



Solid HD

Mark Brindle reviews Panasonic's new HVX200 HD/SD camera



Many IOV members have gone down the HD path with some great cameras recently reviewed in Focus - including the Sony Z1E, the JVC HD100 and the Canon XL-H1. There are different flavours of HD - with 1080/50i available on the Sony and Canon and 720p/25, 720p/30 and 720p/24 on the JVC, plus some additional variation on progressive scan (25F) and HD-SDI output available on the Canon. These camera all shoot HDV to tape, at up to 25mbps as either Interlaced (1080i) or Progressive (720p) - and some can output uncompressed.

To add to the mix of formats, the new PAL version of the Panasonic AG-HVX200 does not record in HDV. Instead it records in DVCPRO HD in both interlaced 1080i and progressive 720p modes at 100Mbps and also in standard definition formats DVCPRO50 (50mbps), DVCPRO and DV at 25Mbps.

In the Eye of the Beholder...

DVCPRO50 and DVCPROHD use a 4:2:2 (YUV) colour space - same as SDI and digital Betacam. This means for every 4 pixels, half of the chroma (U and V colour information) is thrown away - which is difficult for mere humans to notice due to the way our visual processing works. PAL DV, HDV and DVD all use a 4:2:0 sampling scheme - which is better described by 4:2:0, 4:0:2, 4:2:0, etc. where a quarter of the chroma information is available and allows for a more compressed signal.

On paper, the less compressed recording format of the Panasonic should give it an edge over its HDV counterparts. However, without doing direct comparisons of identical HD material shot under the same conditions it is very difficult to notice any real difference in the end result.

Is HDV more blocky due to compression artefacts in the MPEG2 data - does it show in fast pans or fast action? Or is MPEG2 (or more advanced compression algorithms) a better way to go forward into the future? Can you spot the difference between HDV at 25Mbps, DVCPROHD at 100Mbps and uncompressed HD at 1.5Gbps? Does HDV MPEG audio sound any different than uncompressed 16-bit 48kHz audio from the Panasonic?

I leave these as an exercise for the reader. There are some direct comparisons available online - comparing one camera to another. Conclusions drawn from these vary, but essentially its down to a personal perception of the images and sound produced.

Personally, I like the rich colours output from the HVX200 - but I also like the output of the Sony Z1E.

What else can it do?

The Panasonic boasts a variable frame rate (only available for 720p) which can allow frame-skipping (undercranking) down to 12fps (actually down to 2fps - although this is an unsupported feature) and high-speed (overcranking) to 50fps.

The undercranking option allows for a type of 'quick motion' effect - similar to setting a shutter speed of 1/12 or 1/6 - but in the 720pn (native mode) only real frames are actually recorded allowing recording times to be lengthened. In undercranked mode you can get twice as many frames recorded and halve your recording time - but you should get some good quality slow-motion effects for fast-paced action.

I say 'should' because at the time of writing (mid May 2006), Apple's Final Cut Studio does not support 720p/25 - however it does supports NTSC flavours of 720p/24, 720p/30 and 720p/60. This meant I could not

import any 720p footage. According to Apple, the software update for FCP is due very soon (any time now).

There are also recording options to use progressive recording in interlaced modes - 1080i/25p and 576i/25p. These modes record 25 progressive frames and then convert the signal to 50fps interlaced fields for output using a 2:2 pulldown. I must admit to not being very careful when testing the difference between 1080i/25p and 1080i/50i - the information is retained in the MXF wrapper which Panasonic use to record the video data - but the MXF data can get separated from the raw files very easily depending on how you import footage into your NLE. So now FCP only sees my files as 1080i/50 whether they started as 25p or 50i and I cannot tell the difference visually.

According to Panasonic, the HVX actually scans everything internally at 1080p/50 (1080p/60 for the NTSC version) and then internally down-converts to the

chosen format for recording. This is all achieved using a new 14-bit ADC and 19-bit inner processing. They now also provide information online about the CCD size, the pixel shift techniques used to produce HD from a small CCD block. Interesting reading if you're into that sort of thing.

Tapeless Workflow

One of the big features of the HVX is the tapeless workflow made possible with the P2 solid state memory cards. Currently available in 4GB and 8GB sizes.

Panasonic literature suggests that by 2010 a single P2 card will be 128GB - hopefully by then they will be considerably cheaper than the P2 cards currently retailing at £1000 plus VAT for an 8GB version which can record up to 8-minutes of DVCPRO HD.

You can record continuously if you have enough P2 cards (there are 2 sockets) or can copy the data (off camera) from one P2 card whilst another P2 card is recording.



