HD explained

HD stands for High Definition (HD) and is essentially a video format which is digital in nature and offers the promise of sharper, clearer pictures and sound than currently available using analogue video and television formats.

There are two standards (commercially current) of HD which are 720 and 1080.

Each can be shown and recorded in two different ways, Interlaced and Progressive.

This gives rise to the four commonly stated standards which your display device is capable of showing namely:-

720i, 720p, 1080i, 1080p where (i) stands for interlaced and (p) stands for progressive.

To understand which is better and which standard you should seek out it is worth first looking at the common PAL system which is used currently in the majority of VHS, DVD and television broadcasts.

The amount of information contained in a picture is directly related to the quality of the image able to be displayed. For PAL we have a picture which consists of 576 lines and 720 columns per line. This in computer "speak" gives us a number of possible pixels per image of 414,720. Pixel shape is rectangular.

If this raw information is displayed on a screen the clarity will decrease as the screen size increases – will look fuzzier. This is because the same number of pixels will still be present but each will be larger for a larger screen size.

There are clever algorithms which will divide these pixels into smaller units so that the image on a large plasma screen will look better, however the raw information remains the same.

For 720 HD the resolution (number of pixels) increases to 720 lines by 1280 columns giving us a total of 921,600 using square pixels

For 820 HD the resolution (number of pixels) increases to 1080 lines by 1920 columns giving us a total of 2,073,600 using square pixels

Thus PAL has half the resolution of 720 HD and a fifth of 1080 HD.

The next problem is how to get all of this information to the screen to show a smooth motion which looks natural and has no jerky movements and in sport for instance the football moves across the screen without leaving a ghostly trail or shadow, known as video lag.

In the PAL system images are shown using a method known as interlace (i).

Interlace shows the video images as two fields which we call odd and even. The odd fields is lines 1,3,5,7…575 and even fields are 2,4,6,8,…576.

The full image is made up of both fields but to show both "halves of the image" at the same time. As the display of moving video is actually a sequence of stills shown in sequence (25 per second) the engineers devised a method which showed for the 1 of 25 stills just the odd lines and for the 2 of 25 stills just the evens, whilst leaving the odd fields up from the first image. The next still shows the odds of the 3rd image and the evens from the previous still. This iss repeated and gives the appearance of

motion, it is also why when you freeze frame the image is never as clear as you'd expect.

This works because the human eye has a thing called latency, in which the image it sees remains in the retina and fades as a new image is seen. An extreme example of latency is to look at a bright light and then look away – you still see the bright light although it is not present.

The use of interlaced transmission and processing tricks the brain into thinking it is seeing a full motion image when it is not.

The alternative method is to show the whole of each image completely, however this requires a lot of processing power and is now possible due to the technical advances made in electronics. This is called Progressive display.

So the difference between PAL, 720i and 1080i is the amount of data with which the eye is presented.

720i and 1080i are a vast improvement on PAL and you will notice a significant improvement in the clarity of the image and the amount of detail able to be seen.

The same level of improvement again would be displayed with 720p and 1080p which do not use interlaced video display methodology.

DO NOT however think that the selection of 1080p is automatically a superior image to that of 720i. The size of the screen, how far way the viewer is and how the original footage was obtained is very relevant.