

BBC HD

The high definition guide



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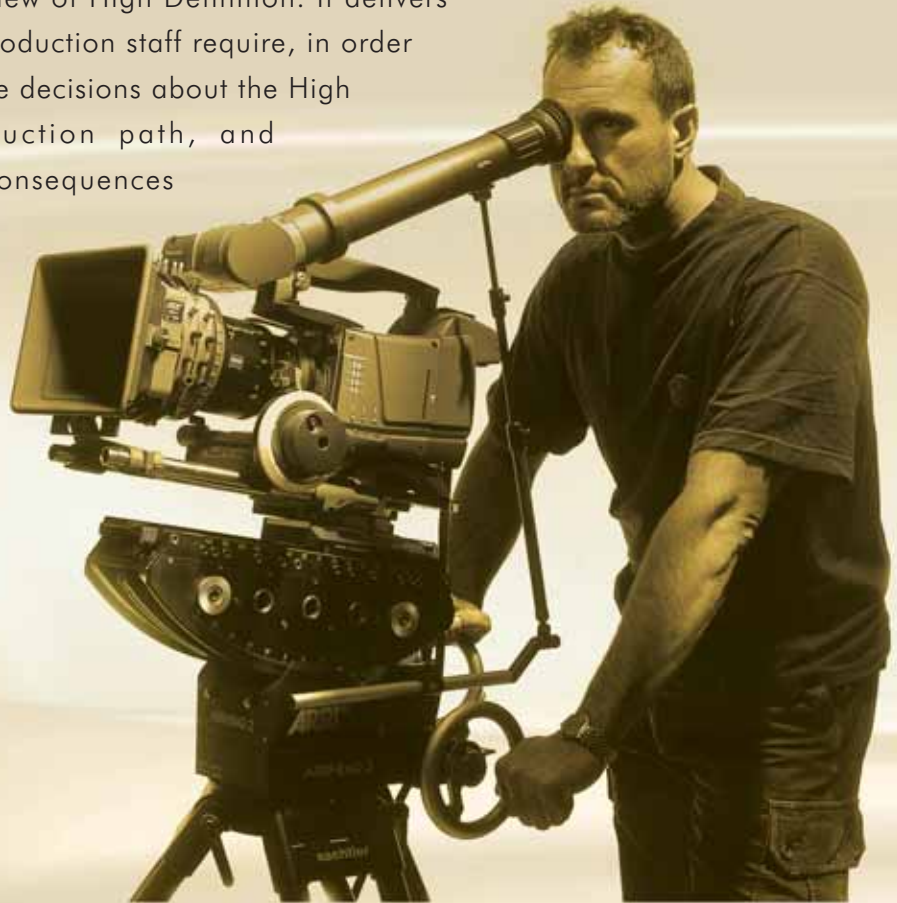
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This guide is intended for programme-makers and is designed to offer an over-view of High Definition. It delivers the information production staff require, in order to be able to make decisions about the High Definition production path, and understand the consequences of each option.





HDTV delivers a marked improvement in clarity to the screen and, with the addition of surround sound, brings a true home cinema experience to the viewer. It represents a considerable change from the current European broadcast standard known as PAL which transmits only 576 viewable lines (out of 625 lines) regardless of the screen size. This limit on lines (and in turn picture quality) becomes particularly noticeable as screen sizes increase above 28". HDTV on the other hand delivers a minimum of 720 or 1080 lines - a considerable improvement on SD especially for the larger television displays which consumers are likely to own in the future.

Technical

Simply put, high definition (HD) has been internationally agreed by the television standards bodies, as a picture that has 1125 lines (1080 visible) with a 16:9 (widescreen) aspect ratio.

HD has also brought some changes to the way television systems are described. One of the first things to know is that the descriptions of the HD formats need more information than just PAL or NTSC.

History

Why now? With the advent of home cinema an average domestic television set in the USA is 38" and growing! We're seeing larger televisions screens, but the same number of lines, and the pictures are looking decidedly fuzzy. In the USA it's the home cinema market which is pushing for more High Definition programming. 1080 lines on a screen of 50" or larger, will look much sharper than 625 lines on the same screen size, and definitely sharper than the 525 lines of the American and Japanese NTSC system.

