

# HDV Sony HVR Z1E Test



It seems necessary to define the term "professional" with regards to the kind of cameras we will be testing in this article. Professional video products achieve this status by adhering to a series of conditions regarding quality and versatility, conditions which are the result of years of study of those professionals who dedicate themselves to use, experiment with and improve these cameras. DoP's, colour-graders, film colorists, engineers, postproduction artists, etc. are the people who should decide whether a product is really a professional tool or if it is just a marketing strategy by manufacturers to attract the prosumer market, without reaching sufficient quality standards. As professionals it is our obligation to be honest about a product's real capabilities. Otherwise we run the risk of lowering our standards so much that any image will be good enough as long as it can be seen, reducing costs in such a way that considerations such as professionalism, craft and quality will be secondary. It could be easy to be swayed by manufacturers marketing machinery but we should ask ourselves whether the definition offered by a 1080i HDV camera is enough to consider it a professional piece of equipment or even if it has enough quality to be considered High Definition. To decide whether a camera deserves the tag of "professional", it has to be measured against the standards valued by the kind of professionals mentioned at the beginning of this analysis. Following is an analysis of Sony's HDV HVR Z1E.



## Sensitivity

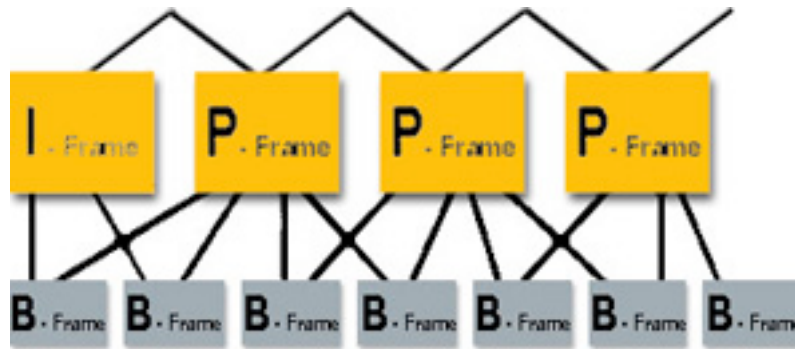
On an 18% grey card we have seen that the camera's sensitivity on automatic is of 125 Asa, showing a value on the wave monitor of 55%, a rather high value which does give a slightly overexposed image, therefore one should underexpose slightly to achieve a value of 50% or 45%, leaving the camera's relative sensitivity between 160 and 200 Asa. This aspect of the camera is surprising, having 2 less F-stops than the DVX100 and 1 1/3 less than the HDCam f/900, taking into account the markets it is attempting to target; for domestic use, where consumers only use available lighting, it will offer very low levels of lighting. For professionals it is also clearly inadequate; not good enough work with available light in interiors, requiring artificial lighting and therefore more time during shooting.

## Latitude / contrast

The camera offers the typical latitude values for video, that is, very low, around 5 F-stops (a contrast ratio of 32:1), 2 stops over the median grey and 3 stops under, taking into account that loss of detail in high lights is already considerable over 1, being specially noticeable when one views the recorded footage. Compare this latitude with that of the F/900/3 with more than 8 F-stops in aperture latitude ( a contrast ratio of 500:1) It should be noted that what we see on the screen or the monitor is not what the camera is recording, since that image is compressed in a 47:1 ratio through the MPEG-2 system.

The compression system affects specially colour and detail. MPEG-2 compresses the image by making the camera capture a full frame out of every fifteen; the frames in between are put together discarding the peripheral information and unifying the values which are similar or repeated. This compression is very effective but it involves a significant loss of detail and sharpness specially if there is camera movement. A Standard Mpeg sequence is composed by I-frames, P-frames and B-frames:





I-Frames: Intra-frames are frames that contain all possible video information

P-Frames : Predictive frames are created with the precedent I or P frames P frames are more compressed than I-frames and provide a reference to calculate B-frames

