Solid Gold: the Panasonic AJ-HPX3700

Reviewed

Lighting cameraman, GTC member and HDCAM owner Maxwell Hodgetts regularly shoots HD and rates quality of pictures as being of supreme importance. He was pleased to review the latest top-end solid state Varicam offering from Panasonic, the AJ-HPX3700, for Zerb

PHOTOGRAPHS BY DEBBIE HODGETTS

I was excited when I was asked to review this camera. As a lighting cameraman/DOP who shoots HD, I've been waiting a while for Panasonic to bring out a true 1080P Varicam camera and to see how it would match up with the other broadcast cameras in the field.

I was also keen to see how the new AVC-Intra 100 codec shapes up having shot previously on Panasonic's DVCPRO HD as well as Sony's HDCAM. The AJ-HDX900 and AJ-HDC27H Varicam, the company's last tape-based cameras, produced some stunning pictures with the HDX900 up-converted to 1080. I was very keen to put the 3700 through its paces, even though it is not Panasonic's first 1080P block camera. That honour went to the AJ-HPX3000 P2 camera.

P2 Varicam

The AJ-HPX3700 packs a good punch if you are looking for quality and features. It is the first of Panasonic's Varicam models in the P2 card format. Its sister camera, the AJ-HPX2700, has a 1 megapixel 720P CCD block but can up-convert to 1080 and has a variable frame rate of 1 to 60fps. The 3700, however, is a true 2.2 megapixel 2/3 inch CCD camera for 1920x1080 output and is the company's first full 1080P Varicam aimed at high end production. With a variable frame rate of 1 to 30 frames per second (depending on the system frequency), it now sits at the top of the maker's broadcast range. This is Panasonic's answer to the Sony F900R but with all the extras (picture cache, variable frame rate and a built-in down-converter) included in the body price. And there's another big difference; it records full resolution onto solid state P2 cards, not tape. The camera can hold a total of 5 x 64GB P2 cards with plans for a 128GB version in the future.

The camera boasts a CCD sensitivity of F10 at 2000 lux with 14-bit processing on the front end. It offers a choice of progressive or interlace shooting formats and supports a wide range of frame rates from 23.98P to 29.97P and 1080i/50 and 1080i/59.94. This camera does it all!

The variable frame rate can be viewed on the camera playback at the speed at which it was filmed, unlike its tape predecessors. The camera has three independent HD SDI outputs and it can be set up to output images via two of its HD SDI lines to form a dual link RGB 4:4:4 10-bit signal. Along with the 10-bit P10-Log, images can be recorded using an uncompressed recorder, which is ideal for green screen work or where the purist image is needed.