What is a television picture

A television picture is made up of rows of squares referred to as pixels, all built up into a grid. These smaller units enable the picture to be broken up and sent 'down the line' one piece at a time, then reassembled into a picture. As a conventional picture is a 400,000 pixel jigsaw puzzle, it's a huge task to reconstruct it into a picture. The pixels are therefore sent in a sequence, line by line, starting in the top left-hand corner and working down to the bottom right-hand corner, re-building at a rate which you shouldn't notice.

Why do I need to know about it?

At present the BBC isn't transmitting any High Definition programmes. The major reason for a programme being made in HD is to attract co-production money. The USA, Japanese, and Australian networks have all made a serious commitment to High Definition and are beginning to insist that any co-production they're involved with is made and delivered in HD. A production made in HD can then be down-converted (or transferred) to standard definition for UK transmission. Even after transfer it will still look superior to a programme shot on digi-beta.

Some of the major players in Hollywood are also beginning to move away from film towards video, with directors such as George Lucas, James Cameron and Robert Rodriguez leading a digital revolution in Hollywood. Any production which moves over from 35mm to HD can make significant savings in stock and processing. In the UK television market, there are only a few productions which are originated on 35mm or super 16, the majority of television production uses digi-beta. HD has much better picture quality than digi-beta although presently costs more in post-production.

The most important thing to know about HD

Who and where? This is the key to planning an HD production. Who will watch it, and where will they watch it? Will it be viewed abroad and in which country? Will the audience watch it on a large or small screen? These are crucial questions which need to be addressed even before a frame is shot.

If you have co-producer on board they might be requesting a certain frame rate for your production, they might also specify if they want an interlaced or progressive delivery (see section on interlace / progressive). Drama producers might also have to consider how the production will be viewed, whether on a large or small screen, as selecting interlaced or progressive has a bearing on whether you can show your production as a cinema release.

If your co-producer hasn't specified an interlaced or progressive delivery, you'll have to work out whether you want the 'video' look of interlaced, or the 'film' look of 25 frame progressive. As a programme maker you'll have a quality image, but with this additional quality comes a big technical responsibility towards the end deliverables. With High Definition, planning is even more paramount than with Standard Definition, as without preparation in HD there is the possibility of major problems, both financially and technically.

Progressive and interlace The film and video look

If you've shot on digi-beta you'll be familiar with the video look, and if you've worked on film, the style of progressive will be recognizable to you.

There are two ways a High Definition picture is constructed; progressive and interlaced, which give two different looks on screen. In its simplest terms - using 25 frame progressive mode will give more of a film look and filming interlace will give a more of a 'video' aesthetic. Dramas and documentaries might choose progressive, whilst sports, concerts and other live shows might benefit from the 'immediacy' of interlace. It's a matter of personal taste, and the look you're trying to achieve.

You'll also need to consider whether your production will be viewed on a large screen, because progressive is preferable for large screen delivery, as it runs like film. It's vital to decide from the outset which one to shoot in, as your decision will affect your post-production, and could have a knock-on effect with your co-producer.

In general progressive images will always look better than interlaced images, especially on a large screen. Currently it's only possible to shoot and post produce progressive at lower frame rates, 25/30fps. But shooting at 25/30fps doesn't give smooth motion, which might not be the best option for your production. Cameras which can shoot 50/60fps will be available soon.

What is Interlace (i) The video look

An interlaced picture is an image separated into two sections. Within our transmission system there isn't enough bandwidth to send the whole picture through at the same time, so when the picture is recorded or transmitted the image has to be split into two halves called fields. It's conventional to say that field one is the odd lines 1,3,5,7,9 etc, and field two is the even lines 2,4,6,8, etc. (see illustration. Those two fields are then combined to make a frame.

The picture elements or pixels on the odd-numbered lines are scanned first, the scan then returns to the top of the picture to scan the even numbered lines. The time this takes depends on the frame rate. If you're recording at 25 fps (frames per second), then each separate field would be recorded at 1/50th of a second. Bring the two fields together it then becomes 25 frames per second, referred to as 50i (interlace). Although each frame is made up of two fields, one field doesn't equal the same amount of detail as in one frame, therefore interlace actually transmits or records less information, but at a faster rate.

Interlace (i)

Original scene



This is the information in field one



This is the information in field two. Each field doesn't contain the full information from the original scene



Interlace image



What is Progressive (p) The Film Look

At low frame rates (25fps) Progressive (p) is often referred to as the 'film look', as it mirrors the way that film is shot, but on videotape, rather than celluloid.