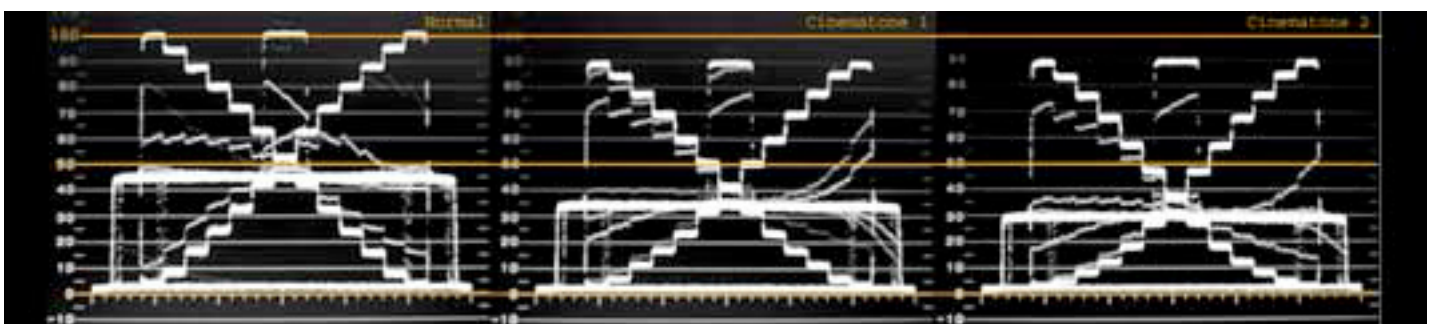
B-Frames :Bi-directional frames use the precedent and the following frames as reference to calculate the compression of the information on the frame.



Its worth noting that whenever a frame drops on a fifteen-frame MPEG sequence, the whole sequence will be affected, meaning half a second of footage can be corrupted, making a shot useless.

The camera offers in its menu two alternative gamma curves to the preset curve called Cinematone 1 and 2.

Como se puede apreciar en el monitor de ondas estas curvas “pegan” los negros dando imágenes más contrastadas y con menos detalle en las sombras, los tonos intermedios también se oscurecen necesitando ser etalonados en posproducción. La



recuperación de detalle en altas luces es prácticamente irrelevante (apenas llega a 1/2 de stop).

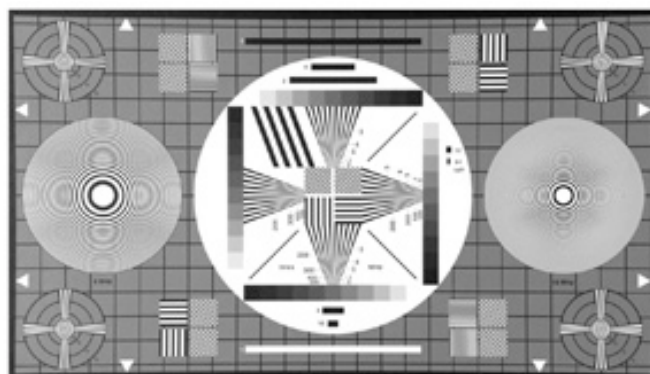
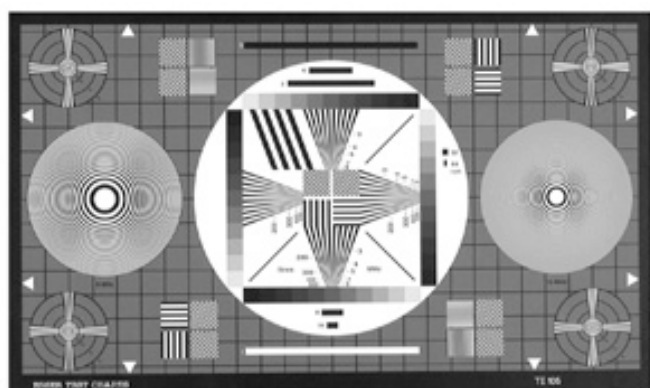
**Resolution / sharpness** The interlaced system offers a far better resolution than any MiniDV on the market.

In the cards we can see how the resolution offered by the interlaced system is similar to that of the HDCAM.

