristics of a regular DVD. The data is at the same depth (0.6 mm) as DVD as to minimize damage from scratching. As with DVD the construction of the HD DVD disc allows for a second side of either HD DVD or DVD.

A study performed by Home Media Magazine (August 5, 2007) concluded that HD DVD discs and Blu-ray discs are essentially equal in production cost. Quotes from several disc manufacturers for 25,000 units of HD DVDs and Blu-rays revealed a price differential of only 5-10 cents. (Lowest price: 90 cents versus 100 cents. Highest price: \$1.45 versus \$1.50.) Another study performed by Wesley Tech (February 9, 2007) arrived at a similar conclusion. Quotes for 10,000 discs show that a 15 gigabyte HD DVD costs \$11,500 total, and 25 gigabyte Blu-ray or a 30 gigabyte HD DVD costs \$13,000 total. For larger quantities of 100,000 units, the 25 gigabyte Blu-ray was less expensive than the 30 gigabyte HD DVD (\$1.49 versus \$1.55).

Security features:-

The primary means of copy prevention on both formats is the Advanced Access Content System (AACS). Use of AACS is optional for HD DVD, but mandatory for Blu-ray, which can add thousands of dollars to production costs. Other copy-prevention strategies include:

Blu-ray Disc

- HDCP encrypted digital output
- ROM-Mark watermarking technology (physical

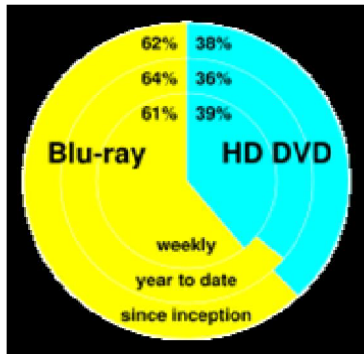
HD DVD

- HDCP encrypted digital

- layer)
- BD dynamic crypto (BD+)

output

Sales data:-



US top ten HD titles (aggregate) for Sales Index the week ending 23rd December 2007

| | Blu-Ray | HD DVD |
|--|---------|--------|
| 1 <i>Harry Potter and the Order of the Phoenix</i> | 56.34 | 43.66 |
| 2 <i>The Bourne Ultimatum</i> | | 98.36 |
| 3 <i>The Simpsons Movie</i> | 83.09 | |
| 4 <i>Planet Earth: The Complete Series</i> | 28.04 | 41.62 |
| 5 <i>Pirates of the Caribbean: At World's End</i> | 62.81 | |
| 6 <i>Blade Runner: Collector's Edition</i> | 35.43 | 24.54 |
| 7 <i>300</i> | 29.46 | 13.14 |
| 8 <i>Spider-Man 3</i> | 34.04 | |
| 9 <i>Transformers</i> | | 32.22 |
| 10 <i>Ocean's Thirteen</i> | 27.03 | |



Spiderman3 bluray



Transformers HD-DVD

Sales of high definition media in the United States. Week of December 23, 2007. Source: Nielsen Video Scan According to a market research company Nielsen Video Scan, U.S. sales of Blu-ray

discs were ahead of HD DVD with 61% of the market for the week ended 2007-12-23. In 2007 U.S. sales, Blu-ray leads with 64% of the market. Since inception, US market share was 62% for Blu-ray and 38% for HD DVD. Nielsen also releases normalized sales data (presented in the table to the right). The 2007 sales numbers are in contrast with much of 2006 (before the release of the PlayStation 3 when HD DVD held an early lead. The sales figures Nielsen tracks, however, do not include all points of sale, such as Wal-mart.

Although Blu-ray has sold more discs, the HD DVD group claims that the attach rate (the number of movies bought per player) is higher for HD DVD than for Blu-ray.

Europe:

In Europe, a study by Gfk revealed that Blu-ray lead with 70% of units sold with 650,000 units for Blu-ray and 332,000 units for HD DVD. On 2007-11-27, the Blu-ray Disc Association cited independent Media Control GfK International figures showing its share of European disc sales was 73% and that over 1 million Blu-ray movies had been sold.

Japan:

In Japan, according to Nikkei, the sales figure as of October 2007 is approximately 9:1 in favor of Blu-ray Disc.

Australia:

As of December 2007, according to Gfk, more than 102,000 Blu-ray movies have been sold, compared to less than 18,000 HD DVD, giving the ratio of approximately 5:1 in favour of Blu-ray.