One of the major advances of High Definition cameras is their ability to 'scan' the picture from top to bottom one line after the other, progressively. This enables more information to go down on to tape, rather than half the information of the interlace images. If you consider each frame as a snapshot, a whole image is captured before the camera shutter closes (Lines 1,2,3,4,5,6 etc) usually at a standard rate of 25 frames per second (faster if you're shooting slow-motion). So instead of individual lines being scanned separately and then re-built as with interlace, each complete image is scanned in an instant.

Check your camera choice, if you want to shoot progressive, as not all cameras on the market can shoot 1080 lines progressive. Some will only shoot 720 progressive or 1080 interlaced, which might not be acceptable to your co-producers. If you are shooting for a theatrical release you must choose to shoot progressive, and possibly at 24fps, the same speed as film.

Note: If you decide to shoot progressive then this cannot be changed to interlace in post.

If you shoot high frame rate progressive, you'll be working in the same way as you would with film, shooting at 50fps, 100fps even 250fps.

In summary your DoP would shoot at 24fps (p) for cinema release, or 25fps (p) for television transmission at 1080 lines (see co-producer requirements / standards). When shooting progressive at normal frame rates, film rules will apply. Slow pans, or fast pans aren't a problem, but motion within the range of about 3 seconds per picture width (i.e. The time it takes for an object to move from one side of the screen to the other) will produce the most visible picture judder. This is because the brain is unable to connect the motion from frame to frame; the eye separates the images and can't bring them back together, which the brain translates as judder. If you're shooting at a faster frame rate than 25fps then it's okay to pan quickly, as the brain doesn't have enough time to register them as individual images, it sees the blur.

Transmission

Our current television uses interlace, so whether you decide to shoot interlace or progressive, UK broadcasters will transmit interlaced and at 625 lines, not at the 1080 lines of high definition. The quality of the image on screen, even when broadcast at standard definition (625 interlaced) will still echo the standard of the original HD material and will look superior to digi-beta.

When progressive images are handled for transmission, at less than 50 frames per second, they have to be sent in two parts (fields) to avoid the annoying flicker. This is known as Progressive with Segmented Frames (psf). It is exactly the same process as is used for scanning film (at 25 frames per second) for conventional transmission, and is a key element of the film style image.

Frame rates

For UK transmission you would either shoot 50i or 25p at 1080 lines.

Production type	super16	25p	50i	Reason
Drama with cinema release	Very likely	Possibly 24p	No	Compatibility with 35mm
Television drama	Possibly	25p	If you want a video look	If shot progressive it could be used for large screen release / compatibility with 35mm
Soap opera / Continuing Drama	Unlikely	Possibly	Likely	More likely to want the 'immediacy' of i
Sitcom	Not common	Possibly	Likely especially if mixed studio and location	Depend on broadcaster / look of the programme
Live Sport	Never	Very unlikely	Always	Fast movement requires smooth motion.
Documentaries / Current Affairs	Possibly	Possibly	Possibly	Dependent on the style of the documentary, and what look you're trying to achieve.
Live events - concerts etc	Practically impossible	Optional	More likely	Live events suit interlace images, which gives the audience a feeling of being at the event. But it is a choice of style.
Natural history / wildlife	Often	Often	Sometimes	Progressive shot at high frame rates produces good slow motion. Compatibility with 16mm archive material.
News	Never	Very unlikely	Always	Interlace delivery appropriate for news footage. Also matches in better with interlace archive material on varied formats

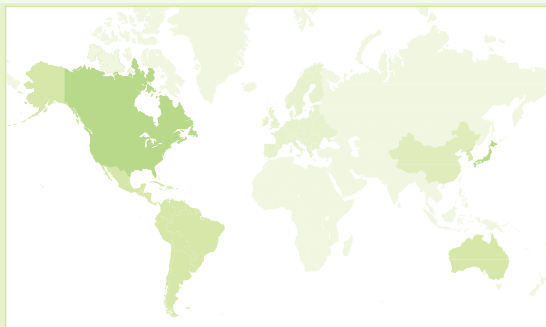


Advance planning is key to High Definition television production. Therefore the pre-production phase of any project is vital for the smooth running of the shoot and the edit. The decisions you make at this stage will heavily influence your post-production.

