



# The Holy Grail

**Do your films lack that certain something? Ben Frain explains how to achieve the dreamlike quality of Hollywood cinema armed with only your trusty cam**

***'Video actually produces images more akin to our own sense of vision and herein lies the paradox: we want to believe in the things that aren't real'***

**A**t present, the only thing that looks and acts exactly like film is film. If there was a cheaper way of making films with another format that looked and acted exactly the same as film, don't you think the hotshots in Hollywood would have cottoned on?

It is only a matter of time before a cheaper digital format supersedes what we experience with celluloid today. However, until that day arrives, anybody wanting to achieve a halfway 'film look' (without selling vital parts of their anatomy for film stock) must enter a situation of compromise. What components of the film look are vital? What elements can be sacrificed for the greater good of the project? Each available video format in use today can be altered (with varying degrees of success) to make it appear more 'film like'. However, before looking at these formats and products, we must

first define what, aesthetically speaking, we mean by the 'film look'.

## **Land of make-believe**

The aesthetic qualities of celluloid film compared with video are hard to describe. It's hard to say what looks 'right' about a celluloid film but conversely simplistic to identify when something looks wrong. We are happy to watch the news and daytime TV when it is shot on video but a feature film shot on video just doesn't seem right.

The look of celluloid film is often described as 'dreamlike' or 'hyper-real'. Interestingly, although audiences commonly applaud films for being visually 'realistic', in the case of film, nothing could be further from the truth. Video for the most part actually produces images that are more akin to our own sense of vision and herein lies the

paradox: we want to believe in the things that aren't real.

When we visit the cinema or watch a film in our homes we surrender ourselves to the story we are about to watch. We suspend our disbelief because we want to experience the story. However, the enchanting spell of a feature film can be easily broken. How many times have you been watching a film when suddenly there is a special effect so ludicrous that it completely ruins your belief in it?

Audiences are very sophisticated. Just as they can spot a dodgy special effect, so too can they tell when there is something not quite 'right' about a film. The look and feel of cinema has evolved over more than a century. We subconsciously identify the look and feel of film with dramatic storytelling, and anything alien to that runs the risk of producing the same reaction as the dodgy special effect: distancing the audience from the story.

So, until public consciousness changes, we must accept that to make projects look like a 'proper' film and have audiences view video projects as such we must somehow emulate the visual characteristics of celluloid film.



## Who's got the look?

It would be misleading to say that, by changing the following aspects of a video signal, a perfect 'film look' will be achieved. There are many more elements that make a big-budget film look like a big-budget film besides the format it is shot on. We must consider production values, expensive prime lenses for the cameras, expert lighting technicians, quality scripts and acting. It all adds up, with the result often greater than the sum of its parts.

That said, there are some key identifiable attributes that contribute directly to the aesthetic characteristics of film. We will discuss the most common.

## Resolution

Film is an analogue format and therefore independent of resolution. As film begins life as analogue information, it can be digitally scanned to whatever resolution is needed for digital postproduction. There are practical limits however, with film rarely scanned beyond 4,000 x 3,000 resolution for professional film postproduction.

More resolution means more detail. More detail makes for a better image.

Compare film resolution to that of DV. Even if a film is shot on DV (720 x 576 resolution) and ends up on 35mm film, it will never look as good as if it started out on 35mm film in the first place. It is effectively impossible to add detail to an image that starts at a low resolution. Suffice to say that higher resolution is a good thing!

## Frames of information

Film captures information as complete individual frames (24 or 25 frames every second). Look at a standard 35mm film negative and you can see individual cells which become exposed as the movie camera films a scene. Each cell is one complete picture.

Although practice is slowly changing, video is ordinarily recorded using interlacing. Interlacing records one portion of a frame (e.g. the even fields) at one point in time and the other portion of the frame a split second later (e.g. the odd fields). As portions of information are captured more frequently with interlaced video it creates a more 'real' sense of the information it is recording. Film captures information less frequently, resulting in that 'dreamlike' quality.

However, it is possible for video to record information in complete frames and the technique is called shooting 'progressively'. A frame of progressive video is more akin to a film frame, with a complete image at each interval rather than half. This is still a tricky area though as many 'frame mode' options on consumer camcorders actually record their progressive images at the expense of some vertical resolution.

In PAL land (the UK) we have a more direct correlation between standard progressive video and film. Our progressive video standard is 25 frames per second, also the speed that many celluloid films are shot and projected at (although 24 FPS is just as popular, if not more so).

Progressive video in the US (NTSC standard) on the other hand ordinarily runs at 30 frames per second (NTSC video is roughly 60 fields per second when interlaced), six frames per second different to their film standard (24 FPS). This difference in frame rates causes all sorts of headaches when going from video to film and vice versa, making a 24 progressive FPS video solution highly coveted in the US. It is only in very recent years that manufacturers have created mainstream video solutions that address the problem and it's part of the reason High Definition video is gaining such widespread uptake in the US.

