Written by Administrator

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The High Definition DVD FAQ

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Mirrors

Below is a list of official mirrors for this FAQ. Please contact me if you wish to mirror and/or translate this FAQ. The list below is in alphabetical order:

- Bitburners.com
- CDR-Zone
- www.dvdrs.net
- DVD2DVDR.net
- DVDHelp.us
- Talk DVD
- DVDSoftwareGuide.com
- HDClips.net

Translations:

- Polish: CDRLab.pl

The following list is mirrors that have been arranged, but are not yet online:

- quellicheilpc.com (Italian translation)
- DVD2DVDR.net (Portuguese translation)

For the most up to date list of mirrors, please refer to this forum post.

Table of Contents

1. About this FAQ

1.1 Who am I?

My name is Xiao Fang and I'm the webmaster of Digital Digest and dvdloc8.com. But more important than that, I'm a big DVD fan, and naturally, I'm very interested in the next generation high definition DVD formats. My real concerns is that with all the confusion over the different high definition formats, people will give up on all of the formats due to frustration.

1.2 Which format do you support?

Like most of you, I don't think I have enough information just yet to make any sort of informed decision. One of the main problems right now is that a lot of the literature out there is to promote one format or another, usually biased and sometimes blatant advertising. Hopefully, this FAQ will shed light on most of the issues in a non- -partisan/biased manner, so you can make this decision yourself.

1.3 Why make a FAQ?

Apart from the reasons listed above, I thought it would be nice to have a single document where all the most common questions can be answered, before the official launch dates of the various high definition formats. These questions are questions that I have been seeking answers for, and questions that I've been asked by others (and unfortunately, I have not always been able to find or provide the answers to these questions).

1.4 Providing Feedback

If you have any questions, suggestions and corrections for this FAQ, you can post them in the official forum for this FAQ:

http://forum.digital-digest.com/forumdisplay.php?f=104

When posting, please add at the start of the subject "HDDVD FAQ:", so I will know that the post is in regards to the FAQ.

2. General Topics

2.1 What is high definition DVD?

High definition DVD will be more like an evolution of the DVD format, than an outright revolution. In terms of video and audio quality, high definition DVD will be what DVD was to VHS videotapes. Many television sets today are capable of displaying high definition pictures, and the move to a high definition home video format is the logical step in the evolution of home video.

To be more precise, high definition DVD will aim to offer 1080 lines of video resolution video (more on these technical details later), compared to the 576/480 lines offered by DVDs today.

2.2 Why should I want high definition DVD?

For the same reasons why you would want DVDs over video tapes. Apart from the high resolution video and audio, the increased capacity of high definition discs will hopefully mean an end to single movie multi-disc sets, and allow for more extra features to fit onto one disc. It may, for example, be possible to fit an entire season of a television show onto one disc.

2.3 What will happen to my existing DVDs?

Regardless of which high definition format you choose, they will most likely be compatible with existing DVDs meaning your DVD collection (mine is listed here) does not have to be replaced. Many DVD players today can upscale (increase the video resolution through digital manipulation) existing DVD movies to high definition, and I expect this feature will be present sooner or later on all the high definition DVD players once they are released. While upscaling won't offer the same kind of experience as "real" high definition movies, it will allow your DVDs to be show in the best possible manner without resolution loss being an issue.

More information on compatibility later in the FAQ for each specific format.

2.4 Can my computer playback high definition DVDs?

At this moment, there are no commercially available computer systems available to play some of the sample high definition disc available. Once the hardware and software arrives, most 2.8 GHz or higher rated computers should be able to playback high definition content smoothly, although the highest video/audio resolution movies (e.g. 1080p with high definition multi-channel audio) may require a faster computer and/or dedicated audio decoding hardware. As a test, you can try and playback some trailers marked (HD) on this page or some WMV-HD clips here.

Cyberlink, makers of the PowerDVD software, has already demonstrated playback of a HD DVD using PowerDVD and an Intel Pentium D processor at the Digital Hollywood conference in September 2005. More information about this demonstration can be found in Cyberlink's press release.

Cyberlink has also announced that they will demonstrate Blu-ray disc playback at CEATEC (Combined Exhibition of Advanced Technologies) in Japan in early October 2005. The demonstration will be supported by Panasonic and the BDA (Blu-ray Disc Association). More information about this demonstration in this press release.

2.5 What are the different formats for high definition DVD?

The two main competing formats are HD DVD (not to be confused with the more general term of High Definition DVD, which refers to any and all high definition DVD formats) and Blu-ray disc (or BD).

There are also formats mainly based in Asia, called EVD and FVD, and this FAQ covers them as well.

2.6 Why do we need different formats?

Well, the short answer is we don't. In an ideal world, there would only be one single format, a format all the electronics firms and movie studios would support. In fact, this "ideal world" existed during the creation of the DVD format, and is perhaps one of the main reasons why DVD became the record breaking success that it was.

With multiple formats, this means that movie studios will have to choose a side when it comes to releasing movies in high definition format. What this means for consumers is that unless your high definition DVD player supports all the high definition formats, you will either be limited in the movies you can buy or you might need to purchase more than one player.

While "we" don't need multiple formats, the people behind the various formats do because there is a huge amount of money involved in licensing fees (more on that later).

3. Blu-ray

3.1 What is Blu-ray?

Blu-ray is one of the two major formats competing for the emerging high definition DVD market. The name "Blu-ray" comes from the use of a blue-violet laser to read and write data. The term Blu-ray discs is shortened to BD for simplicity.

3.2 When will Blu-ray be officially launched?

The official date has been set to Spring 2006, announced in December 2005. HD DVD's release date was earlier pushed back to early 2006 as well. The difference between HD DVD and Blu-ray's launch dates is probably not a major issue, because even DVDs, the most successful format ever, took a year to become a "must-have" item after its official launch date, so the difference of a

few months between the official launch dates is probably insignificant.

As for media, the 2006 CES allowed several companies to make annoucements in regards to media availability:

- Fujifilm: Blu-ray and HD DVD media available in mid 2006
- Verbatim: Single layer BD-R and HD DVD-R media available early 2006, dual layer HD DVD-R by the end of 2006

More dates will be posted when more announcements are made.

3.3 Who is behind Blu-ray?

Blu-ray is backed by the following list of companies:

- Apple Computer, Inc.
- Dell Inc.
- Hewlett Packard Company
- Hitachi, Ltd.
- LG Electronics Inc.
- Matsushita Electric Industrial Co., Ltd.
- Mitsubishi Electric Corporation
- Pioneer Corporation
- Royal Philips Electronics
- Samsung Electronics Co., Ltd.
- Sharp Corporation
- Sony Corporation
- TDK Corporation
- Thomson Multimedia
- Twentieth Century Fox
- Walt Disney Pictures

The main backers are Sony, Matsushita (Panasonics) and Philips, with Sharp also playing an important role. Sony (formerly Columbia/Tri-Star, and also the new owner of MGM), Fox and Disney are the main studio backers.

In the latest twist, Warner, previously a HD DVD backer, has announced that it will release movies on Blu-ray as well as HD DVD. This follows Paramount's decision to release movies for both formats, after also previously supporting HD DVD only.

In November 2005, HP has stated that it might shift its support to HD DVD if "managed copy" (see section 3.13) and "iHD" (see section 7.2) are not supported by Blu-ray. Subsequently, mandatory managed copy will now be part of Blu-ray specifications, but the decision to include iHD is being considered. More information here.

If you want to find out "which camp" you are in based on your currently DVD collection, feel free to head on to dvdloc8.com, create a collection list and view the collection's statistics to find out (the same thing can be done with your wish list as well).