Foreign filming

If you're filming abroad you could look into the possibility of sourcing your kit locally, and taking your crew from the UK. It could work out cheaper than paying for excess baggage. Make sure that the cameras can record 1080 lines (or 720 if you've made that choice). Japanese facilities houses only tend to have interlaced cameras, which might work at a different frame rate than you require, so check they can shoot 1080 lines 50i/25p.

HD around the world



Almost fully HD

Low % HD

Co-production / Delivery requirements

Many countries have varying 'standards' requirements for programme delivery. Make sure you know to whom the programme is being delivered and prior to shooting make sure you know what frame rate they want you to deliver. If an HD co-producer asks for a programme to be delivered at a particular frame rate and it is actually shot in another frame rate they could withdraw significant funding. A co-producer might also request a particular field/frame rate, but that might not be compatible with a BBC delivery, which is open for discussion. NHK requested that Last Night of the Proms was shot at 60i, which wouldn't have been acceptable for the UK transmission, so eventually 50i was the compromise. NHK then converted the programme to 60i for broadcast in Japan. If you shoot at 720 lines you may need to up-convert your material to 1080 lines for delivery, which might not be acceptable to the co-producer.

If you are shooting for UK television with co-production money, it's best to shoot at 25p then slow it down to 24fps for the international market. You'll need to take into account the pitch change in the sound which will happen when it's slowed down. The audience don't notice the slower pictures, but they will notice the pitch change of the sound!

Current acceptable delivery standards

For a BBC UK transmission with an international delivery always shoot at 1080/50i or 1080/25p. Normally this is then converted by the co-producer to their own frame rate.

Broadcaster	No. of lines	Possible delivery frame rate				Comments
Euro 1080 (Europe)	1080		25p	50i		
Discovery (USA)	1080	23.98p	25p	50i	60i	Discovery will accept 25% non HD material but no more than 1 minute continuous
USA (others)	1080 720 480 }	23.98p 24p	29.97p	59.94i		American system has odd frame rate due to sound problems when they changed from B&W to colour – they resolved it by shortening the frames by .01%. If they are happy to take 24p delivery it will be slowed down to 23.98 for TX.
NHK (Japan)	1080			59.94i		

Current Delivery format

For international delivery to BBC Worldwide the current acceptable tape formats are HDCam and HDD5.

For up to date information please check BBC Worldwide's HD delivery guidelines on <http://www.bbc.co.uk/guidelines>

Film Effect

Currently BBC Worldwide won't accept a production which has added a film effect to HD images. By adding film motion in post-production, ie by removing fields, you will have reduced the quality of the image, which might not be considered as HD. So if you want a film look, shoot progressive. If you are planning to do any processing to the HD images discuss this with Worldwide and your co-producer prior to your edit.

General information about some of the current more common HD formats

Format	Compression	Comments
35mm (& above)	None	Considered HD
Super 16	None	Not considered to be HD. Check with co-producer that they will accept Super 16 transferred to HD.
HDCam	7:1	1920x1080. Can record all frame rates. Digi-beta style tapes.
DVC PRO HD (DVC PRO100)	6.3:1, compressed signal can travel over HD firewire connection	720 lines progressive up to 60 frames a second (60P) or 1080 lines at 25P and 50i
HDV HDV2	High (MPEG)	Internationally agreed domestic format. Similar to mini dv/ DVCAM. Will record true widescreen at multiple frame rates. Wide range of products will be available, for use in self-op programmes or those with a modest budget. Check whether your international co-producer will accept material shot on this format.
HDD5	3.5:1	Similar format to D5. Common in the US as a mastering format due to its lower compression than HDCam.
HDcamSR	2.7:1 (MPEG)	Similar to HDCAM, same tape format. Used for feature film/ blue screen work. Virtually uncompressed with full colour bandwidth.
DISC Based recorders	1:1	Usually uncompressed disc based recording, no tapes. Used for top-end CGI/feature film work.

How to cope with mixed formats / archive

Non HD material can be up-converted, which is the process of taking a standard definition picture and giving it the same structure as a high definition image, i.e. 625 lines up-converted to 1080 lines. If you take a standard definition (625 line) picture and then up-convert, it doesn't automatically become an HD image, you don't gain any additional resolution through the procedure, and the image could even be degraded. Digi-beta up-converts reasonably well. Super 16 and 35mm can be transferred via HD telecine, but although 35mm is considered HD, Super 16 might not be, by many co-producers.

