

## WHAT IS BLU-RAY? INTRODUCTION

René Terlet, 9/24/08

The word Blu-Ray appears in stores on video products either as an Optical Disc technology or as a Format Convention for handling audio visual digital information. This is reflective of major Consumer Product Markets joining forces to standardize the production and distribution processing of Audio Visual Material (sometimes referred to as Media, Ex. TV). So for us it is useful to understand in general terms the current and future value of products who have both types of Blu-Ray attributes. It is not the purpose of this presentation to deal with the whole spectrum of products involved. However by looking at the major delivery element (the player), it is possible to realize the convergence of a number of Information Technologies which made possible to have the same facilities at Home that employees have on every job that uses a "Computer".

So for us it is useful to have the general understanding that the Xbox is a Blu-Ray player that is based on the Blu-Ray (actually AVCHD) Format without having a Blu-Ray Disc Player. It is useful also to understand that HD Video Conferencing and Broadcasting will be available to our community based on the Blu-Ray Format. It is useful to understand that Hollywood Artistic Capabilities will be available to the Community via Camcorder, Storage, Distribution, and Players based on the Technologies (plural) named Blu-Ray (= AVCHD). It is important to understand that the standardization defines the PC (and its Media Oriented Applications) which is sold to Business and to the Home.

The presentation provides introductions to both topics based on the websites that provide the details.

## **Blu-Ray Discs:**

The slides tell the story that while the recording material layer was moved from being sandwiched to residing on top, the manufacturing costs remain the same. The capacity of future discs can be increased significantly through a different color laser, but it will take new players and recorders to use them. The discs are available in these flavors:

BD-ROM (Read Only) for DVD Movies

BD-R Recordable

BD-RW Rewritable for Storage

BD-RE Rewritable for HDTV Recording

One intriguing feature is the ability to watch a movie while recording on the same Disc (likely to be a drive feature)

Future applications of the higher disc capacities are likely to be associated with forthcoming flat screens with resolutions in multiple of HD. They may be limited to Home Theaters and will deliver realistic 3D videos.

From my experience, while the literatures place the Optical Disc as a major product for Data Storage we should be warned that it does not have enough to have the security, reliability, and accessibility requirements of modern storage of financial, business, or personal data. I would add also that as home imagery in particular increases, the loss of data on high capacity storage can be as bad as what can be caused by hurricanes simply because there may not be time left in our lives to recreate the family data. The Optical disc is not suitable to Google Searches, nor is it amenable to unattended automatic batch saving. The restore issues also are very dependent on being able to reliably read on a machine that did not produce the disc. The data Center is moving to Homes operated by people with no Data Center Operating Experience.

## **Blu-Ray Players and Recorders:**

They are based on the combination of the Media Center “application” and the associated “special” chip set which has become the current PC architecture (*Vista*). So the machines are connectible to wide band Internet for downloads of current previews, games (based on the film characters), bonuses, and highly compressed versions for hand held players. In fact it may turn out that they could be just keys for downloads of the film itself. That would make copying extra difficult.

With the remote control function associated with media center, the Player/X Box (See **Best Buy** TV/XBox Bundle) with a Wifi Lan capability becomes a media center extender which can stream HD videos from computer storage in an other room. And then the machine in the other room can have a home media server (or become one) which can be used to share photos and videos through the Internet to a restricted set of family and friends. In fact, while I have not seen it specifically, it should be possible for the sharing to be done within homes through the Internet for homes that do not have PCs.

And this can be done with the same chips because a player is a powerful PC. And then it is possible to add hard drives . . . .

This will be the case with the recorders which will be available in Japan (\$1,500) before the end of the year, and a year later in the US.

## **Blu-Ray “Format” = AVCHD “Format”**

AVCHD = Advanced Video Codec High Definition

The Blu-Ray “format” is fully supported by all industries associated with the use of HD videos, from Hollywood, to the Broadcasters, and to the Manufacturers of business and entertainment products. It is as universal as MP3 and JPEG in giving opportunities for new products. The main compression codec is MPEG4 which is usable for high quality transmission and playing, as well as for Video Streaming for hand held devices. MPEG 4 is more efficient in compression than MPEG 2 and can deliver better HIFI audio.