3.4 Are there different readable/writable formats like with DVD/DVD-R/W?

Blu-ray will come in three different formats, BD-ROM for read-only discs (similar to DVD-ROM), BD-R for write-once discs (similar to DVD-R) and BD-RE for rewritable discs (similar to DVD-RW). Why BD-RE instead of BD-RW is anyone's guess though.

At the 2006 International CES, Panasonic made several announcements in regards to pricing of BD-R/BD-RE media. A single layer BD-R will have the retail price of $17.99 (USD). A dual layer BD-R will have the retail price of $42.99. A single layer BD-RE will have the retail price of $24.99, while the dual layer variety will retail for $59.99.

3.5 What will be the capacities of these types of discs?

Like DVDs, BDs will come in single layer and dual-layer versions, and eventually, multi-layer (3 or more layer) discs will be supported.

A single layer BD will store around 25GB, which is more than 5 times the capacity of a single layer DVD. For each additional layer, an additional 25GB of storage will be available. The reason for the dramatic capacity increase over DVD is obvious when you consider that a HD transmission will take up a lot more room than a typical DVD stream, although with 25GB and 50GB capacities, and better compression algorithms, capacity shouldn't be an issue (so no "flippers", or double sided disc).

However, in an interview with a Microsoft representative, it was suggested that BD's 50GB discs may not be ready yet for mass production. In December, the Blu-ray group has official stated that dual layer discs will not be available at the official launch of the format, in Spring 2006. Buena Vista has expressed concern at the delay of dual layered BDs.

This could also lead to potential problems with early movie releases, as Sony has indicated that MPEG-2 compression is their preferred video compression format. A typical HD quality MPEG-2 compressed video would require more space than what a single layer 25 GB BD can offer. The good news is that Panasonic has started testing a production line for producing dual layer BDs, although most expect full production of dual layer BDs to be available in the second half of 2006. In comparison, HD DVD movies showcased at CES 2006 did not use MPEG-2 compression.

3.6 What resolution will the video on a movie BD be?

BD resolution will follow the standard HD resolution standards currently used for HDTV

transmissions. This means, at least for the present, the maximum resolution will be 1080i/p, or 1920x1080 in either interlaced or progressive format (progressive being the better, although not many displays can support 1080p, and even less can resolve or display the full 1080 lines - more information about the difference between interlaced/progressive video in section A.2). There is also 720p resolution (1280x720, progressive), which is the current native resolution of many home theatre displays, and also SD resolution support, similar to today's DVDs.

3.7 What kind of video compression will be used?

BD will support MPEG-2 compression as found in DVDs, MPEG-4 AVC and also Microsoft's VC-1, the exact same set as HD DVD's support (gee, I wonder why we need two different formats then). Microsoft's VC-1 is based on their WMV-9 standard.

Out of the supported compression formats, MPEG-2 is the oldest and least efficient (larger file size/bitrate in order to achieve the same quality as MPEG-4 AVC or VC-1). But due to licensing issues, Sony has indicated that, at least at release, BD may use MPEG-2 compression instead. Using MPEG-2 compression for HD content could lead to disc capacity problems (see section 3.5).

3.8 What about the audio?

Audio details are a bit sketchy at the moment, mainly because a specific audio format has not been decided on. An intelligent guess would be something similar to HD DVD's approved specifications (see section 4.8), with 7.1 or better surround sound and high definition audio similar to that of DVD-A. Support for all of the existing DVD-video audio formats should be present as well. There is also rumors that a lossless compression system (see section A.2) may be used.

3.9 What can you tell me about the recordable BD formats?

The BD specification calls for the recordable function to be available in most hardware. The initial recording speed will only be 1x (for the BD 1.0 specification), at 36 Mbps, which is actually equal to about 28x in DVD transfer terms. BD movies by their nature may require more than the 36 Mbps offered by 1x drives, so 2x or higher speed drives should be available by the time of launch.

There are already some prototype BD recorders out in Japan:

- Panasonic DMR-E700BD
- Sharp BD-HD100
- Sony BDZ-S77

3.10 What kind of equipment will I need to playback BD movies?

The first thing you will need is a BD capable player. No existing DVD player will be able to read a BD, and there is no software or hardware upgrade that can be performed to enable BD playback. Buying a new player is, therefore, the only choice if you want BD playback.

To get the best out of BD and HD in general, you will need a TV that is not only "HD Ready" (accepts HD inputs, but may not display HD in full resolution), but a TV that can fully resolve and display 1080 lines of resolution, preferably in progressive fashion. Your HD display should also have HDMI (see section A.2) or DVI input that supports HDCP (High Definition Copy Protection - see section A.2), as otherwise you will be limited to standard definition (SD) pictures only.

The support for HDMI/HDCP only HD output is a bit of a debating point amongst people that have been following the development of high definition DVD formats. A lot of people do have HD equipment that only have component/analog inputs, and even today, most of the cheaper displays do not have HDMI or DVI inputs. By the end of this year though, it is expected that most equipment will have HDMI/DVI inputs, and so this will become less of an issue to people over time. There are also (some quite valid) points being made about HDMI/DVI being inferior in quality to analog inputs (mainly in the area of color reproduction).

For those that don't yet have HD displays, BD movies will still work on your existing television set, but only at SD definition. This isn't too bad, as the having a HD source to down-convert to SD will mean you will get the best possible looking SD picture there is.

3.11 What about my existing DVD collection? Out the trash like my old VHS collection?

There is no official standard that says DVDs will have to be supported by BD devices, but the general consensus is that all BD devices will supports DVDs, without requiring any major modifications on the manufacturer's part. It will be stupid for manufacturers not to put support for such a popular and established format into their BD players.

3.12 Will BD/HD DVD players be able to playback the other high definition DVD formats?

Yes and no. No in that the official specifications obviously won't mention rival formats, unless it's to slag them off, but as with support for DVDs, it would be stupid for many manufacturers (especially those that haven't strongly backed any single format) to not support all the major formats, just like how DVD recordable multi-drives (DVD+ and DVD- support in one drive) is the de-facto standard at the moment.

3.13 What about copy protection? Will it be as weak as DVD's CSS?

One major lesson that the movie studios have learnt with DVD is that copy protection is

something they should take much more seriously, and they have done just that with the next generation formats, although some would argue that there are still inherent weaknesses in the copy protection scheme chosen.

BD and HD DVD will both use AACS (Advanced Access Content System) to protect its digital data. It is very similar to the flawed CSS, but the "key" difference is in how the various decryption keys are distributed. AES encryption is to be used.

There is actually a lot of computer science behind this, including binary trees, public/private keys and what have you, so I won't bore you with it. Basically, a key is like the normal use of the word: a device used to unlock something. All BD/HD DVD players will have sets of keys that can unlock the data on BDs/HD DVDs. Studios have the power to revoke keys, or prevent certain keys from being used to unlock the data (e.g. keys that have been posted publicly after being hacked). So far so good (or bad), as this is how CSS functions as well, although it's much harder for CSS to revoke keys because the keys are not structured properly like with AACS. Once a key is revoked, future discs will not carry this key, and players using this key will can no longer playback these new discs. The real intention here is not to disable players, but rather, stop ripping software that uses a set of "leaked" or "hacked" keys to rip disc. There might be a situation where a particular hardware player's keys have all been leaked, and it will no longer be able to playback new discs.