Carta de resolución HDV

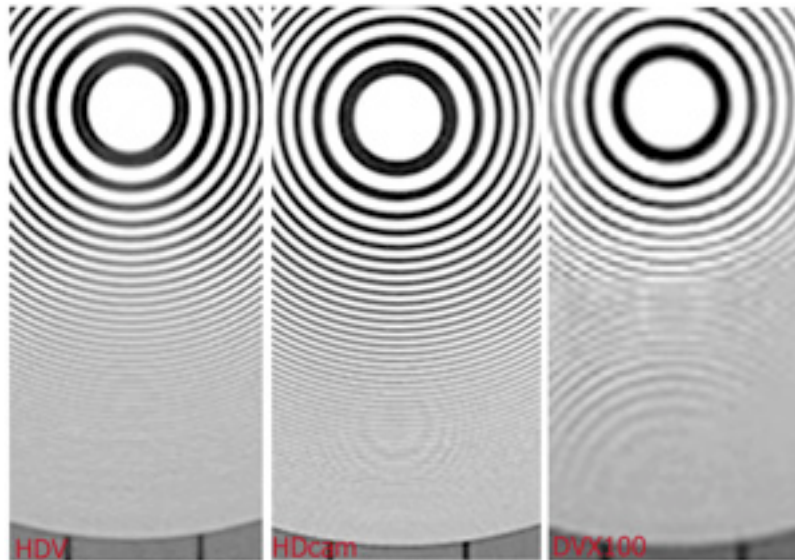
Carta de resolución HDcam

The camera offers the possibility of shooting in cinema mode with the cineframe function. Its worth noting that this mode does not record with progressive scan;



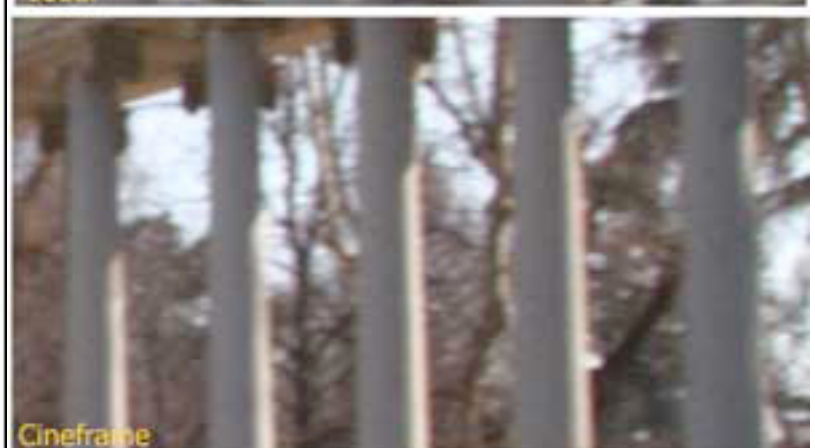
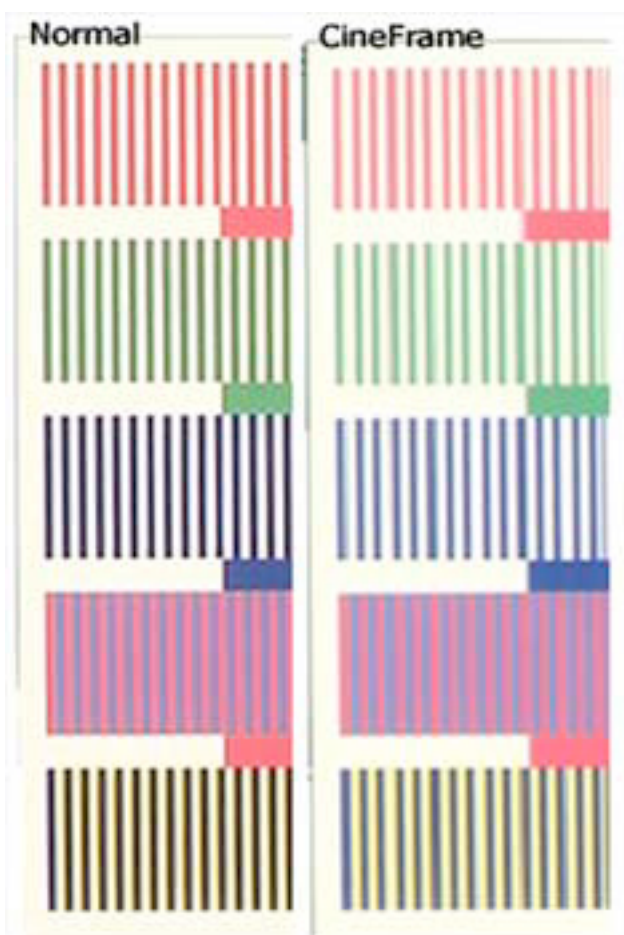
instead the camera eliminates a field in the image and uses a copy from the following frame. This implies reducing by half the resolution of interlaced mode recording, which results in loss of information specially in vertical resolution and diagonal lines may appear, creating a see-saw effect. It goes without saying that the quality this offers is in a different league to that of the real progressive scan offered by professional HD systems. It is also surprising to see that this camera does not take into account the needs of professionals, who would prefer progressive scan systems, and offers the poorer interlaced system instead.