## Screen dimensions

Ever looked at the back of a DVD and wondered what all the screen information (e.g. 2.35:1 or 1.85:1) actually means? These figures simply describe the picture dimensions. For example, 2.35:1 means that the picture is 2.35 times wider than the height (or in the case of 16:9, 16 parts horizontal, to 9 parts vertical).

Differing screen dimensions are largely unnoticed in the cinema (unless you're a real geek like me and you like to watch the ratio change as the main feature reel is put on!) but become abundantly clear when watching back a 'widescreen' video/DVD on TV.

Depending upon whether you have a 4:3 (standard size) or wider format 16:9 television (the screen size of HDTV) you will notice black bars of some height at the top and bottom of the image. This is simply because the filmmaker decided to make the film in a dimension that doesn't directly correlate to the dimensions of your TV set – how inconsiderate!

In recent history feature films have always enjoyed wider image dimensions (more akin to natural vision) than TV and therefore seeing a wider picture ratio

*Audiences are willing to accept TV programmes shot on video – such as 'our Trev' on the daily news*



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typically reminds the viewer of the cinema and a 'proper' film. Video has always gone hand in hand with TV, and until recently TV has had a ratio of 4:3.

The obvious solution therefore is to shoot wider video images. However, although most mini DV cameras boast a 16:9 mode, the 16:9 dimension is usually achieved by masking part of the original 4:3 image. As each video format has a finite resolution, masking part of the image loses image resolution. To produce a true 16:9 image with a video camera either the image must be anamorphically squeezed with an adaptor lens before hitting the CCDs (in the case of a 4:3 format camera) or the CCDs themselves must be built with 16:9 in mind.

### Gamma and latitude

Gamma characteristics are believed by many to be the single most important factor in emulating a film look. It's practically impossible to talk in depth about Gamma without making use of complex mathematics so what follows is an oversimplification.

Of all the recording formats in common use today, film enjoys the largest visual latitude. Latitude in this sense describes the range from absolute black at one end of the scale to absolute white at the other. The more increments available (measured as *f*-stops) between these two points the more detail an image can contain. Film handles extreme darks and whites incredibly well, gently crushing the detail at each end of the scale (film has an 'S' Gamma curve, video's is traditionally a straight line).

Video, however, finds it more difficult to cope with very dark and very bright images. More often than not, the less sophisticated (and cheaper) the camera, the more the whites of an image will be clipped and the very dark sections crushed. Practically this means that as a video camera shoots a dark area, it doesn't capture any detail within it, merely registering the area as 'black'. Film on the other hand could capture the different shades of black that the video cannot deal with.

Experts in the field have found ways of pushing the more expensive video cameras and formats (especially HD) to greater limits. They change the standard gamma curve of the video signal by adjusting the 'black stretch' (for the darks of the picture) and 'knee' (for the brighter parts) enabling greater latitude than the default factory settings.

### The search begins...

Equipment manufacturers realise that achieving a true film look on video

(especially cheap video!) is the Holy Grail of the independent filmmaker. However, for the most part, the chances of producing something of true cinematic quality on any camera costing less than tens of thousands of pounds are remote, regardless of any manufacturers claims to the contrary. Nor is there any software that can instantly turn camcorder footage into cinema-ready perfection. We're back to our compromise situation.

The formats table below shows how each film look solution weighs up, technically, with regards to the areas discussed. Typically, the more expensive the format, the more it potentially has in common with celluloid film. Despite this fact, many of the cheaper solutions provide very respectable performances in key areas of the film look. Maybe £100,000 isn't necessary after all?

### HDCAM

(camera set-ups around £80,000)  
Sony's High Definition video format, HDCAM is probably the nearest we can get to the look and quality of film on video. It is almost capable of equalling film's latitude and also offers a very high resolution. Many big budget films have made use of this format e.g. *Star Wars Episode II*. What lets the format down is the lack of multiple frame rates negating quality slow motion sequences. Oh, and an incredibly high price tag.

### DVCPROHD

(camera set-ups around £50,000)  
Whilst poor in comparison to film's



**Panasonic DVX100** boasts a cine-like gamma curve

capabilities, the current Panasonic HD camera (AJ-HDC27V) can handle frame rates from 4-60 frames per second. However, to achieve this impressive feat, a first in video, resolution is sacrificed to allow the necessary bandwidth for the extra frames. Another point of issue with DVCPROHD is that it compresses the image quite heavily to tape for a high-end format (6:7:1). This means image artefacts are slightly more apparent on the big screen than with HDCAM.