Now, there have been a lot of discussion about AACS requiring an Internet connection to update keys and so forth, as well as checking for content authorisation (pay per play, etc…), but this is not really true of standalone hardware players, at least not right now (although by launch time, this may change, but it's hard to imagine Internet connections being required by default, as this would wipe out a huge segment of the consumer base). Only software based players will require this key update, as it isn't really practical to implement an "Internet connection" requirement for hardware. An Internet connection might be useful if say a hardware player's keys have all been leaked and revoked, so a new set can be issued to the player through an Internet update. Although allowing updates through the Internet opens up a whole other set of issues, like security. Besides, this kind of copy protection can be implemented without an Internet connection, as in the case of SPDC (see below).

And as long as hackers don't post keys publicly, or produce tools which randomly generates working keys, this scheme won't even work to provide any protection. Even if there was a large scale leak, say if all the keys of a certain hardware manufacturer are leaked, a mass revocation may not work either because this would cause big problems for existing players of said manufacturer (assuming it is an "established" name), and a lot of headaches to a lot of normal consumers (but we'll probably have to get used to this sooner or later). If a "minor" manufacturer has its keys revoked (e.g. a small manufacturer that did not pay licensing fees), then people who have purchased this player might be in a bit of bother, but this is probably one of the intended effects of this new copy protection scheme.

Worst yet, work on AACS has been delayed meaning that a delay on the launch dates of both Blu-ray and HD DVD hardware is a strong possibility.

Unfortunately, the Blu-Ray Disc Association has deemed AACS insufficient, and has also added support for Self-Protecting Digital Content (SPDC), or what it calls BD+, and "ROM Mark". Starting with ROM Mark, it is a unique and undetectable identifier produced in the manufacturing phase that prevents mass piracy. Fair enough. BD+ or SPDC, on the other hand, has come under some criticism. BD+ allows discs to carry title specific security logic, basically means that each disc can contain code that can be run on a BD player to allow or disallow playback (although the player's behaviour is not modified, and will return to normal once the disc is ejected). Whether this code can be used maliciously by hackers (e.g. a pirated disc distributed on the Internet, which can shut down a player, forcing the user to reboot and quickly eject the malicious disc before the code is run again), we can only wait to find out.

More information on SPDC can be found here: http://www.cryptography.com/technology/spdc/

In November 2005, HP has requested "Managed Copy" to be added to the Blu-ray specifications as a mandatory features. That request was subsequently approved, so now both Blu-ray and HD DVD will have mandatory managed copy support. Managed copy refers to the part of the copy protection system that allows backups to be made, as well as the content to be played back remotely (eg. over a home network). Microsoft has recently cited this to be one of the main reasons for its shift of support towards HD DVD, before Blu-ray made it mandatory as well.

3.14 So why have AACS if it might not work?

The very same reasons why the (non-working) CSS and (non-working) region protection schemes are still in place today.

Licensing is the cash cow of the 21st century. By only providing working keys to manufacturers that pay you licensing fees (at your own schedule/price), every time a device capable of playing BD/HD DVD is produced, a licensing fee is paid to the founders of the formats. This is also why there are two major and two minor high definition DVD formats, as opposed to just the one (see section 2.6).

So in actual fact, AACS is more of a licensing protection scheme, than a copy protection scheme, and any inconvenience consumers have to suffer as a result is much less important, in the eye of the format founders, than the billions in income that licensing will generate in the lifetime of these high definition formats.

3.15 What about region coding?

By all accounts, region coding for DVDs should be considered a failure, with region-free hacked firmware available for DVD-ROM drives, and remote control hacks for standalones (not to mention the great number of players manufacturered to be region-free). However, this is not stopping region coding to be included in Blu-ray, even if the boundaries of the regions are different to that for DVDs.

An announcement in December 2005 specified the regions for Blu-ray discs:

- Region 1: North America, South America, East Asia except for China
- Region 2: Europe and Africa
- Region 3: China, Russia and other countries

3.16 PlayStation 3

3.16.1 Why is the PS3 being mentioned in this FAQ? Did you copy and paste the wrong section into the wrong FAQ?

The Sony PS3 is indeed important to the success or failure of the BD format. As mentioned above, Sony is one of the major backers of the BD format, and so it is no surprise that the next generation game console, the PS3, will use BD as its primary format.

But thanks for assuming that it was a mistake on my part.

3.16.2 Will the PS3 be able to playback BD movies?

Yes. If not at the time of launch (due to lack of any BD movies or a settled specification), then later on with software/firmware updates.

The PS3 is capable of 1080p output, so full resolution BD playback could be supported.

3.16.3 Why is PS3's support for BD significant enough to warrant an entire chapter in this FAQ?

Because people like playing games, and the PS3 will most likely be the most popular game console once it is released, and if not, it will still be in the top 3. If anything, this could tip the format race in favor of BD over HD DVD, and certainly doesn't hurt Sony, which had the choice of having a proprietary format for its game console, or something just as good.

3.16.4 What about the Xbox 360?

See

3.17 Technical details overview

Laser Type:	Blue-violet laser
Laser Wavelength:	405nm
Track Pitch:	0.32µm
Read Power:	0.35mW
Disc size:	120mm
Capacity:	
Single Layer:	25GB
Dual Layer:	50GB
Transfer Rate:	1x => 36 Mbps
Video Resolution:	1080i (1920x1080 HD, 50i, 60i)
	1080p (1920x1080 HD, 24p)
	720p (1280x720, 50p, 60p, 24p)
	SD (720x576/480, 50i, 60i)
Video Compression:	MPEG-2
	MPEG-4 AVC
	Microsoft VC-1
Audio Resolution/Compression:	TBA
Copy Protection	AACS
	ROM Mark
	BD+
File System:	DF 2.6

3.18 Hardware availability

This section will provide some details of early Blu-ray hardware (for computers or standalone devices) that will be available around launch. This section is not meant to be an all inclusive list of all available hardware, but rather, a list that is designed to give you a general idea of the specifications (and if available, costs) of the early generation hardware.

Pioneer BDR-101A

Type: Computer Drive (ATAPI interface)
Supported Read Media

- Single Layer BD-R (2x)
- Single Layer BD-RE (without cartridge, 2x)
- Single and Double Layer BD-ROM (without cartridge, 2x)
- DVD-ROM
- DVD-R/DVD+R/DVD-RW/DVD+RW/DVD-R(DL)/DVD+R(DL)
- No CD support (will be available in upcoming BDR-102A)

Supported Write Media:

- Single Layer BD-R at 2x speed
- Single Layer BD-RE at 2x speed
- DVD-R/DVD+R/DVD-RW/DVD+RW/DVD-R(DL)/DVD+R(DL)
- No CD support (will be available in upcoming BDR-102A)

Shipping Date: End of January 2006
Estimate RRP: $USD 995
More information: http://www.pioneer.co.jp/press/release159.html

Samsung BD-1000

Type: Standalone Player
Supported Read Media:

- BD-ROM/BD-R/BD-RE
- DVD
- DVD-R/DVD+R/DVD-RW/DVD+RW/DVD-RAM

Supported Write Media:

- None

Interface: HDMI
DVD Playback: Yes

Shipping Date: Spring 2006
Estimate RRP: $USD 1000

Pioneer BDP-HD1

Type: Standalone Player
Supported Read Media:

- BD-ROM/BD-R/BD-RE
- DVD
- DVD-R/DVD+R/DVD-RW/DVD+RW/DVD-RAM

Supported Write Media:

- None

Interface: HDMI **Video Support:**

- 720p or 1080i or 1080p
- JPEG, WMV Playback

Audio Support:

- DTS-HD, Dolby Digital

DVD Playback: Yes, with up-conversion to 720p/1080i/1080p through HDMI

Shipping Date: June 2006
Estimate RRP: $USD 1800

3.19 Software (Movies) availability

This section will list some software (currently only movies) that have been official announced for release in 2006:

- Aeon Flux (2005)
- Armageddon
- Batman Begins
- Behind Enemy Lines
- Bram Stoker's Dracula
- Brothers Grimm, The
- Charlie & The Chocolate Factory
- Constantine
- Dark Water
- Desperado
- Devil's Rejects, The
- Dinosaur
- Dukes of Hazzard, The
- Dune
- Everest
- Fantastic Four
- Fifth Element, The
- For a Few Dollars More
- Four Brothers
- Great Raid, The
- Guns of Navarone, The
- Hero
- Hitch
- House of Flying Daggers
- Ice Age
- Italian Job, The (2003)
- Jay and Silent Bob Strike Back
- Kill Bill: Vol. 1
- Kiss of the Dragon
- Knight's Tale, A
- Kung Fu Hustle
- Ladder 49
- Lara Croft: Tomb Raider
- Last Samurai, The

- Last Waltz, The
- League of Extraordinary Gentlemen, The
- Legends of the Fall
- Lethal Weapon
- Lord of War
- Manchurian Candidate, The (2004)
- Matrix, The
- Million Dollar Baby
- Oceans 12
- Punisher, The
- Rambo: First Blood
- Reservoir Dogs
- Resident Evil Apocalypse
- Robocop
- Saw
- Sahara
- Sense and Sensibility
- Sky Captain and the World of Tomorrow
- Sleepy Hollows
- Stealth
- Species
- SWAT
- Swordfish
- Terminator 2: Judgement Day
- Terminator 3: Rise of the Machines
- Total Recall
- Training Day
- Troy
- Twister
- U2 - Rattle & Hum
- Unforgiven
- We Were Soldiers
- xXx

4. HD DVD

4.1 What is HD DVD?

HD DVD (not to be confused with the general concept of high definition DVD formats, although the confusion is probably intentional) is one of the two major formats competing for the emerging high definition DVD market. The name "HD DVD" is obviously an extension of the existing DVD naming scheme, and while it's the usual marketing ploy, it does make a little sense in that HD DVD is a lot closer to the current DVD format than Blu-ray discs (BD).

4.1.1 What is AOD?

AOD is Advanced Optical Disc, another name for HD-DVD. The only difference between AOD and HD-DVD is that AOD is shorter and easier to say, which may be a potential marketing advantage.

4.2 When will HD DVD be officially launched?

A recent press release indicated that HD DVD will be officially launched in early 2006. Speculations were rife at the time of this announcement, in that this little set-back could spell trouble for the HD DVD format before it is even released, but the success of either format is likely to be based on support from movie studios, release of movie titles, pricing and many other factors, least of all the release date.

An announcement in late September 2005 from Toshiba has indicated that the U.S launch will be delayed until February or March 2006. And in December 2005, Blu-ray's launch date has been set for Spring 2006.

As for media, the 2006 CES allowed several companies to make annoucements in regards to media availability:

- Fujifilm: Blu-ray and HD DVD media available in mid 2006
- Verbatim: Single layer BD-R and HD DVD-R media available early 2006, dual layer HD DVD-R by the end of 2006

More dates will be posted when more announcements are made.

4.3 Who is behind HD DVD?

The major companies backing HD DVD are:

- Canon Inc.
- Digital Theater Systems
- Hitachi Maxell, Ltd.
- Kenwood Corporation
- Mitsubishi Kagaku Media Co., Ltd.
- NEC Corporation
- Onkyo Corporation

- Paramount Home Entertainment
- Sanyo Electric Co., Ltd.
- Teac Corporation
- Toshiba Corporation
- Universal Pictures
- Warner Home Video Inc.

There are also some minor "Associate Members", the full list can be found here

The major backers are Toshiba and NEC. The main studio backers are Universal, Warner and Paramount, although in October 2005, Warner and Paramount both stated that they will support Blu-ray as well as HD DVD.

Sony (the major backer of Blu-ray) announced in late November that it will merge its optical disc-drive unit with that of NEC's, with operations under the leadership of Sony. This has led to speculation that NEC may pull out of HD DVD production, but the most likely outcome could be that the merged unit will produce both Blu-ray and HD DVD drives, as a Sony spokesman has said that "It is conceivable that there could be a variety of disk-drive requests produced … perhaps even that other format" (the "other format" being HD DVD, one presumes). More information about the merger can be found here.

An announcement in late September 2005 from Microsoft and Intel has stated that they would now officially support HD DVD. The reasons for this support, taken from an interview with a Microsoft representative by Tom's Hardware Guide , seems to be that it would be easier to make authorised copies of legally obtained discs with HD DVD (Managed Copy), which is important in the context of home media streaming.

If you want to find out "which camp" you are in based on your currently DVD collection, feel free to head on to dvdloc8.com, create a collection list and view the collection's statistics to find out (the same thing can be done with your wish list as well).

4.4 Are there different readable/writable formats like with DVD/DVD-R/W?

HD DVD will come in three different formats, HD DVD-ROM for read-only (similar to DVD-ROM), HD DVD-R for write-once discs (similar to DVD-R) and HD DVD-Rewritable for rewritable discs (similar to DVD-RW).

4.5 What will be the capacities of these types of discs?

Like DVDs, HD DVDs will come in single layer and dual-layer versions, and new is a triple-layer version just recently announced (BD may support multi-layer discs, but nothing has yet been announced).

A single layer HD DVD will store around 15GB, which is more than 3 times the capacity of a single layer DVD. For each additional layer, an additional 15GB of storage will be available. The reason for the dramatic capacity increase over DVD is obvious when you consider that a HD transmission will take up a lot more room than a typical DVD stream, although with 15/30/45GB capacities, and better compression algorithms, capacity shouldn't be an issue (so no "flippers", or double sided disc).

4.6 What resolution will the video on a movie HD DVD be?

HD DVD resolution will follow the standard HD resolution standards currently used for HDTV transmissions. This means, at least for the present, the maximum output resolution will be 1080i (see below for updated information on this issue), or 1920x1080 in interlaced format only (progressive is better, although not many displays can support 1080p, and even less can resolve or display the full 1080 lines, and even if they can, the required HDMI specifications for 1080p output has not been finalized yet as of early February 2006 - more information in section A.2). There is also 720p resolution (1280x720, progressive), which is the current native resolution of many home theatre displays, and also SD resolution support, similar to today's DVDs.

The lack of 1080p support was something that even supporters of HD DVD are complaining about. Even if 1080p output is supported in the future, the actual movies are stored in 1080i format, so it will require a bit of de-interlacing to produce a progressive picture, as opposed to BD's progressive source.

But this is due to be changed as in a interview with Microsoft in the Audioholics magazine in January 2006 indicated that HD DVD movies will be stored in 1080p format like BD, even if initial players can only output at 1080i. You can read the full interview here.

4.7 What kind of video compression will be used?

HD DVD will use the same set of video compression codecs as BD (see section 3.7). And just approved by the DVD Forum (14th September 2005), China will have its own HD DVD sub-format, that will use the Advanced Audio Video Coding Standard (AVS), as opposed to the more expensive to license MPEG and VC-1 codecs.

4.8 What about the audio?

Unlike BD, HD DVD currently has an approved audio specification scheme. The supported mandatory formats will be Dolby Digital Plus (DD+), DTS++, MLP 2-Channel (lossless - see section A.2, 24-bit, 192kHz) and DTS++ Lossless (optional).

Existing DVD audio formats will be supported by the above approved formats.