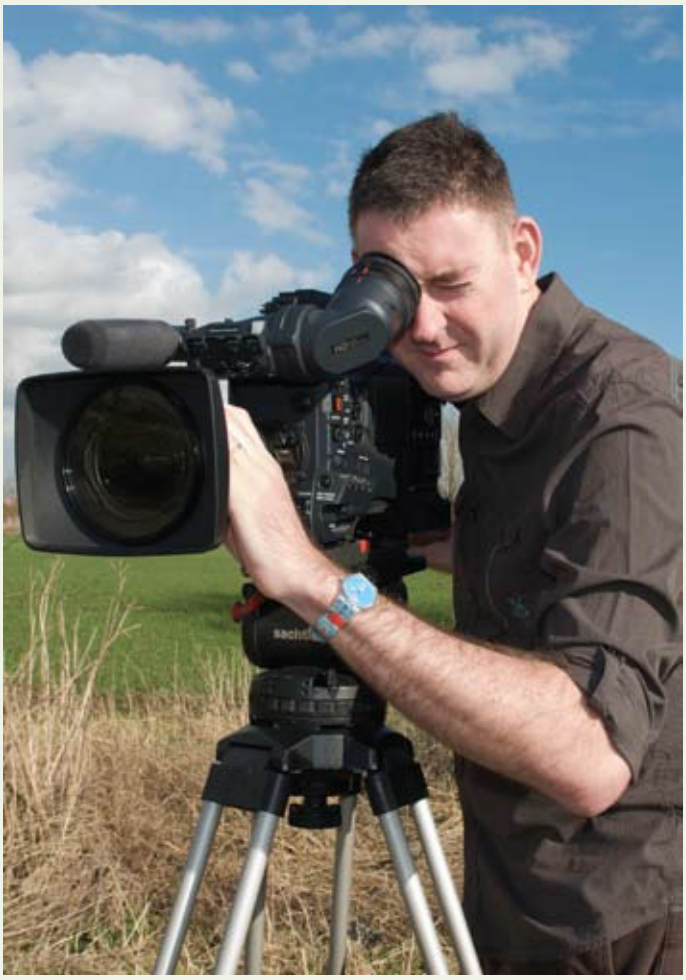
Bits and bytes

The camera can record a full resolution picture of 4:2:2 10-bit full raster sampling. That's a full 1920x1080 picture at 100 mega-bits per second with the new AVC-Intra 100 codec, based around the MPEG 4/H.264 codec. In short, it completes its processing within each frame (I-Only) while MPEG2 compression uses Long GOP (group of pictures) for processing. The resulting picture quality is stunning but with twice the compression efficiency of MPEG2. At 50i a 64GB P2 card can hold around 60 minutes of footage. The AJ-HPX3700 can record using the DVCPRO HD, the AVC-Intra 50 or the AVC-Intra 100 codec. The AVC-Intra 50 codec records in the 4:2:0 colour space at 50 mega-bits per second which is at 10 bits, but at a resolution of 1440x1080 it is near to HDCAM quality and has double the storage space of the AVC-Intra 100 codec.

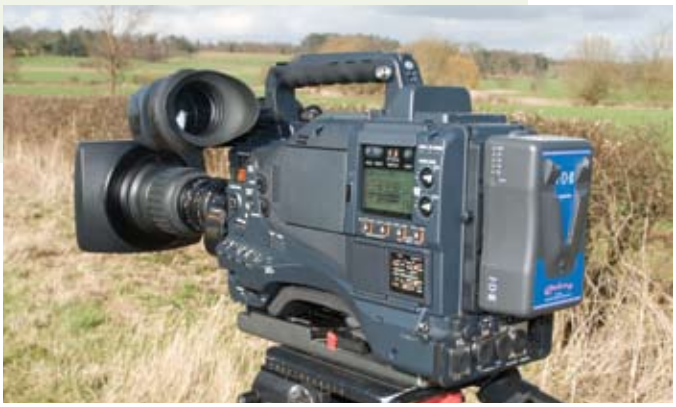
Looking around the camera, the first thing that strikes you when you pick up the AJ-HPX3700 is the build quality. This is a well-built, solid and robust camera; one that you know will take the knocks and bumps of everyday filming. With Panasonic offering a 5-year warranty repair programme, you can't help but think that they have full confidence in their product. If only other manufactures did the same.

While the camera body at 4.9kg is slightly heavier than previous models, when set up it is well balanced and comfortable on the shoulder.

The handle is ergonomically designed; it's chunky and has a plethora of mounting holes on the top, enough to mount a variety of peripherals. The viewfinder is also very well made. It provides a clear, crisp image – a must when shooting HD – and it has a sturdy support. This is one of the best viewfinders I've used in terms of image clarity. However, the amount of information that can be displayed in the viewfinder was so plentiful it became a little irritating and I found myself switching most of it off.



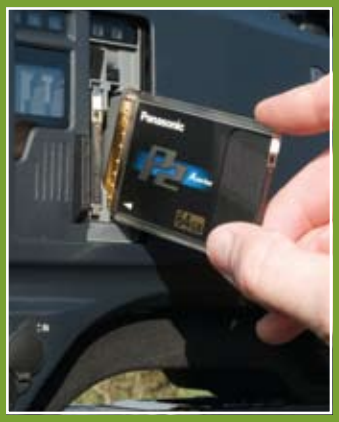
▲ *Maxwell testing the AJ-HPX3700*



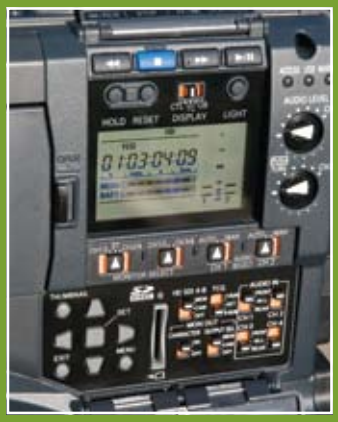
▲ *AJ-HPX3700 from rear showing battery*

"whether you like it or not, the future of recording on camera will no doubt be using solid state"