I admit to assuming the HVX came supplied with at least one 4GB card as standard – but these are optional extras. Focus Enhancements has partnered with Panasonic to produce a compatible hard disc recorder – the Firestore FS100 with 100GB disc retailing at £1500 plus VAT. This seems to be better value for money but I think this does somewhat defeat the object of having a solid state recording facility.

Panasonic also manufacture the AJ-PCS060G – the 'P2 store' which allows you to transfer data from P2 card in the field to this portable unit. Since the workflow is now tapeless



there are other methods for transferring files. You can connect the FireWire port of the camera to your NLE and 'capture now'. I tested this with Apple's FCP to capture 1080/50i in real time with no problems. This method actually allows you to operate in a studio (or on location with a portable NLE) without any P2 cards in the camera at all.

You can also operate the camera in 'host mode' and download the contents of the P2 cards directly to an attached FireWire HDD (no computer required). You can also plug your P2 cards into a card reader or pcmcia slot in your computer and copy the files that way.

You can transfer from P2 via FireWire to your NLE as well. FCP has a special 'import from P2' feature which shows thumbnails of your clips so you can decide which to import or you can mount the P2 on the desktop like a hard-drive and drag the files across. The P2 card operates at up to 640Mbps so you can copy faster than real time.

There is also a mini DV tape drive in the camera – but you can only record standard definition DV to the tape drive (not even DVCPRO). You can do some fancy internal down-conversion from 720p to DV from the P2 card to allow you to make use of the variable frame rate option and still output as SD – although I'm not so sure how useful that is going to be (unless 720p/25 support on FCP is very delayed or you have no other way of viewing your HD footage).

Getting footage out of the camera is not a problem – whether direct on FireWire, via the P2 or some other copying process. The HVX also has composite and component video output and S-video in/out available (S-video in only for DV recording). You can choose to output 720p, 576i or 1080i on the component output. I used an external monitor on the composite output and this displayed 576i for all recording modes.

The workflow benefits derive from not having to capture your footage – providing instant random access to the video files either on the camera or on the NLE. You can preview the clips on the camera and change the meta data associated with them (via the MXF wrapper) or delete them to make some space.

One annoying feature – you must be in the same recording mode as the clips on the card to be able to preview them on the camera. I guess most people will be in 1080i or 720p or 576i and stick with that for video onto a P2 card rather than mixing formats so it isn't an issue really – just a bit odd.

For some environments like ENG the workflow is certainly beneficial – speeding up the delivery of video and being able to start the edit straight away or transmit the data more quickly than before. I can certainly think of times covering events where it would have been much simpler to hand over a memory card and carry on filming. But this workflow is not new to anyone using a Firestore or other hard disc recorder now.

Any Space Left ?

Now you have your footage – what are you going to do with it? You will have 100GB for every hour of video instead of 12GB for DV/DVCAM or HDV – and you don't have a tape master anymore. Where is it all going to go? What about backups?

There is no easy answer unless you have plenty of cash for a multi-terabyte raid system – although HD editing was always going to take up lots of space. There are a number of reasonably priced external raid systems based around SATA discs with removable disc caddies. Or lots of external FireWire drives, perhaps.

How long does a DV or HDV tape last in dry storage? Fifteen to twenty years, perhaps, before you find you can't get the data



off reliably? DVD-R may have been useable for backing up DV or HDV backup – one 4GB P2s' data will fit onto one – all 4 minutes of DVCPRO HD footage!

What about HD-DVD or BlueRay or the new optical storage devices that are looming on the horizon? It's certainly time to think closely about storage and backup and consider the implications of your current backup strategy and what you are storing. This topic is huge and there isn't enough space in this issue to cover all the current options. You will definitely need more disk space, though.

DVCPRO HD can be natively edited in most current NLEs without the performance hit of native HDV editing and without being transcoded to an intermediate codec.


Who's got the Look?

Getting back to the camera features – the HVX shoots High Definition in 16:9 and Standard Definition (DV) in either 4:3 or 16:9 formats. Both look great with rich colours and nice detail.

The camera does have a lot of settings that you can use to

create a 'look' – although sometimes not the look you really wanted. There are six preset 'scene files' which can be modified and saved/ reloaded from an SD memory card. The scene files can be edited manually on a computer – which is one method to achieve the unsupported 2fps 'hack' mentioned earlier.