4.9 What can you tell me about the recordable HD DVD formats?

The initial recording speed will only be 1x at 36.55 Mbps, which is actually equal to about 28x in DVD transfer terms. Faster recording speeds will be available, possibly at launch time.

The DVD Forum steering committee meeting on the 14th of September also agreed on the specifications for 1x dual layer recording, suggesting that dual layer recording (for standalone or computer based recorders) may be available at launch or shortly after.

Toshiba has already demonstrated player/recorders at electronic shows.

4.10 What kind of equipment will I need to playback HD DVD movies?

The first thing you will need is a HD DVD capable player. No existing DVD player will be able to read a HD DVD, and there is no software or hardware upgrade that can be performed to enable HD DVD playback. Buying a new player is, therefore, the only choice if you want HD DVD playback.

To get the best out of HD DVD and HD in general, you will need a TV that is not only "HD Ready" (accepts HD inputs, but may not display HD in full resolution), but a TV that can fully resolve and display 1080 lines of resolution, in interlaced fashion (1080i). The choice to support only 1080i for HD DVD is a controversial one, and while it makes sense currently (due to lack of viable equipment for displaying 1080p), it may prove to be a problem when future displays come out with 1080p as the native resolution.

The same HDMI HD output only requirements applies for HD DVD as well.

For more information, see section 3.10.

4.11 What about my existing DVD collection? Out the trash like my old VHS collection?

HD DVD is marketing itself as the natural successor to DVD (both approved by the DVD Forum, although the DVD Forum is not as official as it sounds), and so, DVD playback should not be an issue for HD DVD players.

4.12 Will BD/HD DVD players be able to playback the other high definition DVD formats?

See section 3.12

4.13 What about copy protection? Will it be as weak as DVD's CSS?

See section 3.13

4.14 So why have AACS if it might not work?

See section 3.14

4.15 What about region coding?

It appears (at least from statements made in October 2005, by the DVD Forum) that HD DVD will be region free. This is not a total surprise as DVD region coding can only be considered a failure, as it achieved none of the goals it set out to.

4.16 Xbox 360

4.16.1 Since the Sony PS3 will support BDs, will the Xbox 360 support HD DVD?

The Xbox 360 did not include a HD DVD drive nor were there plans to have support for HD DVD at launch, although Bill Gates has hinted that an updated Xbox 360 with HD DVD support may be available in the future (see update below). At the time of release, however, Xbox 360 will rely on the DVD format fof distribution, with no support for any of the future high definition formats. The game console itself will be able to output high definition pictures (at 1080i), so the exclusion of HD movie playback support is a bit confusing. But this is probably the price Microsoft has to pay in order to release their console earlier than the competition, and without having to choose one format over another (Microsoft's VC-1 codec is supported by both major high definition formats, and this gives you an indication of the fence-sitting attitude that Microsoft will take towards this issue).

Update (October 2nd, 2005): Microsoft has officially backed the HD DVD format, along with Intel. While there is still no official news that the Xbox 360 will have HD DVD capabilities, this news does suggest that the Xbox 360 will have this capability in the future if the HD DVD format is not a total failure.

Update (January 8th, 2006): At the CES 2006, Microsoft announced that it will provide HD DVD support for the Xbox 360 in the form of an external drive/add-on, to be release later in 2006. Since the drive will be an optional accessory, it is most likely that support for HD DVD would be in terms of movies at first, perhaps with

games available hybrid discs at first - in other words, it's unlikely for HD DVD only games to appear on the market unless almost everyone has the external drive add-on.

4.17 Technical details

Laser Type:	Blue-violet laser
Laser Wavelength:	405nm
Track Pitch:	0.40µm (HD DVD-ROM, DVD-R) 0.34µm (HD DVD-Rewritable)
Read Power:	0.50mW
Disc size:	120mm
Capacity:	
Single Layer:	15GB
Dual Layer:	30GB
Triple Layer:	45GB
Transfer Rate:	1x => 36.55 Mbps
Video Resolution:	1080i (1920x1080 HD, 50i, 60i) 1080p (1920x1080 HD, 24p) 720p (1280x720, 50p, 60p, 24p) SD (720x576/480, 50i, 60i)
Video Compression:	MPEG-2 MPEG-4 AVC Microsoft VC-1
Audio Resolution/Compression:	Dolby Digital Plus (DD+) DTS++ MLP 2-Channel DTS++ Lossless (optional)
Copy Protection	AACS
File System:	DF 2.6

4.18 Hardware availability

This section will provide some details of early HD DVD hardware (for computers or standalone devices) that will be available around launch. This section is not meant to be an all inclusive list of all available hardware, but rather, a list that is designed to give you a general idea of the specifications (and if available, costs) of the early generation hardware.

NEC HR-1100A

NEC HR-1100A

Type: Computer Drive (ATAPI interface)
Supported Read Media

- HD DVD (2x)
- DVD-ROM (8x)
- DVD-RAM (5x)
- DVD-R/DVD+R/DVD-RW/DVD+RW/DVD-R(DL)/DVD+R(DL) (8x)
- CD (32x)

Supported Write Media:

- N/A

Shipping Date: March 2006
Estimate RRP: $USD 500

Toshiba HD-A1

Type: Standalone Player
Supported Read Media:

- HD-DVD
- DVD
- DVD-R/DVD-RW/DVD-RAM
- CD-R/CD-RW

Supported Write Media:

- None

Interface: HDMI **Video Support:**

- 720p or 1080i

Audio Support:

- Multichannel 24-bit/192-kHz audio DACs
- MP3 and WMA playback
- Onboard Dolby Digital, Dolby Digital Plus, and Dolby TrueHD (2 channel)
- Onboard DTS and DTS-HD decoding with 5.1 analog audio outputs
- Four 32-bit floating-point DSPs to decode multichannel streams

DVD Playback: Yes, with up-conversion to 720p/1080i through HDMI

Shipping Date: March 2006 (available to pre-order now)
Online Pre-order: http://tinyurl.com/duscx
Estimate RRP: $USD 499.99

Toshiba HD-XA1

Type: Standalone Player
Supported Read Media:

- HD-DVD
- DVD
- DVD-R/DVD-RW/DVD-RAM
- CD-R/CD-RW

Supported Write Media:

- None

Interface: HDMI **Video Support:**

- 720p or 1080i
- High performance video processor
- Selectable user interface

Audio Support:

- Multichannel 24-bit/192-kHz audio DACs
- MP3 and WMA playback
- Onboard Dolby Digital, Dolby Digital Plus, and Dolby TrueHD (2 channel)
- Onboard DTS and DTS-HD decoding with 5.1 analog audio outputs
- Four 32-bit floating-point DSPs to decode multichannel streams

DVD Playback: Yes, with up-conversion to 720p/1080i through HDMI

Shipping Date: March 2006
Estimate RRP: $USD 799.99

4.19 Software (Movies) availability

This section will list some software (currently only movies) that have been official announced for release in 2006:

- Aeon Flux (2005)
- Aviator, The
- Band of Brothers
- Batman Begins
- Bourne Supremacy, The
- Braveheart
- Four Brothers
- Friends
- Harry Potter and the Goblet of Fire
- Italian Job, The (2003)
- Lara Croft: Tomb Raider
- Lord of the Rings Trilogy, The
- Manchurian Candidate, The (2004)
- Matrix Trilogy, The
- Sahara
- Seven
- Sleepy Hollows
- Sky Captain and the World of Tomorrow
- Terminator 3
- U2 - Rattle & Hum
- Ultimate Star Trek Movie Collection, The
- We Were Soldiers

5. EVD

5.1 What is EVD?

EVD stands for Enhanced Versatile Disc, and it was developed by a consortium of Chinese companies. EVD is actually just a DVD disc with a different set of video/audio specifications, one using a better compression algorithm than MPEG-2, and hence, allows high definition movies to be stored onto a DVD.