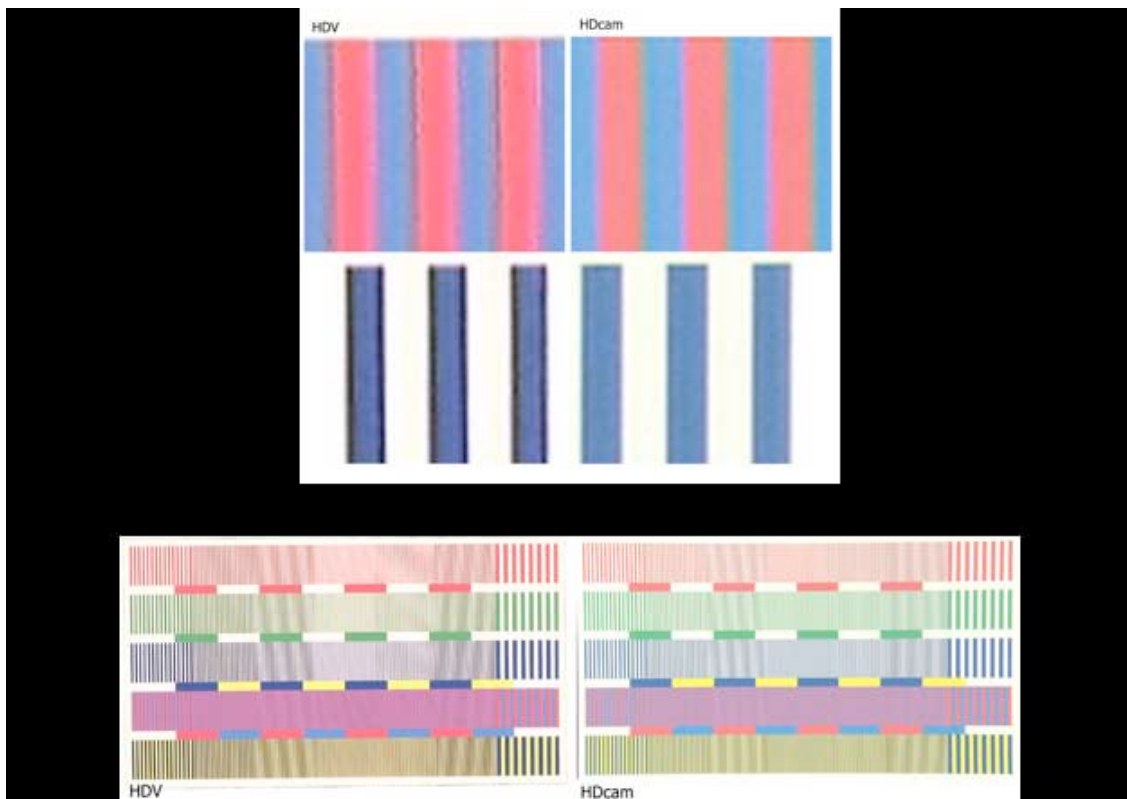
**Colour reproduction** In this department the camera proves to be a completely inadequate. The sampling format is 4:2:0 which means that for every four times that luminance gets registered the red component and blue dominance are registered alternately red twice, causing a significant loss of colour tones. Combined with the Mpeg compression, where similar colours tend to blend (see the following still life images and the cards), the colour reproduction ends up being poor, with shrill colours and few tone contrasts.



In the image we can zoomed see the effects of compression, specially in the magenta/cyan stripes, we can also see the black edge in areas of high contrast to simulate better sharpness.

The camera does allow for some colour adjustments but these are clearly insufficient, basically offering the possibility of adding colour dominances to the image (warmer / colder) and effects such as preserving a single colour of an image and turning the others into B&W. for example.