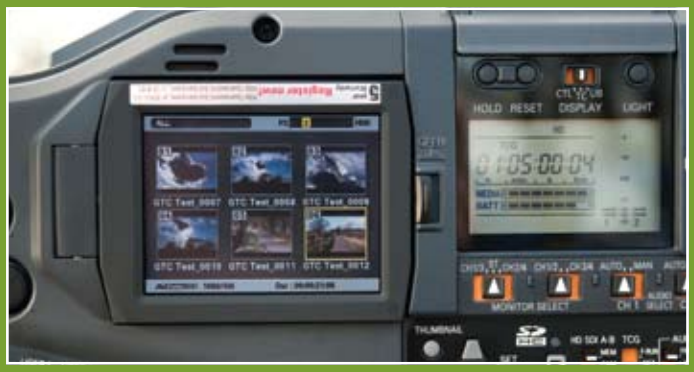
▲ *Front camera layout showing the recessed menu button*



▲ *Easy loading of P2 cards*



▲ *Familiar 'VTR' style controls*



▲ *The camera's thumbnail display when in VTR mode*

The layout of most of the switches was very familiar. I found it was easy to pick up the camera and start shooting without getting frustrated at selecting the wrong switch. A useful feature is the inclusion of five user assigned switches. Three of these are on the face side of the body, behind sliding panels to help prevent accidental activation. The other two, Marker Select and Text Memo, while having a limited choice, can also be changed. Marker Select allows the operator to change display markers in the viewfinder at the touch of a button. All of the user assigned switches can be set up from the camera menu to perform a variety of operations, including VTR record, frame rate, pre-record and many more; in fact, I counted around 17 different assignable functions.

Additional features include a mode check button, an instant viewfinder display of the camera's settings that saves you having to trawl through the main menu. There is also a side-mounted front audio control, which can be disabled if you prefer. Its location makes it easily accessible. On many other cameras I have had difficulties using the front-mounted control, as they often reside under the lens and are hard to get to. Finally, there are plus and minus synchro scan buttons which enable you to fine-tune the shutter speed which is particularly useful in eliminating noise bars when filming computer monitors. They can also be used to control the frame rate when the variable frame rate (VFR) is selected; this was a very appealing feature.

The usual flip-out LCD screen displays both the shooting picture and the thumbnail view. Although the screen quality is not high definition I found that the screen could be viewed in daylight. At the back of the camera is the familiar 'VTR' style player section with the usual audio and time code switches and a thumbnail select control next to it. With such an IT based camera it was great to see some good old hard switches to change the monitor display output, character out, time code type and 'audio in' selection. The unit has a receded audio control, which is hard to knock accidentally. The camera setting and user metadata can be loaded or saved via the camera's SDHC slot using readily available SD cards.

With the thumbnail button selected, the LCD screen changes over to display the recorded clips. Using the four point directional buttons, I found it easy to navigate around the screen and menus to select any clip to play back, or for more advanced management. I do think though that it would have been better if the clip selected had a red frame rather than the aqua one presently employed. It would be far easier to see when scrolling through the thumbnails, but this is a minor point. The camera plays the clips back seamlessly as if off tape. If you do stop and start recording straight away, the camera will automatically find the next available blank space on the P2 cards. I love this innovation as you don't have to worry about accidentally recording over previously shot material. Another lovely feature this camera offers is the ability to repair a damaged clip. Let's suppose you lost power half-way through a shot. Normally that shot would be lost, but with the 3700 the operator can re-power, search the thumbnail menu, click on the repair clip function and like magic the damaged clip gets repaired so it can be accessed again.

Connectivity

As with all P2 cameras, the AJ-HPX3700 comes with 2 USB slots to provide connectivity with a portable hard drive or laptop as either host or device. This is a useful feature for downloading rushes off P2 cards, particularly when filming long shoots abroad.

I should mention a little about the camera's menu. Accessed from the front via a push button, the camera has different menu configurations depending on how long the button is pressed. A nice touch was the first page in the 'system setting' part of the main menu. Panasonic engineers have grouped the important settings you're most likely to change in one place, useful when you're in a hurry. Items like System mode, Record format, Variable frame rate and PC mode (for switching on the USB) can all be found here.

Within the menus is where you will find 'CAC', short for chromatic aberration compensation. This clever feature compensates for the chromatic registration errors found on CAC listed zoom lenses. I downloaded the 'CAC' files for my lenses from the internet very easily. Another interesting feature is 'scan reverse' for when using an anamorphic lens adapter.

I did find the positioning of the menu switch a little unsatisfactory. It is located very near to the Rec Start which was easy to mix up when unfamiliar with the camera. It is also recessed quite deeply and I feel a different design would be more comfortable to use.