It is a fixed file structure (like the DVD format) and has been referred to as a container which has information for transmission over the Internet as well as directions for decompression, and for the player. The compressed data can contain videos, slide shows (with audio), and montage instructions. These instructions will be used for anything that the media center chip set and the associated software can do. In particular, it will instruct the player as to the video frame rate type: interlace, progressive, and 24p for movies.

The film industry produces films at a frame rate of 24 frames per second. The movie projectors project each frame twice to overcome the flicker that the human eye sees (this can occur below around 35 images per second). The TV industry in the US is based on the 60 cycles of AC power distribution. The initial TV broadcasting capability, however, could handle only 30 full frames per second. But in using half frame interleaving and the right kind of phosphors, the eye flicker problem could be overcome. In Europe as the AC rate is 50 cycles per second, videos could be broadcast with higher image resolution (more lines). The conversion technique to show films on TV is to add frames which are copies of the basic 24 frames per second by alternating the addition of 2 copies and 3 copies (2:3 pull down) on every other basic frame. This is similar to the conversion method used in the media conversion lab film to DVD process. This works well with Hollywood movies which do very little or slow panning, but has been a visual problem in some cases. With AVCHD, by transmitting to the player only 24 frames per second, it is then possible to have less image compression than at 60 frames per second, with better quality images on 1080 TV screens. In particular with shades in color being more visible, a 3D effect can be realized. As very high resolution panels are becoming

available, it is possible that the 24p format could lead to higher imagery from Hollywood as the studio cameras now are fully digital at 2X HD 1080 with high capacity hard drives (and going bigger with RAID4 arrays).

I believe also that AVCHD is aimed at making editing easier, by providing direct access to segments of clips, and even to clips. Probably limiting rendering (which is most time consuming) to the only clip that is trimmed. Also providing to extract that part of a feed to put in the news. At this point I cannot verify. We need the contacts we had when we worked to keep current.

## **Low Cost HD Production.**

As the cost of the blank Blu-Ray discs currently is very high, and reasonably priced recorders are year(s) away, an intermediate good quality result can be achieved on a 1080 screen by using HD camcorders and producing SD DVDs. SD is already 480 lines and HD TVs up convert very well. In addition, in photography, images delivered at a given resolution are always better if generated by a camera with a higher resolution. This was true with films and is true with digital images. So as a HD camcorder has a higher resolution than SD camcorders, the basic image before up conversion is quite good. This is what I do, and the result is close to HD. The result on old TV sets is also quite good.

## **Final Remarks.**

I welcome any comments and corrections that will better help inform me and the Computer Club. What I wrote had inputs from Google Internet searches and from CES visits in Las Vegas and being on a newsletter for professionals called *Digital Content Producers Newsletter*. I also found some good information from the recent edition of B&H *Professional Video Source Book*. In the last case it is clear that the equipment available to the professionals is plentiful and not as expensive as in the days when freelance cameramen could only rent their camera as they were so unique.

In using Google, it was not possible to get the technology information from major manufacturers who deliver Blu-Ray products that I was able to get a few years back. I don't know why. Maybe the Google searches gave too much information away. On the other hand, while Google can do in depth searches, the B&H publication does better than Google to learn professionals buy. It was interesting for me to find out that high end consumer products can be classified in the professional class, and that professional grade products prices would not be out of range for professionals or multiple users pools (i.e., Computer Club members).

The following slides contain websites for more details on Blu-Ray optical discs, players, recorders, and the AVCHD specifications.