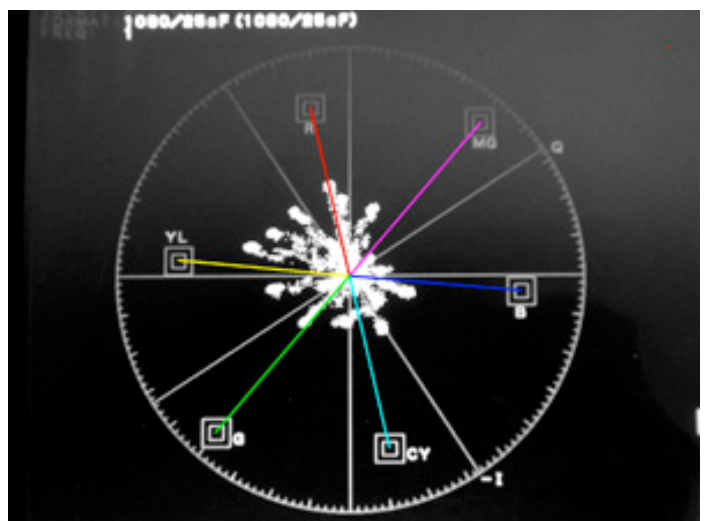


In this comparison we can see HDV's lower latitude, lower level of detail in the blacks

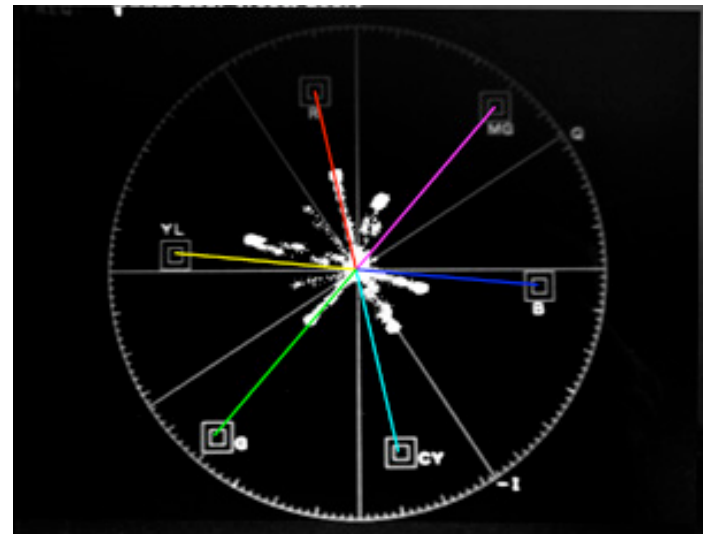
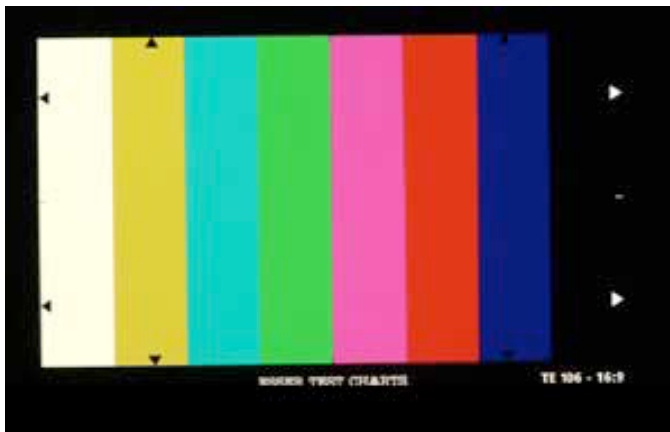


and harsher whites. We can also see the loss of colour detail in yellows and greens. The area with the carrots, apples and eggplant we can see the superior colour tones of HDcam whereas in the HDV image they tend to merge into a similar tone.