Older archive will need to go through an Aspect Ratio Converter (ARC) to convert from 4:3 to 16:9, and will be impaired by the process. Up-conversion will then add to your problems. Up-conversion of SD material is also relatively expensive, so it's probably best to transfer the material at the final stages of the offline, rather than up-converting a huge amount of material which might not be needed. Poor quality images might also require electronic cleaning, which will add to the cost. **The major consideration is how much SD archive your co-producer will allow you to have within each programme** (see delivery requirements).

If you want to use both interlace and progressive shot archive within the project, the edit will cope with the mixed styles, as long as they were shot at 50i / 25p. When up converted, 50i will still look like video and 25p will still have film motion. There are no technical problems mixing the formats in editing although you can add film effect to

50i archive to give it film motion, you can't make 25p archive look like video. If you try and include material shot at different frame rates your EDL's won't match, which could cause problems at your conform. If it's a small amount you could consider eye-matching at the online, or you'll need to transfer all your material in advance of your final edit, so that it will all run at the same frame rate. If you want to include 35mm film archive it will need to be transferred to HD at 25p therefore it is still considered as HD and shouldn't affect your co-production deal in regards to level on non- HD material.

Graphics / CGI

Graphics in High Definition is all about planning, knowing what you want and how to achieve it.

The computer file sizes are larger and more pixels take more time and processing power. This adds cost as well as time when making computer generated sequences. Another problem is rendering, which could take as much as four times longer than standard definition. There is some good news though, this is a just a technical problem! As the speed of computers continues to increase and the cost of processing power falls, the time and cost penalties will decrease.



Always talk through the delivery schedule with the graphics company to make sure you understand the issues. Although it's difficult to give the incremental cost of HD computer graphics, currently you can assume it will cost about 15% more to do the same sequence in HD than it would in SD.

If you are planning on compositing work within your production, you should consider shooting progressive. This makes matte work easier and can speed up the process. Within High Definition it's important to discuss all aspects of the work with your graphic designer at an early stage. They'll decide with you the most appropriate frame rates before you shoot the sequence, which might help to speed up your graphics time and then cost less.

Costume / Set design / Make-up

Within High definition pictures there is approximately five times more information in the image, therefore you see much more detail. The problem is how the sets, make-up and wardrobe will stand up to the closer scrutiny; too much detail could distract from the creative illusion and the performance.

Basically production designers will have to pay more attention to detail when working in HD. When you're viewing a scene shot on High Definition, you might be distracted by a notice board in the back of shot, as you'll be able to read all the text on the notice, (so the information will need to be accurate). The little things which didn't concern us in SD, will have increased importance, although



it's no more unusual than doing a CU in SD next to a notice board.

With standard definition images it isn't a problem to fix a damaged set with gaffer tape, but with HD that will now become unacceptable. Designers will have to create a set with HD in mind, joining flats at the corners or where there is a natural break and giving more consideration to the maintenance and movement of sets.

Make-up

The increased detail in the picture means that in close-ups you'll see more of the actor, both good and bad! The good will be the increased clarity of picture, the bad could be skin imperfections, beard growth and even the make-up itself, all of which will take away from the illusion you're trying to create. A lot of the problems associated with make-up can be solved with the use of airbrushing for foundation and new micro-powder products.

Not all make-up artists will have the equipment or have completed the training for airbrushing, so check their level of awareness and competence. Continuity might also have to pay more attention to make-up and five o'clock shadows!

Costumes

As with make-up the same will apply to costumes. You'll see much more of the costume, so blemishes and marks on the fabric will become apparent, and you may have to pay more attention to the ironing and stitching within the costumes. Editorially you might not want to see a lot of detail in the costume. It could be useful to talk with your DoP, who might have creative solutions to help to minimise the level of detail, possibly using filters or lighting.