5.2 When was EVD officially launched?

EVD was officially announced way back in November 2003, and while players and discs are available, it has not been a total success story. When the other major high definition DVD formats are launched, it will be interesting to see if EVD can market itself as the cheap DVD based alternative to high definition movie distribution.

5.3 Who is behind EVD?

EVD was developed by Beijing E-World Technology, a consortium of major electronic firms in China, backed by the Chinese government. These firms include:

- SVA
- Shinco
- Xiaxin
- Yuxing
- Skyworth
- Nintaus
- Malata
- Changhong
- BBK

The video compression technology used is On2's VP5/VP6 video codec, but there was a dispute between On2 and E-World over licensing fees.

5.4 What about EVD recordable formats?

EVD is really just a DVD disc with a different set of video/audio codecs, so it can't really be classified as a recordable media format. EVD is mainly a playback format.

5.5 Why develop EVD?

EVD was developed as a response to the relatively high licensing cost of DVDs (around $US 15 per hardware player, as opposed to EVD's $2). DVD licensing and royalty cost includes CSS, Macrovision, MPEG-2 and the various surround sound systems. EVD will essentially be royalty free.

Also see section 2.6 and 3.14.

5.6 What resolution will the video on an EVD be?

EVD supports 1080i (1920x1080 at 50i or 60i) and 720p (1280x720) resolutions, comparable to HD DVD, although not to Blu-ray's 1080p support. Standard DVD definitions are also supported, as EVD was originally designed to be a DVD replacement, as well as a next generation DVD format.

5.7 What kind of video compression will be used?

EVD uses On2 Technologies' VP5 and VP6 video compression codecs.

5.8 What about the audio?

EVD uses an audio codec from called EAC 2.0 (Enhanced Audio Codec). EAC supports 6 channel audio and is more efficient that Dolby Digital or DTS used in DVDs.

5.9 What kind of equipment will I need to playback EVD movies?

While EVD shares the same media as DVDs, existing DVD players will not be able to playback EVDs, since they do not support the decoding of EVD's video and audio codecs.

The specifications are similar to HD DVD (see section 4.10), although being developed as a DVD replacement, the expected user base will be primarily people who can watch DVDs, as opposed to a new user base featuring people with high definition displays.

FVD discs can also be read by standard computer DVD-ROM drives, so playback on the PC is a software issue only.

5.10 What about my existing DVD collection?

EVD is a DVD replacement, so there is no mandatory support for DVD playback. But as in the case for Blu-ray (see section 3.11), support for DVD playback is almost always present due to competition and the need to support the popular format.

5.11 Will EVD players be able to playback the other high definition DVD formats?

While players compatible with both Blu-ray and HD DVD will be available, these players are unlikely to include EVD (or FVD) playback support, due to the limited geographical nature (mainly aimed at the Asian market) of the format. However, Chinese or Taiwanese made BD or HD DVD player may include EVD playback functionality, since it isn't difficult or costly to include support for this type of "enhanced" DVD format.

5.12 What about copy protection?

EVD features copy protection, but details of it are hard to find. Copy protection will be less of an issue if the format is primarily aimed at the Chinese market (where legal retail discs aren't all that more expensive than pirated ones, and damn cheap compared to western standards).

5.13 Technical details

Laser/Track/Capacity/Transfer Rate/File System: DVD	
Disc size:	120mm
Video Resolution:	1080i (1920x1080 HD, 50i, 60i)
	720p (1280x720, 50p, 60p, 24p)
	SD (720x576/480, 50i, 60i)
Video Compression:	On2 VP5/VP6
Audio Resolution/Compression:	EAC 2.0
Copy Protection	Copy Protection Scheme

6. FVD

6.1 What is FVD?

FVD stands for Forward Versatile Disc (also known as Finalized Versatile Disc), and is developed by a consortium of 29 Taiwanese optical storage companies.

6.2 When was FVD officially launched?

FVD was formally launched in March 2005, although the format was announced much earlier. As is the case with EVD, it will not be until the official launches of BD and HD DVD before one can judge whether this new format can compete in the highly lucrative high definition DVD market. As of December 2005, FVD player manufacturing has gone into the mass production stage.

6.3 Who is behind FVD?

FVD was developed by a consortium of 29 Taiwanese optical storage companies, also known as Advance Optical Storage Research Alliance (AOSRA). The Industrial Technology Research Institute (ITRI) and the Opto-Electronics & Systems Laboratories (OES) are also behind the format, as is the Taiwanese government.

The companies involve include, but is not limited to:

- BenQ
- CMC Magnetics
- LiteOn Technology
- Mustek
- Prodisc Technology
- Quanta Storage
- Ritek
- U-Tech Media

6.4 What about FVD recordable formats?

Recordable and re-writable versions of FVD will be available.

6.5 Why develop FVD?

FVD was developed in response to DVD licensing/royalty costs, and also to compete with the EVD format.

Also see section 2.6, 3.14 and 5.5.

6.6 What will be the capacities of these types of discs?

FVD (unlike EVD, which is based on the DVD specifications), is different from the DVD specifications. FVD will also have single and dual layer version, but the capacity for each layer will be slightly larger than the equivalent for DVDs. A single layer first generation FVD (FVD-1) can contain 5.4GB of data, as opposed to DVD's 4.7GB, and a dual layer version of contain 9.8GB to DVD's 8.5GB.

The second generation FVD (FVD-2) will support single, dual, and triple layers with sizes of 6.0GB, 11.0GB and 15.0GB.

6.7 What resolution will the video on a FVD be?

FVD supports 1080i (1920x1080 at 50i or 60i) and 720p (1280x720) resolutions, comparable to HD DVD, although not to Blu-ray's 1080p support. Standard DVD definitions are also supported.

The first generation FVD will mainly support 720p, while the second generation will support 1080i - mainly due to capacity restrictions.

In addition, standard definition titles can be up-scaled (increased in resolution through digital image enhancement) to HD quality.

6.8 What kind of video compression will be used?

FVD will utilise Microsoft's WMV-9 video compression codec. WMV-9 can deliver both standard and HD video, as demonstrated on the Microsoft website, as well as on certain DVD titles (e.g. Terminator 2 Extreme Edition, which featured the entire movie in WMV-HD format).

6.9 What about the audio?

FVD will utilise Microsoft's WMA audio format. DVD's LPCM and Dolby Digital AC3 support will also be available.

6.10 What kind of equipment will I need to playback FVD movies?

Even if FVDs are somehow readable by normal DVD lasers, the hardware decoders on most DVD players will not be able to decode WMV content, and certainly not able to output in HD. There are some WMV-9 compatible standalone players, some even with HD upscaling, but it's unlikely that they will be able to playback FVDs, at least not with full functionality.

The specifications are similar to HD DVD (see section 4.10), although being developed as a DVD replacement, the expected user base will be primarily people who can watch DVDs, as opposed to a new user base featuring people with high definition displays.

6.11 What about my existing DVD collection?

FVD has backward compatibility with existing DVDs, so your existing DVD collection should be safe.

6.12 Will FVD players be able to playback the other high definition DVD

formats?

See section 5.11

6.13 What about copy protection?

While Microsoft traditionally uses its own DRM (Digital Rights Management) scheme in their WMV-HD movies, FVD will use Advanced Encryption System (AES) for its copy protection needs.