In the Macbeth card as well as with the

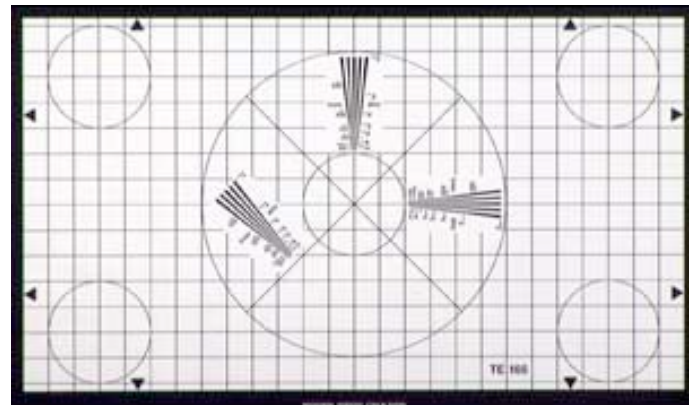
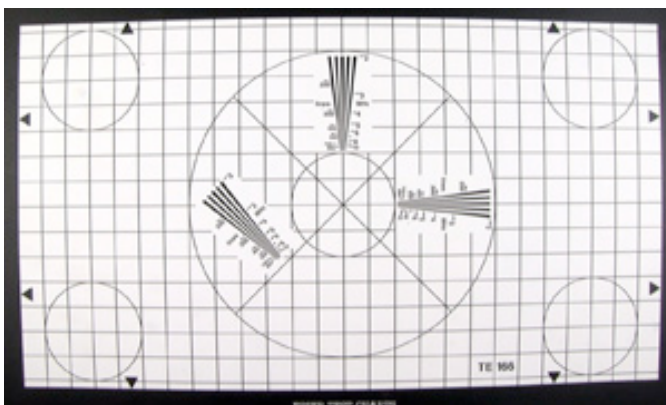


bars we can see the tendency of yellow towards red and Magenta. Cyan also tends towards blue tones.

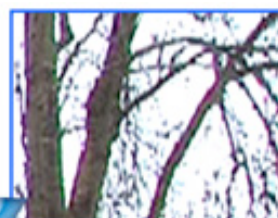


The lens body (the lens and the prism). The lens is a Vario-Sonnar® T\* High Definition Carl Zeiss lens with a 12x optical zoom T 1.6-2.8 (4.5 - 54mm)

We ascertained the total absence of vignette halo, maintaining a uniform luminosity over the whole surface of the image on a wide angle as well as on tele. Notice the barrel distortion and the lateral chromatic aberrations that manifest themselves in the typical colour stripes on edges with very high contrast. We have also seen how it produces a noticeable flare in high-lights.



Aberracions cromàtiques.





### **Viewfinder / LCD Screen**

They are both excellent as far as sharpness and resolution goes far better than their competition in the miniDV market but it was very disappointing to find that both the screen and the viewfinder do not show a full image, cutting the image around the edges, which can ruin a carefully framed composition.



### **Postproduction**

There is very little that can be done in postproduction with such a compressed image. We saw when working with Mistika that the colour correction is very small due to the little information available and very soon the image is BROKEN UP with ARTIFACTS. Given that its an 8bit image and that it's compression is very high it is very hard to manipulate it.



## Conclusions

In my opinion this camera belongs to the high quality prosumer camera and can be a useful tool for those projects which do not require a high standard in terms of image quality, specially of colour and in low-light situations. This camera is still far from Hdcam or any other professional HD format and therefore cannot substitute these in any case, which does not mean to say that it should not be used if a project demands the kind of image quality it can offer. It is not particularly suited for either documentary work, due to its low sensitivity and latitude and poor chromatic reproduction, or for fiction, given that it does not offer a real progressive scan.

## Characteristics

Capture resolution: the CCD captures at 960x1080, which is transformed to 1440x1080 Output resolution: 1440x1080 is the resolution at which the footage is recorded to tape, when played back the resolution is converted to 1920x1080 Colour depth: 8 bit Sampling format: 4:2:0 Compression range: 25 Mbits/sec = 3.125 MB/sec, around 47:1

## Technical info

Sony HVR Z1E HDV camera. Wave Monitor / Vectoscope AstroLCD Sony HD Monitor ESSER TEST CHARTS TE 105 TE 125 TE 166 TE 222 TE 223 TE 106 (Some cards are transparencies lit by an LV5 spherical format) The still life images were shot at the Parque del Retiro in Madrid The tests were done in the test lab at INFOTV. The postproduction was done on MístiKa with the help of SGO. The HDV footage was captured on Premier using Firewire. Detailed specifications for this camera can be found in [bssc.sel.sony.com](http://bssc.sel.sony.com)