### Digital Betacam

(camera set-ups around £35,000)  
Digital Betacam seems a curious choice for a film look considering it doesn't record pictures progressively. However, like all interlaced footage it can be de-interlaced afterwards. In terms of image quality Digital Betacam is probably the most impressive of the standard definition formats (thanks to better signal processing, larger CCDs etc) and many Digital Betacam cameras feature true 16:9 image processing. It uses less compression than DV subsequently

**Format table:** Indicates how each of the film look solutions matches up

	Colour Sampling at camera (PAL)	Aspect Ratio	Typical Latitude	Progressive	Frame Rate	Native Resolution (PAL)	Typical CCD Size
Film	4:4:4	Any (2.35:1, 1.85:1)	F11	24 or 25FPS	Any (e.g. 4 - 800 FPS)	Independent, up to 4000 x 3000	N/A
HDCAM (e.g. HDC-F950)	4:4:4	16:9	Up to F10	30, 25 or 24 FPS	No more than 30FPS	1920 x 1080	3 x 2/3
DVCPROHD (e.g. AJ-HDC27V)	4:2:2	16:9	Up to F10	30, 25 or 24 FPS	4-60FPS	1280 x 720	3 x 2/3
Digital Betacam (e.g. DSR-570WSPL)	4:2:2	16:9/4:3	Upto F9	No	No more than 30	720 x 576	3 x 2/3
DVCAM (PDX10P)	4:2:0	16:9/4:3	F6	25FPS (PAL) 30FPS (NTSC)	No more than 30	720 x 576	3 x 1.47
DV Cinema (Panasonic DVX100)	4:2:0	4:3 (16:9 with adapter)	Allegedly F11!	25FPS (PAL) (24FPS in US)	No more than 30	720 x 576	3 x 1/3
MiniDV (e.g. XL-1S)	4:2:0	4:3 (16:9 with adapter)	F6	25FPS (PAL) 30FPS (NTSC)	No more than 30	720 x 576	3 x 1/3

## Filmic formats **The Knowledge**



retaining more image quality. Digital Betacam equipment is made with professional productions in mind and can be tweaked extensively to alter gamma levels etc to achieve a suitable look. Digital Betacam is often used to shoot commercials and independent feature films e.g. *Atanarjuat, The Fast Runner*.

### DVCAM

(PDX10P) (camera set-up around £2,000) Sony's PDX10P caused considerable intrigue when announced. The main selling point is a true 16:9 mode, especially given the cameras conservative price tag. At the time of writing we have yet to test this camera at *CU* towers to evaluate the widescreen mode ourselves but it allegedly uses a greater portion of the CCD area resulting in a truly wider image that doesn't sacrifice resolution. If a higher resolution 16:9 image is a priority, take a closer look at the PDX10P.

### Panasonic AG DVX100 DV Cinema Camera

(camera around £3,000) Panasonic are actively pushing their DVX100 camera as the camera for independent filmmakers. This camera has been designed with progressive images in mind. Furthermore, the camera boasts

a cinema-like gamma curve in the progressive mode hopefully negating the need for extensive postproduction gamma correction to achieve a more film-like look. There are numerous example clips around the net of footage shot with the DVX100. To see if it cuts the mustard yourself, head over to the DVX100 forum at [www.2-pop.com](http://www.2-pop.com).

### mini DV

(camera set-up around £2,000) mini DV is the format most of us spend our time with. Its limitations are well documented when compared with film, but that doesn't stop it being used successfully each year to produce feature films, eg *28 Days Later*, shot entirely on Canon XL-1s and later transferred to



*Top Left: The closest video gets to film, HDCAM*

*Top Right: Sony's PDX10P offers 16:9 on a budget*

*Left: An unlikely candidate, Digital Betacam*

*Bottom Left: The Panasonic AJ-HDC27V, the only camera capable of true slow motion*

*Below: Film, unsurprisingly still the 'film look' king*

film. Whilst it's obvious the footage didn't originate on film, the quality of the filmmaking goes a long way to helping us forget the fact.

### Conclusion

The next time an incredible solution to turn video footage into 35mm cinema is announced, look closely at how it aims to achieve those results. There are only so many things that can be altered post-shooting and as the old adage goes, you can't make a silk purse out of a sow's ear. Wherever possible, identify which elements of the 'film look' are most important to the project. For example, high resolution may not be important if the project is web bound, and a film-like gamma curve might not be necessary if a celluloid transfer is on the cards.

Ultimately, content should be the key component in all your films. Unfortunately, content alone does not equal success and the very nature of an acquisition format could change the possible marketability of a project. Bearing all of this in mind during the planning stages of your project will help enormously. So whatever your choice, choose wisely. ■