6.14 Technical details

Laser Type/Wavelength:	DVD
Track Pitch:	0.64µm
Disc size:	120mm
Video Resolution:	1080i (1920x1080 HD, 50i, 60i)
	720p (1280x720, 50p, 60p, 24p)
	SD (720x576/480, 50i, 60i)
Video Compression:	Microsoft WMV-9
	Microsoft WMA
>Audio Resolution/Compression:	LPCM
	Dolby Digital AC3
Copy Protection	AES
File System:	UDF 1.02

7. Format Comparisons

7.1 Introduction

This section will offer a brief comparison between the various high definition DVD formats mentioned in this FAQ. The comparison will be between BD/HD DVD, and EVD/FVD, as it does not make sense to compare BD/HD DVD and EVD/FVD, since they are aimed at different market segments.

7.2 Blu-ray vs HD DVD

Blu-ray and HD DVD are much more similar than both lobby groups would like to admit (this is why a movement to release a unified format was created, although it looks like it now has failed), but there exists a few main differences, most of them already outlined in detail above.

The first main difference is the capacity. With BD, at least at the time of launch, there will be two choices (single/dual layer) in capacities for movie studios to choose from, both of them quite large (25 and 50 GB). With HD DVD, there will most likely be 3 choices (single, dual and triple layer), each with smaller capacities than their BD equivalent. Some people might prefer having more choice over larger capacities per choice, as it provides more flexibility (in producing movie discs or buying blank media for home use), especially if the reduced capacity means lower cost.

The second main difference is the maximum video resolution. BD will store movies in 1080p format, while HD DVD will store them in 1080i format. This makes BD much more future proof, and even though 1080p displays are hard to find at the moment, this will not always be the case.

The third main difference could perhaps be the most important difference, although not directly for you and me, but for disc manufacturers. HD DVD has been designed to be as close to current DVDs as possible, and so, production lines do not have to be changed to produce HD DVD media. BD, on the other hand, will require changes to be made, and this could mean high media costs (which won't really affect sell-through movie sales/pricing, but will affect blank media pricing), as manufacturers try to recoup the money invested in new production lines. But Blu-ray has already responded by producing equipment which aims to bring production costs more in line with HD DVD production.

The fourth main difference at the moment is copy protection, in that BD has BD+ or SPDC, which HD DVD doesn't have (yet). As mentioned in section 3.13, SPDC will allow individual BDs to carry code to prevent playback if it detects something is not right. Also, Managed Copy (see section 3.13) is mandatory on HD DVD (users are allowed to make at least one copy), and was only made mandatory for Blu-ray in November 2005 (following pressure from members of the BDA).

Interactive content for HD DVD will be provided by iHD, which is a creation of Microsoft and Toshiba, and will be implemented in Microsoft's Windows Vista operating system as well. Blu-ray has opted for Sun Microsystem's Java for interactive features. HP, part of the Blu-ray alliance, has requested iHD support to be added to the Blu-ray specifications, and the request is being considered. iHD is considered to be superior to Java due to its support for greater interactivity.

And finally, the support of movie studios will be very important if sell-through movie sales, which is the driving force behind the success of DVDs, is to be the most important factor in determining the success and failure of either format. Currently, Sony (Columbia/Tri-Star, MGM), Fox and Disney will support BD, which is not bad considering the large line of movies Sony and Fox has on offer. In the HD DVD corner, there are the industry heavyweights Universal, Warner and Paramount.

In late September 2005, Microsoft (and Intel) decided to back HD DVD over Blu-ray, and many of the above factors were key reasons for this backing (Microsoft had stayed neutral up until this point, and there were even signs that it might back Blu-ray in the end). Interestingly, both Microsoft and Intel believe that less rigid copy protection that allows copies of a movie to be made is essential for their home networking/media streaming vision. More information in this

Tom's Hardware interview with a Microsoft representative.

7.2.1 The Author's Opinion:

I think the most important factor will be the support of the studios. When I first wrote the guide in September of 2005, it wasn't the case of one format having significantly more support than the other. But this has changed as of October 2005, with Warner and Paramount both shifting towards the Blu-ray camp (while still maintaining their support for HD DVD). Judging by my existing DVD collection statistics, the break-down is 139 to 35 in favor of the BD camp, with a further 67 DVDs belonging to studios that have backed both formats. I suspect the situation will continue to change in this area, and by the end of the year, it could be the case where only Sony Pictures will exclusively back one format (BD obviously), with others putting their eggs in both baskets. If you want to find out "which camp" you are in based on your currently DVD collection, feel free to head on to dvdloc8.com, create a collection list and view the collection's statistics to find out (the same thing can be done with your wish list as well).

The PS3 could be a major factor in all this, although the PS3 is aimed at an entirely different market to high definition movies, and the support for the PS3 may not translate well to the home video market. Copy protection is something I take seriously, and I have to say I'm leaning towards HD DVD due to its lack of SPDC and generally more consumer friendly approach (although it is still far from being perfect).

One factor that people often overlook (and I did too, so thanks to D. Chambers for pointing this out to me) is the porn industry. Adult DVDs were one of the reasons the uptake of the DVD format was so quick (I seem to remember a time when adult DVDs outnumbered Hollywood movie DVDs 5 to 1, at a time when DVD uptake was still comparatively low). So far, there hasn't been any strong indication of support for one format over another for the porn industry, and I suspect they will adopt a wait and see attitude, which might be a bad thing for all concerned.

Another factor in the success of DVD was the available of cheap players made by Asian manufacturers, particularly China, and one of the reasons for the low price is the lack of any licensing fees being paid by these manufacturers. It is in the best interest of the major players like Sony and Toshiba to prevent a situation like this, and so cheap Blu-ray/HD DVD players may not be so readily available (although with that said, even fully licensed players from Asian manufacturers will still be lower in price due to lower production and labour costs), and this could also cause either or both formats to fail.

7.2.2 Opinion from www.dvdrs.net:

Technology is sometimes beyond the comprehension of the consumer and although all these standards are far better than the current DVD MPEG2 we have now I cannot see the uptake of yet another hardware change so quickly.

Consumers are still making the change from VHS to DVD and its unlikely they'll understand the true benefits of HD for some time.

Forcing all these standards and further hardware updates on a market that has only truly accepted the DVD standard recently is crazy. Most users are only interested in getting their favourite films on seemingly lossless media and they believe that DVD is currently that. Granted its not lossless in the true sense of the actual content but consumers see it that way as no matter how many times you play the media it doesn't degrade like older technology of VHS or BETAMAX.

Personally I think all this is currently in the high realms of the real enthusiast and I cannot see a standard being reached properly for sometime. And by the time its accepted we will be forced yet another standard to adopt and upgrade to.

7.2.2 Opinion from DVDHelp.us:

The difference in technologies used for HD-DVD/AOD and Blu-Ray are significant enough that they will likely play a major factor in the battle. While both camps have corporations behind them with extremely deep pockets, I believe that the eventual victory will go to HD-DVD/AOD. Blu-Ray may be able to hold slightly more data, but ultimately, that isn't enough. New and improved future codecs will eventually be able to fit more and more on a disc, so raw storage space will always be a moot point. HD-DVD drives and discs can be more easily created on current assembly lines, saving the manufacturers a lot of money. Likewise, the discs will be backwards compatible, so consumers won't have to immediately rush out and buy all new discs and players. Historically, consumers have always been more likely to accept a new product when it became a natural progression from their current product, as compared to having to throw away a perfectly good (but outdated) product in favor of the new one.

