HD Video Distribution Options

by

H. Vernon Barchard
C3IS, Inc.

High Definition video is relatively new, and until recently was cost prohibitive for the independent video producer. Recent advances in technology, hardware and software have brought this standard to a reasonable price range.

Terms Defined:

High Definition.

1080i and 720p are the two primary formats available via broadcast, cable and satellite in the United States.

1080i means 1080 lines, interlaced (alternating sets 540 lines are delivered) for an effective rate of 1080 lines by 1920 pixels.

720p delivers full screens (non-interlaced) every 1/60th of a second by 1280 pixels.

C3IS productions are shot in HDV format. This new standard delivers1080i High Definition (HD), recorded to MiniDV tape using MPEG-2 (software compression algorithm) technology and 1:1.3 anamorphic (optical) compression for pixel width. This expansion opens the 1440 wide image up to an effective, full 1920 pixels width.

High Definition TV is really only available via cable or satellite. In fact, if you think your DVD's are HD played on your big screen, think again.

Bad News

Standard Definition (SD) television, known as NTSC is a mere 720x486 interlaced (in 4:3 Aspect Ratio). In the computer world, this is very low resolution. Most desktop monitors today are XGA or 1024x768 pixels. More bad news, today's DVD's conform to this NTSC standard. Now true, there is great magic in our computer world, we can extrapolate to higher resolutions … that is, we can "make up" data to fill in the gaps, but facts are facts. You can never get any better than the original. A production shot in SD can never be better than 720x486.

Another fact: there is no economical method of distributing this hi-res data to television consumers.

Good News

For broadcast television, or cable service HDV format can be dubbed off to BetaHD, or any other HD format,air as an HD commercial or documentary.

Transfers

MiniDV HDV Format Tape

We can directly copy our production to a MiniDV HDV format tape. Played on an HDV player (currently $1250-$2000), on an HD monitor with RGB cables, you will get full HD delivery.

VHS Tape

We can copy your production to VHS tape. Since it is a digital transfer, it will be a good copy, but still only 720x486.

Encoding

Four major contenders are still duking it out for dominance in the video encoding world. They are

Microsoft - Windows Media Encoder & Player
Real – Real Player
Apple – QuickTime
Adobe/Macromedia – Flash Video

As with all brands, each has their advocates. They all effectively do the same thing.

All of the following options are encoded with Windows Media Encoder 9. On request, we can quote outsourcing for alternative solutions.

HD Computer Based Play

Encoded at non-interlaced 1080 x 1920 pixels, this version requires a swift computer system and must be played from a fast local hard drive. Playback on a computer monitor actually is at a much higher resolution than most monitors are capable of. However, if connected to a large screen HD monitor with a VGA connector, the result is delivered at it's ultimate resolution. For trade show booths, or continuous play office displays, this is superb.

Autorun CD Computer Based Play

For simplicity sake, we encode at 800x450, and this Windows Media file will play directly on most CD players. That is, the CD, when inserted into the computer CD tray, will automatically start, take the user to an info screen, and a mouse click starts the video. This is a crisper, cleaner play than a DVD.

Optionally, a full HD version may be distributed on this CD, so that proficient users can copy to their hard drives, and see the production in it's ultimate clarity.

Standard DVD

Your production can be encoded to DVD format, but remember … the resolution drops to 720x486, but they can be played on virtually any DVD device.

INTERNET

Fasten your seatbelt. Because the road is full or forks, curves and rough spots.

Most professional sites today marginalize, if not actually ignore, the dial-up users. Most businesses and homes today have broadband, so we ignore the tedious discussion of trying to accommodate the slower among us.

We have already discussed encoding for HD, CD and DVD's … but even with broadband access, consistent delivery of media content is a challenge.

Essentially there are three types of internet video delivery.

Download

The entire video must download before play begins. The video is encoded at a single bandwidth. With a fixed image size and fixed frame rate. This video can reside on any hosting service. But be aware that your web hosting service will charge you if you exceed the maximum download on your contract (very small print).

Advantages

- No special hosting service
- Simple

Disadvantages

- No play until completely downloaded
- Cost for downloads
- Provider ymust compromise on a single image size & frame rate OR provide multiple play links for users.

Progressive Download

After a partial download, the video will begin to play, then download continues. If the play rate passes the download … the system will pause to catch up. The video is encoded at a single bandwidth, with a fixed image size and fixed frame rate. This video can reside on any hosting service. But again, you will be up charged if you exceed the maximum.

Advantages

- No special hosting service
- Simple
- Play begins while download is in progress

Disadvantages

- Play may pause repeatedly
- Cost for downloads
- Provider must compromise on a single image size & frame rate OR provide multiple play links for users.

Streaming

Requires hosting by a specialty service equipped with the streaming side of the encoding system. When creating the encoded file, video encoder selects multiple sets of image size and frame rates. A single variable bit rate (VBR) encoded file with multiple sets of encodes is hosted on a specialty system. These sets may be:

1. 1000 x 562 @ 30fps,
2. 800 x 450 @ 30 fps
3. 600 x 337 @ 30 fps
4. 360 x 202 @ 15 fps
5. 240 x 135 @ 15 fps

There are likewise options for the audio quality. Each step down requires lower bandwidth for delivery.

When a user select a video from a streaming server, a dialogue is conducted between the local web browser and the streaming server to establish an acceptable data rate and hence the encode set, size and frame rate which can be effectively delivered.

Advantages

- Larger, better delivery for users with large bandwidth
- Greater flexibility as to image size

Disadvantages

- Requires specialty server
- Extra work in preparation of encode

Project Deliverable

Once a video production is complete, and the client has signed off on the final production, the client will be supplied with an original MiniDV HDV format tape of the edited product.

The mini DV HDV is a digital product representing the highest quality product possible. It is a 1080i, MPEG-2 compressed format output. From it, all output options are available.

The Future

The stage is set, the battle begins.

The next generation of DVD's …. High Definition DVD has spawned two **incompatible** formats and there is no hope of a mediated settlement at this point.

In this corner you have, "HD-DVD" (yes, that's it's formal name) from Toshiba and "Blu-ray" from SONY. HD-DVD has the market jump with players and disks already available. "Blu-ray" is yelling, 'wait for us, we'll be better' and hope to be in the marketplace before Christmas 2006.

Shades of Beta vs. VHS, only one clear winner will emerge, and anyone buying into the losing technology will be left to wail and moan. We all know the marketplace will not tolerate two parallel, incompatible systems.

	Sony - Blu-ray	**Toshiba – HD-DVD**
Features	Larger Capacity – 50 GB dual layer	First to market – players & content
	32 Streams of Audio	More Content Providers
	More Hardware Backers	Lower Price Point
Hardware Backers	Dell	NEC
	Hewlett-Packard	Sanyo
	Hitachi	
	Apple	
	LG	
	Mitsubishi	
	Panasonic	
	Royal Phillips	
Content	Sony	Paramount

	Walt Disney	Universal Studios
	Warner Brothers	New Line
	MGM	

But one way or the other, by Christmas 2006, technology to produce High Definition DVD's will be out available, and players will begin to show up in homes and businesses across the US.