Within HD pictures
there is
five times
more information in the image



Camera settings

High Definition cameras have more features and facilities than digi-betas or film cameras, which means that, if the camera isn't used properly more can go wrong. Adjusting the camera settings on location can be a problem. The BBC has devised optimal settings for both interlaced and progressive shooting. Some of these settings have been devised to maximise the contrast range and colour handling from the camera, under all normal conditions. With HD cameras every parameter can be adjusted and set in the menu. These settings will allow the camera to capture as much of the image as possible for post production. At the moment a correctly set up camera will have a maximum of 12 stops of contrast handling, that's about 4,000:1. These adjustments will enable you to achieve the best input for grading the pictures.

Monitoring

Focus

With HD there is no place for complacent focussing. The enhanced clarity of the picture will make a dodgy focus even more obvious than on digi-beta. The camera operator or focus puller needs to be aware that the back focus adjustment with these cameras is absolutely crucial and should be checked at regular intervals.

In addition you need to wait for the camera to acclimatise to the conditions prior to adjustment. The camera operator / DoP also needs to have the best viewfinder available, and it should be an HD viewfinder.



Monitors

As focus is so important with high definition pictures, it's important to monitor your images on an HD monitor. It's not acceptable to use a standard definition monitor, as you won't see the errors. The DoP will need a 14-17inch high quality HD monitor and currently CRT (tube) monitors are the best. It is perfectly acceptable for Costume, Make-up etc to use a 17-24inch HD LCD monitor. LCD monitors are now high quality, light-weight, battery-powered and can be requested flight case ready. If you have larger monitors, then more people will be able to look at them, therefore the fewer you'll need. If you're working at 50i or 25p you can use standard definition monitors for non key positions, but not if you are recording at 24p.



Sound

5:1 Sound

If you have an international HD co-producer or a possible DVD release you may be asked to deliver a 5.1 sound track as well as a stereo mix for UK transmission. 5.1 can be captured on location for multi-camera programmes such as concerts and sporting events, but this is a specialist operation and will need to be planned well in advance especially for live programmes or where tape inserts will be shot and edited on location.

5.1 for single camera (PSC) programmes is much simpler.

It is much better to produce the 5.1 tracks during audio post production and this means there is no change to the audio requirements on location. However make sure the audio post facility knows exactly what the 5.1 delivery requirements are and if possible involve them in any technical pre shoot planning.

Most stereo programmes sold internationally are required to deliver a Main and M&E (or international) sound track. 5.1 deliveries are no different, you will be asked for a 5.1 main and a 5.1 M&E as well as a stereo main and stereo M&E. There are 6 audio tracks for each of the 5.1 sound tracks and two for each stereo track, giving a delivery requirement of 16 audio tracks!

There is however a way to encode 5.1 sound onto only two audio tracks. DolbyE and DTS are two of the systems that compress 6 audio tracks onto two tape tracks and both are accepted internationally - but you need to know which one your particular co-producer wants. Also, once encoded onto two audio tracks it can be very difficult to edit the tape or pass the audio through processes such as standards converters. Always take advice about all the processes you may need if using encoded 5.1 audio.

Multi-camera

Live multi-camera events

One of the easiest HD routes is a live OB event. As it follows the same path as SD, the problem lies in the cost rather than the production route. There are HD scanners available, all with variable levels of HD monitoring. Some scanners will have HD cameras, but not full HD monitoring. There are some fundamental questions to ask when you're booking an HD scanner.

Are you shooting progressive or interlace, and which camera to select?

(see camera section)

Do the cameras come with High Definition lenses?

You *must* use an HD lens on an HD camera, although some specialist SD lenses are almost good enough for HD. If in doubt talk to your supplier.

Do the cameras have High Definition colour viewfinders?

As focussing is such a crucial issue with HD, any operator working without an HD viewfinder is going to struggle, and if you don't have HD monitoring you might not know that it wasn't in focus, until you check back your transmission tapes.

What HD monitoring is available in the scanner, and who can see it?

Are the monitors 21 inch or larger? Coupled together with an HD viewfinder at least you'll be able to see that the camera is in focus! But, be aware of some of the newer flat screens, as you might experience about a two or three frame delay, which is no good for live cutting!

With High Definition what you're looking at is approximately five times the resolution of standard definition, but with this increased resolution come additional problems. What you didn't see in SD will become blatantly obvious in HD. Microphone slings with a criss-cross of wires will be much more apparent. It could mean that you decide not to use that particular shot, or you might adjust how you would shoot. With the increased detail in each shot you might be tempted to linger on an image, giving the audience more time to explore the picture, rather than fast cutting, but do remember your UK SD audience. Or it could be that you choose to work in HD in exactly the same way as you did for SD, or you might adjust the way you offer information to the viewer; it's all a matter of personal preference.