In the end, it will be the cost, not to features, that win this battle. Simply put, HD-DVD is cheaper to make, cheaper to buy, and cheaper to upgrade from your current setup. With the exception of the lucky few to whom money isn't a concern, the rest of us will have to support the one that represents the lower cost to us.

7.3 EVD vs FVD

Straight off, EVD is essentially DVD with a different set of audio/video codecs, so nothing new is being offered in the area of capacity. This can be good because existing hardware will be able to read the discs (not necessarily play it, if it doesn't support the audio/video decoding), but it is

limited in the amount of content it can distribute before doing double sided discs and multi-disc sets. FVD will try to increase the capacity, although I'm not sure if FVD disc, particular FVD-2 discs with larger capacities, can be read on existing computer DVD-ROM drives (even if reading is possible, there will be compatibility problems).

I suspect players supporting both EVD and FVD (and also DVD) will become available in Asia eventually, although from the look of things, FVD does have a brighter future than EVD, but EVD being adopted by a huge Chinese consumer base could tip the scale in its favor as well.

8. The Future

8.1 Which format will win the day?

That's impossible to tell at the moment. What is quite likely is that all the formats mentioned in this FAQ will fail, and this will be because of greed (licensing/royalty) and utter lack of understanding of the consumer base (copy protection, user needs).

I hope that one format does win the day, and hopefully with the support of everyone involved, much like the current DVD format, but I might be hoping for too much.

8.2 Which format should I go for now (or soon)?

Hopefully, after reading through this FAQ, you can make your own decision on this. For me, I would not make any decision at the moment until there are at least 200 popular movies available on one of the format, and wait to see if multi-format players are available.

8.3 How can I ensure there is only one format?

If you are reading this, and you are the President of Sony or Toshiba, then there is a lot you can do to ensure there is only one format. If not, then there are petition and advocacy groups you can join (e.g. http://www.dvdsite.org/), but in the end, the Blu-ray and HD DVD camps will do whatever they think they have to do to ensure maximum profits.

A. Appendix

A.1 Distributing this FAQ

If you wish to mirror this FAQ, please contact me The reason for this is not that I don't want this FAQ to be distributed, but rather, I am planning to keep a record of all the mirrors for this FAQ, eventually on a separate page sorted by location (for faster access) and language. I will also need your details to send periodic updates and to ensure all mirrors are up to date.

A.2 Terms and Concepts

Below are some terms and concepts mentioned in this FAQ, but not fully explained:

Codec - Coder Decoder. Basically a way to describe a piece of software or hardware that can decode or encode compressed video or audio.

CSS - Content Scrambling System. The form of copy protection used by DVDs, and famously (or is that infamously) hacked, which led to the MPAA DeCSS trials.

HDCP - High Definition Copy Protection. Now standard with every DVI/HDMI connection, HDCP requires both the source (player) and destination (display) to support HDCP if HD video is to be played, otherwise playback will fail or a low resolution image may be shown only.

HDMI - High Definition Multimedia Interface. HDMI is essentially DVI with (digital) audio. Ever popular with high end home theatre devices, it is starting to find its way onto mid-end and even some budget systems. Most devices, including some next generation game consoles (like the Sony PS3).

Interlaced/Progressive - With interlaced resolutions (e.g. 1080i), at any one time, only half of the horizontal lines are displayed. This means that for each frame, the odd lines of information is displayed first, and then the even lines, to make up the complete frame. For progressive resolutions (or progressive scan), the full horizontal resolution (e.g. 1080p, with 1080 lines of horizontal resolution) is displayed at all times.

Sometimes you also see the 50i, 60i or 24p terms used after indicating a resolution. The number (50, 60 or 24) represents the frames per second (FPS), the i or p represents interlaced or progressive frames. PAL is 50i, NTSC is 60i and FILM is 24p.

Lossless/Lossy Compression - With normal types of compression, quality lost in favor of conserving space. This is called lossy compression, because the quality loss is gone forever. With lossless compression, the original quality is preserved when the audio/video is uncompressed, although this does mean that file sizes for lossless compressed content is much larger than that for lossy compression.

A simple analogy which can be used is the difference between JPEGs, which is lossy, and a ZIP file, which is lossless.

A.3 Acknowledgements

The author of this FAQ wishes to acknowledge the following websites for providing information that contributed to this FAQ, listed in alphabetical order:

http://www.avsforum.com/
http://www.blu-raydisc.com/
http://www.cdfreaks.com/
http://www.dvdsite.org/
http://www.hddvdprg.com/
http://www.lsilogic.com/
http://www.oes.itri.org.tw/
http://slashdot.org/
http://wikipedia.org/

A.4 ChangeLog

Version 0.7.1 (5 February, 2006):

- Updated list of mirrors
- Clarified information regarding 1x transfer speed for Blu-ray drives (2x required for BD movies) (3.9, 3.17)
- Updated information about HD DVD's use of 1080p movies (4.6, 4.17)
- Added information for NEC HR-1100A HD DVD reader drive (4.18)

Version 0.7 (8 January, 2006):

- Corrected incorrect dates (3.2, 4.2)
- Added more information about media availability (3.2, 4.2)
- Added information about estimate retail pricing for BD-R/BD-RE media (3.4)
- Added information about possible delay caused by AACS (3.13)
- Added new section about region coding (3.15, 4.15)
- Added new section on available hardware (3.18, 4.18)
- Added new section on available software (movies) (3.19, 4.19)
- Updated information due to Xbox 360 launch. Added information about Xbox 360 HD DVD drive add-on (4.16.1)

Version 0.6 (11 December, 2005):

- Updated list of mirrors
- Updated information about Blu-ray official launch date (3.2, 4.2)
- Added information regarding HP's request for Managed Copy and iHD (3.3, 3.13)
- Added more information about managed copy (3.13)
- Added more information about interactive contents differences between BD and HD DVD (7.2)
- Updated information regarding Sony's preference for MPEG-2 video compression (3.5, 3.7)

- Updated information regarding availability of dual layered BDs (3.5)
- Added information regarding Sony and NEC's optical disc drive unit merger (4.3)
- Added information regarding mass production of FVDs (6.2)

Version 0.5.1 (2 November, 2005):

- Updated list of mirrors
- Added basic information about AOD, thanks to DVDHelp.us (4.1.1)
- Added opinion from DVDHelp.us (7.2.3)

Version 0.5 (25 October, 2005):

- Updates due to Warner and Paramount's decisions to support both formats.

Version 0.4 (4 October, 2005):

- Mainly updates due to recent announcement of Microsoft and Intel's support for HD DVD (3.5, 4.3, 4.16.1, 7.2)
- Added further information about the (delayed) launch of HD DVD in the US (4.2)
- Added information about Blu-ray playback on PowerDVD (2.4)
- Added opinion about Blu-ray vs HD DVD by www.dvdrs.net

Version 0.3 (24 September, 2005):

- Updated list of mirrors
- Added information about HD DVD playback on PowerDVD (2.4)
- Added information on China only HD DVD format (4.7)
- Added information on dual layer HD DVD-R (4.9)
- Added more information about the effects of the porn industry and cheap Asian players on the success/failure of BD/HD DVD (7.2.1)

Version 0.2 (18 September, 2005):

- Minor spelling/grammatical changes
- Additional links (most to A.2) and minor clarification of information
- Added list of mirrors
- Added 7.2.1 and moved "The Author's Opinion" to this section
- More detailed information and correction of information about my DVD collection in 7.2.1
- Added explanation of Lossless/Lossy compression in A.2

Version 0.1 (14 September, 2005):

- First public release of FAQ

Last Updated (Sunday, 05 February 2006)