# **BLU-RAY HARDWARE AND BLU-RAY FORMAT**

**OPTICAL DISC AND DRIVES**

**BLU-RAY PLAYERS**

**BLU-RAY RECORDERS**

**MEDIA CENTER**

**AVCHD FORMAT**

**HD INTERIM OPPORTUNITIES**

## OPTICAL DISC AND DRIVES

<http://electronics.howstuffworks.com/blu-ray.htm>

### Blue Laser Optical Disc vs. "DVD" Optical Disc:

Blu-ray Disc = BD

Five times capacity – 4.7 vs 27 GB

36 Mbps vs. 10 Mbps

R, RW, RE (HDTV), ROM

New manufacture, Same cost

### Applications:

Distribution Media (copyrights protection),

Limited Data Storage Value

### BD vs. HD DVD

Same manufacturing as DVD

27 GB vs 15 GB

### Future

500 GB w/ultraviolet (Pioneer)

1080 X 2 (and more)

Home Theater is HiFi of today

Audio HiFi built in TV

### Other reference

[Wikipedia for more specifics](#)

[http://en.wikipedia.org/wiki/Bluray#Player\\_profiles](http://en.wikipedia.org/wiki/Bluray#Player_profiles)

Specs for disc and player

Software Standards (Codecs & Java), Region Codes,

Digital Rights Management (Encryption)

Player Profiles: Bonus View, BD Live

Backward Compatibility

Ongoing development

BD Recordable

## **BLU-RAY PLAYERS**

Sony BDP -S350 (Elementary Player)

[http://www.sonystyle.com/webapp/wcs/stores/servlet/ProductDisplay?storeId=10151&catalogId=1055&langId=-1&productId=8198552921665368427&categoryId=27898&SR=sony\\_search\\_seo&SQS=BDP-S350](http://www.sonystyle.com/webapp/wcs/stores/servlet/ProductDisplay?storeId=10151&catalogId=1055&langId=-1&productId=8198552921665368427&categoryId=27898&SR=sony_search_seo&SQS=BDP-S350)

Bonus View (PIP)

BD-Live = Internet Downloads

Full HD 1080/60p & 24 p True Cinema Video output

(24p optimized)

Audio = Dolby TrueHD

## **BLU-RAY RECORDERS**

Soon to appear in Japan. May come to US after year or x months sooner.

Player functions

Record on BD while playing Video

Large HDDs for DVD construction and editing

Sony BDZ-A70

<http://www.engadget.com/2008/04/08/sonys-bdz-a70-blu-ray-recorder-with-1-touch-transfer-to-walkman/>

## **Media Center**

Application & Chip Set

Chip set is THE PC

Guts of games, players, recorders, and Vista

Major Anti-trust issue for Microsoft in Europe  
forcing Microsoft to divulge OS/Application Interfaces

**AVCHD FORMAT:**  
also called Blu-ray Format

<http://en.wikipedia.org/wiki/AVCHD>

[http://en.wikipedia.org/wiki/H.264/MPEG-4\\_AVC](http://en.wikipedia.org/wiki/H.264/MPEG-4_AVC)

(def.) **A**dvanced **V**ideo **C**odec **H**igh **D**efinition  
for Tapeless Camcorders (?)

MPEG 4 based “container” or file structure  
for Presentation data and Player instructions

for ease of transportation through the Internet

for File to File operations (Camcorders & Storage)

Direct Access to Video Segment (Storage)

Player can combine Videos & Slide shows (montage)

Major standard for video handling products and systems

### **Some Excerpts:**

standard developed by the [ITU-T Video Coding Experts Group](#) (VCEG) together with the [ISO/IEC Moving Picture Experts Group](#) (MPEG), product of a partnership effort known as the Joint Video Team (JVT).

An additional goal was to provide enough flexibility to allow the standard to be applied to a wide variety of applications on a wide variety of networks and systems, including low and high bit rates, low and high resolution video, [broadcast](#), [DVD](#) storage, [RTP/IP](#) packet networks, and [ITU-T](#) multimedia [telephony](#) systems.

## **HD INTERIM OPPORTUNITIES**

HD Camcorder & DVD (HD 480)  
HD Camcorder & Video Streaming

Good HD imagery w/ DVD Player Up Conversion  
16: 9 Format  
low DVD Disc & Burner cost

Home Video Production:  
Low Distribution Cost  
to most Friends & Family

Media Conversion:  
60 Frames/sec HD Camcorder & Regular Projectors (Flicker)

Old Film Color Correction (White Balance)

Video Streaming:  
exploit AVCHD Format