Multi-camera camcorders

If you are shooting with more than one camera and decide to use PSC cameras it is always good practice to "lock" all the cameras together using a video reference signal and a common source of timecode such as the sound recordist's DAT machine. However some models of camera require an HD reference signal for locking. Not all equipment can provide this and it is always advisable to check this with the camera supplier.

Bear in mind an HD signal will not travel as far as an SD signal through a traditional cable. If cable runs are longer than 75m problems may start to occur. It is possible to use an optical fibre a fibre optic cable instead. Several companies offer fibre connection between the camera and the DoP station, some even send power to the camera.



Offline Editing

As with an SD edit, it's best to use the same platform, eg Avid, Final Cut, Quantel etc, all the way through from your offline to the online. Working with systems which can talk to each other will create the least problems for your edit. Changing systems from offline to online means that edit decision lists (EDL's) might not transfer over easily, if at all. If you are working with multiple editors then it's essential that all the machines speak the same language.

There is no problem with the availability of HD online editing, although currently it does cost more. One of the difficulties is storage. High Definition images take up a lot more disc space than SD, which is why using a comparatively low-quality offline format could be a good route to select. The cost of storage is always decreasing and new HD online editing options are arriving on the market and it will not be long before there is no need to use the offline online route for HD programmes with reasonable shooting ratios.

DV route

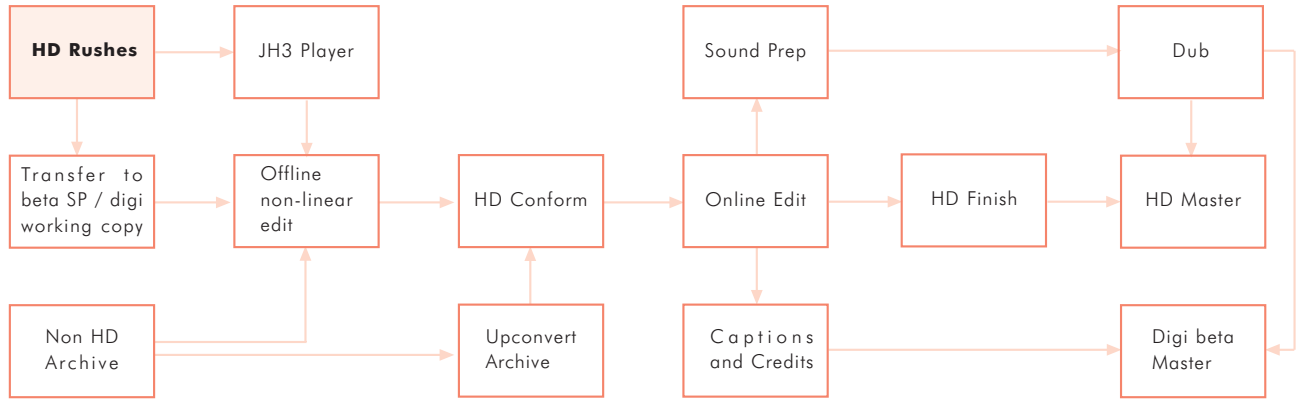
Transfer your HD masters to a DV edit system using a firewire connection. The idea of DV being a good option might come as a surprise to some! The advantage of DV means that you will still have very clear pictures, and be able to view more of the information on screen. DV storage is cheap and you'll most likely be able to load in all your rushes, which will release an HD player much earlier and reduce costs. DV offers a high quality solution compared with the high compression found in most non linear systems. It's lightweight and can be portable, which could be useful for editing on location. DV sound is the same quality as

digi-beta or HD, therefore it is possible to transfer the audio directly to the track-lay without having to go back to the HD rushes. Or if the final sound track is not complex you could even complete the track-lay in the DV edit! You'll also be able to make DV copies of your master HD tapes, which could be useful for making high quality viewing copies. Your online process then begins with an HD conform, concluding with an HD master and a down-converted digi-beta for UK delivery.