Scene files allow you to control the camera in a variety of ways – such as choosing the gamma levels, detail levels and chroma settings plus colour temperature, skin tone detail, aperture angle (syncro scan), black level, noise reduction, adjustments to the auto iris settings and frame rate. This can be great for a multi-camera shoot where each camera can be set up exactly the same by copying the scene file from the SD card.

Making adjustments to the default scene files definitely requires delving into the manuals – which are surprisingly readable. The default scene files do have settings suitable for shooting in a variety of conditions – with cine-like gamma settings and news gamma, plus shooting under fluorescent lighting. 



Who are you calling Ugly?

When I first saw photos of the Panasonic AG-HVX200, I thought - "pretty ugly-looking" - but its not that bad at all in the flesh. It is quite fat, though - 'barrel shaped' perhaps. It has an 82mm Leica-Dicomar lens with a removable wide angle lens shade. I rather liked the lens shade on the Sony Z1E - which has a built-in closure mechanism and is very practical. The HVX lens cover fits on easily enough but I did manage to lose it for a few days to start with.

The 13x fixed lens is the widest in its class at 4.2mm (35mm equivalent is 32.5mm to 423mm). Compared to 4.5mm for the Sony Z1E, 5.4mm for the Canon XL-1H and 5.5mm for the standard JVC lens. It seems very sharp throughout the zoom range and has a 60cm minimum focus distance.

The HVX200 does not have a still image capture mode - although there is a frame capture and interval capture setting. Pulling stills on an NLE from DVCPRO HD is very easy though and at 1920 x 1080 is a reasonable still image size for some applications.

Zoom Zoom Zoom

There is a servo zoom ring which can be manually disengaged for fast smash zooms - very sensitive but handy sometimes. The zoom and focus scale is shown on the viewfinder and can be set to a number (0-100) or a measurement in either feet and inches or meters and mm. The zoom scale reading in meters corresponds to the numbers printed on the zoom ring.

When the servo is engaged, the zoom ring is controlled by two thumb-rocker switches - one on the top handle and one on the side in the usual position for handheld work. The handle zoom switch has another three position switch, which can actually be assigned in the menu to allow a Low/Medium/High or a Low/Off/High or Low/Off/Medium selection - handy if you want to avoid accidentally zooming. The slow zoom is a nice touch and very much more stable and repeatable than I could achieve any other way.

Stay Sharp

The Focus ring is unfortunately the standard rotation ring with no markings or hard stops. You cannot turn the focus ring off either, which I would like to be able to do when using the RedRockMicro M2 Cinema Lens Adapter (subject of a future review).



There is a feature that's lets you switch between using the focus ring as a temporary manual focus or as an iris dial when you are in auto focus mode. Maybe useful to someone - but when manually focusing in auto focus mode the auto kicks in quite quickly as soon as you stop moving the focus ring.

A focus assist button allows you to effectively zoom into the centre of the view for fine focus control without having to actually zoom in. Coupled with a button for viewfinder detail setting (on/off) this allows you to focus more accurately - although I would have preferred something similar to other makes that use a zebra-pattern-like colouring method for showing what is in focus.

The focus assist does not operate in DV modes which is a little curious since although this mode does not need such critical focus (on a small screen), it would seem to be the easiest mode to provide it for.

Zebra Crossing

You can adjust the Zebra pattern levels in increments from 50% to 105% (two presets can be created) or you can have a spot

marker (but not both at the same time) showing a percentage light reading for a position just offset from the centre of the viewfinder.

I found the marker function to be a very useful way to get manual exposures right and since this is through-the-lens its acts as a great light meter for setting up for any exposure changes in a shot.

One slight niggle is that the meter function does not come on automatically when you start the camera. You must open the LCD and press the zebra button three times to use it. It would have been useful to have a small four position slider switch for this feature.

There is a manual iris control (wheel) which can be set for exposure control either up or down which should help some operators get used to this camera. Plus there's a fully auto exposure mode.

There are two switchable ND filters at 1/8 and 1/64 with on-screen prompts when you ought to be using the filters or not. There are switches for manual adjustable gain from 0db to 12db (plus auto gain control) - you

can set the levels of the mid and high gain through the menu with an optional 18db gain set to a preset user switch.

Using the scene files you can also adjust the auto level controls. For example, you can set the auto exposure level to half a stop less than the value the camera would normally use. You must remember to save the modified scene files otherwise the changes are lost when the camera is powered down.

White Balance

As expected, the camera can be set up for fully automatic auto focus, auto iris and auto tracing white balance (ATW). You can disable any or all of these independently as required - and you have three user preset buttons to assign to a few features like ATW, whitefade and blackfade but I admit to not finding much use for any of the presets available to me.