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Camera test

For the camera test I decided to film real locations in different light conditions to see how the camera would handle various situations, filming in both interlace and progressive using the AVC-Intra 100 recording format. You can view the footage at www.panasonicpro-user.com

The camera has seven preset gamma modes including HD, SD, Filmlike 1, 2, and 3, Film-Rec and Video-Rec. For the test, I used HD and Filmlike 2.

I was extremely impressed by the power up speed. At around 4 seconds, it is one of the quickest I've used. On pressing record, all I could hear

▲ *Screen grabs from the test footage. Top left and right show contrast range. Bottom left : VFR 1 no gain. Bottom right: normal speed with no gain*

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was the ambient sound around me. I am so used to the sound of the heads spinning, that for the first few seconds, I found myself looking at the access LED light to see if it was recording and of course it was.

Daylight

Under normal daylight conditions, the camera performed better than expected. It produced crisp, clean images with a rich colour reproduction that was not harsh and had a film-like depth. Skin tones were reproduced faithfully. I found that I was happily working around F8.

Lowlights and highlights were handled impressively with good detail in shadow areas. In one set-up, the camera was filming the sun setting over water with the sun down the barrel of the lens. This was no problem for the AJ-HPX3700 as it picked up detail within the clouds as well as in the mid shadow areas. As expected, with 0 dB gain, there was no noticeable noise in the blacks.

Undercranking

When using the camera in undercranked mode, with the variable frame rate reduced to 1, there is an increase in sensitivity, which is ideal for low light situations. Setting the camera to 6 dB gain and a VFR of 1, I was able to film road traffic on an unlit road at 11pm with the only sources of light being the moon and car headlights. The resulting images were stunning. With this small amount of gain, the noise was minimal. In daylight, I found that the filter wheel had enough neutral density settings to allow the exposure to be pulled back without introducing any external ND filters.

One feature I found useful while filming was the ability to leave markers or text memos on the clips, which could be seen on the timeline.

The camera has a picture cache card which allows a pre-record function of up to 8 seconds of 'loop record' images before VTR Start is pressed. It is extremely useful to have this feature built in. Also provided is a time-lapse facility which I found very easy to set up and use.

I was very impressed by the camera's sensitivity. Not only did I get a wide latitude in daylight, the same was true for lowlight. I filmed a moon shot with no gain, using my HJ21 long lens with 2x extension, and still had room to play with the exposure.

Low light

The AJ-HPX3700 performed equally well under artificially lit situations. To explore the camera's ability to cope with very low light, with no gain, I filmed a single lit candle in a darkened room. The resultant image was sharp and noiseless, with no flare. It was possible for the camera to capture details in shadow areas.

When it came to getting the footage off the P2 card I found the procedure a breeze. There are three methods of doing this. One is to back up the cards whilst they remain in the camera, with the unit set up in PC mode. This enables you to send the data to a portable hard drive. Another is to connect your laptop directly to the camera. Or thirdly, the AJ-PCD35 unit can be connected to a laptop or tower unit. All work well, however the transfer speed achieved using the latter method was much quicker.

The free P2 contents management software enables the operator to view, adjust metadata and arrange footage, all on a laptop or PC.

I had no problem getting the P2 footage recorded in the AVC-Intra 100 codec into Final Cut Pro, although it did go in via the 'log and transfer' as Apple ProRes 422 (HQ) codec. Editing software like Edius will take AVC-Intra natively onto the timeline. I was lucky to have some footage shot from an F900R in FCP so I could compare the two. The AJ-HPX3700 matched the F900R on picture quality and in some cases I felt it looked better.

Summary

In summary, the P2 workflow was very easy to use and understand. I feel Panasonic have produced a real gem of a camera here. It is well built with great design features, and produces stunning pictures with depth, quality and richness.

Whether you like it or not, the future of recording on camera will no doubt be using solid state, and Panasonic have made the transition as easy and painless as possible with P2. At first I was a bit apprehensive of a camera that was all information technology based with no tape system. Within a few minutes of playing though, I was loving it and getting down to concentrating on the important thing: creating beautiful shots. I for one can't wait to get my hands on this ca

Fact File

Thanks go to Top Teks for the loan of the AJ-HPX3700 camera and to John Funnell at Panasonic for answering my technical questions.

Maxwell Hodgetts is a freelance lighting cameraman/ DoP based in Bucks with 19 years' broadcast experience, ranging from factual to promos and commercials in both live and pre-record situations. Website www.maxcam.co.uk

For information, tips, user histories and discussion on user experience with P2 and other products, Panasonic have recently launched a new site for professional users of their kit at: www.panasonicpro-user.com