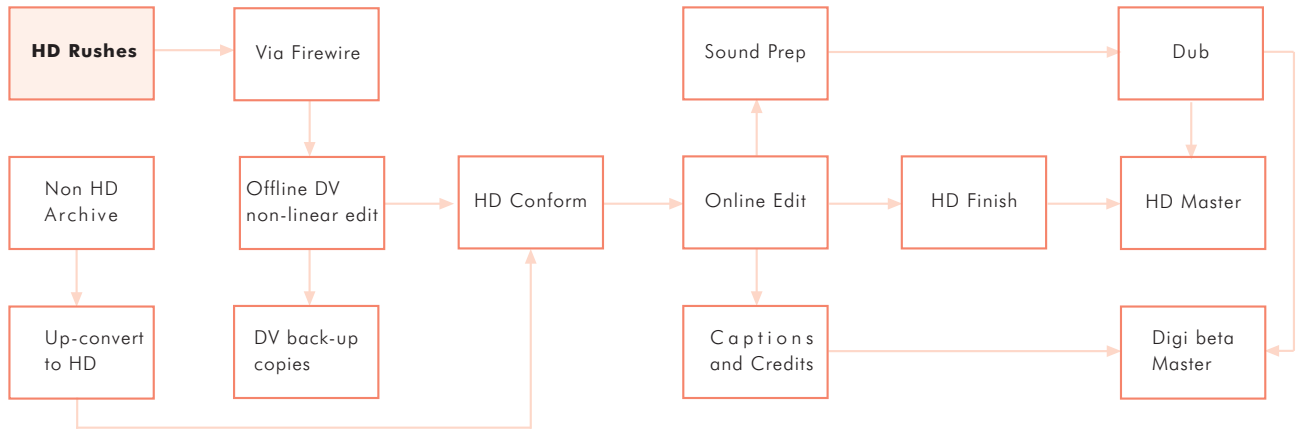
Standard Edit Route

An alternative is to transfer all your HD rushes onto a working copy such as beta sp, with matching timecode, then do a traditional non-linear edit, with an HD conform, creating an HD master and a digi-beta for UK delivery.

Working Copy Route



DV Edit Route



Conform / Online

If you've followed the standard edit (working copy) route, you will conform from the HD masters and any up-converted archive. It is always a good idea to minimise the number of compressed formats you use during online.

Your rushes, online edit and delivery tape could all use different compression standards and to many different standards can lead to unexpected problems especially when added to the compression used for transmission. You may hear people talk about "concatenation", in this case they are talking about what happens when many different compression standards are added together. Make sure you talk to your post production facility about the complete route to maintain the quality of the HD images.

Grading

Many of the most popular interfaces are now available in HD. The choice of grading machine normally comes with your colourist who will select the best tool for the job. Tape to tape grading on some of the HD tape formats can introduce a generation loss. This doesn't apply to tape formats such as HDcamSR, as multiple generations aren't a problem, although this format could be considerably more expensive.

Credits

With High Definition a smaller typeface can be used for on-screen credits and end rollers, as they are more legible in HD. It is important, however, to consider the UK standard definition audience, as the smaller typeface might not be

suitable for SD, so check your credits on an SD monitor. International credits are sometimes different to the BBC's, if you have two versions of the credits it is better to add them to the standard definition version after the programme has been down-converted, this will eliminate any compatibility problems.

Sound

All quality HD cameras offer two, or more, good digital sound channels i.e. the sound route for shooting and post-production is the same as for SD. Dolby surround sound for an international delivery, a feature film or DVD release, discuss with your dubbing mixer what the best route is (see 5:1 sound).

If you are future proofing your production you'll need to multi-track all the stems and save on DAT. This can then be re-mixed when you do need to deliver 5.1. Check with your dubbing suite that they have a Dolby licence. If you have to deliver 5.1 Dolby surround sound, it can be very expensive for the facility to acquire one.



Discuss with your co-producer and Worldwide how they want the sound delivered. It could either be encoded ie. Dolby E or multitrack.

Screenings

If you are planning a screening in a theatre that has a high definition projector and you have shot using the interlace format (1080i/50), make sure the projector can handle interlace signals. Many digital cinema projectors that produce very good progressive images do not handle interlace at all well. They often convert the pictures to 25p (progressive) making them look like a very poor film effect has been added ruining the screening – especially if the DoP is there!



And finally ...
sit back and enjoy the
fabulous picture quality
of high definition, its long life and
the wonderful possibilities offered by this new television format.

BBC HD