There is a lot of buttons on this camera - some in rather awkward locations like the menu control buttons which are not intuitively placed at all.

The ATW can also be a bit confusing to use. You have preset switches for 3200 and 5600 which can be coupled with the auto white balance to perform auto tracing or not, plus an auto white balance button to manually set the white balance on the fly. This system does take a bit of experimenting with to get right - unless you use the all auto ATW setting - but you don't always get the result you want in low light.

The sensor is on the front of the camera rather than through the lens so this feature is not so useful when additional lenses are attached to the front (say with a 35mm adapter) which may be introducing their own unique white balance effects.

Sounds

The camera supports a built-in stereo microphone and ships with a small microphone bracket to connect an external mic to one of the two XLR sockets.

The XLRs can be switched between Mic and Line with +48V phantom voltage as expected. The supplied microphone bracket isn't very long, however, and I found the Rode NTG-2 flopped around on it a bit too much for my liking. I guess the Panasonic accessory mic (extra) is not so long.

The bracket is also a bit too low - so much so that a long haired softie will show in the viewfinder on a wide angle



setting. CVP may build another custom offset microphone bracket for the HVX200 to complement the one they make for the Sony Z1E.

The mic levels can be set at -50db or -60db which can be overdriven by some external mics, so care must be taken to get the levels right. I tested out the auto gain control and found it didn't seem to do anything when presented with loud sounds. You'll get lots of distortion and clipping unless you set the levels just right.

The level controls on the back of the camera light up to make them easier to use in the dark (nice) but the coupling of the control movement to the audio level changing is very slow (not nice) so you end up turning down (too far), turning up (too far), turning down... eventually getting the level OK. When you get the recording levels right the sound is excellent.

Built to Last?

I'm very happy with the overall build quality of the camera – and it feels pretty solid although the camera is lighter than you would imagine from its size – but not so light that you long for some kind of steady-rig for handheld shots after a while.

I used the camera handheld for some filming, and also with a Fig Rig and a DVRig Pro, and was happy with the balance and feel. The optical image stabiliser can be switched on and off easily for transferring to a tripod. For handheld low shots however, the camera does not seem to balance well at all when holding the handle. There is a definite twist to the side (right side down) so the horizon is slightly skew – even without an external mic or battery.

The LCD panel is a bit flimsy and does not feel very robust. It has no touch screen controls which is disappointing and could have helped reduce a few buttons on the camera body. It has the usual self-shoot twist and also a 'mirror' feature which will probably help the talent as it's just like looking in a mirror and more intuitive than a standard twist screen self-shoot on other cameras. Pity the LCD does not have a 180 degree image flip mode which is useful for external 35mm adapters.

The front lens screw thread is made of plastic like the rest of the camera. This is to be expected I guess but not so good for me when swapping front adapters quite regularly between an LED light ring for chromakey work and for the M2 35mm adapter. I think most cameras in this style are the same, however,



and most new SLR cameras and lenses too.

The viewfinder is bright and has separate controls for detail, contrast and brightness. The viewfinder can be switched between colour and black & white and can also be set on or off when the LCD panel is being used - which is useful.

You get a choice of two rubber viewfinder cups supplied and the usual eyesight focal adjustment. The physical plastic parts of the viewfinder do seem overly large for the actual viewfinder inside but this does let you see the image from a reasonable distance away.

Everyone's a Winner

Unlike some manufacturers the HVX is supplied with a nearly respectable 5400mAh battery – the largest one for the camera – and the same battery that fits the DV100 model, so its not overpriced for replacements.

Having been used to Sony battery systems with a time-remaining indicator for battery power, I was not very happy with the 'three bars' battery indicator on the HVX - maybe I'm just spoiled. The battery life was okay (140-minutes) but I will be looking out for some longer life batteries.

Panasonic are running a promotion for the first 750 European customers and you get to win another 5400mAh battery and a Kata bag to fit the camera (I 'won' and am awaiting my prize!).

And there's More...

...to Spend Money On

There are a range of accessories for the Panasonic AG-HVX200 including a newly designed focus/iris controller from BeBob Engineering (the Foxi), plus a manual follow-focus system and matte box with rod support system and shoulder brace from Vocas. ■

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Notes: Panasonic camera micro website www.hvx200.eu - Panasonic main website www.panasonic-broadcast.com. Camera and P2 card supplied by CVP (P2 card was a loan item from CVP – thanks !). Firestore FS100 also from CVP (but I don't think it's available just yet).

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